# Squore 17.1.11

**Installation and Administration Guide**

**Key Performance Indicator**



| Line Counting | | | |
|---|---|---|---|
| Lines of Code | 481219 | ↗ | ✓ |
| Source Lines Of Code | 401326 | ↗ | ✓ |
| Effective Lines Of Code | 325196 | ↗ | ✓ |
| Cyclomatic Complexity | 12265 | ↗ | ✓ |
| Comment Rate | 16 % | ↘ | ✗ |

| Decision Making | | | |
|---|---|---|---|
| Business Value | 1912 | → | **i** |
| Technical Debt | 3626 | ↗ | **i** |
| Maturity Index | 65 % | ↘ | **C** |
| Stability Index | 84 % | ↗ | **B** |
| Reusability Index | 44 % | ↘ | **D** |

# Installation and Administration Guide

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**Abstract**

This edition of the Installation and Administration Guide applies to Squore 17.1.11 and to all subsequent releases and modifications until otherwise indicated in new editions.

# Table of Contents

# List of Tables

# Typographical Conventions

The following conventions are used in this manual.

| Typeface or Symbol | Meaning |
|---|---|
| **Bold** | Book titles, important items, or items that can be selected including buttons and menu choices. For example: Click the **Next** button to continue |
| *Italic* | A name of a user defined textual element. For example: **Username** : *admin* |
| `Courier New` | Files and directories; file extensions, computer output. For example: Edit the `config.xml` file |
| **`Courier Bold`** | Commands, screen messages requiring user action. For example: **Username** : *admin* |
| > | Menu choices. For example: Select **`File > Open`**. This means select the File menu, then select the Open command from it. |
| <...> | Generic terms. For example: `<SQUORE_HOME>` refers to the Squore installation directory. |

*Notes*

*Screenshots displayed in this manual may differ slightly from the ones in the actual product.*

# Acronyms and Abbreviations

The following acronyms and abbreviations are used in this manual.

| CI | Continuous Integration |
|---|---|
| CLI | Command Line Interface |
| DP | Data Provider, a Squore module capable of handling input from various other systems and import information into Squore |
| RC | Repository Connector, a Squore module capable of extracting source code from source code management systems. |

# 1. Introduction

## 1.1. Foreword

This document was released by Squoring Technologies.

It is part of the user documentation of the Squore software product edited and distributed by Squoring Technologies.

## 1.2. About This Document

This document is the Installation Guide for the Squore software product.

While we recommend that you read it in its entirety, we divided it up into chapters for an easier introduction to Squore:

→ Jump to Chapter 2, *The Squore Architecture* to learn about the available Squore components.
→ Jump to Chapter 3, *Installing Squore Server* to learn how to deploy Squore in your environment.
→ Jump to Chapter 4, *Starting Squore* to learn how to to start Squore Server.
→ Jump to Chapter 5, *Squore Administration* to discover how to maintain a Squore installation.
→ Jump to Chapter 6, *Integrating Squore on Your Network* to understand how to integrate Squore Server within your network.
→ Jump to Chapter 7, *Sizing Squore Server and Database* to evaluate the resources that Squore will require in your environment.

If you want to install Squore Command Line Interface, refer to the Command Line Interface manual.

If you are already familiar with Squore, you can navigate this manual by looking for what has changed since the previous version. New functionality is tagged with **(new in 17.1)** throughout this manual. A summary of the new features described in this manual is available in the entry **\* What's New in Squore 17.1?** of this manual's Index.

## 1.3. Contacting Squoring Technologies Product Support

If the information provided in this manual is erroneous or inaccurate, or if you encounter problems during your installation, contact Squoring Technologies Product Support: https://support.squoring.com/

You will need a valid Squore customer account to submit a support request. You can create an account on the support website if you do not have one already.

For any communication:

🖥 **support@squoring.com**

🗐 **Squoring Technologies Product Support**
    76, allées Jean Jaurès / 31000 Toulouse - FRANCE

## 1.4. Responsabilities

Approval of this version of the document and any further updates are the responsibility of Squoring Technologies.

## 1.5. Getting the Latest Version of this Manual

The version of this manual included in your Squore installation may have been updated. If you would like to check for updated user guides, consult the Squoring Technologies documentation site to consult or download the latest Squore manuals at https://support.squoring.com/documentation/17.1.11. Manuals are constantly updated and published as soon as they are available.

# 2. The Squore Architecture

## 2.1. The Squore Ecosystem

Squore is based on a traditional 3-tier architecture consisting of:

→ A database and a data folder for storing project data

→ An application server running the main application, the licence server and a distribution of PhantomJS

→ A client front-end accessible through a Web Browser

→ A Command Line Interface (Squore CLI) to interact with the server from a client machine
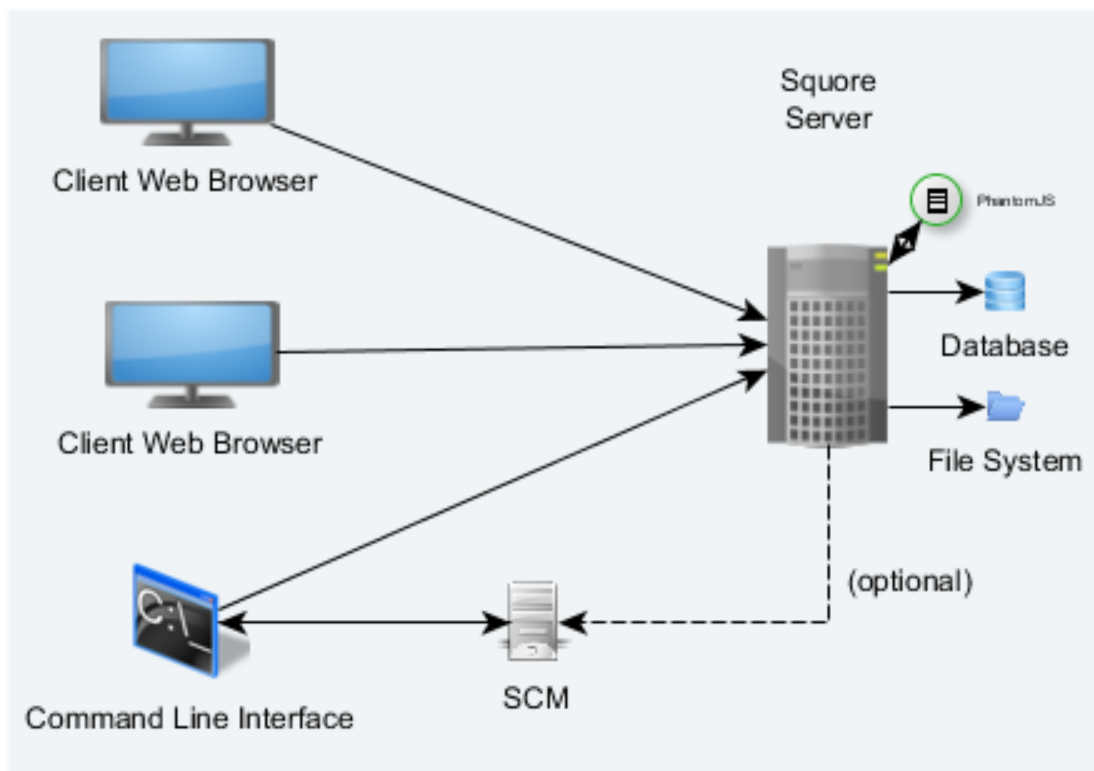


The Squore Architecture

As shown in the schema above, Squore Server can provide analysis results to clients without having access to any source code, in scenarios where the analysis is carried out on a client machine with access to the SCM repository, as is the case in most Continuous Integration environments.

If you are planning to access source code hosted in a Subversion, Git, ClearCase, CVS or Synergy repository, a command line client for this repository must be available on the machine where the Squore analysis carried out. For complete information about all installation pre-requisites, consult Section 3.1, "Installation Prerequisites".

Squore allows analysing source code in the following programming languages: ABAP, Ada, C, COBOL, C++, C#, Fortran 77, Fortran 90, Java, JavaScript, Lustre, Mind-C, Objective-C, PHP, PL/SQL, Python, T-SQL, Visual Basic .NET, XAML.

## 2.2. The Squore Database and Data Folder

The Squore database is a **PostgreSQL** or **Oracle** database used for storing:

→ A hierarchy of artefacts defined in a software projects (e.g. files, classes, functions)

→ Incremental sets of base measures (e.g. complexity measures provided by the Squore data providers)

→ Incremental sets of derived measures (i.e. all measures computed by the specified analysis model)

Along with the database, a set of data files is maintained on disk to compute information about project history and stability. A backup of a Squore installation must always include the database and the file system. For more information about backing up your installation, refer to Section 5.3.1, "Backing-Up the Squore Data".

**Note: No source code is stored in the database or the file system.**

## 2.3. The Squore Application Server

The Squore application server is based on the **WildFly** framework. Its main functionalities are:

→ Aggregating data coming from the various Squore Data Providers

→ Applying an analysis model, producing high-level key performance indicators

→ Exploring and analysing the results using efficient graphical representations and statistical features

## 2.4. The Squore Web Interface

Squore end-users access the server services through a Web interface that enables them to:

→ Create projects from source code or other data types via the Squore Data Providers system.

→ Explore the results of analyses, view the levels of performance of the project artefacts via a user-specific, dynamic dashboard making use of filtering and sorting features

→ Review action plans, highlights and findings of the analysis

→ Export information for reporting purposes

→ Perform administration tasks like managing users and groups or troubleshooting the system

Refer to Section 3.1.3, "Browser Compatibility" to make sure that your the Squore Wib Interface is compatible with your browser

For more details on performance-related requirements when using Squore, please refer to Chapter 7, *Sizing Squore Server and Database*.

## 2.5. Squore CLI

In order to provide compatibility with Continuous Integration systems or run analyses on machines other than Squore Server, Squoring Technologies also delivers Squore CLI (Command Line Interface): a set of APIs used to remotely create and manage software projects.

Squore CLI is a Squore package that allows a Squore client to locally analyse project source code files visible to the client machine and send the results to a remote Squore server.

Squore CLI comes as a separate installable package that can be downloaded from Squoring Technologies's support site: https://support.squoring.com/download_area.php.

For more information about installing Squore CLI, refer to the Command Line Interface manual.

## 2.6. The Squore Licence Server

Squore Server requires a valid licence file in order to run. The licence file information is served by the Squore Licence Server, which reads a licence file `squore-license.p7s` located in `<SQUORE_HOME>/server/standalone/configuration`.

The licence file is delivered by Squoring Technologies and can be copied on the machine hosting Squore Licence Server at installation time or post-installation. In all cases, Squore Server must be restarted to take into account new licence information.

If you run multiple instances of Squore Server, each one can have its own Squore Licence Server and licence file, or you can point them to a common Squore Licence Server.

### Note
Sharing an instance of Squore Licence Server between multiple Squore Server instances means that each Squore Server instance queries the Squore Licence Server to find out which licence features are available. The Squore Licence Server keeps track of the total number of active users, volume of code analysed and number of projects created on all instances of Squore Server. User-Management is specific to each Squore Server: if a user called "admin" exists on two instances of Squore Server linked to the same Squore Licence Server and both accounts are active, as far as the Squore Licence Server is concerned, two licences are used by two individual users.

The licence file restricts Squore usage according to the following parameters:

→ A licence file has a start date: it becomes active at a date decided by Squoring Technologies when the licence is issued.

→ A licence file has an end date: it becomes invalid at a date decided by Squoring Technologies when the licence is issued.

→ A licence file is tied to a particular server host-id, a fingerprint of some of the hardware components of a server machine. It can therefore not be used on another machine. If you need to move your licence file to another machine, contact Squoring Technologies to request a new licence. If you need to know your host-id, refer to Section 3.1.6, "Obtaining a Licence File".

→ A licence file defines a maximum number of active users. A user is active if any activity has been recorded for their Squore Server account in the past 6 months. Activities include remote project creation, viewing of analysis results, and e-mail notification.

→ A Squore login is meant to be used by an individual user: each Squore user should log into Squore using their own personal account.

→ A licence file defines a maximum number of projects that can be created. After this number is reached, no new projects can be created.

→ A licence file defines a maximum number of lines of source code that can be analysed. After this number is reached, no new analysis can be carried out.

→ A licence file defines the ability to generate XML report of analyses, export data and generate reports from the web user interface.

# 3. Installing Squore Server

**Warning**

**Squore Server can only be installed in a folder whose path contains no space, accented and non-Latin letters or special characters.** This is a PostgreSQL limitation that must be followed to ensure maximum compatibility, efficiency, and to avoid unexpected behaviour when analysing projects.

The application files (product binaries and standard configuration) and the data files (database cluster, analysis data, custom configuration, custom scripts...) must be located in **separate folders**.

By default, application files are deployed in a folder we will refer to in this manual as **<SQUORE_HOME>** and data files are deployed under a folder we will refer to as **<SQUORE_DATA>**.

Refer to the specific options of the setup package for your platform below to know how to specify the desired paths when installing Squore Server.

## 3.1. Installation Prerequisites

### 3.1.1. Supported Operating Systems

The following is a list of the officially supported and tested operating systems:

→ CentOS 6

→ CentOS 7

→ Fedora 19

→ Ubuntu Server 16.04

→ Windows 8

→ Windows 10

→ Windows Server 2012 R2

**Note**

On Linux, a 64-bit version of the OS is required

On Windows, a 64-bit version of the OS is required if you want Squore to run as a Windows service, but the installation is also supported on a 32-bit system (and is started and stopped using .bat files instead of a Windows Service)

The following is a list of the operating systems that are not regularly tested but are known to be working:

→ RedHat EL 6

→ RedHat EL 7

→ SuSe Linux 11.1

→ Windows 7

→ Ubuntu Server 10.04

→ Ubuntu Server 14.04

→ Windows Server 2008 R2

### 3.1.2. Supported Database Management Systems

Squore Server can use the following database management systems to store its data:

→ PostgreSQL 8.4 and up

→ Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production

In both cases, it is possible to have database on the same machine as Squore Server or on a remote machine.

**Note**

When using a database backend on a remote machine, the database administrator is responsible for backing up the database. The backup scripts included in the Squore Server installation will only handle the backup of the data stored on the Squore Server file system in that case. You can find more information about backup strategies for Squore Server in the section called **Backup Tools** in the Installation and Administration Guide.

## 3.1.3. Browser Compatibility

Squore is compatible with many browsers. The following is the list of officially supported browsers:

→ **Google Chrome stable branch**

→ **Mozilla Firefox latest esr version**

→ **Microsoft Internet Explorer 11.0.15063.0 and up**

→ **Microsoft Edge 40.15063.0.0 and up**

## 3.1.4. For All Systems

For a successful installation of Squore, you will need:

→ The latest version of the Squore Server installer, which can be downloaded from https://support.squoring.com/download_area.php

→ A supported Operating System, as stated in Section 3.1.1, "Supported Operating Systems"

→ A user account with system administrator privileges

→ The Oracle Java Runtime Environment version 8 (other versions are not supported)

**Warning**

→ It is technically possible to run Squore on a server using a 32-bit JRE, however this will limit the memory available to 1GB of RAM to run the application, which will result in poor performance. If you still want to attempt such an installation, consult the troubleshooting page at http://openwiki.squoring.com/index.php/Running_Squore_On_A_32-bit_Java_Installation

→ At least 4 GB of space available on the disk for a full installation with demo projects

→ At least 8 GB of RAM on the server machine

→ A valid Squore Server licence file (optional, since the licence file can be added after installation)

**Tip**

Keep in mind that the requirements above are the strict minimum. In production, Squore Server generally runs on a dedicated machine with a multi-core processor and 8 to 12GB of RAM. Squore reserves 25% of the available RAM of the machine to the database and another 25% to the server. External processes (like Checkstyle or FindBugs) running on the same machine as Squore may add to the amount of RAM required for analysing source code. Linux is known to offer better performances than Windows when running Squore. For a production database, you should plan a minimum of 20 GB of disk space. For more details about resource usage in Squore, consult Chapter 7, *Sizing Squore Server and Database*.

## 3.1.5. Prerequisites for Oracle

When using Oracle as a database backend, a database administrator must create an Oracle user before you can install Squore.

The user requires the following privileges:

→ **CREATE PROCEDURE**
→ **CREATE SEQUENCE**
→ **CREATE SESSION**
→ **CREATE TABLE**
→ **CREATE TYPE**
→ **CREATE VIEW**
→ A valid quota for the tablespace used by the user (for example **UNLIMITED**)

## 3.1.6. Obtaining a Licence File

A Squore licence file is linked to the hardware that Squore Server is installed on. When you complete your installation of Squore Server, and access http://localhost:8180/SQuORE_Server in your browser, you are presented with a screen that allows you to request an activation key and download an evaluation licence.
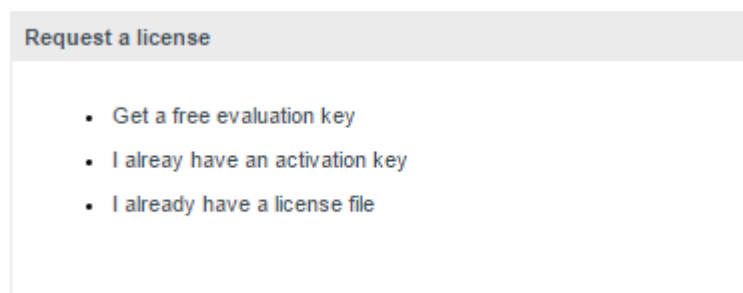


**The licence request dialog**

Request an activation key or enter an existing one to download a temporary licence for your machine. Requesting an activation key ensures that Squoring gets all the information necessary to generate your final licence file when the evaluation period ends.

### Note

The licence request dialog only displays when accessing http://localhost:8180/SQuORE_Server (it redirects to http://localhost:8180/SQuORE_Server/License/License.xhtml) from the machine where Squore Server is installed. If you cannot open a browser window on the server, you will have to request your evaluation licence by manually generating and e-mailing your host-id to Squoring:

1. Open a terminal on the machine where you installed or plan to install Squore.
2. Change to the <SQUORE_HOME> folder
3. Run the command `java -jar ./lib/hostid.jar`.
4. Send the output to support@squoring.com.

## 3.1.7. Packages for Windows

A JRE is required for Squore Server. The Windows installer contains the tcl and perl runtimes as well as a portable PostgreSQL installation and a distribution of PhantomJS.

## 3.1.8. Packages for Linux

On Linux platforms, the following must be installed before installing Squore:

→ **Perl** version 5.10.1 or greater including the following extra-modules:

  → Mandatory packages:

    → **Algorithm::Diff** [module details] [http://search.cpan.org/~nedkonz/Algorithm-Diff/lib/Algorithm/Diff.pm]

    → **Archive::Zip** [module details] [http://search.cpan.org/~phred/Archive-Zip/lib/Archive/Zip.pm]

    → **Date::Calc** [module details] [http://search.cpan.org/~stbey/Date-Calc/lib/Date/Calc.pod]

    → **DBD::Pg** (unless you use a Oracle as your database backend) [module details] [http://search.cpan.org/~turnstep/DBD-Pg/Pg.pm]

    → **DBI** (unless you use a Oracle as your database backend) [module details] [http://search.cpan.org/~timb/DBI/DBI.pm]

    → **Digest::SHA** [module details] [http://search.cpan.org/~mshelor/Digest-SHA/lib/Digest/SHA.pm]

    → **HTTP::Request** [module details] [http://search.cpan.org/~gaas/HTTP-Message/lib/HTTP/Request.pm]

    → **JSON** [module details] [http://search.cpan.org/~makamaka/JSON/lib/JSON.pm]

    → **LWP** [module details] [http://search.cpan.org/~ether/libwww-perl/lib/LWP.pm]

    → **LWP::UserAgent** [module details] [http://search.cpan.org/~gaas/libwww-perl/lib/LWP/UserAgent.pm]

    → **Time::HiRes** [module details] [http://search.cpan.org/~zefram/Time-HiRes/HiRes.pm]

    → **XML::Parser** [module details] [http://search.cpan.org/~toddr/XML-Parser/Parser.pm]

  → Optional packages for working with Microsoft Excel:

    → **HTML::Entities** [module details] [http://search.cpan.org/dist/HTML-Parser/lib/HTML/Entities.pm]

    → **Spreadsheet::BasicRead** [module details] [http://search.cpan.org/~gng/Spreadsheet-BasicRead/BasicRead.pm]

  → Optional packages for working with OSLC systems:

    → **Date::Parse** [module details] [http://search.cpan.org/~gbarr/TimeDate/lib/Date/Parse.pm]

    → **WWW::Mechanize** [module details] [http://search.cpan.org/~ether/WWW-Mechanize/lib/WWW/Mechanize.pm]

    → **XML::LibXML** [module details] [http://search.cpan.org/~shlomif/XML-LibXML/LibXML.pod]

  → Optional packages for working with GitHub systems:

    → **Date::Parse** [module details] [http://search.cpan.org/~gbarr/TimeDate/lib/Date/Parse.pm]

    → **Mail::Box::Manager** [module details] [http://search.cpan.org/~markov/Mail-Box/lib/Mail/Box/Manager.pod]

    → **Mail::Message::Body::Lines** [module details] [http://search.cpan.org/~markov/Mail-Box/lib/Mail/Message/Body/Lines.pod]

    → **Mail::Message::Construct** [module details] [http://search.cpan.org/~markov/Mail-Box/lib/Mail/Message/Construct.pod]

    → **Mail::Mbox::MessageParser** [module details] [http://search.cpan.org/~dcoppit/Mail-Mbox-MessageParser/lib/Mail/Mbox/MessageParser.pm]

    → **Net::GitHub** [module details] [http://search.cpan.org/~fayland/Net-GitHub/lib/Net/GitHub.pm]

→ Optional packages for working with Semios/Prometil systems:

→ **File::Slurp** [module details] [http://search.cpan.org/~uri/File-Slurp/lib/File/Slurp.pm]

→ Optional packages for Advanced CSV Export Management:

→ **Text::CSV** [module details] [http://search.cpan.org/~makamaka/Text-CSV-1.33/lib/Text/CSV.pm]

**Tip**

If some of these modules are not available as packages on your operating system, use your perl installation's cpan to install the modules. Using the OS packages is recommended, as it avoids having to reinstall via cpan after upgrading your version of perl.

→ **Tcl** version 8.5 or greater,

→ **PostgreSQL** version 8.4 (unless you use a RDBMS running on another system) including at least the **server** component, and optionally, the **pgAdmin** utility. Note that your system must use a UTF-8 locale for the database creation to be carried out successfully. You can force this by running `export LANG=en_US.UTF-8` or `export LANG=fr_FR.UTF-8` according to what is available on your system before installing Squore.

→ The **rsync** utility

If you are running on a headless Squore Server, java-1.6.0-openjdk may not be sufficient, as it lacks some fonts to render graphics. This is why using Oracle's JRE is recommended.

## 3.1.9. Packages for CentOS and Red Hat Enterprise Linux

On Red Hat Enterprise Linux and CentOS (6.5 and 7.1), the dependencies are satisfied by the following packages:

**Mandatory packages:**

→ **java-1.8.0-openjdk**

→ **perl**

→ **perl-Algorithm-Diff**

→ **perl-Archive-Zip**

→ **perl-Date-Calc**

→ **perl-Digest-SHA**

→ **perl-JSON**

→ **perl-libwww-perl**

→ **perl-Time-HiRes**

→ **perl-XML-Parser**

→ **postgresql-server** (unless you use a RDBMS running on another system)

→ **rsync**

→ **tcl**

**Optional packages for working with Microsoft Excel:**

→ **perl-HTML-Parser**

→ **perl-CPAN** (CPAN utility requirement)

→ **perl-Spreadsheet-ParseExcel** (available in the EPEL repository)

→ **perl-Spreadsheet-XLSX** (available in the EPEL repository)

> **Warning**
>
> The module **Spreadsheet::BasicRead** is not available as a package and must therefore be installed using cpan (make sure cpan is properly configured, by running **cpan** without arguments first):

```
sudo cpan -i Spreadsheet::BasicRead
```

**Optional packages for working with OSLC systems:**

→ **perl-TimeDate**

→ **perl-WWW-Mechanize** (available in the EPEL repository)

→ **perl-XML-LibXML**

**Optional packages for working with GitHub systems:**

→ **perl-TimeDate**

→ **perl-Mail-Box** (available in the EPEL repository)

→ **perl-Mail-Mbox-MessageParser** (available in the EPEL repository)

→ **perl-Net-GitHub** (available in the EPEL repository)

**Optional packages for working with Semios/Prometil systems:**

→ **perl-File-Slurp**

**Optional packages for Advanced CSV Export Management:**

→ **perl-Text-CSV** (available in the EPEL repository)

For more information about how to install the Extra Packages for Enterprise Linux (EPEL) repository, consult https://fedoraproject.org/wiki/EPEL.

## 3.1.10. Packages for Ubuntu

On Ubuntu 16.04.3 LTS, the dependencies are satisfied by the following packages:

**Mandatory packages:**

→ **libalgorithm-diff-perl**

→ **libarchive-zip-perl**

→ **libdate-calc-perl**

→ **libdbd-pg-perl** (unless you use a Oracle as your database backend)

→ **libdbi-perl** (unless you use a Oracle as your database backend)

→ **libhttp-message-perl**

→ **libjson-perl**

→ **libwww-perl**

→ **libxml-parser-perl**

→ **openjdk-8-jre**

> → **perl**

> → **postgresql** (unless you use a RDBMS running on another system)

> → **rsync**

> → **tcl**

**Optional packages for working with Microsoft Excel:**

> → **make** (CPAN utility requirement)

> → **libhtml-parser-perl**

> → **libspreadsheet-parseexcel-perl**

> → **libspreadsheet-xlsx-perl**

> **Warning**
>
> The module **Spreadsheet::BasicRead** is not available as a package and must therefore be installed using cpan (make sure cpan is properly configured, by running **cpan** without arguments first):
>
> ```
> sudo cpan -i Spreadsheet::BasicRead
> ```

**Optional packages for working with OSLC systems:**

> → **libtimedate-perl**

> → **libwww-mechanize-perl**

> → **libxml-libxml-perl**

**Optional packages for working with GitHub systems:**

> → **libtimedate-perl**

> → **libmail-box-perl**

> → **libmail-mbox-messageparser-perl**

> → **libnet-github-perl**

**Optional packages for working with Semios/Prometil systems:**

> → **libfile-slurp-perl**

**Optional packages for Advanced CSV Export Management:**

> → **libtext-csv-perl**

# 3.2. Common Deployment Scenarios

### 3.2.1. Creating Projects using the Web Interface Only
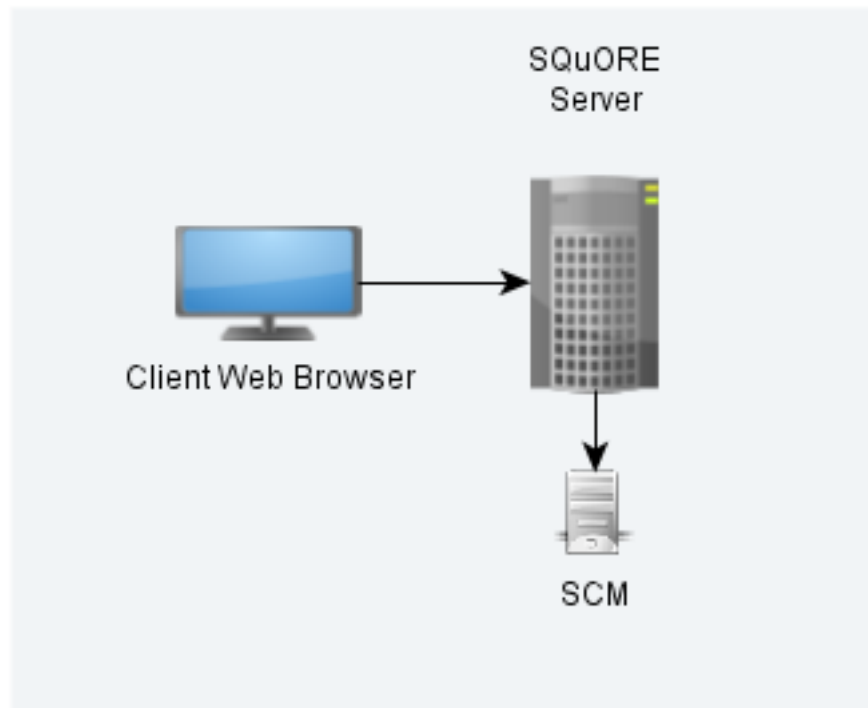


Squore in a configuration where projects are created via the web interface

In this simple deployment, you only use the web UI to create projects. Squore Server is installed on a machine and you connect to it using a web browser. Analyses are carried out on the server, which must have access to the source files you are telling it to analyse.

### 3.2.2. Creating Projects From a Client Machine

## Instructing the Server to Run an Analysis
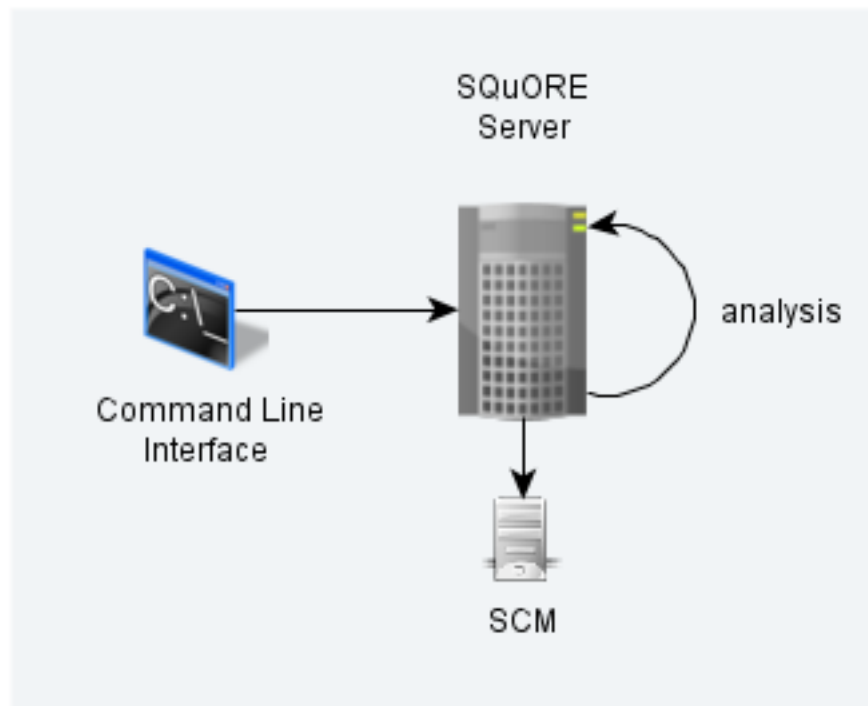


Squore in a configuration where projects creations are requested by a client and delegated to a server

In this deployment, Squore Server is installed on one machine (the server), and Squore CLI is installed on another machine (the client). The client remote-controls the server and instructs it to analyse source files. The client provides the path to the sources as the server sees it. The sources need to be visible or accessible from the server only, and the code is fully analysed on the server. This is known as the **Delegate method** and is quite similar to what you achieve by creating projects from the web interface directly.

Sending Local Analysis Results to the Server
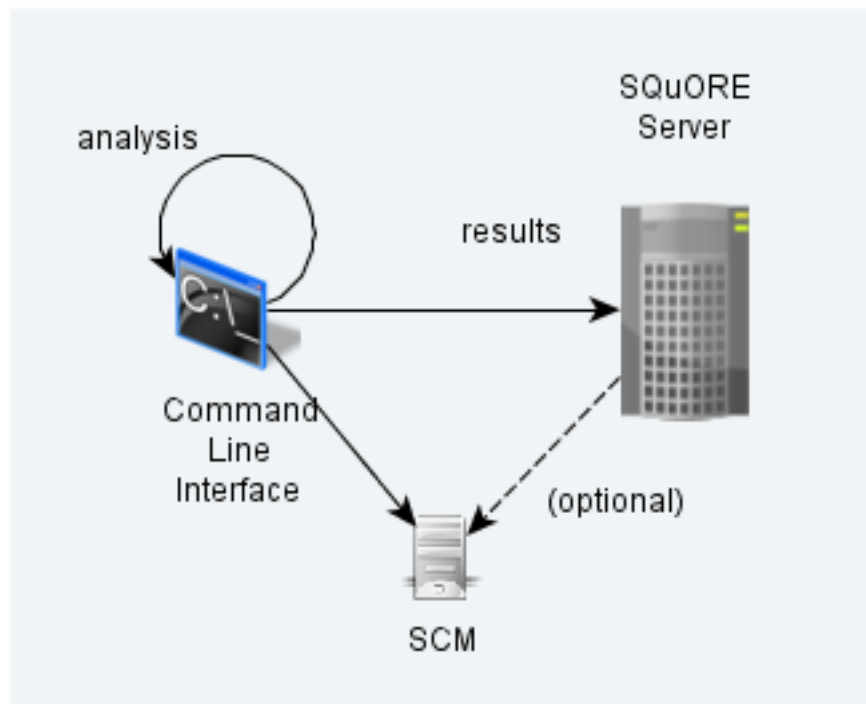


Squore in a configuration where projects creations are run locally on a client and results are sent to a server

In this type of deployment the setup is the same as in the previous method, but the client runs the full analysis and only send the results of the analysis to the server when it is done. This is useful when the server does not have access to the source code, or when parts of the data analysed is only available on the client machine.

## 3.2.3. Using a Remote Database

It is possible to install Squore Server and use a database running on another machine. In this mode, Squore Server does not manage the database startup and shutdown, and database backups should be performed manually.

If you plan on performing such an installation, ensure that you have access to the information:

→ The IP address or hostname of the server where the database is running

→ The port that the database is listening on

→ The name of the PostgreSQL database or the Oracle schema that will store your data

→ The credentials required to connect to the database backend

The installer requires that the specified user and database already exist so it can connect and initialise the database using the details provided. However, the Linux installation script also include an extra option to specify SYSDBA credentials to automatically create a new Oracle schema for Squore.

### Warning
When performing backups, ensure that you backup the database and the project folder at the same time so that you can restore a coherent snapshot of your data. For more information about backups in Squore, consult Section 5.3, "Backup Tools".

### 3.2.4. Using Squore in Continuous Integration

In a Continuous Integration scenario, you are free to choose either client/server deployment method described in Section 3.2.2, "Creating Projects From a Client Machine". This will depend on which machine carried out the source code extraction or computes the data you feed to the Data Providers. You can learn more about how to configure Squore in a Continuous Integration environment by referring to the Command Line Interface Manual.

### 3.2.5. Access from Mobile Devices

Squore provides a mobile-friendly web interface that can be used by users to view their favourite charts in their dashboards. This requires no extra configuration on your part, as it uses the same http port as the main web interface. For more information about how users may use Squore Mobile, refer to the Getting Started Guide.

## 3.3. Installing Squore Server on Windows

This section describes the possible scenarios for installing Squore on windows.

If you use all the default settings, the installer will deploy the following components in the specified locations:

→ `<SQUORE_HOME>` is `%SYSTEMDRIVE%\Squoring\squore-server` and contains Squore Server and its dependencies, including dedicated distributions of:

  → Strawberry Perl 5.12.3.0 Portable

  → PostgreSQL 8.4.22 Portable

  → Tcl 8.5 for Windows 8.5.12

  → PhantomJS 2.1.1

  → WildFly 10.1.0

→ `<SQUORE_DATA>` is `%SYSTEMDRIVE%\Squoring\squore-data` and consists of the following subfolders:

  → The Squore database in `<SQUORE_DATA>\cluster`

  → The Squore database backup directory in `<SQUORE_DATA>\backup`

  → The Squore project data directory in `<SQUORE_DATA>\projects`

  → The Squore temporary data directory in `<SQUORE_DATA>\temp`

  → The Squore temporary source code directory in `<SQUORE_DATA>\temp\sources`

The installer provides options to:

→ use a different installation folder

→ use a specific path for temporary data and project data

→ use a specific path for the local PostgreSQL cluster and backup folder

→ use an existing local PostgreSQL instance

→ use a remote PostgreSQL or Oracle database

→ use your own perl distribution

### Warning

The data and temporary folders must be excluded from the scope of virus scanners, malware protectors and search indexers to avoid any errors during an analysis.

**Note**

When an error occurs during the installation, the installer wizard remains open and display the log file of the installation, as shown on the screenshot below. When this happens, review the contents of the installer window, and if necessary, copy and send the contents to support@squoring.com.
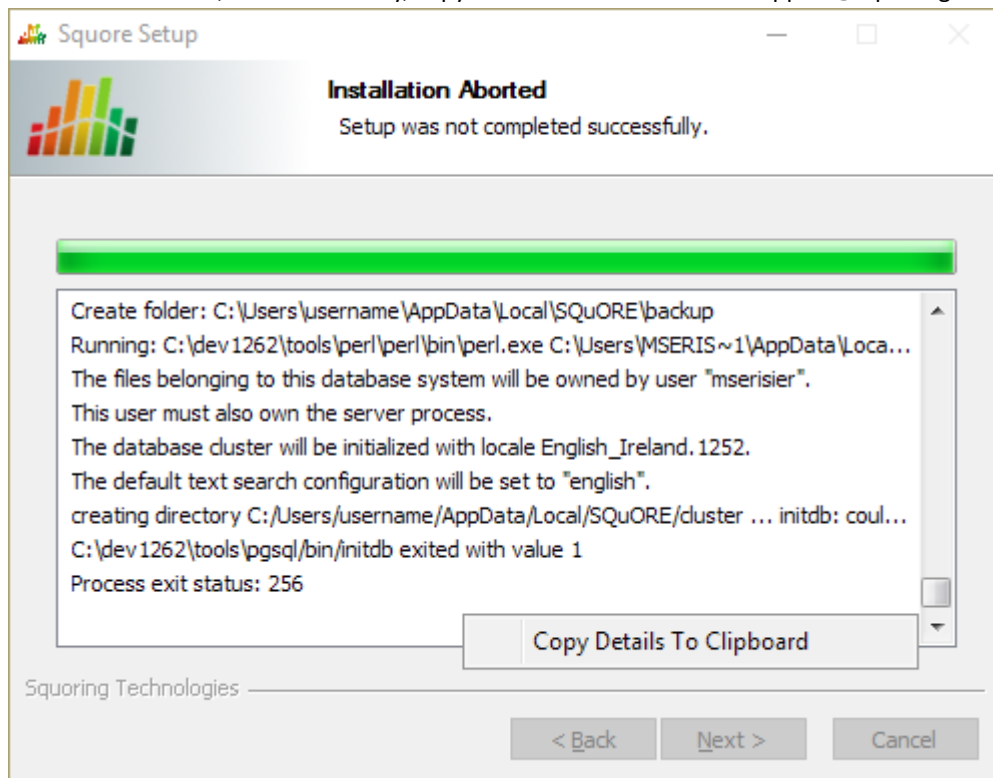


The Installation Aborted screen

In order to start installing Squore, log on with an account that has administrator privileges and launch the Squore installer (squore-17.1.11-windows-x86_64.exe).  Each of the wizard screens is documented below in the order that you will see them.

1.  The Squore installer Welcome screen

The Squore installer Welcome screen

On the Welcome screen, click the **Next** button to start the installation.

2. The Squore Licence Agreement screen
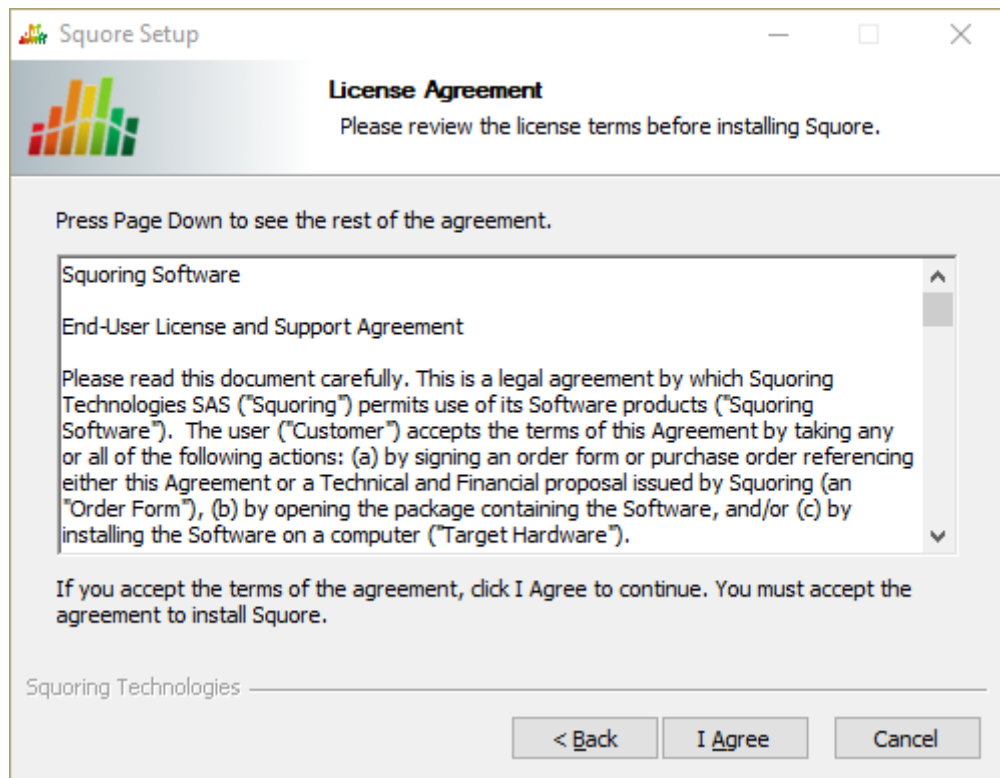
The Squore Licence Agreement screen

Review the Licence Agreement and click **I Agree** to accept the terms of the agreement and continue with the installation.

3. Squore Server Destination Folder screen
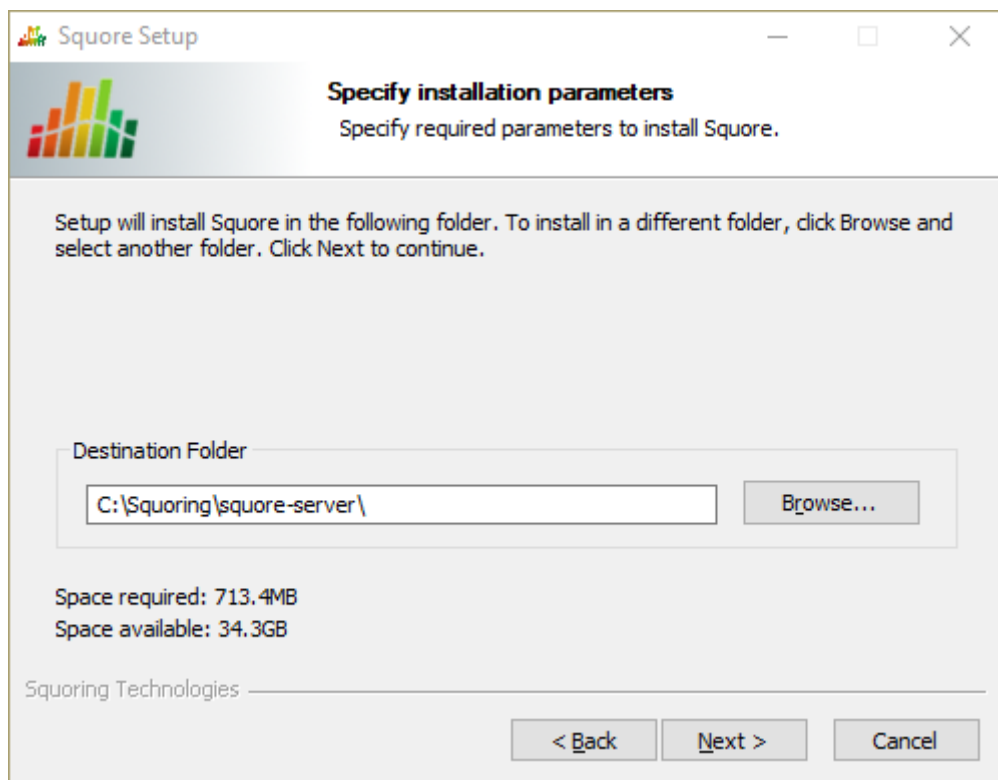
Squore Server Destination Folder screen

The Destination Folder screen allows you to select the Squore installation folder, where the application server will be installed. If you choose the path of an existing Squore installation, the installer will offer to upgrade this existing installation. **Note that you should back up your data before you attempt to upgrade a Squore installation.**

**Tip**
The steps to follow in order to upgrade an existing installation are described in Section 3.6, "Upgrading from a Previous Version". The rest of the current chapter describes the procedure for a new installation.

Check that the location suggested by the Squore installer is appropriate. If not, use the **Browse...** button to select another location.

After specifying the Destination Folder, click on the **Next** button.

4. The Squore Components screen
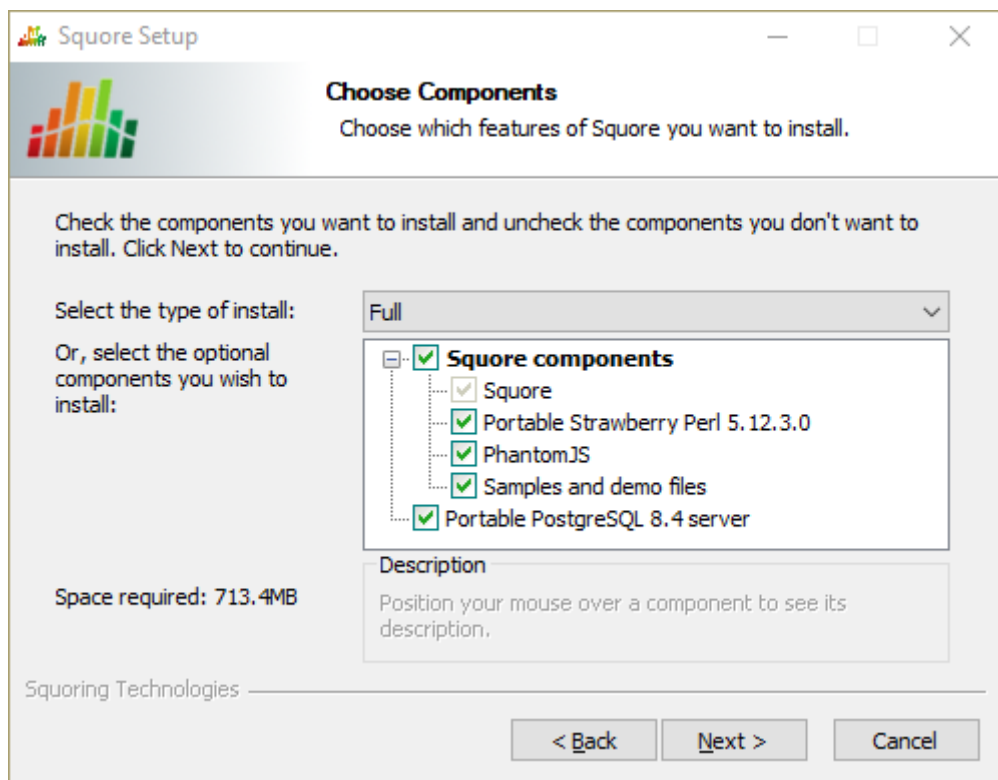
The Squore Components screen

The Components screen allows you to choose between the three available types of installations:

→ **Full:** all components will be installed

→ **Minimal:** only Squore Server will be installed. Use this mode if you already have your own database server, perl and PhantomJS installations

→ **Custom:** you define which components will be installed using the checkboxes on the Choose Components screen

If you are unsure which option is the best for you, you can safely use the Full installation, so that all Squore components are installed locally.

Select the appropriate installation mode. Then, click the **Next** button.

5. The General Options screen
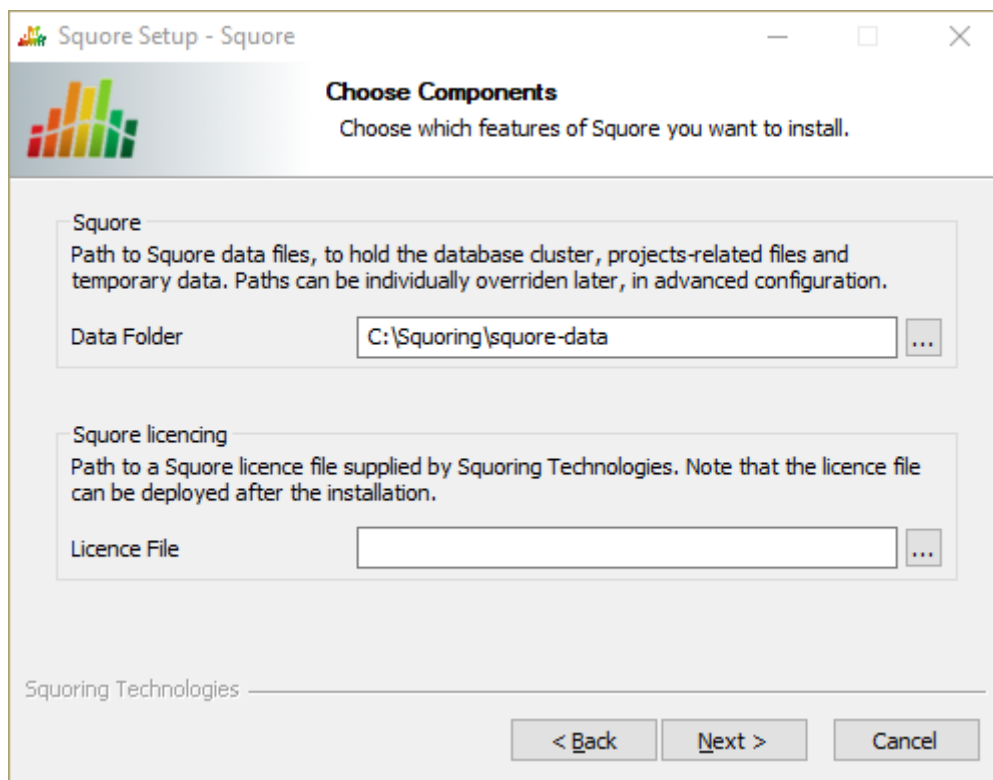
The General Options screen

The Squore General Options screen allows specifying where Squore stores its data and which licence file is used for the installation.

→ **Data Folder**: The data folder is the main folder where the data generated by Squore will be stored. Define a path on your system to hold the data. By default, the database cluster, the temporary folder, the project data and the default backup folder will live in this location. Note that you can refine each individual location later by going through the advanced option screens of the installation wizard.

→ **Licence File**: The location of the Squore licence file you wish to use for your installation. Note that you can leave this field empty at this time and provide the licence information only after the installation procedure has finished. This is explained in further details in Section 5.17, "Updating the Squore Licence File".

After specifying the data location and optionally pointing to a licence file, click the **Next** button.

6. The Squore Additional Options screen

https://www.squoring.com/
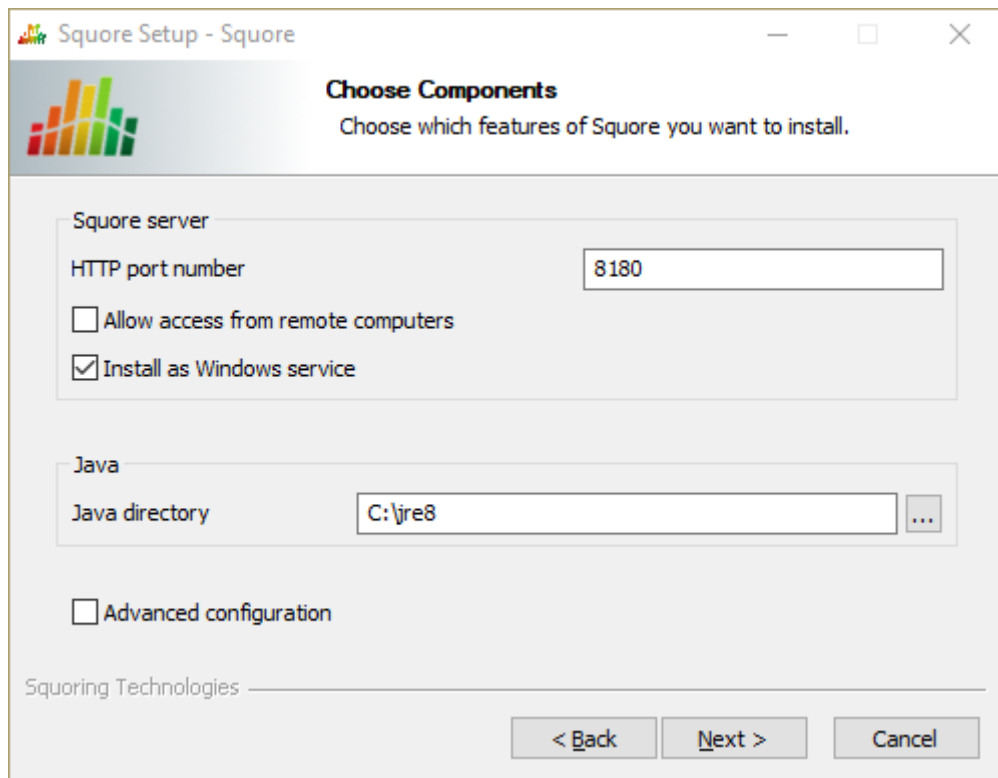
The Squore Additional Options screen

The Squore Additional Options screen allows specifying the rest of the necessary, basic options for your installation.

→ **HTTP port number**: Define the port used to access Squore from your browser.

→ **Allow access from remote computers**: Check this box to allow other computers on your network to connect to the Squore installation from a web browser. This setting is off by default to provide a safe installation that is only accessible from the server machine itself. The value can be changed after the installation process finishes by following the steps detailed on http://openwiki.squoring.com/ openwiki/index.php/Connect_remotely_to_the_server.

→ **Install as Windows service**: Check this box if you want to be able to start and stop Squore Server using a Windows service. You can optionally customise the service name when clicking the **Next** button.

> **Warning**
>
> If you plan to have multiple Squore Server installations on the same machine, using Windows Services is not recommended, as it can cause issues when upgrading. For more details, consult https://wiki.squoring.com/display/HOW/Recommendations+for +Squore+Installations+on+Windows%3A+Services+and+Registry.

→ **Java directory**: the directory where the Oracle JRE is installed. The wizard should have found the appropriate Java installation on your server, but you can modify the value if the JRE you want to use is in a different location using the **...** button. Note that Java 8 (other versions are not supported) is required (see Section 3.1, "Installation Prerequisites").

→ **Advanced configuration**: Check this box to see more installation options for advanced users. Advanced options include finer control over data folder locations, memory settings, and advanced database configuration (like using a remote PostgreSQL installation or an Oracle database).

After setting your preferences, click the **Next** button to view a summary of your installation settings (step 14) or proceed with the advanced configuration options (step 7).

7. The Advanced Squore configuration screen
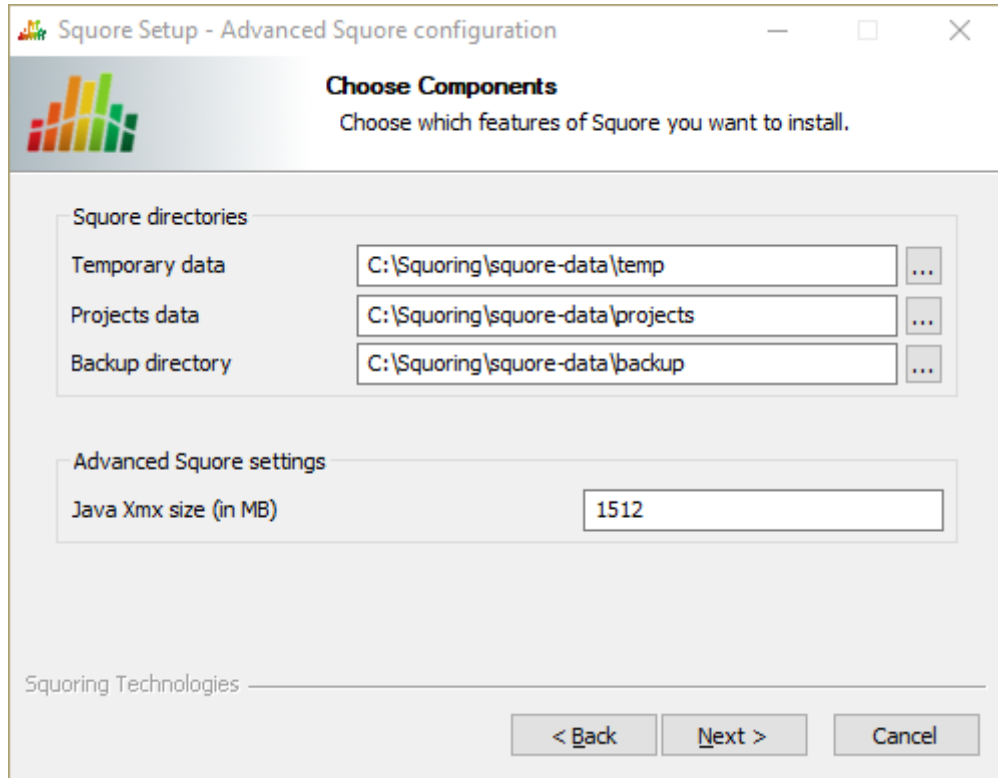
The Advanced Squore configuration screen

### Note

This screen is only displayed if you checked the **Advanced configuration** box in step 6.

On the Advanced Squore configuration screen, you can modify the default work directory and memory and performance settings for the server.

→ **Temporary data:** The location of the temporary data generated by Squore.

→ **Projects data:** The location of the data generated by Squore when running analyses on the server.

→ **Backup directory:** The location used to store backups when the backup script is launched. For more details about backing up your Squore data, see Section 5.3.1, "Backing-Up the Squore Data"

→ **Java Xmx size (in MB):** The maximum amount of RAM available to Squore Server, set to 25% of the physical RAM available on your server by default. It is recommended to keep the memory allocated to Squore under 25% of the total physical RAM so that other Squore modules (especially the database) or external processes (the OS and some Data Providers like Checkstyle or FindBugs) still have enough resources available. This setting can be changed after installation by following the procedure described in Section 5.11, "Changing the Java Heap Size".

8. The Perl selection screen
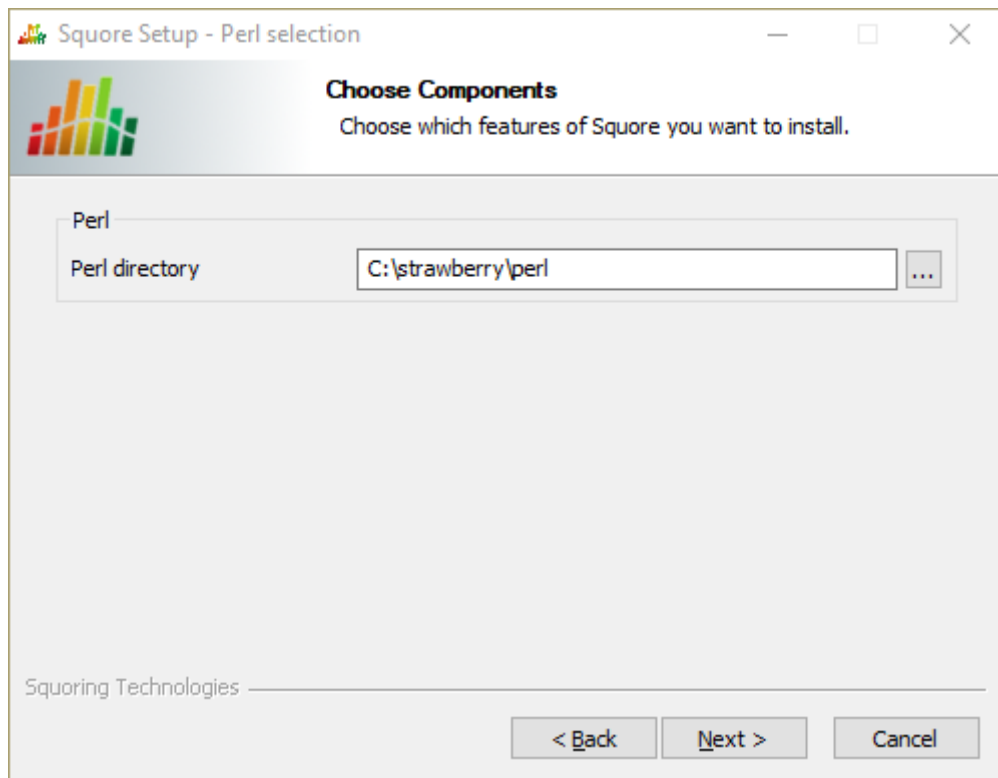
The Perl selection screen

**Note**

This screen is only displayed if you disabled the installation of Strawberry Perl 5.12.3.0 Portable box in step 3.

On the Perl selection screen, you can modify the path to the Perl distribution that will be used by Squore Server. Use the **...** button to specify the Perl installation folder and click the **Next** button to continue.

9. The Squore database screen
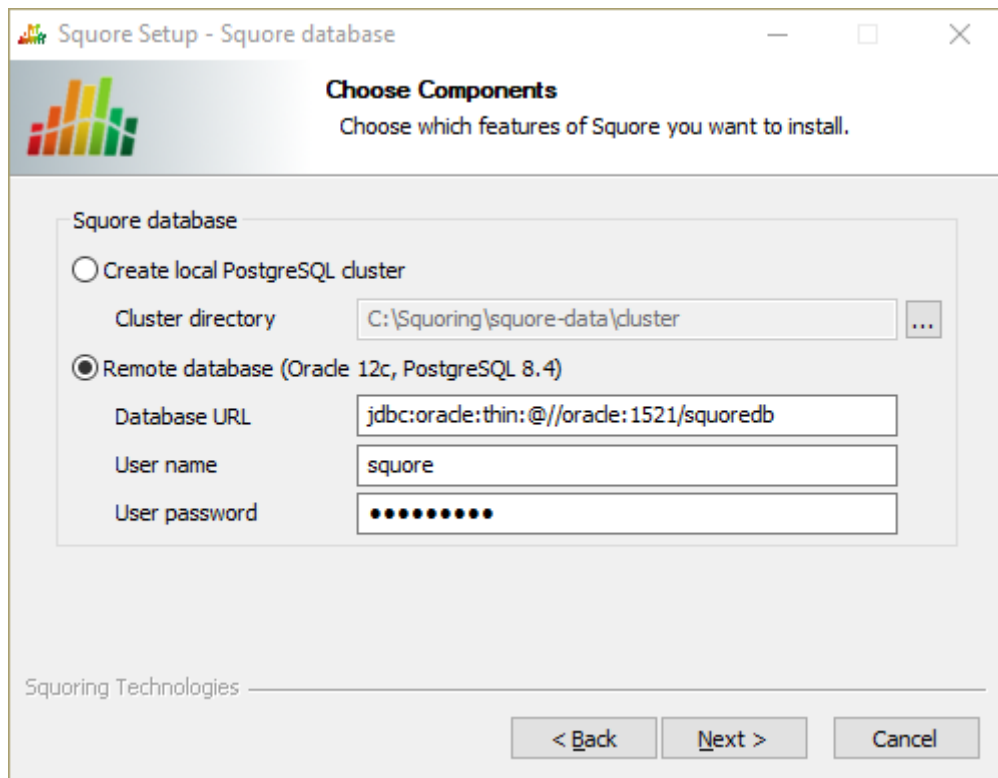
The Squore database screen

On the Squore databse screen, you can specify if your Squore Server installation should use a local PostgreSQL cluster or a database on a remote DBMS.

In order to use a local PostgreSQL cluster, modify the path to the PostgreSQL installation that will be used by the installer to create the Squore database. Use the **...** button to specify the installation folder and click the **Next** button to continue.

In order to use a remote database backend, specify its URL and provide the username and password of a dedicated user for the Squore installation.
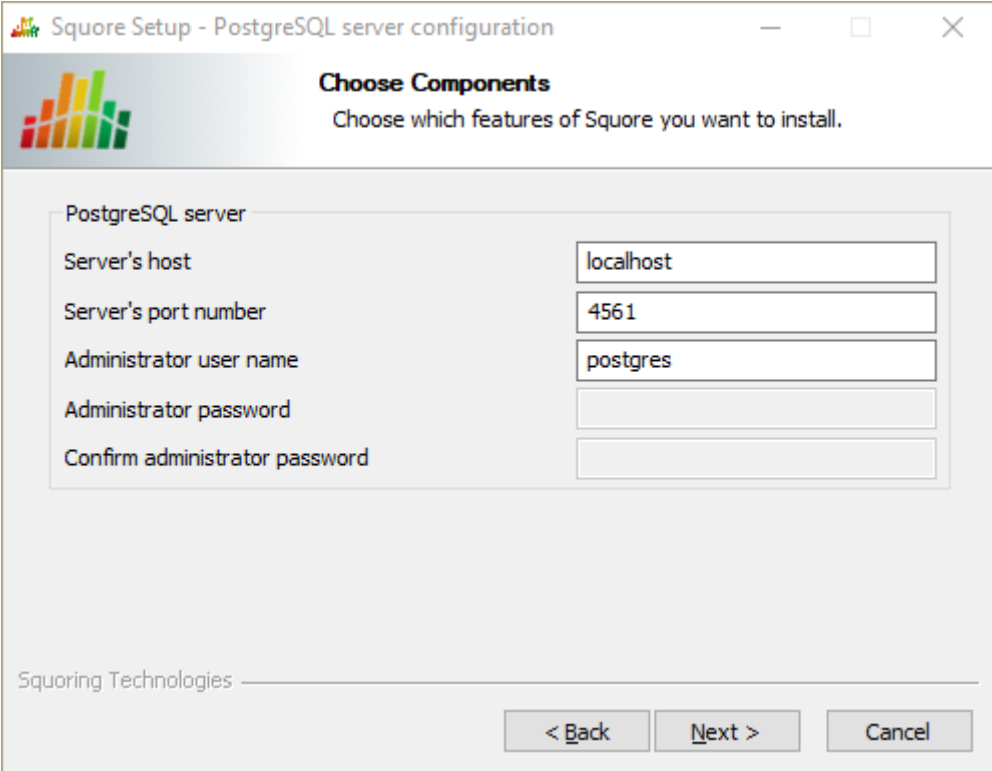
**Tip**

The syntax for the database URL is:

→ **jdbc:oracle:thin:@//[host][:port]/sid** for Oracle

→ **jdbc:postgresql:[//host[:port]/]dbname** for PostgreSQL

When you click the **Next** button to continue, a connection to the databse is attempted. If the database cannot be reached with the details supplied, you will be asked to review them before you can continue with the installation.

10. The PostgreSQL server configuration screen

The PostgreSQL server configuration screen

**Note**

This screen is only displayed if you checked the **Advanced configuration** box in step 6 and are
using a local PostgreSQL database.

On the PostgreSQL server configuration screen, you can provide details about the PostgreSQL server to
be used with Squore Server
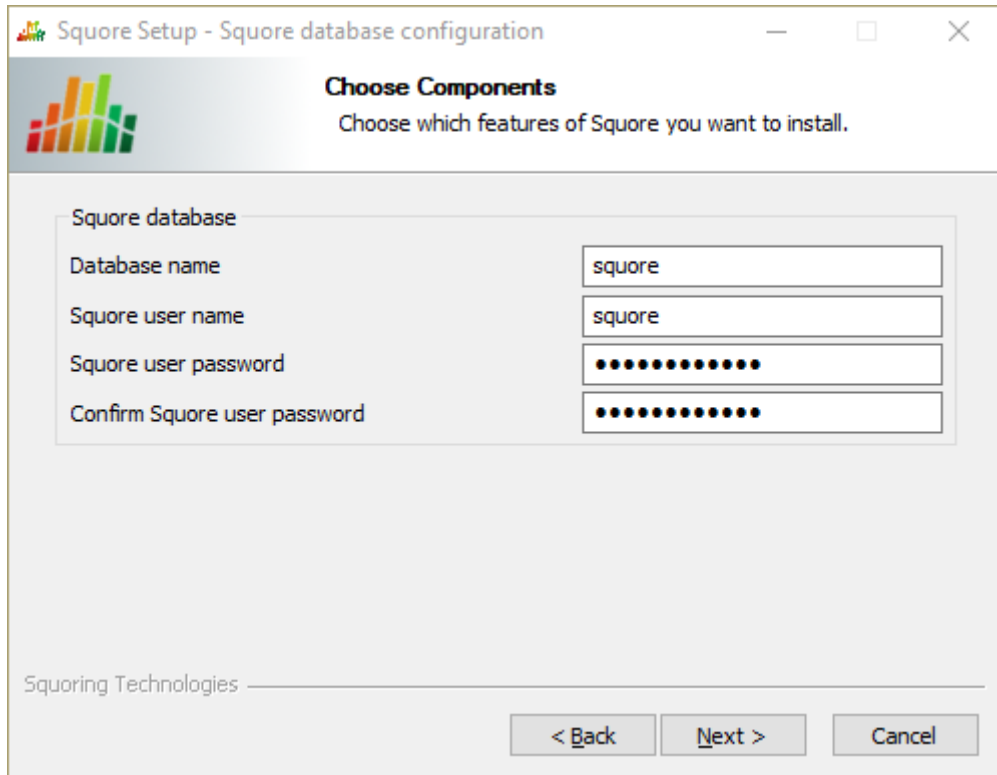
→ **Server's host:** the hostname of the machine running the PostgreSQL server

→ **Server's port number:** the running port of the PostgreSQL server

→ **Administrator user name:** the user name of the PostgreSQL server admin user
Note that the Administrator password cannot be set. After adjusting your settings, click the **Next** button
to continue.

11.  The Squore database configuration screen

The Squore database configuration screen

**Note**

This screen is only displayed if you checked the **Advanced configuration** box in step 6 and are using a local PostgreSQL database.

On the Squore database configuration screen, you can specify the desired name and user for the Squore database:

→ **Database name:** the name of the database that will be created for this installation of Squore

→ **Squore user name:** the name of the user that will be created as the owner of the database

→ **Squore user password:** the password for the specified database user
After adjusting your settings, click the **Next** button to continue.

12. The Networking screen
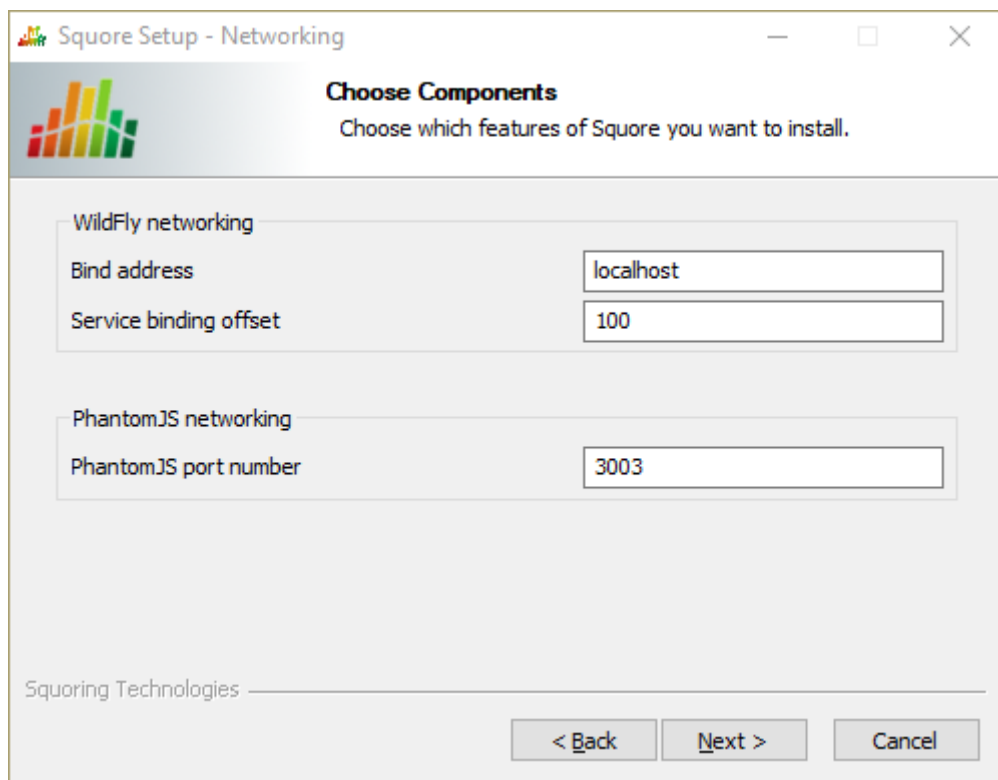
The Networking screen

**Note**

This screen is only displayed if you checked the **Advanced configuration** box in step 6.

On the Networking screen, you can specify the desired bind address and ports for Squore Server, as well as the port to use for the PhantomJS server:

→ **Bind address:** the bind-address configuration for the WildFly Server
If you want to restrict access to Squore Server from the server itself, leave `localhost`. If you want your server to be accessible from anywhere on your network, set the bind address to `0.0.0.0`.

→ **Service binding offset:** the offset added to the value of the default WildFly ports (as described on https://docs.jboss.org/author/display/WFLY10/Interfaces+and +ports#Interfacesandports-SocketBindingGroups) for this installation of Squore, resulting in the following ports being assigned for the following offset values:

  → 100 (default): http: 8180, https: 8543, management: 10090

  → 200: http: 8280, https: 8643, management: 10190

  → 300: http: 8380, https: 8743, management: 10290

**Tip**
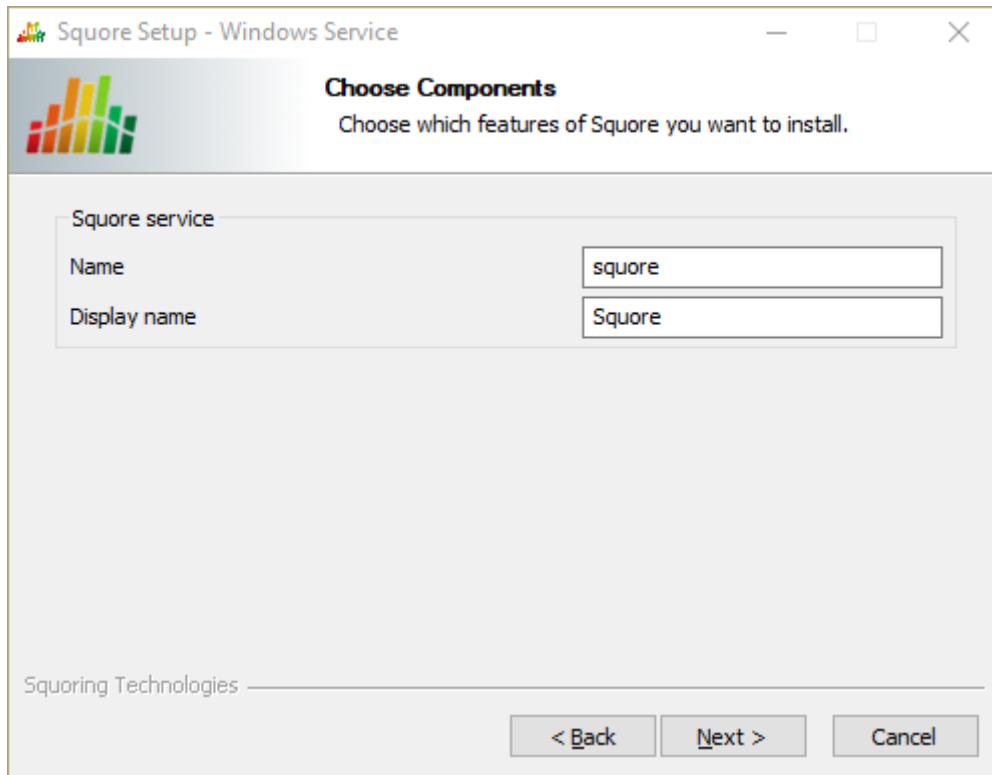
The offset is mainly used to install several instances of Squore using different ports on the same machine.

The remoting port is used to share a licence server between multiple installations, as described in Section 5.18, "Connecting to a Remote Licence Server".

→ **PhantomJS port number:** Choose the port used for the PhantomJS server. Not that all communication between Squore Server and PhantomJS happens on the same machine. This port therefore does not need to be open on your firewall, except in very specific scenarios described in Section 5.5, "Advanced PhantomJS Settings".

After adjusting your settings, click the **Next** button to continue.

13. The Windows Service screen



The Windows Service screen

**Note**

This screen is only displayed if you checked the **Install as Windows service** box in step 6.

On the Windows Service screen, you can specify the desired name and display name for service that controls Squore Server.

**Tip**

For a Windows Service, the name is the alias used in the command line (for example: `net start squore`), and the display name (Squore) is the name displayed in the graphical Windows Services Console.

Set the name and display name for the service according to you needs and click the **Next** button to continue.

14. The Confirmation screen
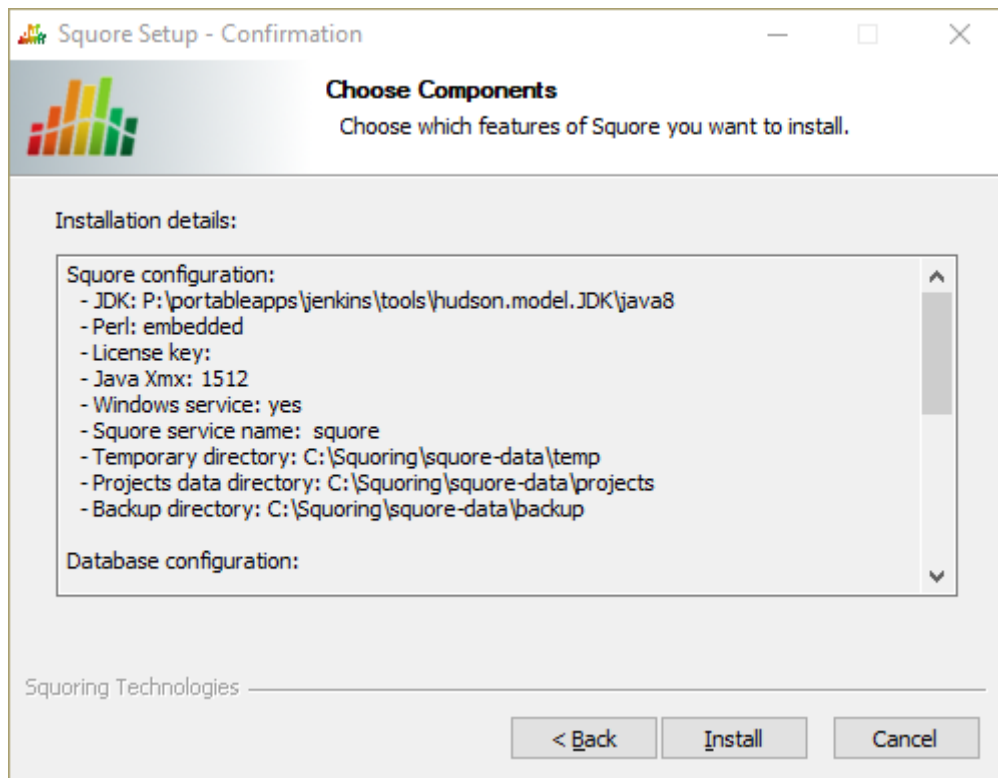
The Confirmation screen

The Confirmation screen shows a summary of the parameters you specified in previous steps of the wizard. Verify that the information matches your selections and click **Install** to start installing Squore. The installation process lasts a few minutes.

15. The Installation progress screen
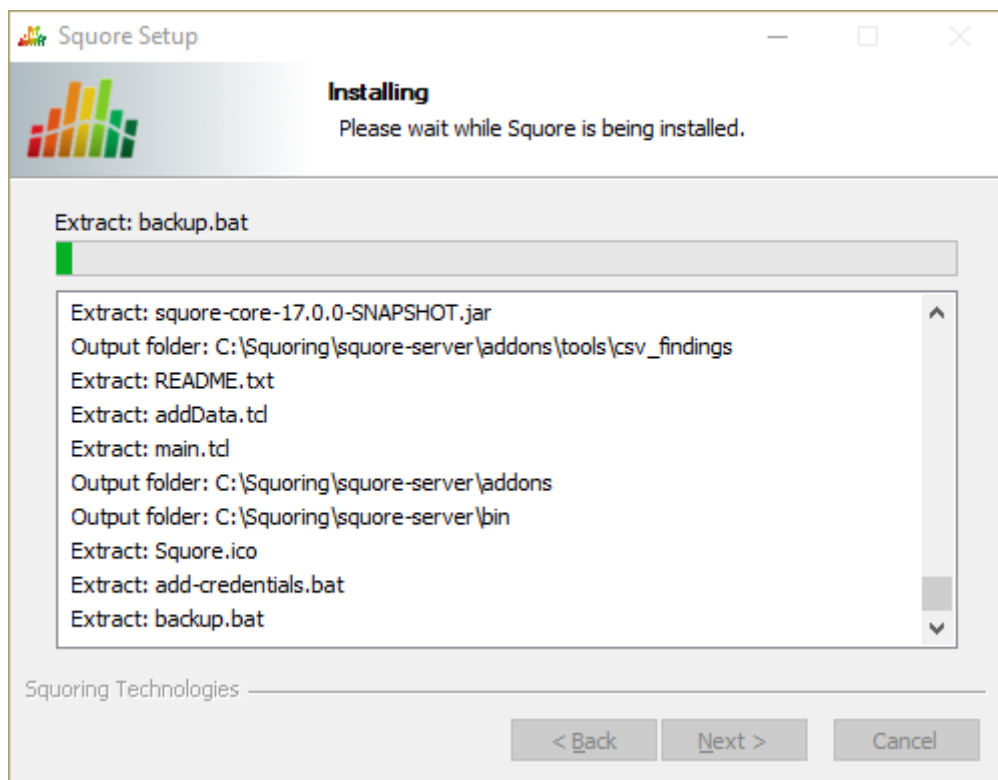
The Installation progress screen

During the installation, a progress bar is displayed while files are copied to your hard drive.

### Note
The installation cannot be cancelled after it has started.

16. The Squore installation completed screen

The Squore installation completed screen

When the installation completes, the installation completed screen is displayed. Click the **Finish** button to close the Squore Installation Wizard. If you checked the **Start the Squore client** box, the Squore Login page should open in your browser.

Squore is now ready for use and can be accessed via `http://localhost:8180/SQuORE_Server`. Refer to the next section if you need more information about how to start and stop Squore and, if applicable, change the default configuration.

## 3.4. Installing Squore Server on Linux

Before installing Squore on a Linux platform, verify that all prerequisites are met, as described in Section 3.1, "Installation Prerequisites"

If you use all the default settings, the installer will deploy the following components in the specified locations:

→ Squore Server (including its dedicated WildFly instance) in `<SQUORE_HOME>`

→ The Squore database backup directory in `<SQUORE_DATA>/backup`

→ The Squore temporary data directory in `/tmp/squore`

→ The Squore temporary source code directory in `/tmp/squore/sources`

Ensure that the user that installs and runs Squore has read and write access to these locations.

### Note
The installation script will try to guess the amount of memory to allocate for the database on your system. If it cannot do it, you will get an error message about setting kernel.shmall. In this case,

you need to set the value of kernel.shmall to a value that suits your need, based on which other applications are running on your system. The script will only suggest a minimum value.

Follow these instructions to install Squore Server:

1.  Copy the installation package (squore-17.1.11-linux-x86_64.tar.bz2) into the location where you want to install Squore Server (For example: `/opt/squore/`).

2.  Extract the contents of the archive into the selected installation directory.
    The folder now contains a new folder called `squore-server`, which we will refer to as **`<SQUORE_HOME>`** .

3.  Run the Squore installation script in a command shell. The full list of options accepted by the **install** script can be found in install(1), but the command below is usually enough for most installations:
    `<SQUORE_HOME>/bin/install -b 0.0.0.0 -k /path/to/squore-license.p7s  / path/to/project/data`

    ### Note
    It is mandatory to accept the end-user licence agreement as the first step of the installation.

    ### Warning
    Do not run the installation script as root, as this causes the installation of PostgreSQL to fail.

    The file `squore-license.p7s` should have been previously provided by Squoring Technologies according to the applicable Squore licensing agreement in order to run Squore Server, but you can perform the installation even if you do not have a licence file yet.

    ### Tip
    If you want Squore Server to use a remote database backend, consult install(1) to find out more about the parameters available to set the remote database type, name and location.

## 3.5. Third-Party Plugins and Applications

End users can run third-party static code analysers or rule checkers that are not shipped with the Squore installer for licencing reasons. In this case, it is necessary to download the extra binaries from https:// support.squoring.com/download_area.php and deploy them on the server.

The list of third party plugins to be downloaded separately is as follows:

→ Checkstyle 5.6

→ FindBugs 3.0

→ Cppcheck 1.61

→ PMD 5.0.5

→ Polyspace Export

→ Stylecop 4.7

Here is a full example of how to deploy Checkstyle into Squore

1.  Download the Checkstyle binary from https://support.squoring.com/download_area.php.

2.  Extract the contents of the zip file onto Squore Server.

3.  Copy the extracted checkstyle-5.6 folder into <SQUORE_HOME>/addons/tools/CheckStyle_auto.

4.  Instruct all client installations to synchronise with the server so that they get the newly deployed third-party binaries.

If you have deployed some third-party tools on Squore Server, they will automatically be downloaded to your client when you launch the client synchronisation script.

**Tip**

AntiC and Cppcheck on Linux also require special attention: Cppcheck must be installed and available in the path, and antiC must be compiled with the command:

```
cd <SQUORE_HOME>/addons/Antic_auto/bin/ && gcc antic.c -o antic
```

For more information, refer to the Command Line Interface Manual, which contains the full details about special installation procedures for Data Providers and Repository Connectors.

# 3.6. Upgrading from a Previous Version

The Squore installation package can be used to upgrade an existing Squore installation from Squore 2013-B-SP3.

When an installation is upgraded, the following happens:

→ The new version of Squore Server overwrites the previous one in the same installation directory.

→ The database is upgraded.

→ The data files are migrated.

→ The old basic configuration is kept: location of data, cluster and tmp folders as well as ports.

→ LDAP settings, licence server sharing, SSL configuration are discarded and will need to be configured again. The old <SQUORE_HOME>/config.xml and <SQUORE_HOME>/server/standalone/configuration/standalone.xml are backed up for your convenience next to the new ones (i.e. <SQUORE_HOME>/config.xml.bkp and <SQUORE_HOME>/server/standalone/configuration/standalone.xml.bkp).

## 3.6.1. On Windows

**Warning**

→ The java version required by the new version of Squore may be different from the one you were using in your previous installation. On Windows, an installer screen will prompt you for the path to the new Java installation to use after upgrading. On Linux, you can use the -J option to specify the new path to Java in your upgrade command line.

→ Before upgrading from a pre-16.0 version, ensure that you have as much free space on your disk as the size of your current database, as reported on Administration > Projects.

→ **Folders inside the installation directory are deleted during an upgrade**, including the default tmp, data, cluster and backup folders. Before you attempt to upgrade Squore, run a full backup of your data (and move it outside <SQUORE_HOME>) using the provided backup scripts described in Section 5.3.1, "Backing-Up the Squore Data"

→ **On Linux, if you used the -x and/or -s parameters in your initial installation or if you manually edited the value of PostgreSQL's shared_buffer or java Xmx parameters after installing**, you must pass -x and/or -s on the command line for the upgrade as well, as they are not read from the previous installation. For more details on **install** options, refer to install(1).

→ The file `postgresql.conf` in your database cluster is patched during the upgrade process. If you have modified it manually, create a backup copy before upgrading and verify that the migrated file still contains your modifications.

→ If you are a local PostgreSQL cluster as your database, ensure that the server and the database are shut down before continuing. In all other scenarios (an Oracle database or a remote PostgreSQL cluster not managed by Squore) ensure that Squore Server is stopped and that the database is accessible and accepting connections.

→ No progress information is displayed on screen during the database upgrade phase, which may take a while to complete.

Follow these steps to upgrade your Windows installation.

1. Run the Windows installer.

2. Click the **Next** button to get to the Licence Agreement screen.

3. Click the **Next** button to get to the Destination Folder screen.

4. Browse for the folder containing the old installation and click the **Next** button.

5. On the Upgrade Choice screen, select **Override** to delete the existing installation and start from scratch (all your data is lost) or **Upgrade** to upgrade your existing installation to the new version, then click the **Next** button.
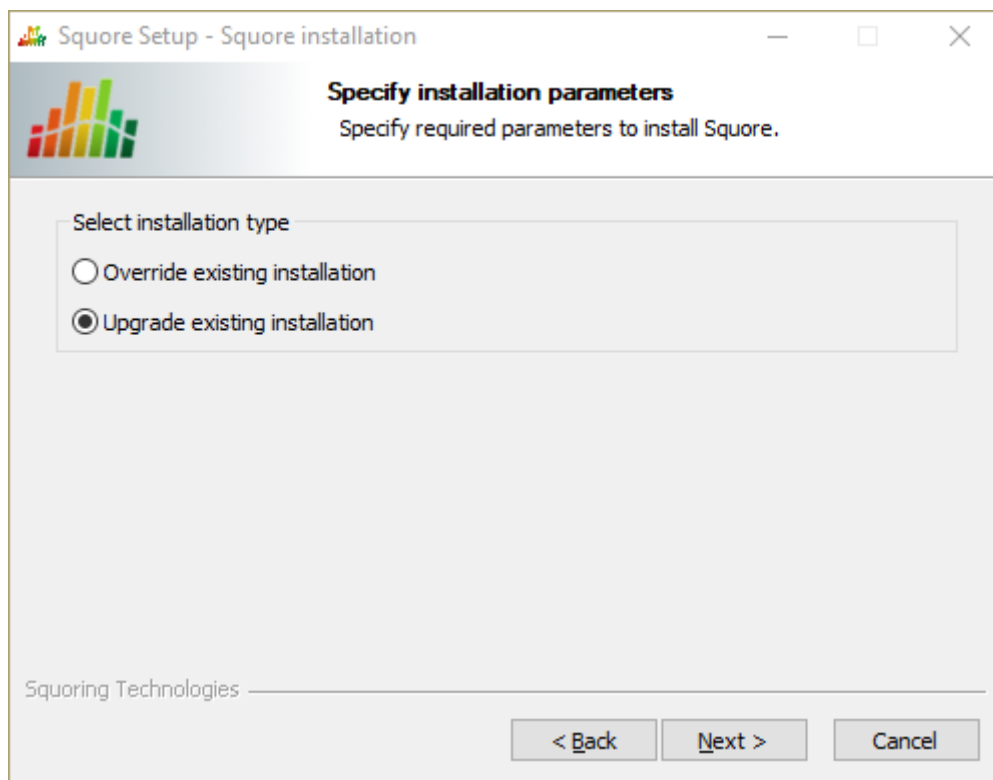


The Upgrade Choice screen

Clicking the the **Next** button button to continue with the upgrade.

6. If you are running an unsupported Java version, you will see the following screen, where you can specify the path to the new Java version:
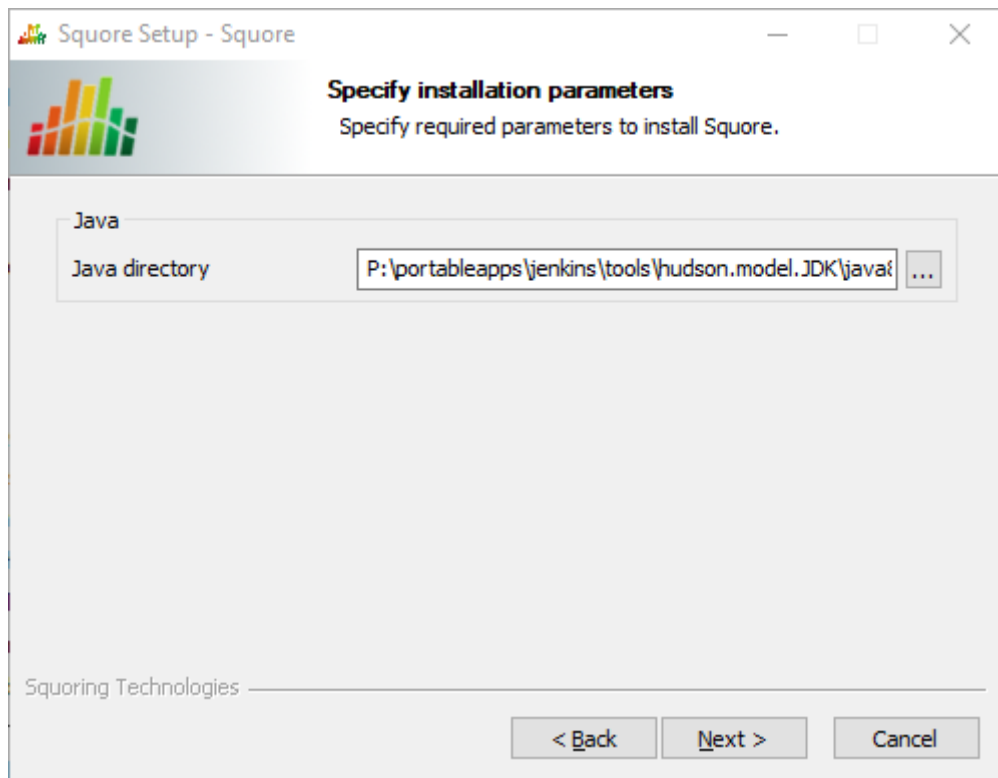
The Squore Setup screen for the new Java directory

Specify the path to the new Java installation and click the **Next** button to continue with the upgrade.

7. Wait while the installer retrieves the settings to apply to the upgrade and displays them on the Confirmation screen, and click **Install**.
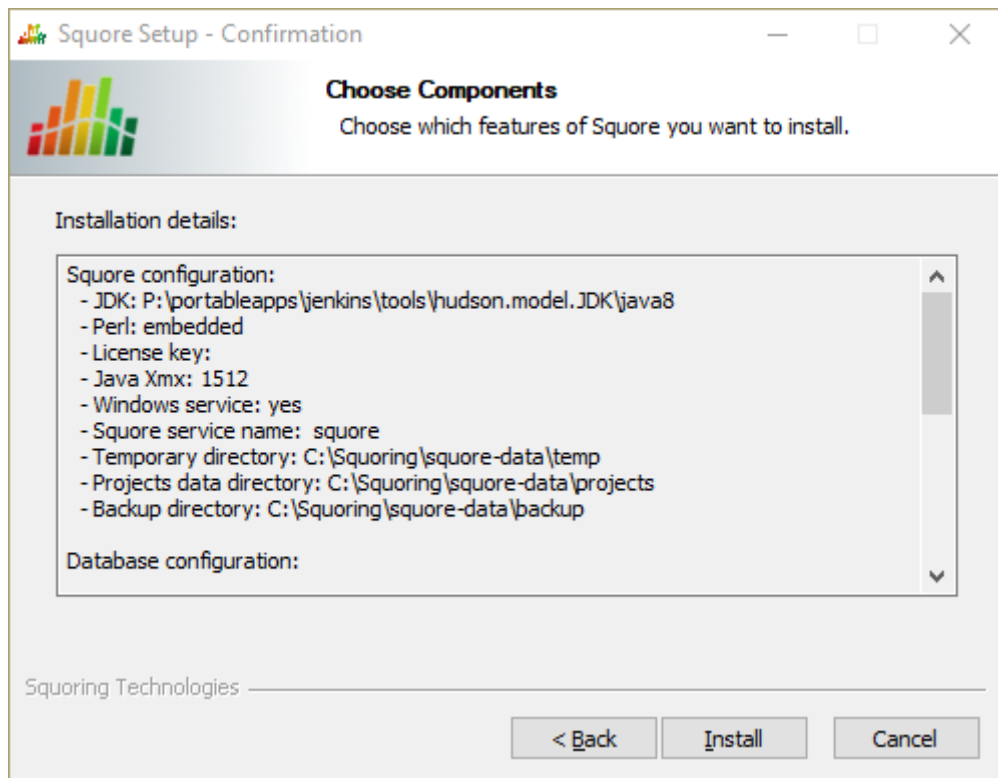
The Confirmation screen

8. Wait for the upgrade process to complete and close the wizard by clicking on **Finish**.

The Installation Complete screen

## 3.6.2. On Linux

**Warning**

→ The java version required by the new version of Squore may be different from the one you were using in your previous installation. On Windows, an installer screen will prompt you for the path to the new Java installation to use after upgrading. On Linux, you can use the -J option to specify the new path to Java in your upgrade command line.

→ Before upgrading from a pre-16.0 version, ensure that you have as much free space on your disk as the size of your current database, as reported on Administration > Projects.

→ **Folders inside the installation directory are deleted during an upgrade**, including the default tmp, data, cluster and backup folders. Before you attempt to upgrade Squore, run a full backup of your data (and move it outside <SQUORE_HOME>) using the provided backup scripts described in Section 5.3.1, "Backing-Up the Squore Data"

→ **On Linux, if you used the -x and/or -s parameters in your initial installation or if you manually edited the value of PostgreSQL's shared_buffer or java Xmx parameters after installing**, you must pass -x and/or -s on the command line for the upgrade as well, as they are not read from the previous installation. For more details on **install** options, refer to install(1).

→ The file `postgresql.conf` in your database cluster is patched during the upgrade process. If you have modified it manually, create a backup copy before upgrading and verify that the migrated file still contains your modifications.

→ If you are a local PostgreSQL cluster as your database, ensure that the server and the database are shut down before continuing. In all other scenarios (an Oracle database or a remote PostgreSQL

cluster not managed by Squore) ensure that Squore Server is stopped and that the database is accessible and accepting connections.

→ No progress information is displayed on screen during the database upgrade phase, which may take a while to complete.

Follow these steps to upgrade your Linux installation.

1. Download the Linux installation package.

2. Extract the archive by running the command:
   `cd /tmp`

   `/usr/bin/tar xjf squore-17.1.11-linux-x86_64.tar.bz2`

3. Manually backup your current `<SQUORE_HOME>/server/bin/standalone.conf`

4. Run the upgrade by executing:
   `cd /tmp/squore-server/bin`

   `./install -U /path/to/old/installation [options...]`

5. Redeploy your backed-up `<SQUORE_HOME>/server/bin/standalone.conf` if necessary to reapply your custom configurations.

# 3.7. Uninstalling Squore Server

## 3.7.1. On Windows

You can remove Squore Server from your machine by going through the uninstaller wizard, as described below:

1. Stop Squore Server by running `<SQUORE_HOME>/stop.bat`.

2. Launch the uninstaller wizard from the **Add/Remove Programs** dialog in the control panel or directly by double-clicking `<SQUORE_HOME>/Squore_Uninst.exe`. The wizard opens:
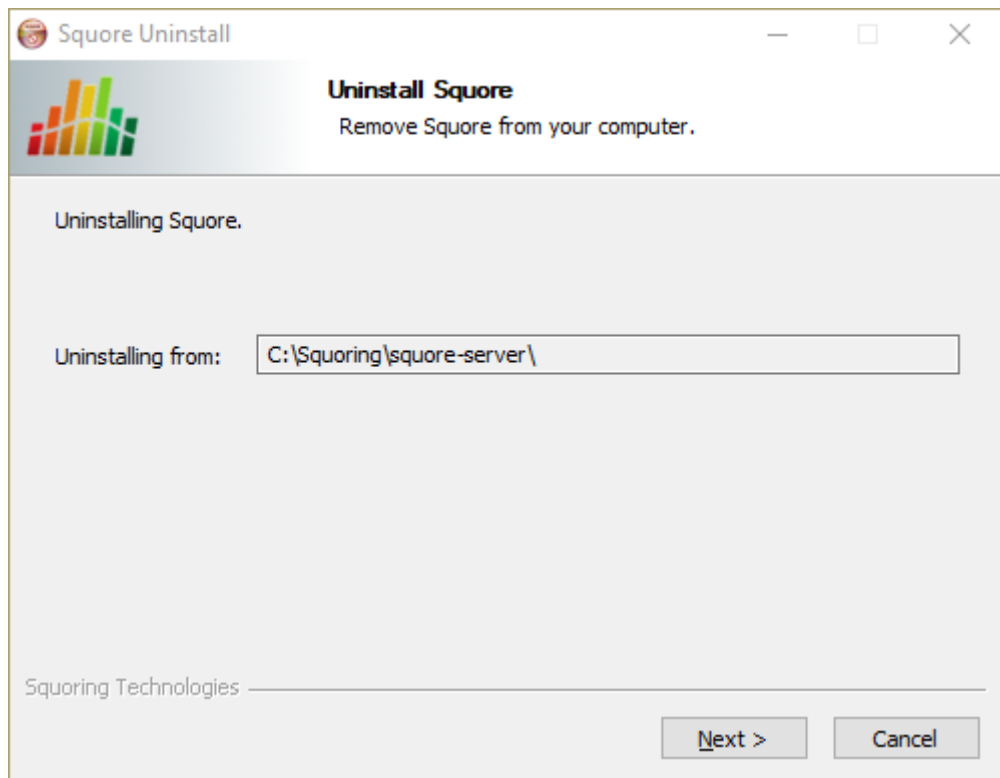
The Squore Server uninstallation wizard

Click **the Next button** to go to the next screen.

3. The wizard will prompt you which of the data folders created by Squore Server to remove from your machine:
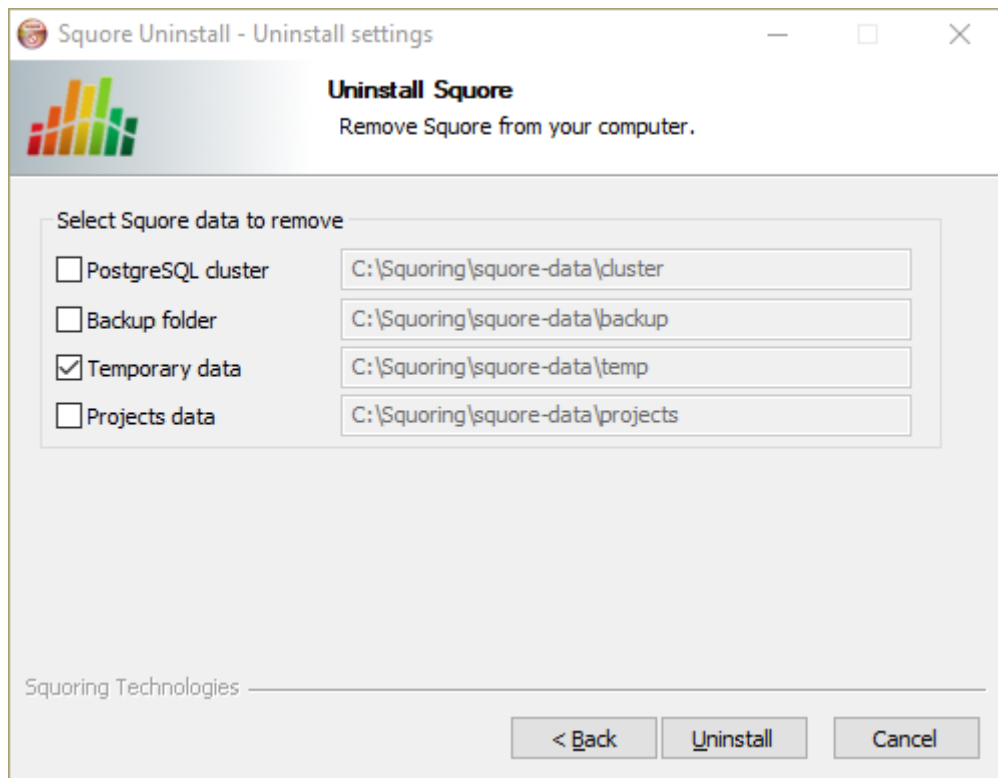
The **Folder Selection** screen

The data generated by Squore Server is left on the machine by default. If you do not need it, check all the boxes to delete all the folders.

Click **Uninstall** to procede with the removal of the software and the selected data.

### Warning
This operation cannot be interrupted or rolled-back.

4. The wizard will notify you when the uninstallation finishes, as shown below:
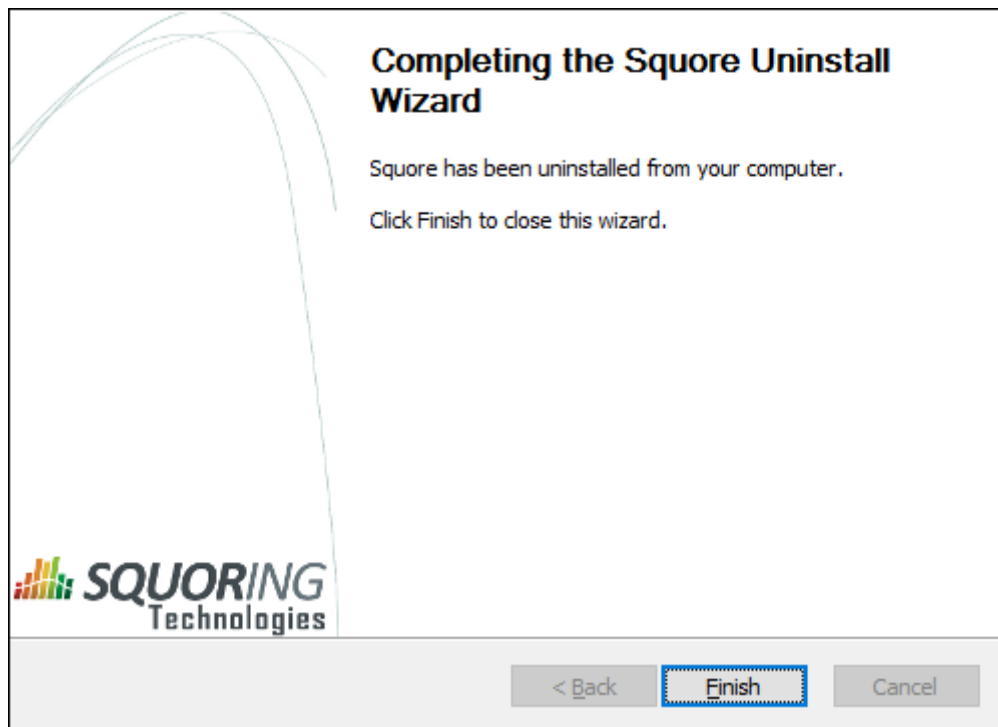
The **Uninstallation Complete** screen

Click **Finish** to exit the wizard.

## 3.7.2. On Linux

There is no uninstallation script for Squore Server on linux. In order to completely remove Squore Server from your system:

1.  Ensure that Squore Server is completely stopped by running:
    `<SQUORE_HOME>/bin/sqctl stop`

2.  Delete the folders where Squore Server generated data:

    → The database cluster

    → The projects folder

    → The temp folder

    → The sources folder

    **Tip**
    You can identify these locations by looking at `<SQUORE_HOME>/config.xml`, as described in Section 5.2, "Understanding `config.xml`".

3.  Delete <SQUORE_HOME>, the folder containing `config.xml` and the Squore binaries.

# 4. Starting Squore

## 4.1. Starting Squore on Windows

The Squoring program group created during the installation process contains all commands to start Squore on Windows.
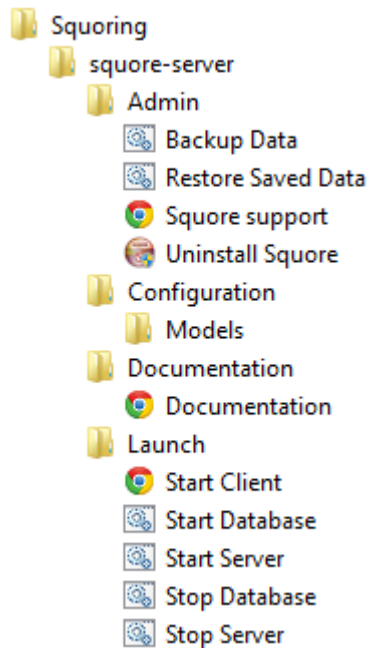


1. Start the Squore Database Server: **Start > Squoring > Squore > Launch > start-db.bat**

2. Start the Squore Application Server: **Start > Squoring > Squore > Launch > start-server.bat**

3. Launch Squore Client: **Start > Squoring > Squore > Launch > StartClient**
   Alternatively, you can type the following address in a web browser: `http://localhost:8180/SQuORE_Server`

4. Log into Squore using the default admin user account:

   → **Username**: *admin*

   → **Password** : *admin*

Squore is now started. Please refer to the Squore Getting Started Guide for more details on how to use Squore.

> **Tip**
> The admin user is the default user with administrative rights. If you want to provide non-administrative access to a user after installation, they need to use the demo login instead (password: demo)

> **Tip**
> Instead of using the Windows Start menu for launch and shutdown operations, you can use the scripts available in <SQUORE_HOME>/bin:

→ *start-db.bat* Starts the Squore database

→ *start-server.bat* Starts Squore Server

→ *start.bat* Performs the two previous operations in succession

→ *stop-server.bat* terminates Squore Server

→ *stop-db.bat* stops the Squore database

→ *stop.bat* performs the two previous operations in succession

## 4.2. Managing the Squore Windows Service

During the installation of Squore Server on Windows, the installer provides the option to register a service to control Squore's startup and shutdown. This section covers the functionality of the prunmgr utility that allows you to further configure some aspects of the Squore Windows service. Note that when you install the Windows service, you should no longer use the start and stop scripts described in Section 4.1, "Starting Squore on Windows"

### 4.2.1. Windows Service Configuration

After installing Squore Server as a Windows service, you can use the service manager to change some of the settings.

**Tip**

The Windows service uses Apache Commons Daemon. Consult https://commons.apache.org/proper/commons-daemon/index.html for more information about the framework and the available installation options.

Start the utility by typing the following in a command window as administrator:

```
<SQUORE_HOME>\bin\prunmgr.exe //ES/squore
```

**Tip**

squore is the service name you chose during the installation.

The service manager opens in a new window and allows you to change the following settings:

1.   **General Settings**
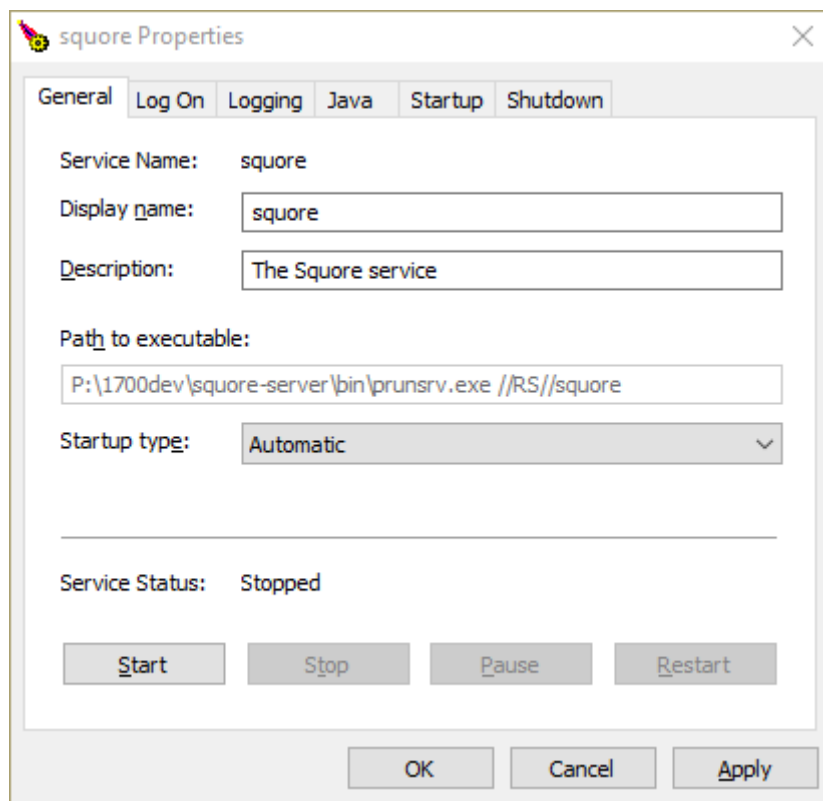
The General Tab

From the General tab, you can adjust the Service display name, description and startup type (Automatic to start at boot, Manual to start interactively, Disabled to stop using the service). You can also see and change the current state of the service.

2. **Log On**
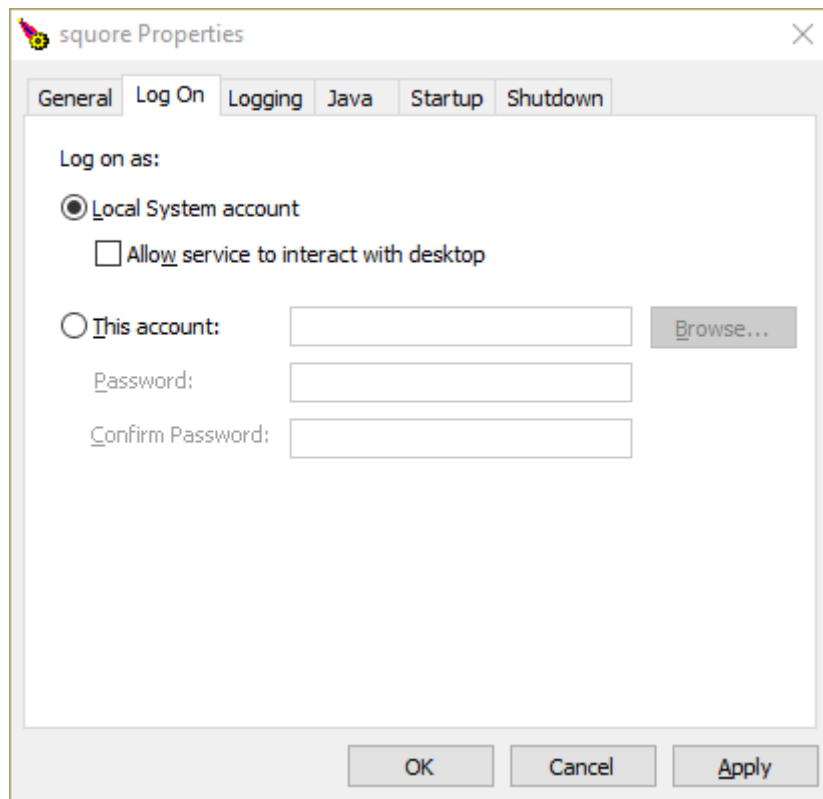
From the Log On tab, you can control which Windows account runs the service. Note that any change takes affect after the service is restarted.

The service is set to run under the local system account by default. Depending on your security requirements you may need to manually set the account to a real Windows user to run the services. For more information, consult the Microsoft Windows documentation at https://technet.microsoft.com/en-us/library/cc755249.aspx.
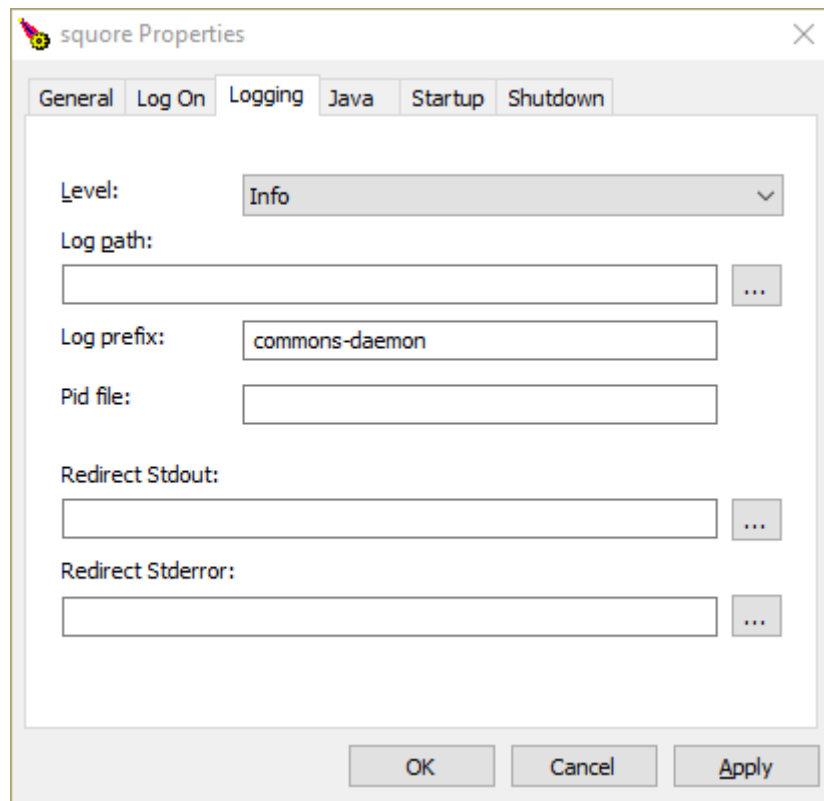
3. **Logging**

The Logging Tab

On the Logging tab, you can define paths to log files where the startup and shutdown activities of the service will be saved. The default location for the log file is `%SystemRoot%\System32\LogFiles \Apache` and generally does not need to be changed, unless you are noticing issues starting and stopping the service.

4. **Java**
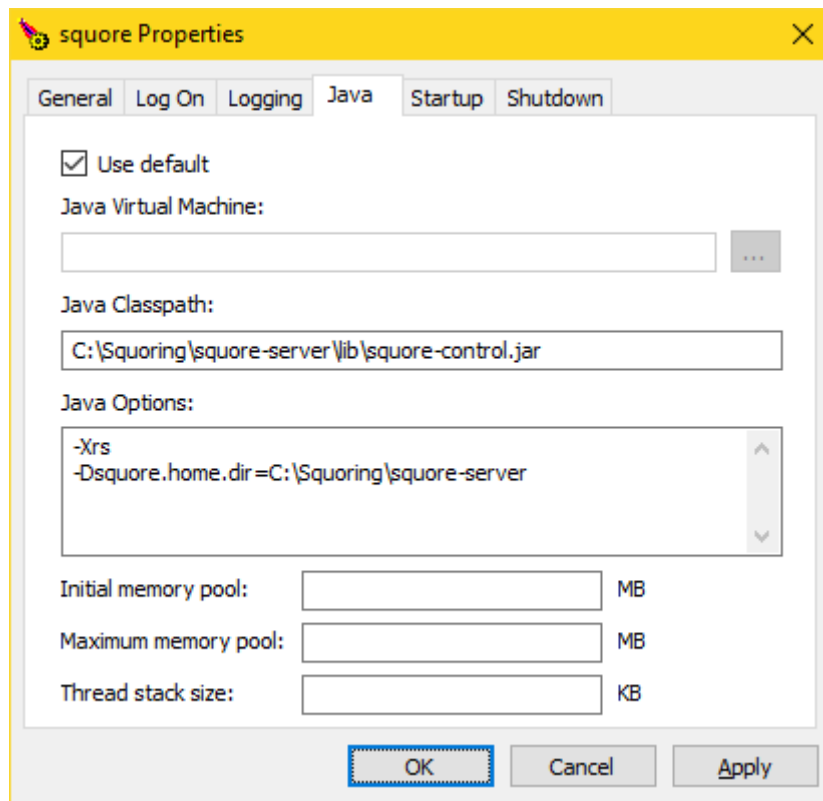
The Java Tab

The Java tab is useful if you need to change the path to your JRE. You can use `jvm.dll` from the system's %PATH%, or you can point to a specific `%JAVA_HOME%\bin\server\jvm.dll` if needed.

### Note

The settings on this tab have no effect over the Java settings for Squore Server. If you want to change the path to the Java installation or the amount of memory used by Squore, refer to Section 5.12, "Changing the path to the Java Installation" and Section 5.11, "Changing the Java Heap Size" instead.

5. **Startup** and **Shutdown**

There are no useful settings to be modified on these tabs.

## 4.3. Starting Squore on Linux

1. Go to the Squore bin directory **`cd <SQUORE_HOME>/bin`**

2. Start Squore Server: **`./sqctl start`**

3. Launch Squore by typing the following address in a Web browser: http://localhost:8180/SQuORE_Server

4. Log into Squore using the default user account:

   → **Username**: *admin*

   → **Password** : *admin*

Squore is now started. Please refer to the Squore Getting Started Guide for more details on how to use Squore.

**Tip**

The admin user is the default user with administrative rights. If you want to provide non-administrative access to a user after installation, they need to use the demo login instead (password: demo)

**Tip**

You can find out know the status of the database and server processes, by running the command `./sqctl status`

# 5. Squore Administration

## 5.1. Getting to Know the Installation Folder

During the installation process, the Squore Installation Wizard creates several folders and files in the Squore installation directory `<SQUORE_HOME>` :
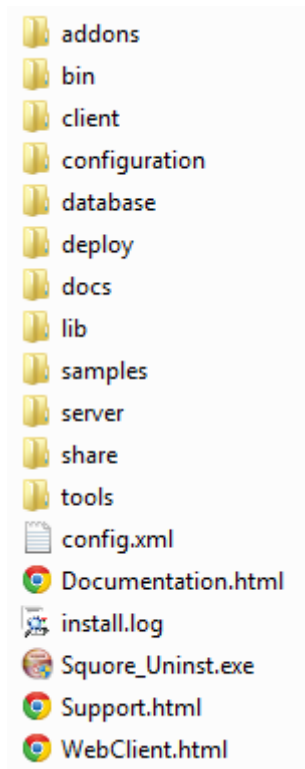


**<SQUORE_HOME>/addons** contains the Data Providers and Repository Connectors available in Squore

**<SQUORE_HOME>/bin** contains the main commands available to administer Squore. Most of these commands are also available from the `Start` menu in the `Squoring/Squore` program group on Windows.

**<SQUORE_HOME>/client** contains the libraries used by Squore CLI.

**<SQUORE_HOME>/configuration** contains folders and files that provide the default analysis and decision models, as well as the default dashboards for these models. For more details on how to understand and use these configuration files, refer to the Squore Configuration Guide.

**<SQUORE_HOME>/database** contains PostgreSQL tools to administer the database.

**<SQUORE_HOME>/docs** contains licences for third party libraries included in Squore.

**<SQUORE_HOME>/lib** contains libraries used by Squore Server for installation and maintenance tasks.

**<SQUORE_HOME>/samples** contains some sample source code in various programming languages that can be used as examples when getting to know Squore. This folder can safely be deleted if you do not need it.

**<SQUORE_HOME>/server** contains the Squore application server. See Section 2.3, "The Squore Application Server" for more information.

**<SQUORE_HOME>/share** contains some custom perl modules.

**<SQUORE_HOME>/tools** contains the deployed instances of perl, tclsh and PostgreSQL on Windows.

**<SQUORE_HOME>/config.xml** is used to specify the location of some configuration folders. See Section 5.2, "Understanding `config.xml`" for more information.

## 5.2. Understanding `config.xml`

**Note**

This section deals with editing the configuration of the installed instance of Squore. For more information about how to edit analysis models and wizards, refer to the Squore Configuration Guide.

### 5.2.1. Default Configuration

The initial contents of `<SQUORE_HOME>/config.xml` are as follows:

```
<?xml version="1.0" encoding="utf-8" standalone="yes"?>
<squore type="server">
 <paths>
  <path name="perl.dir" path="C:\Squoring\Squore\tools\perl\perl"/>
  <path name="tclsh.dir" path="C:\Squoring\Squore\tools\tclsh"/>
 </paths>
 <database>
  <postgresql directory="C:\Squoring\Squore\tools\pgsql"/>
  <cluster directory="C:\Squoring\Squore\cluster"/>
  <backup directory="C:\Squoring\Squore\backup"/>
  <security>
   <user-name>postgres</user-name>
  </security>
 </database>
 <phantomjs>
  <socket-binding port="3003"/>
 </phantomjs>
 <configuration>
  <path directory="C:\Squoring\Squore\configuration"/>
 </configuration>
 <addons>
  <path directory="C:\Squoring\Squore\addons"/>
 </addons>
 <tmp directory="C:\Users\username\AppData\Local\Temp\Squore"/>
 <projects directory="C:\Squoring\Squore\projects"/>
 <sources directory="C:\Users\username\AppData\Local\Temp\Squore\sources"/>
</squore>
```

**Tip**

You can find the XML schema for `<SQUORE_HOME>/config.xml` in config-1.2.xsd.

Here is a description of each element:

→ **paths/path name="perl.dir"** (mandatory) is the path to the perl installation used by Squore. It is detected automatically on Linux and set to <SQUORE_HOME>/tools/perl/perl on Windows.

→ **paths/path name="tclsh.dir"** (mandatory) is the path to the tcl installation used by Squore. It is detected automatically on Linux and set to <SQUORE_HOME>/tools/tclsh on Windows.

→ **database/postgresql directory="..."** (mandatory) is the path to the PostgreSQL installation used by Squore It is detected automatically on Linux (or passed as a parameter to ./install) and set to <SQUORE_HOME>/tools/pgsql on Windows.

→ **database/cluster directory="..."** (mandatory) is the path to the PostgreSQL cluster defined at installation to hold the Squore Database.

→ **database/backup directory="..."** (mandatory) is the path to the folder used by Squore by default to store backups. It can be overridden by passing a path to the backup script.

→ **phantomjs** (optional) allows you to specify the port used by Squore Server to communicate with the local instance of PhantomJS.

→ **configurations/path directory="..."** (mandatory): Paths to one or more configuration folders. The first path listed in the list takes precedence over the next one.

→ **addons/path directory="..."** (mandatory): Paths to one or more addons folders. The first path listed in the list takes precedence over the next one.

→ **tmp directory="..."** (mandatory) is the path to the temporary folder used to hold temporary analysis and user session data created while the server is running (this folder is emptied at startup).

→ **projects directory="..."** (mandatory) is the path to the project folder that holds analysis results. Files in this folder are included in a backup, along with the contents of the database.

→ **sources directory="..."** (optional, default: inside tmp folder) is the path to the folder used to store source files checked out from source code management systems. It is located by default inside the temporary folder, as the source code is not normally necessary after it has been analysed. If you need the source code to be saved permanently, move the sources folder outside of the temporary folder. This is normally only needed when working with zip files to send data files to the server.

## 5.2.2. Adding a Configuration Folder

In order to add a custom addons or configuration folder, simply add a `path` element in the configuration file:

```xml
<?xml version="1.0" encoding="utf-8" standalone="yes"?>
<squore type="server">
 <paths>
  (...)
 </paths>
 <database>
  (...)
 </database>
 <configuration>
  <path directory="C:\MyModels\configuration"/>
  <path directory="C:\Squoring\Squore\configuration"/>
 </configuration>
 <addons>
  <path directory="C:\MyModels\addons"/>
  <path directory="C:\Squoring\Squore\addons"/>
 </addons>
 <tmp directory="C:\Users\username\AppData\Local\Temp\Squore"/>
 <projects directory="C:\Squoring\Squore\projects"/>
 <sources directory="C:\Users\username\AppData\Local\Temp\Squore\sources"/>
</squore>
```

**Tip**
By adding your own custom configuration and addons folder before the standard configuration, you ensure that the modifications you made override the definitions from the standard configuration.

### 5.2.3. Giving Each User Their Own Temporary Folder

When several users run analyses using the command line on the server machine, it is good practice for each user to work with their own `tmp`, `sources` and `data` folders. This can be done by adding a `client` node in the server configuration file.

```
<?xml version="1.0" encoding="utf-8" standalone="yes"?>
<squore type="server">
 <paths>
        (...)
 </paths>
 <database>
        (...)
 </database>
 <configuration>
        (...)
 </configuration>
 <addons>
        (...)
 </addons>
 <client>
  <!-- java system properties are supported under the client node only -->
  <tmp directory="${java.io.tmpdir}/squore-${user.name}"/>
  <projects directory="${user.home}/.squore/projects"/>
  <sources directory="${java.io.tmpdir}/sources"/>
 </client>
 <tmp directory="..."/>
 <projects directory="..."/>
 <sources directory="..."/>
</squore>
```

As stated in the example, java system properties are supported in this section of <SQUORE_HOME>/config.xml.

**Tip**
All three elements are optional, and their default value if missing are the ones described in the XML snippet above.

## 5.3. Backup Tools

Your installation of Squore includes some scripts designed to help save and restore snapshots of your analysis data. These scripts will allow you to:

→ Backup the current Squore data (See Section 5.3.1, "Backing-Up the Squore Data")

→ Restore a previously saved snapshot (See Section 5.3.2, "Restoring Squore Data")

The scripts are located in the `<SQUORE_HOME>/bin` folder of the Squore installation directory.

The Windows and Linux backup scripts accept a parameter that is used as the path to store the backup file. This makes it possible to use a scheduled task on Windows or a cron job on Linux to automate your backups. If you do not specify this parameter, the default backup folder will be used and each new backup will replace the previous one.

**Warning**

→ Before launching a backup or restore operation, stop Squore Server completely and ensure that the Squore Database is started.

→ Backups can be launched while the server is running, but it is recommended to regularly perform a backup while the server is stopped. This guarantees that the database and the data files are in sync, which may not be the case if your server is started and analyses are running.

→ If your database is not running on the same machine as Squore Server, the backup will only include the Squore Server data files. When running in this configuration, you need to perform database backup and restore operations manually.

## 5.3.1. Backing-Up the Squore Data

The contents of the Squore Database and file system can be saved using the backup script from the `<SQUORE_HOME>/bin` folder.

There are several ways to create a backup:

→ By running `<SQUORE_HOME>/bin\backup.bat [%BACKUP_FOLDER%]` on Windows

→ By launching **Start > Squoring > Squore > Admin > Backup Data** on Windows

→ By running `<SQUORE_HOME>/bin/backup [$BACKUP_FOLDER]` on Linux

Executing this script creates a folder with a compressed database dump and a backup of the projects folder in the location configured in `<SQUORE_HOME>/config.xml`, or the backup folder specified on the command line. This backup can later be used by a script that restores database and file system snapshots, which we will cover in the next section.

## 5.3.2. Restoring Squore Data

A previously backed-up Squore snapshot can be restored using the restore script from the `<SQUORE_HOME>/bin` folder.

There are several ways to restore data:

→ By running `<SQUORE_HOME>/bin\restore.bat [%BACKUP_FOLDER%]` on Windows

→ By launching **Start > Squoring > Squore > Admin > Restore Saved Data** on Windows

→ By running `<SQUORE_HOME>/bin/restore [$BACKUP_FOLDER]` on Linux

The script uses the data dump in the `backup` folder specified in your `<SQUORE_HOME>/config.xml` or the backup folder specified on the command line to restore the database and file data for this snapshot.

## 5.3.3. Resetting the Squore Installation

You can reset the Squore installation to its initial state using the sqadm utility from the command line. The tool is located in the `<SQUORE_HOME>/bin` folder of the Squore installation directory.

**Warning**

This operation cannot be undone. All the projects, roles, users, groups and profiles you created will be lost.

1. Stop Squore Server

2. Ensure that the Squore Database is started

3. From a terminal, launch the following command:

```
sqadm reset
```

4.   Confirm, and allow the command to finish

5.   Start Squore Server

# 5.4. Creating a Linux Service

This section describes how you can create a service to start and stop Squore using the launcher script from the installation's `bin` folder.

**Note**

The examples below assume that:

→ Your Squore installation is located in `/opt/Squoring/squore-server`

→ You have created a user called **squore** to run the service, which is optional

After creating a service, you can configure it to launch Squore at boot, or you can start and stop Squore on your system by running the following commands:

```
sudo service squore start
sudo service squore stop
```

## 5.4.1. CentOS 6.6, OpenSUSE 13.2

1.   Create a Squore service description file in `/etc/init.d/squore`

```
#!/bin/sh
#
# Squore Server Service
#
# chkconfig: 2345 20 80
# description: Squore launcher

### BEGIN INIT INFO
# Provides: squore-server
# Required-Start:
# Required-Stop:
# Should-Start:
# Should-Stop:
# Default-Start:
# Default-Stop:
# Short-Description:
# Description:
### END INIT INFO

# Source function library
. /etc/rc.d/init.d/functions

exec="/opt/Squoring/squore-server/bin/sqctl"
user="squore"
prog="squore"
config=""

[ -e /etc/sysconfig/$prog ] && . /etc/sysconfig/$prog

lockfile=/var/lock/subsys/$prog
```

```
start() {
    #[ -x $exec ] || exit 5
    #[ -f $config ] || exit 6
    echo -n $"Starting $prog: "
    # if not running, start it up here, usually something like "daemon $exec"
    su $user -c "$exec start"
    #retval=$?
    #echo
    #[ $retval -eq 0 ] && touch $lockfile
    #return $retval
}

stop() {
    echo -n $"Stopping $prog: "
    # stop it here, often "killproc $prog"
    su $user -c "$exec stop"
    #retval=$?
    #echo
    #[ $retval -eq 0 ] && rm -f $lockfile
    #return $retval
}

restart() {
    su $user -c "$exec restart"
}

reload() {
    restart
}

force_reload() {
    restart
}

rh_status() {
    su $user -c "$exec status"
}

case "$1" in
    start)
        $1
        ;;
    stop)
        $1
        ;;
    restart)
        $1
        ;;
    reload)
        $1
        ;;
    force-reload)
        force_reload
        ;;
    status)
        rh_status
        ;;
    condrestart|try-restart)
        restart
```

```
        ;;
    *)
        echo $"Usage: $0 {start|stop|status|restart}"
        exit 2
esac
exit $?
```

2.  Make the service description file executable

```
chmod a+x /etc/init.d/squore
```

3.  Add it to chkconfig

```
chkconfig --add squore
```

4.  instruct chkconfig to start the service at boot

```
chkconfig squore on
```

## 5.4.2. CentOS 7.1

1.  Create a Squore service description file in `/etc/systemd/system/squore.service`

```
[Unit]
Description=Squore Server Service
After=network.target

[Service]
Type=forking
User=squore
ExecStart=/opt/Squoring/squore-server/bin/sqctl start
ExecStop=/opt/Squoring/squore-server/bin/sqctl stop

[Install]
WantedBy=multi-user.target
```

2.  Enable the service

```
systemctl enable squore.service
```

# 5.5. Advanced PhantomJS Settings

In order to handle cases where the URL configured in **Administration > System** is not accessible to PhantomJS, you can configure a different URL for the communication between Squore and PhantomJS. This is useful when you need to bypass a proxy on your network, or when the Squore Server URL just cannot be resolved from the machine it runs on itself. In those cases, you can force PhantomJS to make requests to Squore Server by adding the `squore-url` attribute to your <SQUORE_HOME>/config.xml, as shown below:

```
<phantomjs>
 <socket-binding port="3003" squore-url="http://127.0.0.1:8180/SQuORE_Server/" />
</phantomjs>
```

When using Microsoft Edge, extra configuration is needed in order to use the **Save as ...** menu items in the chart viewer. In this specific case, PhantomJS must be reachable on your network so that the end user's browser calls it directly to generate a downloadable chart on the fly. The PhantomJS URL needs to be specified in the `distant-url` attribute:

```
<phantomjs>
 <socket-binding port="3003" distant-url="http://servername:3003" />
</phantomjs>
```

## 5.6. Managing Project Visibility

Squore users can only have access to a project when they are added to the project's team by the project manager or an administrator. Until this happens, users are unaware of the projects that others have created. In situations where you wish users to be able to see the list of projects that exist on the server, you can configure Squore Server to provide users with a list of projects they do not currently have access to, so that they contact the project owner and ask to be added to the project's team.

As an administrator, your role is to define which projects should appear on this public list. The list includes all project whose group matches the value set up in the administration settings. The procedure below shows how you can automatically list all projects that were created within the `public` group to the public list.

1.    Log into Squore as an administrator and click on **Administration > System**

2.    Locate the option called **Allow Visibility** and check the box to make projects visible

3.    Locate the option called **Pattern to filter list by project group** and set it to `public`

4.    Click on **Apply** at the bottom of the page to save your changes

The Project Owners List options required to list projects from the `public` group

**Tip**

The **Pattern to filter list by project group** option accepts a regular expression. As a result, you can display projects from any group by setting its value to **.***, or projects from the `public` and `demo` groups by setting it to **public|demo**. By leaving the field empty, all the existing projects on the server will be visible.

After saving your changes, the **Projects** page will display a new button labelled **Ask access to Project Owners**, as shown below:

The Projects page with the Ask access to Project Owners button

When clicking the button, you will see the list of projects in the specified groups, together with their owner. Users can click on a user's e-mail address to ask the project owner if they can add them to the project team.



The Projects page with the Ask access to Project Owners button

## 5.7. Find out your Squore Version

Squore versions use the following naming convention: `major.minor.patch - buildId - scmInfo`. Major and minor releases usually introduce new functionality, while patch releases normally only contain bugfixes.

There are two ways to find out which version of Squore you are running:

→ From the web interface via **? > About**

→ From the command line by running

```
sqadm version
```

## 5.8. Changing Squore Server Port Number

You can change Squore Server port number after installation. The procedure involves modifying some configuration files in a text editor and restarting the server.

1.  Shutdown Squore Server

2.  Edit `<SQUORE_HOME>/server/standalone/configuration/standalone.xml` and search for the element **socket-binding-group**. The attribute port-offset="${jboss.socket.binding.port-offset:**100}"** defines the offset chosen at installation. Modify the value as needed.

3.  Start Squore Server.

## 5.9. Changing Squore Database Port Number

You can change the port used by the Squore Database by editing PostgreSQL's configuration file and modifying Squore Server's `<SQUORE_HOME>/server/standalone/configuration/standalone.xml` to point to the new port. The procedure involves modifying some configuration files in a text editor and restarting the server.

1.  Shutdown Squore Server and stop the database

2.  Open `<CLUSTER_DIR>/postgresql.conf` in a text editor and search for the line where the port option is defined:

```
port = 4561      # (change requires restart)
```

3.  Change the port value to the desired one for your system

4.  Open `<SQUORE_HOME>/server/standalone/configuration/standalone.xml` in a text editor and search for the database connection URL:

```
<connection-url>jdbc:postgresql://localhost:4561/squore</connection-url>
```

5.  Change the port value to match the change you made in `<CLUSTER_DIR>/postgresql.conf`.

6.  Start Squore Server.

> **Tip**
> If you do not know where <CLUSTER_DIR> is located on your server, you can find its location by reading the value of the `cluster` setting in `<SQUORE_HOME>/config.xml`.

## 5.10. Changing the PhantomJS port

The port used by PhantomJS can be changed by editing <SQUORE_HOME>/config.xml to change the port value in the following line:

```
<phantomjs>
 <socket-binding port="3003"/>
</phantomjs>
```

> **Note**
> After changing the port, restart Squore Server for the changes to take effect.

## 5.11. Changing the Java Heap Size

The maximum amount of memory used by Squore Server's Java process at runtime is defined at installation time. If you have not specified any value, the maximum amount of memory used will be 25% of the RAM available on the machine. It is recommended to keep the memory allocated to Squore under 25% of the total physical RAM so that other Squore modules (especially the database) or external processes (the OS and some Data Providers like Checkstyle or FindBugs) still have enough resources available.

This setting can be changed by following this procedure:

1.  Stop Squore Server

2.  Edit `<SQUORE_HOME>/server/bin/standalone.conf` on Linux or `<SQUORE_HOME>/server/bin/standalone.conf.bat` on Windows

3.  Change the value of the **Xmx** parameter, as shown below:

```
JAVA_OPTS="$JAVA_OPTS -Xms64m -Xmx1512m
```

or

```
set "JAVA_OPTS=%JAVA_OPTS% -Xms64M -Xmx1512M -XX:MaxPermSize=256M"
```

**Note**
In the example above, **1512M** is the default value for a machine with 6Gb RAM, i.e. 25% of 6048Mb.

4. Start Squore Server

## 5.12. Changing the path to the Java Installation

The path to the Java installation on your server can be updated by following the procedure below:

1. Stop Squore Server

2. Edit `<SQUORE_HOME>/server/bin/standalone.conf` on Linux or `<SQUORE_HOME>/server/bin/standalone.conf.bat` on Windows

3. Change the value of the **JAVA_HOME**, as shown below:

```
JAVA_HOME="/opt/java/jre8"
```

or

```
set "JAVA_HOME=C:\jre8"
```

4. Start Squore Server

## 5.13. Configuring Timeouts

You can change the main timeout value for tasks on a Squore Server installation. . The default value is six hours and is generally fine: if an analysis runs for six hours, it is assumed that something went wrong or will go wrong for reasons regarding memory consumption.

If you decide that the timeout does not suit your workflow, you can change the default timeout value from the Administration pages:

1. Log into Squore Server as a user with administrative privileges.

2. Click **Administration > System** to view the advanced configuration options.

3. Set the value of the timeout in seconds in the **Timeout of queue tasks, in seconds** field.

**Note**
The timeout period defines how long a project can stay in the project queue on the server. This means the timeout period for projects created using the web interface or from the command line using the `DELEGATE_CREATION` command is as defined by the parameter above. For projects created from the command line using the `PROCESS_CREATION` command, the part of the analysis carried out on the client machine is not taken into account in the timeout time. These projects only enter the server queue when the analysis is finished on the client and the results are sent to the server for processing, and there is no built-in timeout for the client part of the analysis.

## 5.14. Number of Concurrent Analyses

You can change the size of the project queue on a Squore Server installation.  The default value is 8, which means that 8 projects can be analysed in parallel.

If your hardware can handle a higher number of concurrent analyses, you can increase the queue size by editing the file `<SQUORE_HOME>/Server/server/default/deploy/squore-server.ear/squore-server.jar/META-INF/ejb-jar.xml`, and set the **maxSession** key to the desired size. This involves repackaging and redeploying the application, as explained below:

1. Extract the settings file:

```
cd <SQUORE_HOME>/deploy
jar xf squore-server.ear
jar xf squore-ejb.jar
```

2. Make the necessary modifications:

   → Open `<SQUORE_HOME>/deploy/squore-ejb.jar/META-INF/ejb-jar.xml` in a text editor

   → Modify the parameter **maxSession** (default: 8) to set it to the number of projects that can be created in parallel

3. Repackage the application:

```
cd <SQUORE_HOME>/deploy
jar cf squore-ejb.jar
jar cf squore-server.ear
```

4. Deploy the patched application following the instructions on https://openwiki.squoring.com/index.php/Deploying_A_Patch#Since_Squore_16.1.2.

**Tip**

Instead of using the command line, you can use 7zip on Windows to open the .ear and .jar files and directly patch their contents.

## 5.15. Number of Concurrent Delete Tasks

You can change the number of delete tasks running concurrently by changing the setting on **Administration > System**. This is useful on systems where you run into errors when deleting multiple versions and projects at the same time causes errors.

Leaving the field empty uses the slots available as defined in Section 5.14, "Number of Concurrent Analyses" to launch several deletions in parallel. If you encounter errors when deleting projects, notably ORA-00060 errors when using an Oracle database, setting the parameter to 1 helps reducing the occurrences of these errors.

## 5.16. Theme Control

Squore's web interface allows users to choose between several UI themes: chocolate (brown), classico (green) , neroverdi (light green), rossoneri (red). When a user selects a theme, their preference is saved and this theme is applied each time they log into Squore. As an administrator, you can manage theme functionality in two ways:

→ Define what the default theme for all users is

→ Prevent users from using a theme other than the default one

You can access these options from **Administration > System** in the **Theme Control** section.

**Tip**

You can also configure these settings by specifying values for the options **ui.theme.default** and **ui.theme.changeable** in <SQUORE_HOME>/server/standalone/configuration/ squore-server.properties. The default values are shown below:

```
ui.theme.default = classico
ui.theme.changeable = true
```

## 5.17. Updating the Squore Licence File

A Squore licence key file named `squore-license.p7s` should have been provided to you by Squoring Technologies under the applicable Squore licencing agreement.

Follow these steps to deploy the Squore licence file:

1.  Log into Squore Server as an administrator

2.  Click on **? > License**
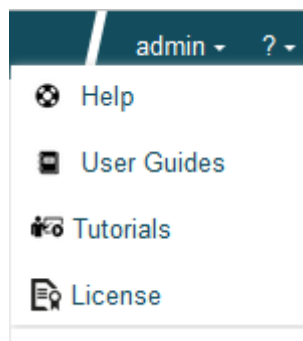


3.  On the License Management page, click Deploy a license file



4.  Upload your new licence file and click Deploy. If the new licence file is valid, you are automatically redirected to the home page.

**Tip**

You can access the License Management without logging in if you are accessing http://localhost:8180/SQuORE_Server from the machine running Squore Server itself.

## 5.18. Connecting to a Remote Licence Server

In this section, you will learn to configure Squore to rely on a remote licence server instead of using the licence server embedded into your local installation. This is useful when you run a production server and a development server, and you want the licence to be shared between both installations.

**Note**

Before you follow these steps, ensure that the two Squore servers are installed and start up correctly as described in Chapter 3, *Installing Squore Server* and Chapter 4, *Starting Squore* and that the remote licence server listens to requests from remote machines:

```
<interface name="public">
 <inet-address value="${jboss.bind.address:0.0.0.0}"/>
</interface>
```

**Tip**

If both servers are running on the same machine, then each server must be identified as a specific instance for this configuration to work. You can achieve this by editing the `server` element at the root of `<SQUORE_HOME>/server/standalone/configuration/standalone.xml` and adding a `name` attribute as shown below:

```
<?xml version='1.0' encoding='UTF-8'?>
<server name="production" xmlns="urn:jboss:domain:4.2">
...
</server>
```

Assign a different name for each server installation before you start following the procedure below.

**Warning**

This procedure involves modifying `<SQUORE_HOME>/server/standalone/configuration/standalone.xml` and removing one of the default applications deployed automatically by the installation or upgrade script. These changes therefore have to be applied again after upgrading Squore.

In order to point a local Squore server to a licence served by a remote Squore installation, carry out the following steps:

1. On the remote license server (optional):

By default, the password of the `ejb` user is `changeme`. If you want to change the password, then:

a.  Generate a new password with this command:

```
echo -n "ejb:ApplicationRealm:new_password" | md5sum
```

where **new_password** is the password to assign to the user.

b.  Edit `<SQUORE_HOME>/server/standalone/configuration/application-users.properties` to specify the new password as shown below:

```
#
# Properties declaration of users for the realm 'ApplicationRealm' which
 is the default realm
# for application services on a new AS 7.1 installation.
# (...)
ejb=bc0deae7c29cd133a2de015f36ab6132
```

c.  Restart Squore Server.

2.  On the local server:

a.  Stop Squore Server.

b.  Edit `<SQUORE_HOME>/server/standalone/configuration/squore-server.properties`.    Add    the property:

```
license.remote = true
```

c.  Edit `<SQUORE_HOME>/server/standalone/configuration/standalone.xml` .

d.  Find the `remote-ejb outbound-socket-binding` element and edit its `remote-destination` definition accordingly so that the `host` and `port` match the hostname and http port of the remote server (8080 plus the offset you defined during installation, so 8180 by default). Here is an example of the complete configuration block:

```
<outbound-socket-binding name="remote-ejb">
 <remote-destination host="remoteLicenceServer" port="8180"/>
</outbound-socket-binding>
```

e.  Optionally, if you have changed the default password for the ejb user on the remote server, look for the `ejb-security-realm security-realm element` , and modify the secret value with the output of the command

```
echo -n "new_password" | openssl base64
```

. Here is an example of the complete block:

```
<security-realm name="ejb-security-realm">
 <server-identities>
  <secret value="bmV3X3Bhc3N3b3Jk"/>
 </server-identities>
</security-realm>
```

f.  Restart Squore Server

g.  Run the following command, with `port` matching the controller port of the installation (9990 plus the offset defined at install time, so 10090 by default):

```
<SQUORE_HOME>/server/bin/jboss-cli.sh -c \
 --controller=localhost:10090 \
 --command="undeploy squore-license.ear"
```

The local Squore Server is now using a remote licence server.

## 5.19. Managing Squore User Accounts

### 5.19.1. Deactivating and Deleting Users

User deletion in Squore permanently blocks an account **and** a login from being reused, and is therefore not recommended unless you know that the associated user will never need to access Squore again. Instead of deleting a user account, you can make it inactive. This section covers the difference between both operations.

When you delete an account:

→ The user cannot access Squore anymore to view or create projects

→ The comments made by the user are kept and are still displayed in the web UI.

→ You will not be able to reuse the account's login for another user.

→ A licence token is freed up for another user immediately.

When you deactivate an account:

→ The user cannot access Squore anymore to view or create projects

→ The comments made by the user are kept and are still displayed in the web UI.

→ You can set the account to active again at any time to allow the user to log in again.

→ A licence token is freed up when the account becomes inactive (usually 6 months after the last recorded activity of the user).

Deactivating an account is usually a safer operation, especially if you are integrating Squore with an LDAP directory.

### 5.19.2. Exporting Users

Squore lets you export your list of user accounts to a CSV file.

This feature makes use of a perl script that can be run from the command line, as long as you make sure that you have a valid Perl environment for Squore. Refer to Section 5.20, "Setting Perl Environment" for more information about verifying that your environment is correct before running the script.

In order to export user accounts, follow these steps:

1.  Move to `<SQUORE_HOME>/addons/scripts/export-scripts`, which the location of the **sqexport.pl** script.
2.  Run the perl script with the appropriate options to export users, groups and their members respectively:
    ```
    perl sqexport.pl -f users.csv users
    ```
    ```
    perl sqexport.pl -f groups.csv groups
    ```
    ```
    perl sqexport.pl -f members.csv groups -m
    ```

The format of the csv files is described below.

users.csv

```
login;fullname;email;password;department;
demo;demo;demo@domain.com;[encrypted-password];demo;
```

members.csv

```
group;login
Demo Mode;tobias
```

## 5.20. Setting Perl Environment

This section is useful if you want to manually execute Perl scripts that are usually internally used by Squore.

### 5.20.1. Windows

If you have installed the Portable Strawberry Perl with Squore, locate and execute this file (skip this step otherwise):

```
<SQUORE_HOME>\Tools\perl\portableshell.bat
```

Then type all commands in the new command prompt window.

```
SET SQUORE_HOME=<SQUORE_HOME>
SET PERL5LIB=%SQUORE_HOME%\share\perl
```

### 5.20.2. Linux

```
SQUORE_HOME=<SQUORE_HOME>
export SQUORE_HOME
PERL5LIB=$SQUORE_HOME/share/perl
export PERL5LIB
```

## 5.21. Usage Statistics

As a Squore administrator, you may need to keep track of the usage of the platform and report on its overall performance. This information is now available directly within Squore via **Administration > Statistics**. If you are also a model developer or a project manager and wish to fine-tune the layout of your dashboards, you will find more statistical data about how users consult analysis results via **Models > Statistics** and the **Manage Project** page. This section describes the information you can access from these pages. Note that statistics are collected locally, saved in the Squore database, and never sent anywhere. Statistics collection cannot be turned off. Viewing the statistics collected on the server is subject to licence.

**Tip**
Before you can view statistics on these pages, a date range must be selected in order to display information about the activity on the server during this period. You can also select whether the information is aggregated by day, week, month or year by adjusting the granularity setting.
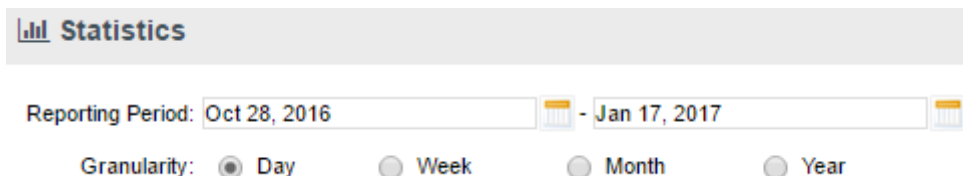


### 5.21.1. Application Usage Statistics for Administrators

The application usage statistics are broken down into five sections where you can view information about users, projects, hardware resources, pages response time and dashboard usage.

## Users
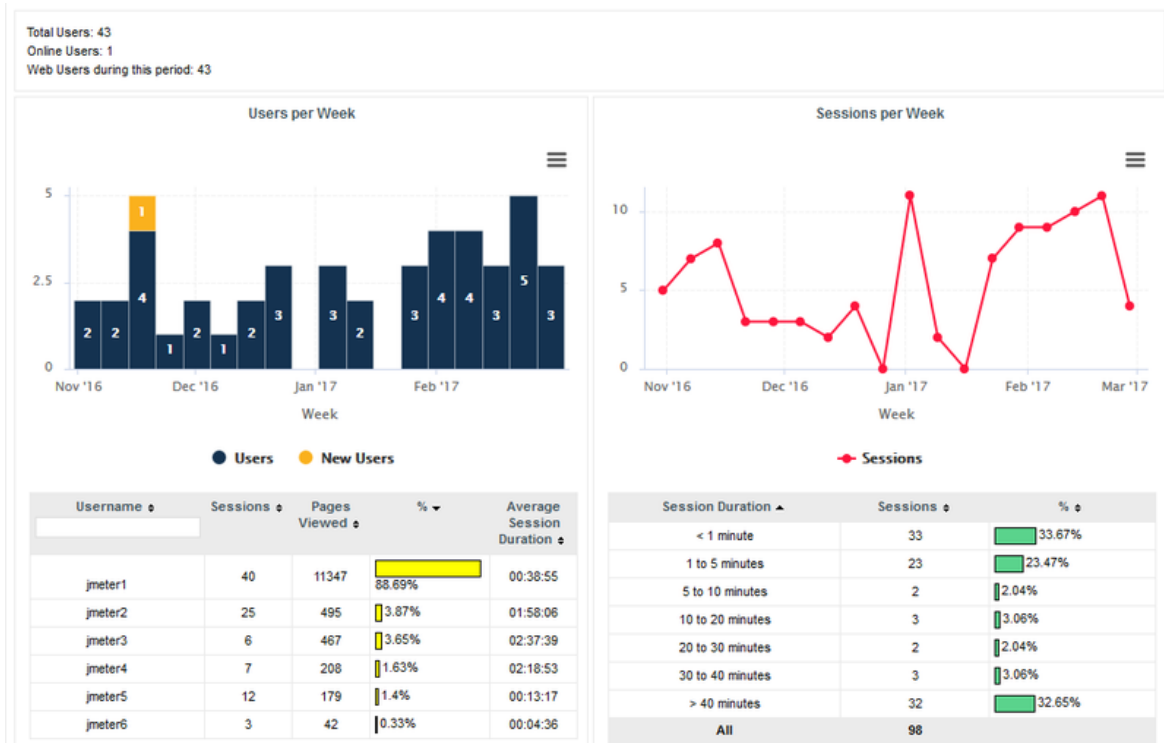


The Users tab displays the following information:

→ Global statistics about user accounts for this Squore Server installation

→ Information about current Web Users Web Users during the selected period

→ A series of charts containing information about the number of users, new users and overall connections to the server during the selected period

→ A table detailing session information per user

→ A table displaying session duration statistics

---

## Projects
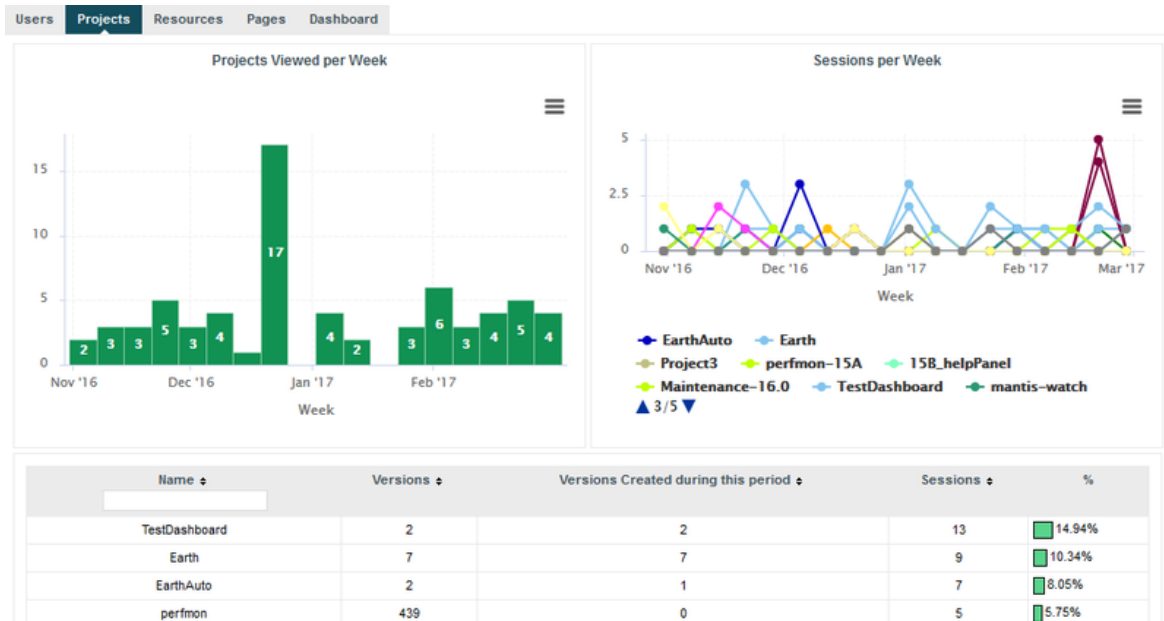


The Projects tab displays information about the number of projects viewed. You can get overall numbers of visits for all the projects on the server, or select specific projects to compare their number of views. The data is rendered as:

→ A chart showing a trend of the total number of projects viewed for the selected reporting period

→ A chart where you can consult detailed view statistics about the projects of your choice. You can click on a project name to show or hide it from the chart.

→ Information about the number of sessions per project during the selected period

## Resources

The Resources tab helps administrators in monitoring the memory and disk consumption and the performance of the application.

Memory Consumption vs. Users per Week
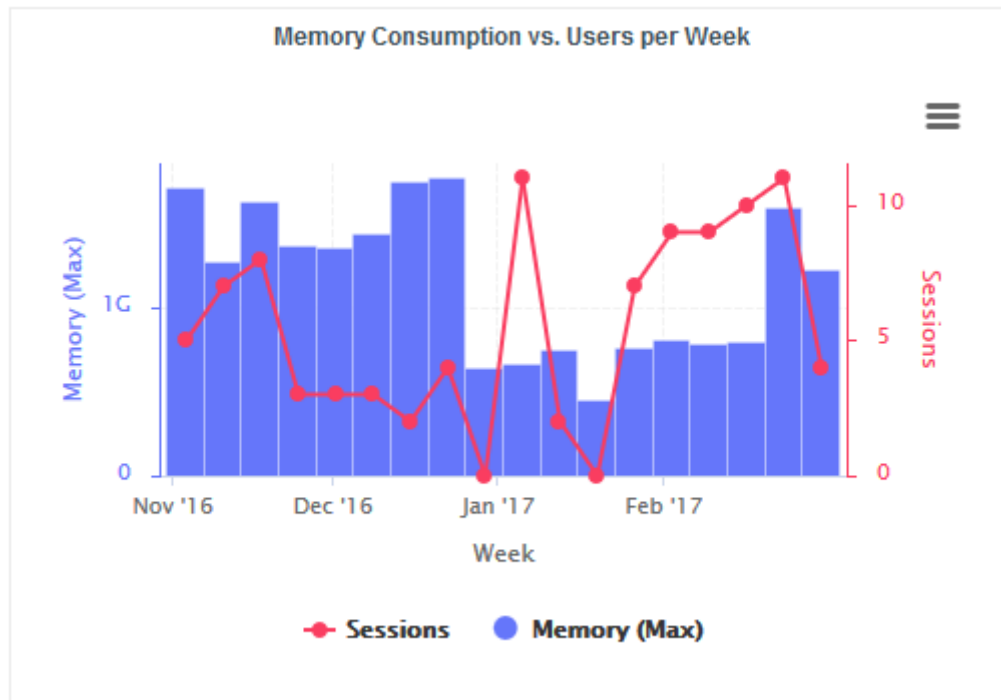
**Memory Consumption vs. Users:** displays a history of the amount of memory used by the java process running the application and a line indicating the number of users who logged in during the selected period.



Database Size vs. Average Load Time per Week
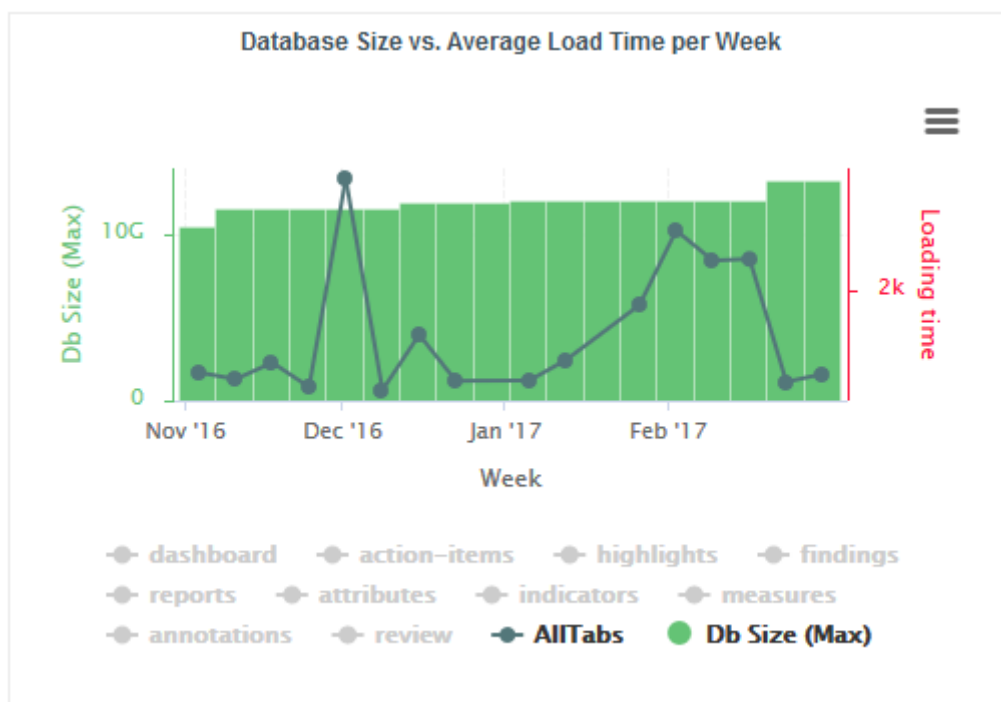
**Database Size vs Average Load Time:** displays a history of the size of the database on disk. Trend lines displaying the average page or tab load times can be displayed on the chart.

## Pages
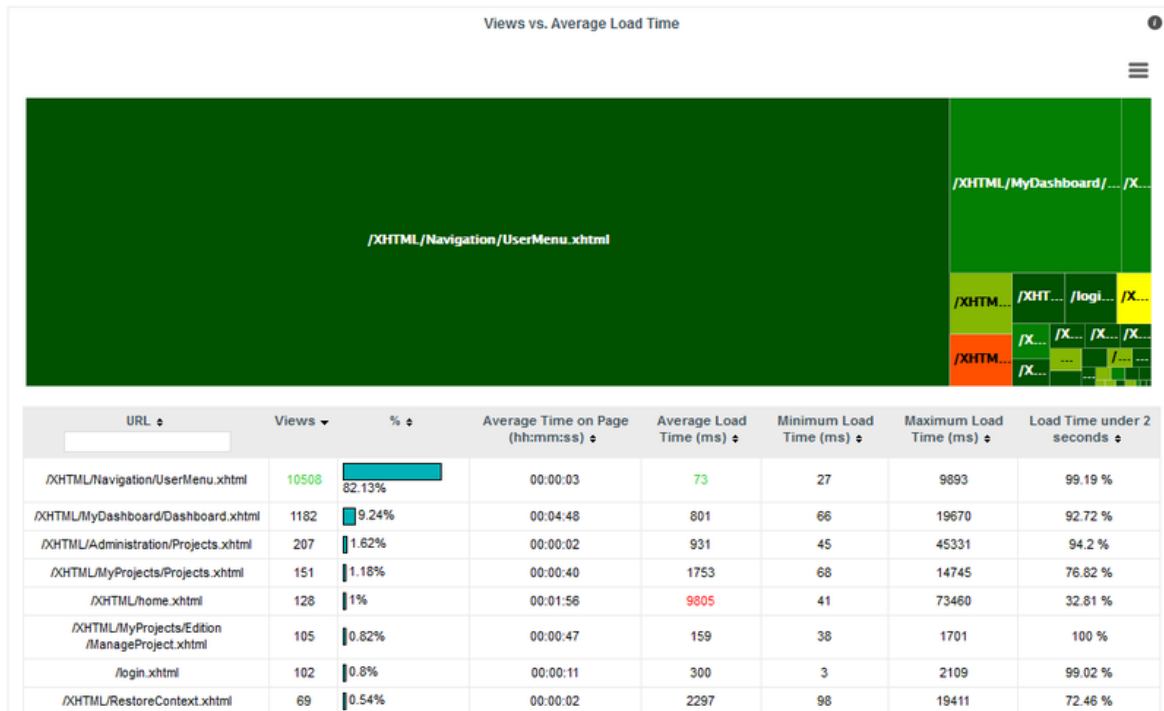


The Pages tab, shows statistics about page views and load times in tabular form and graphical form. The table automatically highlights the best result in green and the worst result in red.

## Dashboard
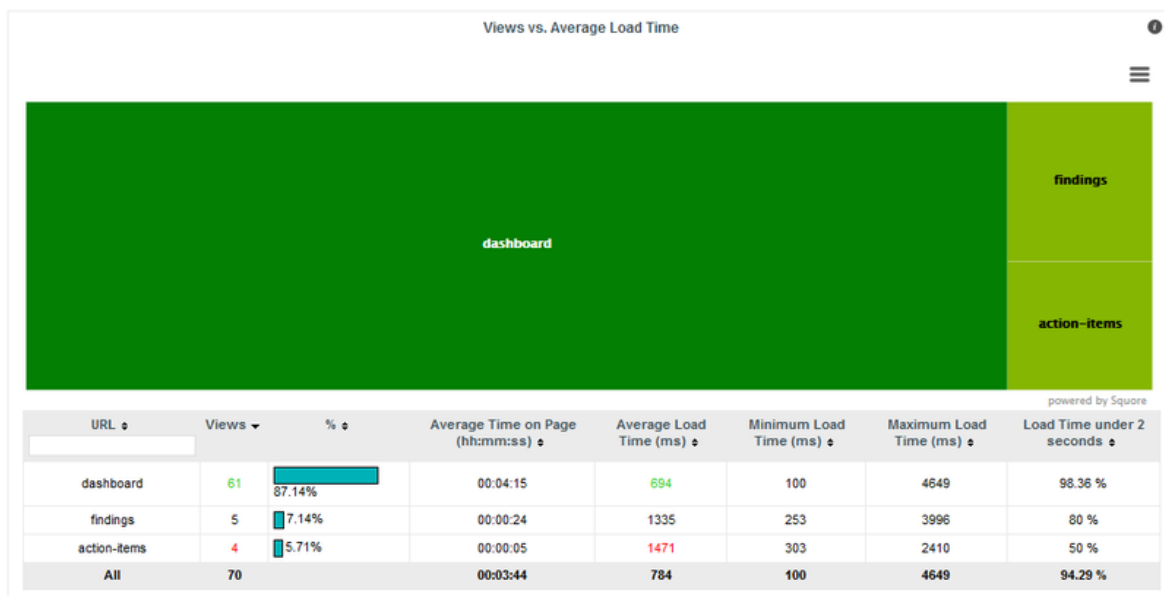


The Dashboard tab allows analysing the usage of each tab on the dashboard. Each tab is represented in a treemap according to how many views it receives. This information can be used to adjust the default display status of each tab or their availability to end users.

## 5.21.2. Statistics for Model Developers

You can learn more about the usage of particular features of a model by clicking **Models > Statistics**. For each analysis model, find out how many users consult results, which projects are the most popular and which regions and charts of the dashboard are the most useful for users.

### Users



The Users tab displays the information about the number of users and overall connections to the server for projects in this analysis model.

### Projects
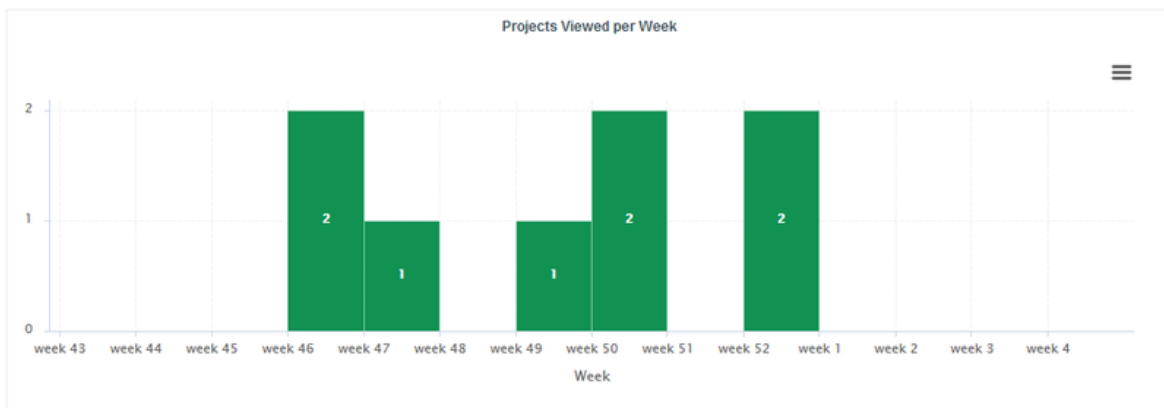


On the Projects tab, you can check how many projects had visitors over the selected period.

## Dashboard
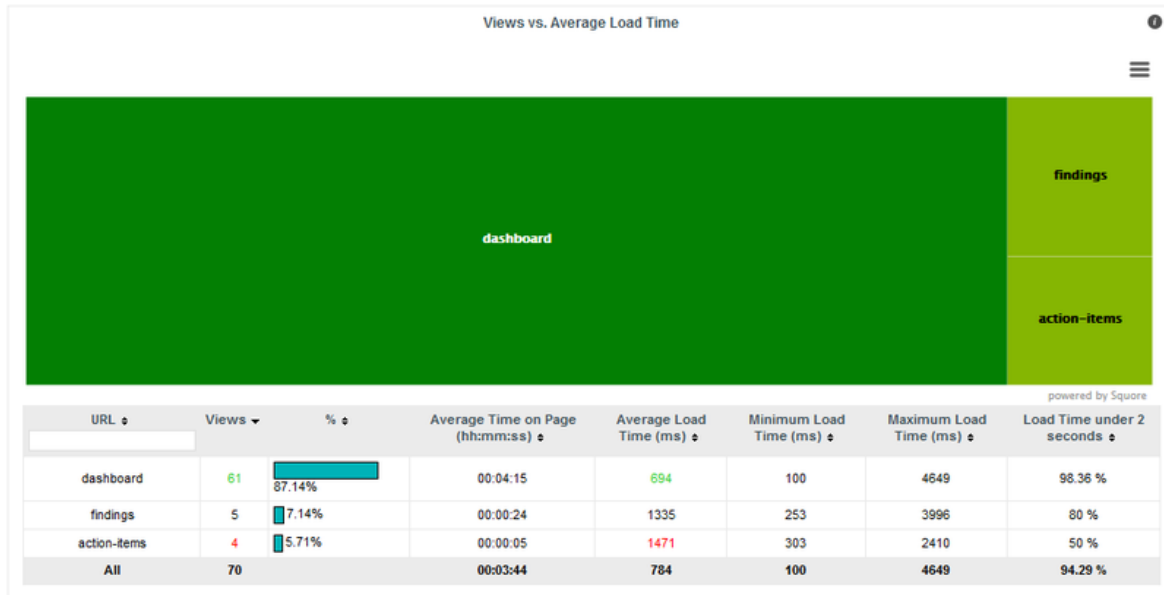


The Dashboard tab allows analysing the usage of each tab on the dashboard. Each tab is represented in a treemap according to how many views it receives. This information can be used to adjust the default display status of each tab or their availability to end users.

## Charts

| Chart ▲ | Sessions | Average Load Time | Comments |
|---|---|---|---|
| EVOL_HANDLER | 1 | 0 | 0 |
| Health | 1 | 0 | 0 |
| Issues to Verify | 2 | 0 | 0 |
| MANTIS_EVOL | 1 | 0 | 0 |
| REMAIN_TASK_ID | 1 | 1 | 0 |
| SCRUMBOARD_APPROVAL | 1 | 2530 | 0 |
| SCRUMBOARD_PRIORITY | 2 | 1579 | 0 |
| STATUS_HOTLINE | 1 | 0 | 0 |
| STATUS_MAINTENANCE | 1 | 0 | 0 |
| STATUS_RELEASE | 1 | 0 | 0 |
| To Be Estimated by Handlers | 1 | 1 | 0 |
| **Total** | **13** | **437** | **0** |
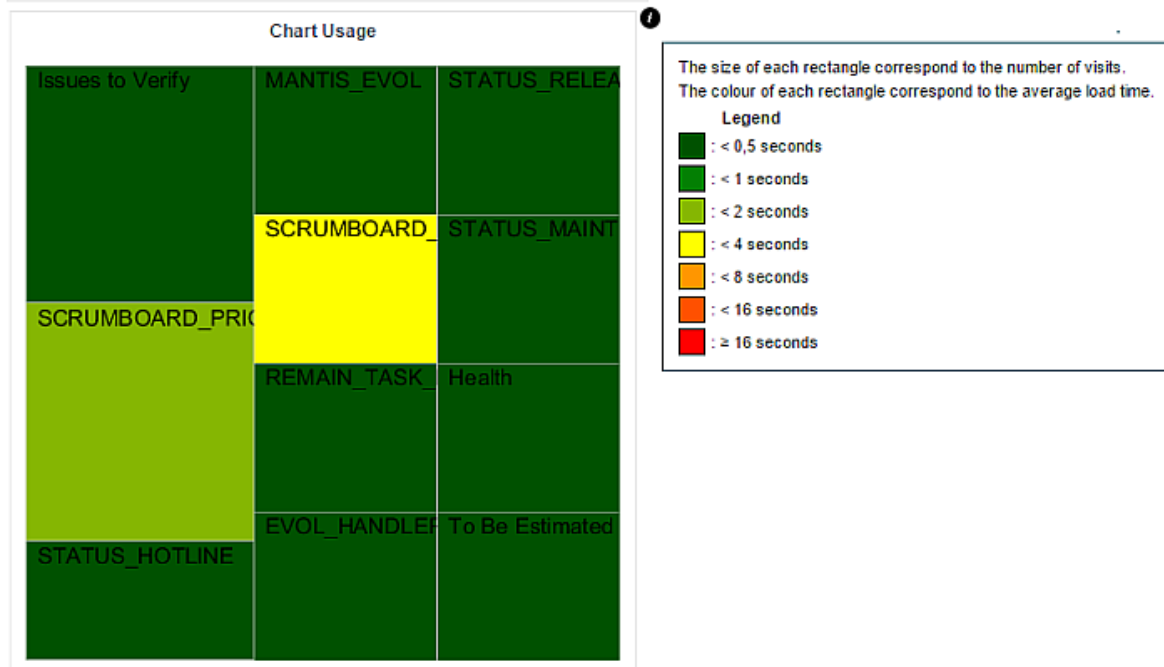


The Charts tab provides information about chart usage in your model: The number of views per chart (per artefact type or for all artefact types), the average loading time and the number of comments.

## 5.21.3. Statistics for Project Managers

As a project manager, you can use project statistics to investigate the popularity of your project by going to **Manage > Statistics**.
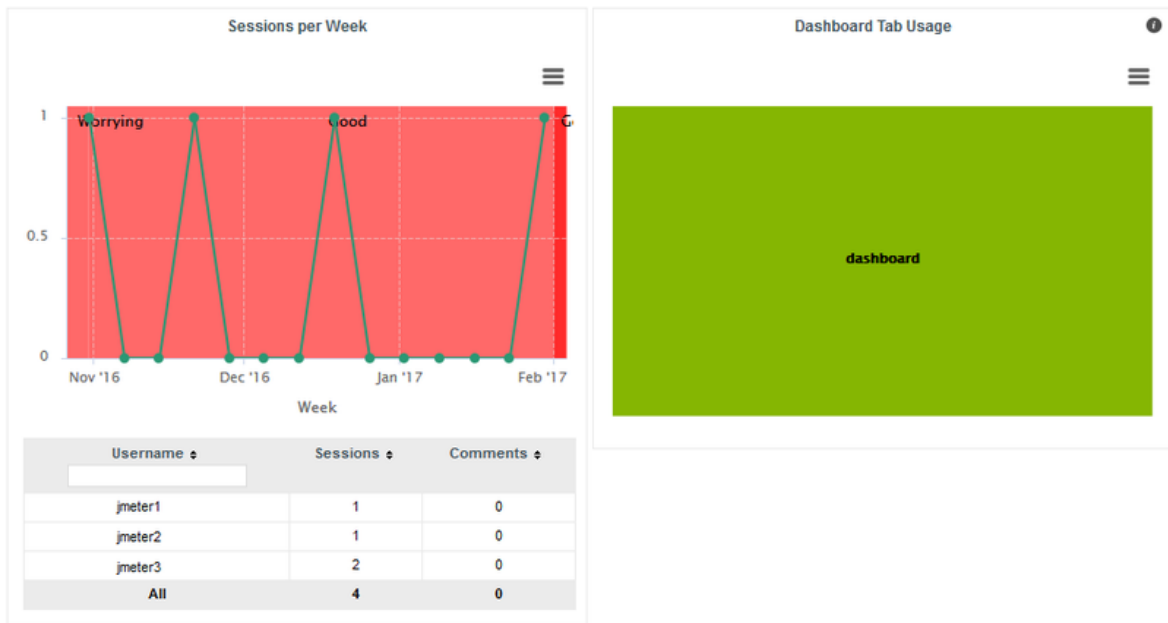
When you select a reporting period, the following information is displayed:

→ The trend of the number of views for this project uses the colours from the scale of the root indicator as background to help you correlate the project rating with the number of visits.

→ The treemap helps you understand which of the dashboard tabs is the most visited for this project.

→ A table summarises the breakdown of views per user, as well as the number of comments left by each user.

# 6. Integrating Squore on Your Network

## 6.1. Accessing Squore via HTTPS

You can configure WildFly to allow https access to Squore Server instead of http by following the instructions below.

### Note

These instructions are based on the standard WildFly instructions from https://docs.jboss.org/ author/display/WFLY10/Security+Realms#SecurityRealms-DetailedConfiguration for securing the web server and use a self-signed certificate managed in the Java keystore, which may show a warning in users' browsers.

If your company supply their own certificate and you want to import it instead of generating one, refer to the instructions in Section 6.4, "Key and Certificate Management".

### Tip

It is also possible to use Apache as a reverse proxy on top of Squore Server to achieve the same result. For more information, consult Section 6.3, "Proxying Squore Server with Apache".

1.  Generate a secret key/certificate and store it in a file called a "key store" (foo.keystore in the current directory). The certificate is valid for 30 years (10950 days). The password use for encryption is "secret". One important issue is the common name (CN) of the certificate. For some reason this is referred to as "first and last name". It should however match the name of the web server, or some browsers like IE will claim the certificate to be invalid although you may have accepted it already.

```
$ keytool -genkey -alias foo -keyalg RSA -keystore foo.keystore -validity
 10950
Enter keystore password: secret
Re-enter new password: secret
What is your first and last name?
  [Unknown]:  foo.acme.com
What is the name of your organizational unit?
  [Unknown]:  Foo
What is the name of your organization?
  [Unknown]:  acme corp
What is the name of your City or Locality?
  [Unknown]:  Duckburg
What is the name of your State or Province?
  [Unknown]:  Duckburg
What is the two-letter country code for this unit?
  [Unknown]:  WD
Is CN=foo.acme.com, OU=Foo, O=acme corp, L=Duckburg, ST=Duckburg, C=WD
 correct?
  [no]:  yes

Enter key password for <deva> secret
    (RETURN if same as keystore password):
Re-enter new password: secret
```

2.  Create a new security realm in WildFly's <SQUORE_HOME>/server/standalone/configuration/ standalone.xml to configure an SSL Server identity:

```
<management>
 <security-realms>
```

```
    <security-realm name="SslRealm">
     <server-identities>
      <ssl>
       <keystore path="/path/to/foo.keystore" keystore-
password="keystore_password" alias="foo" key-password="key_password" />
      </ssl>
     </server-identities>
    </security-realm>
    <security-realm name="ManagementRealm">
    ...
    </security-realm>
   </security-realms>
</management>
```

**Tip**

You can use a relative path to the keystore file if you add a `relative-to="jboss.server.config.dir"` attribute to your `keystore` element.

3. Add a HTTPS listener next to the default HTTP listener in <SQUORE_HOME>/server/standalone/configuration/standalone.xml:

```
<http-listener [...] name="default" socket-binding="http" [...] />
<https-listener name="default-ssl" socket-binding="https" max-post-size="0"
 security-realm="SslRealm"/>
```

**Note**

Alternatively, if you want to completely disable HTTP access, remove the **http** `connector` .

4. Start Squore Server. The SSL port is 8443 + the offset selected at installation. By default you should therefore be able to access the web interface via https://localhost:8543 in your browser.

## 6.2. Redirecting from HTTP to HTTPS

After you enable HTTPS access to Squore Server following the steps described in Section 6.1, "Accessing Squore via HTTPS", you can automatically redirect insecure traffic to HTTPS by modifying <SQUORE_HOME>/server/standalone/configuration/standalone.xml:

1. Find the `host` section of the undertow `subsystem` and add a `filter-ref` element to match URLs using the server's HTTP port:

```
<host name="default-host" alias="localhost">
 <location name="/" handler="welcome-content"/>
 <filter-ref name="server-header"/>
 <filter-ref name="x-powered-by-header"/>
 <filter-ref name="http-to-https" predicate="not(equals(%A,'127.0.0.1')) and
 equals(%p,8180)"/>
</host>
```

2. Find the `filters` section of the undertow `subsystem` and add a `rewrite` element to redirect insecure requests to HTTPS:

```
<filters>
 <response-header name="server-header" header-name="Server" header-
value="WildFly/10"/>
 <response-header name="x-powered-by-header" header-name="X-Powered-By"
header-value="Undertow/1"/>
 <rewrite name="http-to-https" target="https://localhost:8543%U"
redirect="true"/>
```

```
</filters>
```

3.   Start Squore Server and access http://localhost:8180 to verify that you are automatically redirected to https://localhost:8543.

## 6.3. Proxying Squore Server with Apache

It is possible to use Apache in a proxy/reverse proxy role on top of Squore Server. This approach makes use of the `proxy` and `proxy_wstunnel` modules to handle web and websocket traffic between client browsers and Squore Server and is compatible with Apache starting from version 2.4.

> **Note**
>
> For more information about the Apache modules, consult http://httpd.apache.org/docs/2.4/mod/mod_proxy.html and http://httpd.apache.org/docs/2.4/mod/mod_proxy_wstunnel.html.

The following configuration can be used to proxy Squore Server traffic in your Apache configuration file:

```
<VirtualHost *:80>
  ServerName   squore.example.com
  ProxyPass / http://localhost:8180/
  ProxyPassReverse / http://localhost:8180/
  <Location />
    RewriteEngine on
    RewriteCond %{HTTP:UPGRADE} ^WebSocket$ [NC]
    RewriteCond %{HTTP:CONNECTION} Upgrade$ [NC]
    RewriteRule .* ws://localhost:8180%{REQUEST_URI} [P]
  </Location>
</VirtualHost>
```

These lines of configuration are the minimum required to guarantee that the necessary traffic to and from Squore. For more complex scenarios, including SSL and certificate configuration, refer to official Apache documentation on http://httpd.apache.org/docs/2.4/.

## 6.4. Key and Certificate Management

For more details on keys and certificates management  with the **keytool** utility, please refer to the keytool(1) man page, or online documentation.

The system-wide keystore with CA certificates is a `cacert` file, which is located in the `java.home/lib/security` directory, where *java.home* is the runtime environment's directory.

Note: the default password of the system-wide keystore is *changeit*.

### 6.4.1. Import a private key and a certificate

The Java **keytool** utility does not support importing a private key directly from a file. First convert the private key into PKCS12 format, then merge that file with the Java keystore:

openssl pkcs12 -export -in *server.crt*  -inkey *server.key*  -name *company*  -out *file.p12*

keytool -importkeystore -srckeystore *file.p12*  -destkeystore *file.keystore* -srcstoretype PKCS12 -destalias *company*

## 6.4.2. Import a certificate

To import a certificate into a keystore:

```
keytool –importcert -keystore file.keystore  -file file.crt  -alias company
```

You can now use the keystore and certificate alias to configure HTTPS access to your Squore installation following the instructions in Section 6.1, "Accessing Squore via HTTPS".

# 6.5. Using the LDAP Authentication Module

By default, Squore Server uses its own authentication mechanism, storing user information in the Squore database. An existing directory can be used in addition, so that all existing users your the directory can log into Squore without having to create accounts manually, and the user's full name, e-mail address and department can be imported automatically. The process described in this section explains how to configure a Squore administrator, set up the server to authenticate all new users as standard users when they log in via with their LDAP credentials and finally lists the configuration files that need to be modified to turn on LDAP authentication. After you integrate with LDAP, you will still be able to create and use users that are only known to Squore and do not exist in your directory.

**Tip**

Before you start, ensure that you know:

→ The address of the LDAP server you want to connect to Squore.

→ The section(s) of the directory that contain the users that should be allowed to log into Squore.

→ The login and password of a user account allowed to browse the section(s) of the directory mentioned above.

→ Basic knowledge of your directory structure. Note that Squore was tested with Microsoft Active Directory on Windows Server 2008 and OpenLDAP on Ubuntu 12.04.

In order to enable LDAP authentication, follow these steps:

1. Decide which role will be associated to a user the first time they log into Squore. The default choices are:

    → **STANDARD_USER**: Standard users can view projects.

    → **ADVANCED_USER**: Advanced users can projects and create new ones.

    → **ADMINISTRATOR**: Administrators can view projects and administer the server. They cannot create projects.

    If none of these choices fit your needs, you can create a specific profile later by logging into Squore and going to **Administration > Profiles**. If no profile is specified, then the user will be assigned the **STANDARD_USER** profile by default.

2. Decide which group new users will be part of the first time they log into Squore. The default choices are:

    → **users**: Users from this group can view and create projects.

    → **admin**: Users from this group can administer Squore and view projects but they cannot create projects.

    If none of these choices fit your needs, you can create a specific group later by logging into Squore and going to **Administration > Groups**. If no group is specified, then the user will not be added to any group.

3. Configure WildFly: Edit `<SQUORE_HOME>/server/standalone/configuration/standalone.xml`, and locate the section providing the *squore-policy* security domain, which by default looks like this:

```
<security-domain name="squore-policy" cache-type="default">
 <authentication>
  <login-module code="Database" flag="sufficient">
  (...)
  </login-module>
 </authentication>
</security-domain>
```

4. Paste in the configuration for LDAP or Active Directory before the default login module. Here is a full `security-domain` with both login modules:

```
<security-domain name="squore-policy" cache-type="default">
 <authentication>
 <!-- LDAP login module -->
 <login-module code="com.squoring.squore.server.security.LdapLoginModule"
 flag="sufficient">
  <module-option name="java.naming.factory.initial"
 value="com.sun.jndi.ldap.LdapCtxFactory"/>
   <module-option name="java.naming.provider.url" value="ldaps://domain-
controller:636/"/>
   <module-option name="java.naming.security.authentication" value="simple"/>
   <module-option name="baseCtxDN" value="ou=people,dc=example,dc=com"/>
   <module-option name="bindDN" value="cn=admin,dc=domain,dc=com"/>
   <module-option name="bindCredential" value="password"/>
   <module-option name="baseFilter" value="(uid={0})"/>

   <module-option name="rolesCtxDN" value="ou=groups,dc=example,dc=com"/>
   <module-option name="roleFilter" value="(member={1})"/>
   <module-option name="roleAttributeIsDN" value="false"/>
   <module-option name="roleAttributeID" value="cn"/>

   <module-option name="userCompositeName" value="cn"/>
   <module-option name="userMail" value="mail"/>
   <module-option name="userOrganizationUnit" value="ou"/>
   <module-option name="userId" value="uid"/>
 </login-module>
 <!-- Active Directory login module -->
 <login-module code="com.squoring.squore.server.security.LdapLoginModule"
 flag="sufficient">
  <module-option name="java.naming.factory.initial"
 value="com.sun.jndi.ldap.LdapCtxFactory"/>
   <module-option name="java.naming.provider.url" value="ldap://domain-
controller:389/"/>
   <module-option name="java.naming.security.authentication" value="simple"/>
   <module-option name="baseCtxDN" value="OU=Users,DC=EXAMPLE,DC=COM"/>
   <module-option name="bindDN"
 value="CN=Administrator,OU=Administrators,DC=EXAMPLE,DC=COM"/>
   <module-option name="bindCredential" value="password"/>
   <module-option name="baseFilter" value="(sAMAccountName={0})"/>

   <module-option name="rolesCtxDN" value="OU=Users,DC=EXAMPLE,DC=COM"/>
   <module-option name="roleFilter" value="(sAMAccountName={0})"/>
   <module-option name="roleAttributeIsDN" value="true"/>
   <module-option name="roleAttributeID" value="memberOf"/>
   <module-option name="roleNameAttributeID" value="CN" />
   <module-option name="searchScope" value="ONELEVEL_SCOPE"/>

   <module-option name="userCompositeName" value="sAMAccountName"/>
   <module-option name="userMail" value="mail"/>
```

```
  <module-option name="userOrganizationUnit" value="department"/>
  <module-option name="userId" value="sAMAccountName"/>
</login-module>
<login-module code="Database" flag="sufficient">
  (...)
</login-module>
</authentication>
</security-domain>
```

5. Edit the security domain properties to reflect your setup (LDAP or Active Directory). The LDAP administrator shall provide the following information:

   → **java.naming.provider.url**: The URL of the directory server.

   → **baseCtxDN**: The fixed DN of the context to start the user search from.

   → **bindDN**: The DN used to bind against the ldap server for the user and roles queries. This is some DN with read/search permissions on the baseCtxDN and rolesCtxDN values.

   → **bindCredential**: The password for the bindDN

   → **baseFilter**: The search query sent by Squore to the LDAP server when authentificating. If the password is correct and the search returns true, the user is allowed to log into Squore. The default query checks that the login exists, but you can change it to check that the login is valid and that the user is part of a specific group for example, using the syntax `&((condition1) (condition2))`. For more information about LDAP query syntax, refer to https://technet.microsoft.com/en-us/library/aa996205(v=exchg.65).aspx. Note that the **&** characters must be written as an entity (**&amp;**) in the settings file.

   → **rolesCtxDN**: The fixed DN of the context to search for user roles. This is required to exist, even though it is not used by Squore at the moment.

   → **userCompositeName (optional)**: the field in the LDAP account that Squore will import and user as the user's full name.

   → **userMail (optional)**: the field in the LDAP account that Squore will import and user as the user's e-mail address.

   → **userOrganizationUnit (optional)**: the field in the LDAP account that Squore will import and user as the user's department.

   → **userId (optional)**: the field in the LDAP account that Squore will use as a the final user login to create the account or log into the application. When no value is specified for this field, Squore uses the login as typed by the user on the login page.

   ### Note
   Using this field helps avoiding confusion with mixed-case logins. Squore Server considers **demo** and **Demo** as two separate users by default. By specifying that the login is taken from a specific field from your directory, you ensure that the same account is used no matter what case was used in the login form.

   Note that for Active Directory, *OU*, *DC* and other keywords are all uppercase.

   For more details on the WildFly configuration of the LDAP module and the more details about the available options, please refer to http://community.jboss.org/wiki/LdapExtLoginModule.

6. Start Squore Server.

7. Log in as administrator and configure the default group and profile information for users who log in for the first time in the LDAP configuration section of **Administration > System**.

   ### Note
   Note: It is highly recommended to use LDAPS instead of LDAP. In the `<SQUORE_HOME>/server/standalone/configuration/standalone.xml` configuration file, configure

the *java.naming.provider.url* property to use an LDAPS server. The URL of an LDAPS Server will look like the following: *ldaps://host:port/*.

The java instance used by WildFly shall be able to check the certificate of the LDAP server. If the LDAP certificate has not been signed by an "official" CA (self-signed certificate, or the company issued its own root CA), please refer to Section 6.4.2, "Import a certificate".

**Tip**

User accounts created before you configured the connection to the directory still exist and can still log in.

**Tip**

If you need to authenticate users on more than one branch in your directory, duplicate the `login-module` block and change the `baseCtxDN` and `rolesCtxDN` accordingly.

**Note**

The login module used has changed in Squore 2014-A-SP1 to support the import of extra user information, but you can still revert to the legacy authentication module if you are experiencing compatibility issues. To do so, change the login module `code` attribute in <SQUORE_HOME>/server/standalone/configuration/standalone.xml from

```
<login-module code="com.squoring.squore.server.security.LdapLoginModule"
 flag="sufficient">
```

to

```
<login-module code="org.jboss.security.auth.spi.LdapExtLoginModule"
 flag="sufficient">
```

When using the legacy login module, you should set the following module option if you are using Active Directory:

```
<module-option name="allowEmptyPasswords" value="false"/>
```

This option prevents users from authenticating successfully when sending a blank password, as is the case when using some versions of Active Directory.

## 6.6. Configuring E-Mail Notifications

Squore allows users to configure automatic sending of e-mail notifications at the end of an analysis. In order to use this feature, Squore Server must be configured to communicate with an SMTP server.

Before you start, ensure that the following details are available:

→ The URL and port of your SMTP server
→ The username and password used to authenticate against the SMTP server
→ The e-mail address that you want to see used in the **from** field of the e-mails.

In order to configure the SMTP server integration:

1.  Edit <SQUORE_HOME>/server/standalone/configuration/standalone.xml, find the `mail-session` configuration, which by default looks like this:

```
<smtp-server outbound-socket-binding-ref="mail-smtp"/>
```

2.  Complete the element to add in the username and password for the smtp server, and optionally turn on ssl:

```
<mail-session name="default" jndi-name="java:jboss/mail/Default">
  <smtp-server outbound-socket-binding-ref="mail-smtp" ssl="false"
 username="login" password="password"/>
</mail-session>
```

3. Find the `outbound-socket-binding` element with the `name` attribute mail-smtp and edit the `remote-destination` sub-element as needed:

```
<outbound-socket-binding name="mail-smtp">
    <remote-destination host="localhost" port="25"/>
</outbound-socket-binding>
```

4. Start Squore Server.

5. Log in as administrator and go to **Administration > System**.

6. Set the value of the FROM e-mail address for notifications, as well as the Squore Server URL to be used in body of the e-mails, for example `squore@domain.com` and `http://localhost:8180/SQuORE_Server/`.

## 6.7. Notifying Users by E-Mail



The E-mail form to notify all users available to administrators.

Squore allows notifying all users by e-mail when planned maintenance is necessary. If you have already configured e-mail notification as explained in Section 6.6, "Configuring E-Mail Notifications", follow these steps to send a maintenance e-mail:

1. Log in as administrator.

2. Click **Administration > System**

3.    Click on Notify users by e-mail.

4.    Type a message subject and content and click Send to e-mail users.

The e-mail notification will be sent to all enabled users that have an e-mail address.

> **Tip**
>
> Squore will actually limit the amount of recipients to 100 per e-mail, and send more than
> one e-mail if necessary. If this number of recipients is too high for your SMTP server, you
> can configure the maximum number of recipients to include in a single e-mail by setting
> the **mail.recipients** property in `<SQUORE_HOME>/server/standalone/configuration/`
> `squore-server.properties`:

```
mail.recipients = 100
```

## 6.8. Linking to Projects

There are two ways to build direct links to projects in Squore:

→ using IDs with the **RestoreContext** page

→ using names with the **LoadDashboard** page

Each method supports different parameters to build direct links to a tab of the Explorer for the specified
project, as explained below.

**http://localhost:8180/ SQuORE_Server/ XHTML/ RestoreContext.xhtml**

Links to the Squore Explorer using IDs. The URL accepts the following parameters:

→ **modelId** to link to a model node in the portfolio

→ **projectId** to link to the latest version of the specified project

→ **versionId** to link to a specific version of a project

→ **artefactId** to link to a specific artefact in a project (can be combined with
projectId and versionId)

→ **tabName** to display a specific tab of the Explorer. This parameter can be
combined with any of the ones above and must be one of:

  → dashboard (default)

  → action-items

  → highlights

  → findings

  → reports

  → attributes (Forms)

  → indicators

  → measures

  → annotations

> **Tip**
>
> Users can copy a RestoreContext link from the Home page, the Projects
> page, or generate one using the **Share...** dialog in an artefact's context
> menu, which is the only way to find an artefactId. Model IDs are not
> exposed anywhere in the web interface.

**The sharing dialog from the web UI with a full RestoreContext URL**

Project and version IDs are printed in the project's output XML file, making it easy to parse and build a URL dynamically when using continuous integration to launch analyses.

**http://localhost:8180/ SQuORE_Server/ XHTML/MyDashboard/ dashboard/ LoadDashboard.xhtml**

Links to the Squore Explorer using names instead of IDs. The URL accepts the following parameters:

→ **application (mandatory)** to specify the project to link to

→ **version (optional)** to specify which version of the project to display. When not specified, the latest version fo the project is displayed

→ **artefactId (optional)** to link to a specific artefact in the project

→ **tabName** to display a specific tab of the Explorer. This parameter can be combined with any of the ones above and must be one of:

→ dashboard (default)

→ action-items

→ highlights

→ findings

→ reports

→ attributes (Forms)

→ indicators

→ measures

→ annotations

> **Tip**
> The following is a URL that links to the version called V5 in the project called Earth. Since no artefactId and tabName are specified, the Dashboard tab will be displayed for the root node of the project: http://localhost:8180/SQuORE_Server/XHTML/ MyDashboard/dashboard/LoadDashboard.xhtml? application=Earth&version=V5.

## 6.9. Embedding Dashboard Elements

All the charts displayed on the Squore Dashboard have a unique URL, so they can be embedded into other sites.

In order to find out what the URL of a chart is, follow these steps:

1. Log into Squore and view the dashboard of the project you want to get information from.

2. Click a chart to view it.

3. Click                                                                                          the

                                                                              icon

   in the chart viewer to open the chart in a new browser window or tab.

4. Copy the URL of the chart, as displayed by your browser location bar.

The URL `http://localhost:8180/SQuORE_Server/squore/resource/chart/` `<CHART_UID>.png.xhtml` (the `?s=` parameter is a way to work around the browser cache) is a permalink to this chart for this project version.

# 6.10. Integration with Atlassian Confluence

It is possible to extract some elements from the Squore dashboard and integrate them into a Confluence page. This section details how to configure Squore Server and Confluence to trust each other and how to extract the URLs to display charts.

## 6.10.1. Squore Server Configuration

In order to allow Confluence to connect to Squore Server:

1. Edit <SQUORE_HOME>/server/standalone/configuration/standalone.xml

2. Find the `security-domain` element named **squore-policy**.

3. Add a new `login-module` element, as shown below:

```
<security-domain name="squore-policy" cache-type="default">
  <authentication>
  <login-module code="com.squoring.squore.server.security.TrustedLoginModule"
flag="sufficient"/>
  (...)
  </authentication>
</security-domain>
```

4. Restart Squore Server to take the new configuration into account.

   **Tip**
   Because Confluence does not offer a single sign-on mechanism or authentication delegation, Confluence has to connect to Squore without using a password. This does not, however constitute a security risk, as the Squore user still has to exist and be allowed to view the target project in order for any information to be retrieved.

## 6.10.2. Confluence Admin Configuration
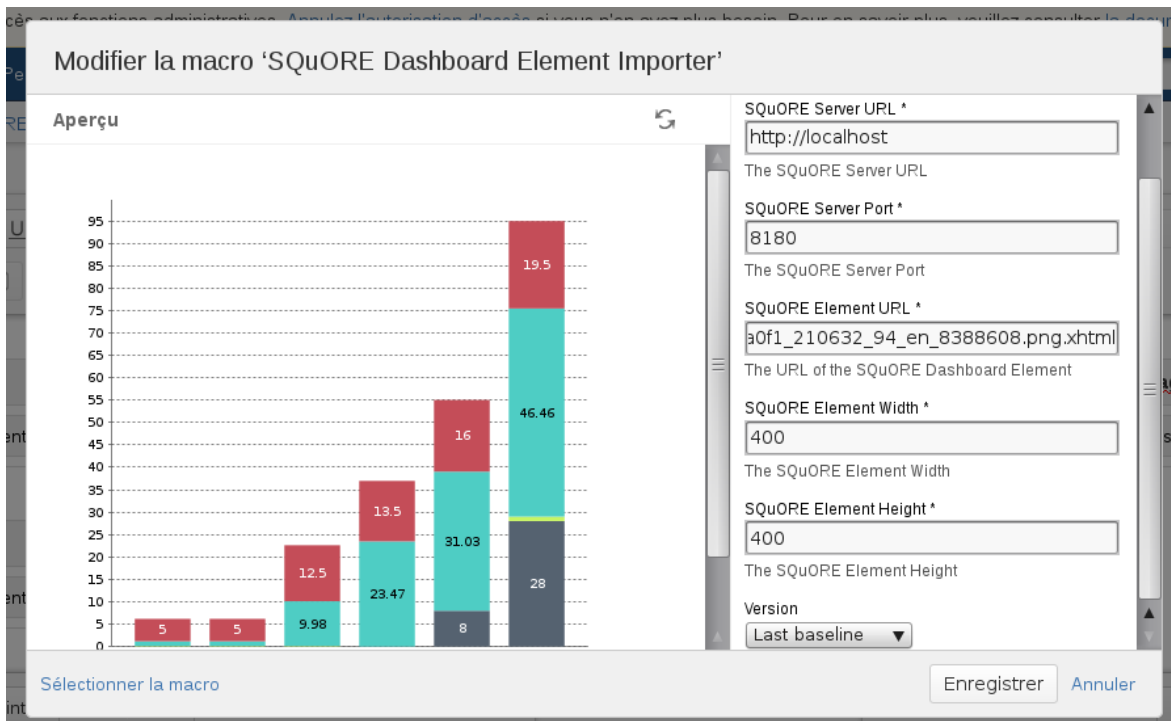
In order to allow Confluence users to add Squore elements, a Confluence administrator can create a macro to make it easier to include Squore elements into a page. You can find an example macro below.

```
## Macro title: Squore Dashboard Element Importer
## Macro category: External Content
## Macro has a body: N
## Body processing: No Body
##
## Developed by: Squoring Technologies
## Date created: 2013/07/28
```

```
## @param squrl:title=Squore Server URL|type=string|required=true|desc=The Squore
 Server URL
## @param sqport:title=Squore Server Port|type=string|required=true|desc=The
 Squore Server Port
## @param chart:title=Squore Element URL|type=string|required=true|desc=The URL
 of the Squore Dashboard Element
## @param sizex:title=Squore Element Width|type=string|required=true|desc= The
 Squore Element Width
## @param sizey:title=Squore Element Height|type=string|required=true|desc= The
 Squore Element Height
## @param version:title=Version|type=enum|enumValues=Current version,Last
 draft,Last baseline|default=Current version
#if ("Last draft"==$paramversion)
    #set($pversion="?version=last")
#elseif ("Last baseline"==$paramversion)
    #set($pversion="?version=last-baseline")
#else
    #set($pversion="")
#end
#set($login=$action.remoteUser.name)
<IFRAME frameborder="0" src="$paramsqurl:$paramsqport/SQuORE_Server/Export/
ChartExport.xhtml?user=$login&width=$paramsizex&height=$paramsizey&chart=
$paramchart$pversion" scrolling="no" width="$paramsizex" height="$paramsizey">
</IFRAME>
```

## 6.10.3. Adding Dashboard Elements

The macro you added in the previous section should be available to other Confluence users as the form show below from **External Content**.



The Confluence Squore form

Users need to fill in the following details:

→ the Squore Server URL

→ the Squore Server port

→ the chart permalink (as retrieved according to the instructions in Section 6.9, "Embedding Dashboard Elements")

→ the desired width of the chart

→ the desired height of the chart

→ the version of the chart to display (exact, last or last baseline)

> **Note**
> You can either link to the chart URL ending in **.png** or **.json**. Using the link ending with .json allows you to embed a fully interactive chart with tooltips and zoom functionality in Confluence, while the link ending in .png only displays a static image of the chart.

> **Tip**
> You can add several charts on the same Confluence page.

## 6.11. Integration with CollabNet TeamForge

Squore for TeamForge Integration does not require any additional installation procedure.

### 6.11.1. Squore Configuration

The connection module must be configured in the file `<SQUORE_HOME>/server/standalone/configuration/standalone.xml` by adding to the security-domain (name="squore-policy") / authentication section (before the **Database** login-module):

```
<login-module code="com.squoring.squore.server.security.CollabNetLoginModule"
 flag="sufficient"/>
```

Restart Squore Server to apply the changes, and log in as administrator to finish configuring the integration via **Administration > System**. In the **Configuration** tab, fill in the information in the CollabNet section according to the values found in TeamForge.

→ **TeamForge Server URL (without / at the end)**, for example `http://localhost`.

→ **TeamForge Server Name (will appear in Squore export format list)**, for example `TeamForge`.

→ **TeamForge artifact default status at export**, for example `Open`.

→ **TeamForge artifact default priority at export**, for example 4.

→ **SvnEdge Main Repository URL**, for example `http://localhost/svn`.

→ **SvnEdge Viewer (viewvc) URL**, for example `http://localhost/viewvc`.

→ **External System Id of SvnEdge (for ex: exsy1001)**, for example `exsy1011`.

### 6.11.2. TeamForge Configuration

Squore is integrated into TeamForge as a "linked application". Steps to add a Squore access to a TeamForge project are:

## Tab Configuration

Project Admin > Project Toolbar > Linked Application > Create

→ Application Name: Squore

→ URL: *http://localhost:8180/SQuORE_Server/Export/CollabNet.xhtml* (+ parameters)

→ Single Sign On Enabled: yes

Possible parameters are:

→ squoreProjectId (the related Squore project Id)

→ squoreVersionId (the related Squore project version Id)

→ trackerId (The Id of the TeamForge project tracker)

If the squoreVersionId is not defined, the last version of the project will be automatically loaded.

Some Examples: (if Squore is running on localhost and on port 8180)

→ Squore project Id 13 (last version) and TeamForge tracker Id tracker1004
  *http://localhost:8180/SQuORE_Server/Export/CollabNet.xhtml?*
  *squoreProjectId=13&trackerId=tracker1004*

→ Squore project Id 13, Squore project version 14 and TeamForge tracker Id tracker1004
  *http://localhost:8180/SQuORE_Server/Export/CollabNet.xhtml?*
  *squoreProjectId=13&squoreVersionId=14&trackerId=tracker1004*

## Tracker configuration

In order to see all fields of the Squore defect reports after export, the corresponding TeamForge tracker should have the following additional fields (individually optionals) with the "Text Entry" input type:

→ SQ_Status

→ SQ_Since

→ SQ_Reasons

→ SQ_Scope

→ SQ_Artefact

→ SQ_Path

→ SQ_Comment

# 6.11.3. Integration Characteristics

## Accessing Squore through TeamForge

The access to Squore is done through a new URL: **http://localhost:8180/SQuORE_Server/Export/ CollabNet.xhtml**

## Automatic connexion

When clicking on the Squore tab in TeamForge, the TeamForge user is automatically identified into Squore. If he is not a Squore user, the connexion is forbidden (error message).

The dashboard is shown and points directly on the specified project with the specified version. (or last version if the corresponding parameter is not defined)

### Defect Report exports

If the user is on the specified project, a new export format is available (name: see Section 6.11.1, "Squore Configuration": `cntf.server.name`). The export button will directly export the selected defect reports under the form of new artifacts into the corresponding TeamForge tracker.

### Source Code View

When visualising a source code, Squore retrieves the corresponding file using the viewvc application of the CollabNet SvnEdge server without asking the user a login and a password.

To use this functionality, the `cntf.svn.url`, `cntf.viewvc.url` and `cntf.svn.exsy` keys must be correctly set in the configuration file

If this functionality is not activated, the user has to use its own SVN login and password to access the source codes from Squore.

## 6.12. Squore Server Monitoring

Squore Server can be monitored with external tools on your network by connecting to administration URLs to retrieve information about the status of projects and users on the server.

→ Access **http://localhost:8180/SQuORE_Server/servlets/state/sessions** to get a report of the current user sessions on Squore Server. The information is extracted as in CSV format as

```
session;login;session start;client
```

.

→ Access **http://localhost:8180/SQuORE_Server/servlets/state/projects** to get a report of the existing projects on Squore Server. The information is extracted as in CSV format as

```
id;project name;model id;owner;creation time;number of versions;last
 version;last build;status;step start;step
```

.

The possible values of the **status** field are:

→ **0** Finished: the version has been successfully created.

→ **1** Warning: some warnings were raised during the last analysis.

→ **2** Error: the analysis finished with an error.

→ **3** Processing: the version is being created. When this status is returned, the current phase of the analysis will be specified in the **step** field and the time at which this step started will be specified in the **step start**.

→ **4** Offline: this project has no versions.

→ **5** Pending: this project is waiting for a free slot to start an analysis.

Note that in order to access these URLs you must be either:

→ A logged-in user with the Administrator profile, in which case you can access the URL from anywhere.

→ Requesting the URL from the computer that runs Squore Server, in which case the information is available without logging in.

**Tip**

By writing your own script that queries the monitoring URLs regularly and saving the output to a CSV file, you can feed the information into monitoring tools like Nagios and monitor the health of Squore Server.

# 7. Sizing Squore Server and Database

This chapter provides information about the resource utilisation and impact of running a Squore server over time.

## 7.1. Project Size and Growth

The disk space necessary for analyses varies depending on your analysis model as well as the amount of information analysed.

As a result, it is difficult to predict accurately the amount of space that your Squore installation will use. After a few runs, you should be able to estimate disk space requirements by working out the space required to analyse an artefact with your analysis model. Keep in mind that the first version of a project is always more costly than subsequent analyses, and that an analysis with only a few changes will use a lot less space than an analysis where there are a lot of changes.

Here is an example based on the Risk Index model, one of the standard multi-language models shipped in Squore 16.1.

**Table 7.1. Project Characteristics**

|  | First Code Snapshot | Second Code Snapshot |
|---|---|---|
| **Language Distribution** | C (13%), C++ (14%), Java (73%) | C (9%), C++ (11%), Java (80%) |
| **Source Files** | 20000 | 30000 <br><br> 10% of previous code changed |
| **Classes** | 28000 | 47000 |
| **Methods and Functions** | 181000 | 296000 |
| **Lines of Code** | 5.2M | 7.6M |
| **Effective Lines of Code** | 2.6M | 3.6M |
| **Findings** | 157000 | 234000 |
| **Action Items** | 7700 | 6300 |

**Table 7.2. Model Characteristics**

| Average metrics per artefact | 160 |
|---|---|
| **Average indicators per artefact** | 15 |

**Table 7.3. Project Cost**

|  | Database Growth | Project Folder Growth |
|---|---|---|
| **V1 (Snapshot 1)** | +3.5GB | +839MB |
| **V2 (Snapshot 1)** | +100MB | +1MB |
| **V3 (Snapshot 2)** | +3GB | +1.1GB |

## 7.2. Saving Space by Deleting Old Data Files

You can save disk space by keeping data files generated by Squore only for the last baseline version. This behaviour is enabled by default and can be overridden either by using a setting in your <SQUORE_HOME>/

config.xml, or by changing the behaviour for each project. This can be useful when you want to debug the analysis data later.

→ In order to save all data files for all versions by default for every project, open <SQUORE_HOME>/config.xml and `projects` element as shown below:

```
<projects directory="path/to/data/folder">
 <data-providers keep-data-files="true"/>
</projects>
```

The behaviour is applied after a server restart, and the old files are deleted when a new version is created.

→ In order to override the behaviour for a particular project in the web interface, check or uncheck the **Keep old versions data files** box when creating a new version of the project or when managing the project.

→ In order to override the behaviour for a particular project from the command line, use the parameter **keepDataFiles=true|false** when creating a new version of the project.

# Appendix A. Reference pages

## Name

install — Squore install script

## Synopsis

install [ options ...] *data_dir*

install -C [ options ...] *data_dir*

install -U *inst_dir* [ options ...]

## Description

Installs and configures Squore.

The most useful options when installing Squore are -b to open Squore to the network (accesses are restricted to localhost by default, specify **0.0.0.0** to open the server to connections from all clients on the network), and -k to deploy a licence file.

Alternatively, when upgrading an existing installation, use -U to specify the directory to upgrade.

Squore data is stored in the *data_dir* directory.

## Options

| | |
|---|---|
| -C | Configure files only, does not create any database schema. This option may be used to reconfigure Squore after installation. |
| -U *inst_dir* | Upgrade the installation pointed to by *inst_dir*. |
| -v | Increase verbosity level. |
| -S | Use remote PostgreSQL server. This option may be used to point on an existing server (no cluster is created). |
| -P *pg_dir* | Location of PostgreSQL executables. |
| -D *cluster_dir* | PostgreSQL cluster directory to create (default: *data_dir*/cluster). |
| -s *size* | PostgreSQL shared buffers size, in MB. Defaults to 25% of the memory available on the server. |
| -r *dbms* | Supported DBMS vendor (default: *postgresql*).<br>Valid values: *postgresql*, *oracle*. |
| -h *db_host* | Database server's host name (default: *localhost*). |
| -p *db_port* | Database server's port number (default: DMBS dependent, *4561* for postgresql). |
| -A *db_admin* | Database administrator name (default: DMBS dependent, *postgres* for postgresql). |
| -d *db_name* | Squore database name (default: *squore*). |
| -u *db_user* | Squore database user (default: *squore*). |
| -e | Pick existing user and database (recommended for Oracle Database). |
| -J *java_home* | Specify the Java home to use. Defaults to *JAVA_HOME*, and, if this variable is not set, to an OS specific value. |
| -x *size* | Java memory allocation pool, in MB (Xmx option). Defaults to 25% of the memory available on the server, with a minimum of 512 MB. |

| | |
|---|---|
| -b *bind_address* | WildFly bind address (default: *localhost*). If you plan to use Squore from your local network, use *0.0.0.0* for the bind address. Otherwise access is restricted to connections from localhost only. |
| -o *binding_offset* | WildFly binding port offset (default: *100*). This number is added to the default (8080 for http) to calculate the set of ports used for Squore Server. An offset of 100 means that Squore is accessible via http://localhost:8180/SQuORE_Server |
| -g *PhantomJS port* | PhantomJS port (default: *3003*). The port to use for the embedded installation of PhantomJS. |
| -T *tmp_dir* | Squore temporary directory (default: */tmp/squore*) |
| -k *squore-license.p7s* | Squore licensing key. |

## Arguments

| | |
|---|---|
| *data_dir* | The Squore data directory, where Squore data is stored. That is, the database cluster (when managed by Squore), projects related files, and backups. |

## Name

sqexport.pl — Squore export utility

## Synopsis

sqexport.pl [ option … ] users [ -r ]

sqexport.pl [ option … ] groups [ -m ]

sqexport.pl [ option … ] versions -m [ -l ] [ -u *uid* ] *id_model*

sqexport.pl [ option … ] versions -p [ -l ] [ -u *uid* ] *id_project*

sqexport.pl [ option … ] artefacts -m [ -R ] [ --add-measure *measure* … ] [ -T *type* … ] [ -L *level* ] [ -u *uid* ] *id_model*

sqexport.pl [ option … ] artefacts -p [ -R | -r *id_rvers* ] [ --add-measure *measure* … ] [ -T *type* … ] [ -L *level* ] [ -u *uid* ] *id_project id_vers*

## Description

The **sqexport.pl** script connects to the Squore database and exports data into the CSV format.

This command extracts raw data from the database. That is, it does not read i18n files or model properties to translate strings.

Columns common to the versions and artefacts exports are:

1. *model_id* - the database identifier of the model (verbose mode only).
2. *model* - the model name.
3. *app_id* - the database identifier of the project (verbose mode only).
4. *app_name* - the project name.
5. *root_id* - the database identifier of the root artefact (verbose mode only).
6. *v_id* - the database identifier of the version (verbose mode only).

7.  *v_name* - the version name.

## Users export

These columns are exported:

1.  *uid* - the database identifier of the user (verbose mode only).
2.  *login* - the login of the user.

```
sqexport.pl users [-r]
```

This command exports all user information for all Squore users. The output contains these additional columns:

1.  *fullname* - the full name of the user.
2.  *email* - the e-mail of the user.
3.  *password* - the SHA-1 of the user password, base 64 encoded.
4.  *department* - the department of the user.

When the `-r` option is specified, the user profiles are exported instead. The output contains these additional columns:

1.  *role_id* - the database identifier of the profile (verbose mode only).
2.  *role* - the profile name of the user.

## Groups export

These columns are exported:

1.  *gid* - the database identifier of the group (verbose mode only).
2.  *group* - the name of the group.

```
sqexport.pl groups [-m]
```

This command exports all Squore groups.

When the `-m` option is used, group members are exported instead. Here are the additional columns in this mode:

1.  *uid* - the database identifier of the group member (verbose mode only).
2.  *login* - the login of the group member.

## Versions export

These additional columns are exported:

1.  *status* - the project's version status.
2.  *sl_rank* - the (numeric) rank of the level of the project.
3.  *level* - the level of the project.
4.  *app_name* - The project name.

```
sqexport.pl versions -m [-l] [-u uid ] id_model
```

This form exports all versions of projects that use the model identified by `id_model`. If `-l` is used, only the last version of each project is exported.

The `uid` is used to restrict output data, using access controls defined in Squore. If not supplied, versions and projects are exported regardless of access control lists.

```
sqexport.pl versions -p[-l][-u uid ]id_project
```

This form exports all versions of the project identified by `id_project`. If `-l` is used, only the last version of the project is exported.

The `uid` is used to restrict output data, using access controls defined in Squore. If not supplied, versions and projects are exported regardless of access control lists.

## Artefacts export

These additional columns are exported:

1. *art_id* - the database identifier of the artefact.
2. *art_path* - the path of the artefact.
3. *art_name* - the name of the artefact.
4. *type* - the type of the artefact.
5. *sl_rank* - the (numeric) rank of the level of the artefact.
6. *level* - the level of the artefact.
7. *trend* - the trend of the artefact, compared to the reference version (with `-R` or `-r` only). Values are 'N' for new artefacts, '^' for artefacts that improved, 'v' for artefacts that regressed, and '=' for others.
8. *\** - the measure values, as specified with the `--add-measure` options.

```
sqexport.pl artefacts -m[-R][--add-measure measure …][-T type …][-L level ][-u uid ]id_model
```

Exports all artefacts of the `id_model` model, eventually filtered out by the `-T` and `-L` filters. Both parameters of these options are identifiers of the types and the level, as specified in the model. This is possible to specify types separated by a comma, or multiple `-T` options. Such types are then OR-ed.

Only artefacts that belong to the last version of projects are exported. If the `-R` option is set, the trend of levels of artefacts is computed against the last but one version of the projects. By default, there is no trend computation.

Use the `--add-measure` option to specify the list of measures to add to the output. Use with caution on large result sets.

The `uid` is used to restrict output data, using access controls defined in Squore. If not supplied, artefacts are exported, regardless of access control lists.

```
sqexport.pl artefacts -p[-R | -r id_rvers ][--add-measure measure …][-T type …][-L level ][-u uid ]id_project id_vers
```

This form exports artefacts of the `id_project` project in its `id_vers` version. If `id_vers` is not specified, the last version if the project is used. Artefacts may be filtered out with the `-T  type`  and `-L  level` options.

The reference version to compute trends of levels of artefacts is either set with `-R` (use the version right before `id_vers`), or with `-r  id_rvers`  to set an explicit version of the project.

Use the `--add-measure` option to specify the list of measures to add to the output. Use with caution on large result sets.

The `uid` is used to restrict output data, using access controls defined in Squore. If not supplied, artefacts are exported, regardless of access control lists.

## Global options

These options are common to all export types.

| | |
|---|---|
| `-h host` | Overrides the database host name. |
| `-p port` | Overrides the database port number. |
| `-d dbname` | Overrides the database name. |
| `-u user` | Overrides the database user name. |
| `-f file` | Set the CSV output file. If not specified, the output is written to the standard output. |
| `-s sep` | Set the CSV separator. Defaults to the ';' character. |
| `-S slices` | Specifies a subset of columns to write, starting from 0. The column numbering is computed against the verbose mode, not the standard mode. Separate column numbers with the ',' character. |
| `-v` | Turns on the verbose mode. Exports additional columns (mainly internal database ids), and displays some SQL and post processing timings. |

## Export options

| | |
|---|---|
| `-a` | Turns on export at the artefact level. |
| `-m` | Turns on export at the model level. |
| `-p` | Turns on export at the project level. |
| `-c` | Counts entries only, do not list all of them. |
| `-l` | Exports the last version of each project only. |
| `-R` | Set the reference version for delta or trend computations to the last but one version of the project, from either its last version, or the user supplied version. |
| `-r id_rvers` | Set the reference version for delta or trend computations to the version pointed to by the `id_rvers`. |
| `-T type ...` | Filter artefacts of types `type`, which is the external id of the artefact type, as specified by the model, like APPLICATION, CLASS, FUNCTION, etc. Types may be coma separated. |
| `-L level` | Artefacts shall have the level `level`, which is the external id of the level of performance of a scale, as specified by the model, like LEVELA, LEVELB, etc. |

## Examples

```
sqexport.pl artefacts -m -T FILE -L LEVELG 1
```

This command lists all artefacts of type `FILE`, that are rated `LEVELG`. The scope of the search is limited to the artefacts that belong to the model `1`, which is its database id. There is no trend computation.

## Exit status

0    CSV successfully generated.

2    Syntax or usage error.

*    The script failed. See stderr for an error message.

## Name

— reset Squore data

## Synopsis

```
sqadm reset -P
```

## Description

This command clears both the database content, and internal storage files used by Squore. So far, the `-P` and `-D` options are mandatory.

The shall be executed on a stopped Squore server, but a running database.

## Options

| | |
|---|---|
| `-h, --help` | Display help information and exit. |
| `-P, --project-only` | Reset project related data only.<br>Not supported for installations that use an Oracle database backend.<br><br>Use this option to keep management related settings, like roles, users, global settings, etc. |
| `-y, --no-prompt` | Do not prompt for confirmation. |
| `--jdbc-url url` | Database url of the form jdbc:subprotocol:subname. |
| `--jdbc-user user` | Database user. |
| `-D dir, --data-dir dir` | Squore projects directory. |

# Appendix B. Squore XML Schemas

Download input-data-2.xsd [../shared_manual/input-data-2.xsd]

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
 elementFormDefault="qualified">

  <xs:simpleType name="id">
    <xs:restriction base="xs:string">
      <xs:pattern value="[A-Z_][A-Z0-9_]+" />
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="relax-status">
 <xs:restriction base="id">
 <xs:enumeration value="RELAXED_DEROGATION"/>
 <xs:enumeration value="RELAXED_LEGACY"/>
 <xs:enumeration value="RELAXED_FALSE_POSITIVE"/>
 </xs:restriction>
</xs:simpleType>

  <xs:element name="bundle">
    <xs:complexType>
      <xs:choice maxOccurs="unbounded">
        <xs:element ref="artifact"/>
        <xs:element ref="finding"/>
        <xs:element ref="link"/>
        <xs:element ref="metric"/>
      </xs:choice>
      <xs:attribute name="version" use="required" type="xs:integer" fixed="2"/>
    </xs:complexType>
  </xs:element>

  <xs:element name="artifact">
    <xs:complexType>
      <xs:sequence>
        <xs:choice minOccurs="0" maxOccurs="unbounded">
          <xs:element ref="artifact"/>
 <xs:element ref="finding"/>
          <xs:element ref="metric"/>
          <xs:element ref="key"/>
 <xs:element ref="info"/>
 <xs:element ref="link"/>
 <xs:element ref="milestone"/>
        </xs:choice>
      </xs:sequence>
      <xs:attribute name="alias"/>
      <xs:attribute name="art-location"/>
      <xs:attribute name="id"/>
      <xs:attribute name="local-art-location"/>
      <xs:attribute name="local-key"/>
      <xs:attribute name="local-parent"/>
      <xs:attribute name="location"/>
      <xs:attribute name="name"/>
      <xs:attribute name="parent"/>
      <xs:attribute name="path"/>
      <xs:attribute name="type" use="required" type="id"/>
      <xs:attribute name="view-path"/>
```

```
      </xs:complexType>
</xs:element>

<xs:element name="info">
  <xs:complexType>
    <xs:attribute name="name" use="required" type="id"/>
    <xs:attribute name="tool"/>
    <xs:attribute name="value" use="required"/>
  </xs:complexType>
</xs:element>

<xs:element name="key">
  <xs:complexType>
    <xs:attribute name="value" use="required"/>
  </xs:complexType>
</xs:element>

<xs:element name="metric">
  <xs:complexType>
    <xs:attribute name="local-ref"/>
    <xs:attribute name="name" use="required" type="id"/>
    <xs:attribute name="ref"/>
    <xs:attribute name="tool"/>
    <xs:attribute name="value" type="xs:decimal"/>
  </xs:complexType>
</xs:element>

<xs:element name="link">
  <xs:complexType>
    <xs:attribute name="dst"/>
    <xs:attribute name="local-dst" type="xs:integer"/>
    <xs:attribute name="local-src" type="xs:integer"/>
    <xs:attribute name="name" use="required" type="id"/>
    <xs:attribute name="src"/>
  </xs:complexType>
</xs:element>

<xs:element name="finding">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="unbounded" ref="location"/>
      <xs:element minOccurs="0" maxOccurs="1" ref="relax"/>
    </xs:sequence>
    <xs:attribute name="descr"/>
    <xs:attribute name="local-ref"/>
    <xs:attribute name="location" use="required"/>
    <xs:attribute name="name" use="required" type="id"/>
    <xs:attribute name="p0"/>
    <xs:attribute name="p1"/>
    <xs:attribute name="p2"/>
    <xs:attribute name="p3"/>
    <xs:attribute name="p4"/>
    <xs:attribute name="p5"/>
    <xs:attribute name="p6"/>
    <xs:attribute name="p7"/>
    <xs:attribute name="p8"/>
    <xs:attribute name="p9"/>
    <xs:attribute name="ref"/>
    <xs:attribute name="tool"/>
```

```
        </xs:complexType>
    </xs:element>

    <xs:element name="location">
        <xs:complexType>
            <xs:attribute name="local-ref"/>
            <xs:attribute name="location" use="required"/>
            <xs:attribute name="ref"/>
        </xs:complexType>
    </xs:element>

    <xs:element name="relax">
        <xs:complexType>
            <xs:simpleContent>
                <xs:extension base="xs:string">
                    <xs:attribute name="status" type="relax-status"/>
                </xs:extension>
            </xs:simpleContent>

        </xs:complexType>
    </xs:element>

    <xs:element name="milestone">
        <xs:complexType>
        <xs:sequence>
            <xs:element minOccurs="0" maxOccurs="unbounded" ref="goal"/>
        </xs:sequence>
            <xs:attribute name="date" type="xs:integer"/>
            <xs:attribute name="name" use="required" type="id"/>
        </xs:complexType>
    </xs:element>

    <xs:element name="goal">
        <xs:complexType>
            <xs:attribute name="name" use="required" type="id"/>
            <xs:attribute name="value" use="required" type="xs:decimal"/>
        </xs:complexType>
    </xs:element>
</xs:schema>
```

Download properties-1.2.xsd [../shared_manual/properties-1.2.xsd]

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" version="1.0">

 <xs:element name="Bundle" type="bundleType"/>

 <xs:complexType name="bundleType">
  <xs:sequence>
   <xs:choice minOccurs="0" maxOccurs="unbounded">
    <xs:element name="help" type="helpType" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="hideObsoleteModels" type="obsoleteType" minOccurs="0"
maxOccurs="1"/>
    <xs:element name="hideModel" type="hiddenType" minOccurs="0"
maxOccurs="unbounded"/>
    <xs:element name="explorerTabs" type="tabsType" minOccurs="0" maxOccurs="1"/>
    <xs:element name="explorerTrees" type="treesType" minOccurs="0"
maxOccurs="1"/>
    <xs:element name="option" type="optionType" minOccurs="0"
maxOccurs="unbounded"/>
```

```
    </xs:choice>
   </xs:sequence>
   <xs:attribute name="version" use="required" type="xs:string"/>
 </xs:complexType>

 <xs:complexType name="helpType">
   <xs:attribute name="label" use="required" type="xs:string"/>
   <xs:attribute name="url" use="required" type="xs:anyURI"/>
   <xs:attribute name="profiles" use="optional" type="xs:string"/>
 </xs:complexType>

 <xs:complexType name="optionType">
   <xs:attribute name="name" use="required" type="xs:string"/>
   <xs:attribute name="value" use="required" type="xs:string"/>
 </xs:complexType>

 <xs:complexType name="obsoleteType">
   <xs:attribute name="value" use="optional" default="false" type="xs:boolean"/>
 </xs:complexType>

 <xs:complexType name="hiddenType">
   <xs:attribute name="name" use="required" type="xs:string"/>
 </xs:complexType>

 <xs:complexType name="tabsType">
   <xs:sequence maxOccurs="unbounded">
     <xs:element name="tab" type="tabType" maxOccurs="unbounded"/>
   </xs:sequence>
   <xs:attribute name="hideSettings" use="optional" default="false"
type="xs:boolean"/>
 </xs:complexType>

 <xs:complexType name="tabType">
   <xs:attribute name="name" use="required" type="xs:string"/>
   <xs:attribute name="default" use="optional" default="false" type="xs:boolean"/>
   <xs:attribute name="mandatory" use="optional" default="false"
type="xs:boolean"/>
   <xs:attribute name="rendered" use="optional" default="true" type="xs:boolean"/>
 </xs:complexType>

 <xs:complexType name="treesType">
   <xs:sequence maxOccurs="unbounded">
     <xs:element name="tree" type="treeType" maxOccurs="unbounded"/>
   </xs:sequence>
 </xs:complexType>

 <xs:complexType name="treeType">
   <xs:attribute name="name" use="required" type="xs:string"/>
   <xs:attribute name="rendered" use="optional" default="true" type="xs:boolean"/>
 </xs:complexType>

</xs:schema>
```

Download config-1.2.xsd [../shared_manual/config-1.2.xsd]

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" version="1.0">

 <xs:element name="squore" type="squoreType"/>
```

```
<xs:complexType name="squoreType">
 <xs:sequence>
  <xs:element name="paths" type="pathsType"/>
  <xs:element name="database" type="databaseType" minOccurs="0"/>
  <xs:element name="phantomjs" type="phantomjsType" minOccurs="0"/>
  <xs:element name="configuration" type="directoriesType"/>
  <xs:element name="addons" type="directoriesType"/>
  <xs:element name="client" type="dataDirectoriesType" minOccurs="0"/>
  <xs:element name="tmp" type="directoryType" minOccurs="0"/>
  <xs:element name="projects" type="projectType" minOccurs="0"/>
  <xs:element name="sources" type="directoryType" minOccurs="0"/>
 </xs:sequence>
 <xs:attribute name="type" use="required" type="xs:string"/>
 <xs:attribute name="version" use="required" type="xs:string"/>
</xs:complexType>

<xs:complexType name="pathsType">
 <xs:sequence maxOccurs="unbounded">
  <xs:element name="path" type="pathType"/>
 </xs:sequence>
</xs:complexType>

<xs:complexType name="pathType">
 <xs:attribute name="name" use="required" type="xs:string"/>
 <xs:attribute name="path" use="required" type="xs:string"/>
</xs:complexType>

<xs:complexType name="directoriesType">
 <xs:sequence maxOccurs="unbounded">
  <xs:element name="path" type="directoryType"/>
 </xs:sequence>
</xs:complexType>

<xs:complexType name="directoryType">
 <xs:attribute name="directory" use="required" type="xs:string"/>
</xs:complexType>

<xs:complexType name="databaseType">
 <xs:sequence>
  <xs:element name="postgresql" type="directoryType" minOccurs="0"/>
  <xs:element name="cluster" type="directoryType" minOccurs="0"/>
  <xs:element name="backup" type="directoryType"/>
  <xs:element name="security" type="securityType" minOccurs="0"/>
 </xs:sequence>
</xs:complexType>

<xs:complexType name="phantomjsType">
 <xs:sequence>
  <xs:element name="socket-binding" type="socketBindingType" minOccurs="0"/>
 </xs:sequence>
</xs:complexType>

<xs:complexType name="socketBindingType">
 <xs:attribute name="address" type="xs:string" default="127.0.0.1"/>
 <xs:attribute name="port" type="xs:short" default="3003"/>
 <xs:attribute name="squore-url" type="xs:string" default=""/>
 <xs:attribute name="distant-url" type="xs:string" default=""/>
</xs:complexType>
```

```
<xs:complexType name="securityType">
 <xs:sequence>
  <xs:element name="user-name" type="xs:string"/>
 </xs:sequence>
</xs:complexType>

<xs:complexType name="dataDirectoriesType">
 <xs:sequence>
  <xs:element name="tmp" type="directoryType" minOccurs="0"/>
  <xs:element name="projects" type="projectType" minOccurs="0"/>
  <xs:element name="sources" type="directoryType" minOccurs="0"/>
 </xs:sequence>
</xs:complexType>

<xs:complexType name="projectType">
 <xs:sequence>
  <xs:element name="data-providers" type="dpType" minOccurs="0"/>
 </xs:sequence>
 <xs:attribute name="directory" use="required" type="xs:string"/>
</xs:complexType>

<xs:complexType name="dpType">
 <xs:attribute name="keep-data-files" use="required" type="xs:boolean"/>
</xs:complexType>

</xs:schema>
```

Download analysis.xsd [../shared_manual/analysis.xsd]

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
 elementFormDefault="qualified">

 <xs:simpleType name="id">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z_][A-Z0-9_]+' />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="list-id">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z_][A-Z0-9_]+(;[A-Z_][A-Z0-9_]+)*' />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="families">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z0-9_]+(;[A-Z_][A-Z0-9_]+)*' />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="categories">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z_][A-Z0-9_]+\.[A-Z_][A-Z0-9_]+(;[A-Z_][A-Z0-9_]+\.[A-
Z_][A-Z0-9_]+)*' />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="measure-type">
  <xs:restriction base="id">
```

```
  <xs:enumeration value="METRIC"/>
  <xs:enumeration value="RULE"/>
 </xs:restriction>
</xs:simpleType>

<xs:simpleType name="format">
 <xs:restriction base="id">
  <xs:enumeration value="NUMBER"/>
  <xs:enumeration value="PERCENT"/>
  <xs:enumeration value="INTEGER"/>
  <xs:enumeration value="DATE"/>
  <xs:enumeration value="DATETIME"/>
  <xs:enumeration value="TIME"/>
 </xs:restriction>
</xs:simpleType>

<xs:simpleType name="datetime-style">
 <xs:restriction base="id">
  <xs:enumeration value="DEFAULT"/>
  <xs:enumeration value="SHORT"/>
  <xs:enumeration value="MEDIUM"/>
  <xs:enumeration value="LONG"/>
  <xs:enumeration value="FULL"/>
 </xs:restriction>
</xs:simpleType>

<xs:simpleType name="rounding-mode">
 <xs:restriction base="id">
  <xs:enumeration value="UP"/>
  <xs:enumeration value="DOWN"/>
  <xs:enumeration value="CEILING"/>
  <xs:enumeration value="FLOOR"/>
  <xs:enumeration value="HALF_UP"/>
  <xs:enumeration value="HALF_DOWN"/>
  <xs:enumeration value="HALF_EVEN"/>
 </xs:restriction>
</xs:simpleType>

<xs:simpleType name="bounds-type">
 <xs:restriction base="xs:string">
  <xs:pattern value='[\[\]]((-)*[0-9](\.[0-9]+)?)*;((-)*[0-9](.
[0-9]+)?)*[\[\]]' />
 </xs:restriction>
</xs:simpleType>

<xs:simpleType name="path-scope">
 <xs:restriction base="id">
  <xs:enumeration value="CHILDREN"/>
  <xs:enumeration value="DESCENDANTS"/>
 </xs:restriction>
</xs:simpleType>

<xs:complexType name="elements">
 <xs:sequence>
  <xs:choice minOccurs="0" maxOccurs="unbounded">
   <xs:element ref="ArtefactType"/>
   <xs:element ref="Indicator"/>
   <xs:element ref="Measure"/>
   <xs:element ref="Package"/>
```

```
    <xs:element ref="package"/>
    <xs:element ref="Scale"/>
    <xs:element ref="ScaleMacro"/>
    <xs:element ref="Constant"/>
    <xs:element ref="RootIndicator"/>
    <xs:element ref="UpdateRules"/>
    <xs:element ref="UpdateRule"/>
    <xs:element ref="Link"/>
    <xs:element ref="ComputedLink"/>
   </xs:choice>
  </xs:sequence>
  <xs:attribute name="providedBy"/>
</xs:complexType>

<xs:element name="Bundle" type="elements" />

<xs:element name="Package" type="elements"/>
<xs:element name="package" type="elements"/>

<xs:element name="Constant">
 <xs:complexType>
  <xs:attribute name="id" use="required" type="id"/>
  <xs:attribute name="value" use="required"/>
 </xs:complexType>
</xs:element>

<xs:element name="RootIndicator">
 <xs:complexType>
  <xs:attribute name="artefactTypes" use="required" type="list-id"/>
  <xs:attribute name="indicatorId" use="required" type="id"/>
 </xs:complexType>
</xs:element>

<xs:element name="UpdateRules">
 <xs:complexType>
  <xs:sequence>
   <xs:element minOccurs="0" maxOccurs="unbounded" ref="UpdateRule"/>
  </xs:sequence>
 </xs:complexType>
</xs:element>

<xs:element name="UpdateRule">
 <xs:complexType>
  <xs:attribute name="categories" type="categories"/>
  <xs:attribute name="disabled" type="xs:boolean"/>
  <xs:attribute name="measureId" use="required" type="id"/>
 </xs:complexType>
</xs:element>

<xs:element name="Measure">
 <xs:complexType>
  <xs:sequence>
   <xs:element minOccurs="0" maxOccurs="unbounded" ref="Computation"/>
  </xs:sequence>
  <xs:attribute name="acceptMissingValue" type="xs:boolean"/>
  <xs:attribute name="categories" type="categories"/>
  <xs:attribute name="dataBounds" type="bounds-type"/>
  <xs:attribute name="dateStyle" type="datetime-style"/>
  <xs:attribute name="decimals" type="xs:integer"/>
```

```
            <xs:attribute name="defaultValue" type="xs:decimal"/>
            <xs:attribute name="excludingTypes" type="list-id"/>
            <xs:attribute name="invalidValue"/>
            <xs:attribute name="families" type="families"/>
            <xs:attribute name="format" type="format"/>
            <xs:attribute name="manual" type="xs:boolean"/>
            <xs:attribute name="measureId" use="required" type="id"/>
            <xs:attribute name="noValue"/>
            <xs:attribute name="pattern"/>
            <xs:attribute name="roundingMode" type="rounding-mode"/>
            <xs:attribute name="suffix"/>
            <xs:attribute name="targetArtefactTypes"/>
            <xs:attribute name="timeStyle" type="datetime-style"/>
            <xs:attribute name="toolName"/>
            <xs:attribute name="toolVersion"/>
            <xs:attribute name="type" type="measure-type"/>
            <xs:attribute name="usedForRelaxation" type="xs:boolean"/>
        </xs:complexType>
    </xs:element>

    <xs:element name="Computation">
        <xs:complexType>
            <xs:attribute name="continueOnRelaxed" type="xs:boolean"/>
            <xs:attribute name="excludingTypes" type="list-id"/>
            <xs:attribute name="result" use="required"/>
            <xs:attribute name="stored" type="xs:boolean"/>
            <xs:attribute name="targetArtefactTypes" use="required" type="list-id"/>
        </xs:complexType>
    </xs:element>

    <xs:element name="Indicator">
        <xs:complexType>
            <xs:attribute name="displayedScale" type="id"/>
            <xs:attribute name="displayedValue" type="id"/>
            <xs:attribute name="displayTypes" type="list-id"/>
            <xs:attribute name="excludingTypes" type="list-id"/>
            <xs:attribute name="families" type="families"/>
            <xs:attribute name="indicatorId" use="required" type="id"/>
            <xs:attribute name="measureId" type="id"/>
            <xs:attribute name="scaleId" type="id"/>
            <xs:attribute name="targetArtefactTypes" type="list-id"/>
        </xs:complexType>
    </xs:element>

    <xs:element name="Scale">
        <xs:complexType>
            <xs:sequence>
                <xs:element minOccurs="0" maxOccurs="unbounded" ref="ScaleLevel"/>
            </xs:sequence>
            <xs:attribute name="isDynamic" type="xs:boolean"/>
            <xs:attribute name="macro" type="id"/>
            <xs:attribute name="scaleId" use="required" type="id"/>
            <xs:attribute name="targetArtefactTypes" type="list-id"/>
            <xs:attribute name="vars"/>
        </xs:complexType>
    </xs:element>

    <xs:element name="ScaleMacro">
        <xs:complexType>
```

```
  <xs:sequence>
   <xs:element maxOccurs="unbounded" ref="ScaleLevel"/>
  </xs:sequence>
  <xs:attribute name="id" use="required" type="id"/>
  <xs:attribute name="isDynamic" type="xs:boolean"/>
 </xs:complexType>
</xs:element>

<xs:element name="ArtefactType">
 <xs:complexType>
  <xs:attribute name="heirs" type="list-id"/>
  <xs:attribute name="id" use="required" type="id"/>
  <xs:attribute name="manual" type="xs:boolean"/>
  <xs:attribute name="parents" type="list-id"/>
 </xs:complexType>
</xs:element>

<xs:element name="ScaleLevel">
 <xs:complexType>
  <xs:attribute name="bounds" use="required"/>
  <xs:attribute name="levelId" use="required" type="id"/>
  <xs:attribute name="rank" use="required"/>
 </xs:complexType>
</xs:element>

<xs:element name="Link">
 <xs:complexType>
  <xs:attribute name="id" use="required" type="id"/>
  <xs:attribute name="inArtefactTypes" type="list-id"/>
  <xs:attribute name="outArtefactTypes" type="list-id"/>
  <xs:attribute name="srcArtefactTypes" type="list-id"/>
  <xs:attribute name="dstArtefactTypes" type="list-id"/>
 </xs:complexType>
</xs:element>

<xs:element name="ComputedLink">
 <xs:complexType>
  <xs:sequence>
   <xs:element minOccurs="1" maxOccurs="1" ref="StartPath"/>
   <xs:element minOccurs="0" maxOccurs="unbounded" ref="NextPath"/>
  </xs:sequence>
  <xs:attribute name="id" use="required" type="id"/>
 </xs:complexType>
</xs:element>

<xs:element name="StartPath">
 <xs:complexType>
  <xs:attribute name="link" type="id"/>
  <xs:attribute name="scope" type="path-scope"/>
  <xs:attribute name="srcArtefactTypes" type="list-id"/>
  <xs:attribute name="dstArtefactTypes" type="list-id"/>
  <xs:attribute name="srcCondition"/>
  <xs:attribute name="dstCondition"/>
  <xs:attribute name="recurse" type="xs:boolean"/>
  <xs:attribute name="keepIntermediateLinks" type="xs:boolean"/>
 </xs:complexType>
</xs:element>

<xs:element name="NextPath">
```

```
    <xs:complexType>
     <xs:attribute name="link" type="id"/>
     <xs:attribute name="scope" type="path-scope"/>
     <xs:attribute name="dstArtefactTypes" type="list-id"/>
     <xs:attribute name="dstCondition"/>
     <xs:attribute name="recurse" type="xs:boolean"/>
     <xs:attribute name="keepIntermediateLinks" type="xs:boolean"/>
    </xs:complexType>
   </xs:element>
  </xs:schema>
```

Download decision.xsd [../shared_manual/decision.xsd]

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
 elementFormDefault="qualified">

 <xs:simpleType name="id">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z_][A-Z0-9_]+' />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="list-id">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z_][A-Z0-9_]+(;[A-Z_][A-Z0-9_]+)*' />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="categories">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z_][A-Z0-9_]+\.[A-Z_][A-Z0-9_]+(;[A-Z_][A-Z0-9_]+\.[A-
Z_][A-Z0-9_]+)*' />
  </xs:restriction>
 </xs:simpleType>

 <xs:complexType name="elements">
  <xs:sequence>
   <xs:choice minOccurs="0" maxOccurs="unbounded">
    <xs:element ref="Package"/>
    <xs:element ref="package"/>
    <xs:element ref="DecisionCriteria"/>
    <xs:element ref="DecisionCriterion"/>
   </xs:choice>
  </xs:sequence>
 </xs:complexType>

 <xs:element name="Bundle" type="elements"/>
 <xs:element name="Package" type="elements"/>
 <xs:element name="package" type="elements"/>
 <xs:element name="DecisionCriteria" type="elements"/>

 <xs:element name="DecisionCriterion">
  <xs:complexType>
   <xs:sequence>
    <xs:element ref="Triggers"/>
   </xs:sequence>
   <xs:attribute name="categories" type="categories"/>
   <xs:attribute name="dcId" use="required" type="id"/>
   <xs:attribute name="excludingTypes" type="list-id"/>
```

```
      <xs:attribute name="families" type="list-id"/>
      <xs:attribute name="roles" type="list-id"/>
      <xs:attribute name="targetArtefactTypes" use="required" type="list-id"/>
     </xs:complexType>
    </xs:element>

    <xs:element name="Triggers">
     <xs:complexType>
      <xs:sequence>
       <xs:element maxOccurs="unbounded" ref="Trigger"/>
      </xs:sequence>
     </xs:complexType>
    </xs:element>

    <xs:element name="Trigger">
     <xs:complexType>
      <xs:sequence>
       <xs:element maxOccurs="unbounded" ref="Test"/>
      </xs:sequence>
     </xs:complexType>
    </xs:element>

    <xs:element name="Test">
     <xs:complexType>
      <xs:attribute name="bounds" use="required"/>
      <xs:attribute name="descrId" type="id"/>
      <xs:attribute name="expr" use="required"/>
      <xs:attribute name="p0"/>
      <xs:attribute name="p1"/>
      <xs:attribute name="p2"/>
      <xs:attribute name="p3"/>
      <xs:attribute name="p4"/>
      <xs:attribute name="p5"/>
      <xs:attribute name="p6"/>
      <xs:attribute name="p7"/>
      <xs:attribute name="p8"/>
      <xs:attribute name="p9"/>
      <xs:attribute name="suspect"/>
     </xs:complexType>
    </xs:element>
</xs:schema>
```

Download description.xsd [../shared_manual/description.xsd]

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
 elementFormDefault="qualified">

 <xs:complexType name="elements">
  <xs:sequence>
   <xs:choice minOccurs="0" maxOccurs="unbounded">
    <xs:element ref="Package"/>
    <xs:element ref="package"/>
    <xs:element ref="Properties"/>
   </xs:choice>
  </xs:sequence>
 </xs:complexType>

 <xs:element name="Bundle">
  <xs:complexType>
```

```
    <xs:sequence>
     <xs:choice minOccurs="0" maxOccurs="unbounded">
      <xs:element ref="Package"/>
      <xs:element ref="package"/>
      <xs:element ref="Properties"/>
     </xs:choice>
    </xs:sequence>
    <xs:attribute name="available"/>
    <xs:attribute name="default"/>
   </xs:complexType>
 </xs:element>

 <xs:element name="Package" type="elements"/>
 <xs:element name="package" type="elements"/>

 <xs:element name="Properties">
  <xs:complexType>
   <xs:attribute name="src" use="required"/>
  </xs:complexType>
 </xs:element>
</xs:schema>
```

Download exports.xsd [../shared_manual/exports.xsd]

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
 elementFormDefault="qualified">

 <xs:simpleType name="type-id">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z0-9_]*' />
  </xs:restriction>
 </xs:simpleType>

 <xs:element name="Bundle">
  <xs:complexType>
   <xs:sequence maxOccurs="unbounded">
    <xs:element ref="Role" />
   </xs:sequence>
  </xs:complexType>
 </xs:element>

 <xs:element name="Role">
  <xs:complexType>
   <xs:sequence maxOccurs="unbounded">
    <xs:element ref="Export" />
   </xs:sequence>
   <xs:attribute name="name" use="required" type="xs:string" />
  </xs:complexType>
 </xs:element>

 <xs:element name="Export">
  <xs:complexType>
   <xs:sequence maxOccurs="unbounded">
    <xs:element ref="ExportScript" />
   </xs:sequence>
   <xs:attribute name="type" use="required" type="type-id" />
  </xs:complexType>
 </xs:element>
```

```
<xs:element name="ExportScript">
 <xs:complexType>
  <xs:sequence>
   <xs:element minOccurs="0" maxOccurs="unbounded" ref="arg" />
  </xs:sequence>
  <xs:attribute name="name" use="required" type="xs:string" />
  <xs:attribute name="script" use="required" type="xs:string" />
 </xs:complexType>
</xs:element>

<xs:element name="arg">
 <xs:complexType>
  <xs:attribute name="value" use="required" type="xs:string" />
 </xs:complexType>
</xs:element>

</xs:schema>
```

Download highlights.xsd [../shared_manual/highlights.xsd]

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">

 <xs:simpleType name="id">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z0-9_]*' />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="measure-id">
  <xs:restriction base="xs:string">
   <xs:pattern value='([BD].)?[A-Z0-9_]*' />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="info-id">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z0-9_]*' />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="indicator-id">
  <xs:restriction base="xs:string">
   <xs:pattern value='([I].)?[A-Z0-9_]*' />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="bounds-type">
  <xs:restriction base="xs:string">
   <xs:pattern value='[\[\]]((-)*[0-9](\.[0-9]+)?)*;((-)*[0-9](.
[0-9]+)?)*[\[\]]' />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="top-order">
  <xs:restriction base="xs:string">
   <xs:enumeration value="ASC" />
   <xs:enumeration value="DESC" />
  </xs:restriction>
 </xs:simpleType>
```

```xml
<xs:simpleType name="result-size">
 <xs:union>
  <xs:simpleType>
   <xs:restriction base="xs:positiveInteger" />
  </xs:simpleType>
  <xs:simpleType>
   <xs:restriction base="xs:string">
    <xs:enumeration value="*" />
   </xs:restriction>
  </xs:simpleType>
 </xs:union>
</xs:simpleType>

<xs:simpleType name="header-display-type">
 <xs:restriction base="xs:string">
  <xs:enumeration value="MNEMONIC" />
  <xs:enumeration value="NAME" />
 </xs:restriction>
</xs:simpleType>

<xs:simpleType name="display-type">
 <xs:restriction base="xs:string">
  <xs:enumeration value="VALUE" />
  <xs:enumeration value="RANK" />
  <xs:enumeration value="ICON" />
  <xs:enumeration value="DATE" />
  <xs:enumeration value="DATETIME" />
  <xs:enumeration value="TIME" />
 </xs:restriction>
</xs:simpleType>

<xs:simpleType name="date-style">
 <xs:restriction base="xs:string">
  <xs:enumeration value="SHORT" />
  <xs:enumeration value="MEDIUM" />
  <xs:enumeration value="DEFAULT" />
  <xs:enumeration value="LONG" />
  <xs:enumeration value="FULL" />
 </xs:restriction>
</xs:simpleType>

<xs:element name="Bundle">
 <xs:complexType>
  <xs:sequence maxOccurs="unbounded">
   <xs:element ref="Role" />
  </xs:sequence>
 </xs:complexType>
</xs:element>

<xs:element name="Role">
 <xs:complexType>
  <xs:sequence maxOccurs="unbounded">
   <xs:element ref="Filters" />
  </xs:sequence>
  <xs:attribute name="name" use="required" type="xs:string" />
  <xs:attribute name="preSelectedType" use="optional" type="xs:string" />
 </xs:complexType>
</xs:element>
```

```
<xs:element name="Filters">
 <xs:complexType>
  <xs:sequence maxOccurs="unbounded">
   <xs:choice>
    <xs:element ref="TopArtefacts" />
    <xs:element name="TopDeltaArtefacts" type="top-artefacts" />
    <xs:element ref="TopBorderlineArtefacts" />
    <xs:element name="TopNewArtefacts" type="top-artefacts" />
    <xs:element ref="TopModifiedArtefacts" />
   </xs:choice>
  </xs:sequence>
  <xs:attribute name="type" use="required" type="xs:string" />
 </xs:complexType>
</xs:element>

<xs:element name="TopArtefacts">
 <xs:complexType>
  <xs:sequence maxOccurs="unbounded">
   <xs:choice>
    <xs:element minOccurs="0" maxOccurs="unbounded" ref="Column" />
    <xs:element minOccurs="0" maxOccurs="unbounded" ref="Where" />
    <xs:element minOccurs="0" maxOccurs="unbounded" ref="OrderBy" />
   </xs:choice>
  </xs:sequence>
  <xs:attribute name="id" use="required" type="id" />
  <xs:attribute name="name" use="optional" type="xs:string" />
  <xs:attribute name="artefactTypes" use="optional" type="xs:string" />
  <xs:attribute name="excludingTypes" use="optional" type="xs:string" />
  <xs:attribute name="measureId" use="optional" default="LEVEL" type="measure-
id" />
  <xs:attribute name="order" use="optional" default="ASC" type="top-order" />
  <xs:attribute name="altMeasureId" use="optional" type="measure-id" />
  <xs:attribute name="altOrder" use="optional" type="top-order" />
  <xs:attribute name="resultSize" use="required" type="result-size" />
 </xs:complexType>
</xs:element>

<xs:element name="TopBorderlineArtefacts">
 <xs:complexType>
  <xs:sequence maxOccurs="unbounded">
   <xs:choice>
    <xs:element minOccurs="0" maxOccurs="unbounded" ref="Column" />
    <xs:element minOccurs="0" maxOccurs="unbounded" ref="Where" />
    <xs:element minOccurs="0" maxOccurs="unbounded" ref="OrderBy" />
   </xs:choice>
  </xs:sequence>
  <xs:attribute name="id" use="required" type="id" />
  <xs:attribute name="name" use="optional" type="xs:string" />
  <xs:attribute name="artefactTypes" use="optional" type="xs:string" />
  <xs:attribute name="excludingTypes" use="optional" type="xs:string" />
  <xs:attribute name="indicatorId" use="optional" default="LEVEL"
type="indicator-id" />
  <xs:attribute name="minLevel" use="optional" type="xs:string" />
  <xs:attribute name="order" use="optional" default="ASC" type="top-order" />
  <xs:attribute name="resultSize" use="required" type="result-size" />
 </xs:complexType>
</xs:element>
```

```
<xs:element name="TopModifiedArtefacts">
 <xs:complexType>
  <xs:sequence maxOccurs="unbounded">
   <xs:choice>
    <xs:element minOccurs="0" maxOccurs="unbounded" ref="Column" />
    <xs:element minOccurs="0" maxOccurs="unbounded" ref="Where" />
    <xs:element minOccurs="0" maxOccurs="unbounded" ref="OrderBy" />
   </xs:choice>
  </xs:sequence>
  <xs:attribute name="id" use="required" type="id" />
  <xs:attribute name="name" use="optional" type="xs:string" />
  <xs:attribute name="artefactTypes" use="optional" type="xs:string" />
  <xs:attribute name="excludingTypes" use="optional" type="xs:string" />
  <xs:attribute name="order" use="optional" default="ASC" type="top-order" />
  <xs:attribute name="resultSize" use="required" type="result-size" />
 </xs:complexType>
</xs:element>

<xs:element name="Column">
 <xs:complexType>
  <xs:attribute name="measureId" use="optional" type="measure-id" />
  <xs:attribute name="infoId" use="optional" type="info-id" />
  <xs:attribute name="indicatorId" use="optional" type="indicator-id" />
  <xs:attribute name="artefactTypes" use="optional" type="xs:string" />
  <xs:attribute name="excludingTypes" use="optional" type="xs:string" />
  <xs:attribute name="headerDisplayType" use="optional" default="NAME"
type="header-display-type" />
  <xs:attribute name="displayType" use="optional" default="VALUE" type="display-
type" />
  <xs:attribute name="decimals" use="optional" default="2" type="xs:integer" />
  <xs:attribute name="dateStyle" use="optional" default="DEFAULT" type="date-
style" />
  <xs:attribute name="timeStyle" use="optional" default="DEFAULT" type="date-
style" />
  <xs:attribute name="datePattern" use="optional" type="xs:string" />
  <xs:attribute name="suffix" use="optional" type="xs:string" />
 </xs:complexType>
</xs:element>

<xs:element name="Where">
 <xs:complexType>
  <xs:attribute name="measureId" use="optional" type="measure-id" />
  <xs:attribute name="infoId" use="optional" type="info-id" />
  <xs:attribute name="value" use="optional" type="xs:string" />
  <xs:attribute name="bounds" use="optional" type="bounds-type" />
 </xs:complexType>
</xs:element>

<xs:element name="OrderBy">
 <xs:complexType>
  <xs:attribute name="measureId" use="required" type="measure-id" />
  <xs:attribute name="order" use="optional" default="ASC" type="top-order" />
 </xs:complexType>
</xs:element>

<xs:complexType name="top-artefacts">
 <xs:sequence maxOccurs="unbounded">
  <xs:choice>
   <xs:element minOccurs="0" maxOccurs="unbounded" ref="Column" />
```

```
      <xs:element minOccurs="0" maxOccurs="unbounded" ref="Where" />
      <xs:element minOccurs="0" maxOccurs="unbounded" ref="OrderBy" />
    </xs:choice>
  </xs:sequence>
  <xs:attribute name="id" use="required" type="id" />
  <xs:attribute name="name" use="optional" type="xs:string" />
  <xs:attribute name="artefactTypes" use="optional" type="xs:string" />
  <xs:attribute name="excludingTypes" use="optional" type="xs:string" />
  <xs:attribute name="measureId" use="optional" default="LEVEL" type="measure-
id" />
  <xs:attribute name="order" use="optional" default="ASC" type="top-order" />
  <xs:attribute name="resultSize" use="required" type="result-size" />
 </xs:complexType>

</xs:schema>
```

Download properties.xsd [../shared_manual/properties.xsd]

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
 elementFormDefault="qualified">

 <xs:simpleType name="id">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z_][A-Z0-9_]+' />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="list-id">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z_][A-Z0-9_]+(;[A-Z_][A-Z0-9_]+)*' />
  </xs:restriction>
 </xs:simpleType>

 <xs:complexType name="elements">
  <xs:sequence>
   <xs:choice minOccurs="0" maxOccurs="unbounded">
    <xs:element ref="package"/>
    <xs:element ref="hideMeasure"/>
    <xs:element ref="findingsTab"/>
    <xs:element ref="actionItemsTab"/>
    <xs:element ref="rulesEdition"/>
   </xs:choice>
  </xs:sequence>
 </xs:complexType>

 <xs:element name="bundle" type="elements"/>
 <xs:element name="package" type="elements"/>

 <xs:element name="hideMeasure">
  <xs:complexType>
   <xs:attribute name="path" use="required"/>
   <xs:attribute name="targetArtefactTypes" type="list-id"/>
  </xs:complexType>
 </xs:element>

 <xs:element name="findingsTab">
  <xs:complexType>
   <xs:attribute name="orderBy" type="list-id"/>
   <xs:attribute name="hideColumns" type="list-id"/>
```

```
    <xs:attribute name="artefactFilters"/>
  </xs:complexType>
</xs:element>

<xs:element name="actionItemsTab">
  <xs:complexType>
    <xs:attribute name="orderBy" type="list-id"/>
    <xs:attribute name="hideColumns" type="list-id"/>
  </xs:complexType>
</xs:element>

<xs:element name="rulesEdition">
  <xs:complexType>
    <xs:attribute name="scales" use="required" type="list-id"/>
  </xs:complexType>
</xs:element>
</xs:schema>
```

Download tutorials.xsd [../shared_manual/tutorials.xsd]

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">

<xs:simpleType name="external-id">
  <xs:restriction base="xs:string">
    <xs:pattern value="[A-Z]{1}[A-Z0-9_]*" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="positive-integer">
  <xs:restriction base="xs:string">
    <xs:pattern value="[0-9]+" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="opacity">
  <xs:restriction base="xs:string">
    <xs:pattern value='(0|1){1}\.?[0-9]{0,2}' />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="actions">
  <xs:restriction base="xs:string">
    <xs:enumeration value="EXPAND_PORTFOLIO_TREE" />
    <xs:enumeration value="EXPAND_ARTEFACT_TREE" />
    <xs:enumeration value="EXPAND_MEASURE_TREE" />
    <xs:enumeration value="COLLAPSE_PORTFOLIO_TREE" />
    <xs:enumeration value="COLLAPSE_ARTEFACT_TREE" />
    <xs:enumeration value="COLLAPSE_MEASURE_TREE" />
    <xs:enumeration value="SELECT_MODEL" />
    <xs:enumeration value="SELECT_PROJECT" />
    <xs:enumeration value="SELECT_ARTEFACT" />
    <xs:enumeration value="SELECT_ARTEFACT_LEAF" />
    <xs:enumeration value="CLOSE_MEASURE_POPUP" />
    <xs:enumeration value="SELECT_MEASURE" />
    <xs:enumeration value="SHOW_REVIEW_SET" />
    <xs:enumeration value="SHOW_PORTFOLIO_TREE" />
    <xs:enumeration value="SHOW_DASHBOARD_TAB" />
    <xs:enumeration value="SHOW_ACTION_ITEMS_TAB" />
    <xs:enumeration value="SHOW_HIGHLIGHTS_TAB" />
```

```
    <xs:enumeration value="SHOW_FINDINGS_TAB" />
    <xs:enumeration value="SHOW_REPORTS_TAB" />
    <xs:enumeration value="SHOW_FORMS_TAB" />
    <xs:enumeration value="SHOW_INDICATORS_TAB" />
    <xs:enumeration value="SHOW_MEASURES_TAB" />
    <xs:enumeration value="SHOW_COMMENTS_TAB" />
    <xs:enumeration value="SHOW_ACTION_ITEMS_ADVANCED_SEARCH" />
    <xs:enumeration value="EXPAND_ACTION_ITEM" />
    <xs:enumeration value="SHOW_FINDINGS_ADVANCED_SEARCH" />
    <xs:enumeration value="SELECT_FINDING" />
    <xs:enumeration value="SELECT_FINDING_ARTEFACT" />
    <xs:enumeration value="EXPAND_FINDING" />
    <xs:enumeration value="EXPAND_ATTRIBUTE" />
    <xs:enumeration value="SWITCH_INDICATORS_PAGE" />
    <xs:enumeration value="SWITCH_MEASURES_PAGE" />
    <xs:enumeration value="SWITCH_COMMENTS_PAGE" />
    <xs:enumeration value="CLOSE_CHART_POPUP" />
    <xs:enumeration value="OPEN_CHART_POPUP" />
    <xs:enumeration value="OPEN_MODEL_CHART_POPUP" />
    <xs:enumeration value="SELECT_DESCR_TAB" />
    <xs:enumeration value="SELECT_COMMENTS_TAB" />
    <xs:enumeration value="SELECT_FAVORITES_TAB" />
    <xs:enumeration value="COMPARE_CHART" />
    <xs:enumeration value="QUIT_COMPARATIVE_MODE" />
    <xs:enumeration value="QUIT_FULLDISPLAY_MODE" />
    <xs:enumeration value="CLOSE_ARTEFACT_TREE_FILTER" />
    <xs:enumeration value="SHOW_ARTEFACT_TREE_FILTER" />
    <xs:enumeration value="OPEN_TABLE" />
    <xs:enumeration value="CHANGE_PAGE" />
    <xs:enumeration value="CREATE_NEW_PROJECT" />
    <xs:enumeration value="SELECT_WIZARD" />
    <xs:enumeration value="VALIDATE_WIZARD" />
    <xs:enumeration value="VALIDATE_INFORMATION" />
    <xs:enumeration value="VALIDATE_DP_OPTIONS" />
    <xs:enumeration value="RUN_PROJECT_CREATION" />
    <xs:enumeration value="OPEN_SUB_MENU_HELP" />
    <xs:enumeration value="CLOSE_TUTORIAL_POPUP" />
    <xs:enumeration value="OPEN_TUTORIAL_POPUP" />
    <xs:enumeration value="NONE" />
 </xs:restriction>
</xs:simpleType>

<xs:simpleType name="alias">
 <xs:restriction base="xs:string">
  <xs:enumeration value="CUSTOM" />
  <xs:enumeration value="BODY" />
  <xs:enumeration value="BREADCRUMBS" />
  <xs:enumeration value="MENU_HELP" />
  <xs:enumeration value="SUB_MENU_HELP" />
  <xs:enumeration value="SUB_MENU_HELP_ROW" />
  <xs:enumeration value="SUB_MENU_HELP_ROW_FIRST" />
  <xs:enumeration value="TUTORIAL_POPUP" />
  <xs:enumeration value="TUTORIAL_POPUP_MODEL" />
  <xs:enumeration value="TUTORIAL_POPUP_MODEL_FIRST" />
  <xs:enumeration value="TUTORIAL_POPUP_TUTORIAL_NAME" />
  <xs:enumeration value="TUTORIAL_POPUP_TUTORIAL_NAME_FIRST" />
  <xs:enumeration value="TUTORIAL_POPUP_TUTORIAL_DESCR" />
  <xs:enumeration value="TUTORIAL_POPUP_TUTORIAL_DESCR_FIRST" />
  <xs:enumeration value="EXPLORER" />
```

```
<xs:enumeration value="DRILLDOWN" />
<xs:enumeration value="EXPLORER_TAB" />
<xs:enumeration value="ARTEFACT_TREE" />
<xs:enumeration value="MEASURE_TREE" />
<xs:enumeration value="EXPLORER_HEADER" />
<xs:enumeration value="PORTFOLIO_HEADER" />
<xs:enumeration value="ARTEFACT_TREE_SEARCH" />
<xs:enumeration value="ARTEFACT_TREE_FILTER" />
<xs:enumeration value="REVIEW_SET" />
<xs:enumeration value="PORTFOLIO_TREE" />
<xs:enumeration value="PORTFOLIO_TREE_PROJECT" />
<xs:enumeration value="PORTFOLIO_TREE_PROJECT_FIRST" />
<xs:enumeration value="MODEL_DASHBOARD" />
<xs:enumeration value="MODEL_CHARTS" />
<xs:enumeration value="MODEL_CHART_FIRST" />
<xs:enumeration value="MODEL_TABLE" />
<xs:enumeration value="MODEL_TABLE_ROW_FIRST" />
<xs:enumeration value="MODEL_CHART" />
<xs:enumeration value="MODEL_TABLE_ROW" />
<xs:enumeration value="MODEL_CHART_POPUP" />
<xs:enumeration value="MODEL_CHART_POPUP_GRAPH" />
<xs:enumeration value="MODEL_CHART_POPUP_PREVIOUS_ARROW" />
<xs:enumeration value="MODEL_CHART_POPUP_NEXT_ARROW" />
<xs:enumeration value="MODEL_CHART_POPUP_NAV_BAR" />
<xs:enumeration value="MODEL_CHART_POPUP_ASIDE" />
<xs:enumeration value="MODEL_CHART_POPUP_ASIDE_HEAD" />
<xs:enumeration value="MODEL_CHART_POPUP_DESCR" />
<xs:enumeration value="FILTER_POPUP" />
<xs:enumeration value="FILTER_LEVEL" />
<xs:enumeration value="FILTER_TYPE" />
<xs:enumeration value="FILTER_EVOLUTION" />
<xs:enumeration value="FILTER_STATUS" />
<xs:enumeration value="ARTEFACT_TREE_LEAF" />
<xs:enumeration value="MEASURE_TREE_LEAF" />
<xs:enumeration value="MENU_INDICATOR_ARTEFACT" />
<xs:enumeration value="DASHBOARD " />
<xs:enumeration value="SCORECARD" />
<xs:enumeration value="KPI" />
<xs:enumeration value="CHARTS" />
<xs:enumeration value="TABLES" />
<xs:enumeration value="CHART_FIRST" />
<xs:enumeration value="LINE" />
<xs:enumeration value="CHART" />
<xs:enumeration value="CHART_FIRST" />
<xs:enumeration value="TABLE" />
<xs:enumeration value="TABLE_FIRST" />
<xs:enumeration value="MEASURE_POPUP" />
<xs:enumeration value="MEASURE_POPUP_CONTENT" />
<xs:enumeration value="MEASURE_POPUP_LEVELS" />
<xs:enumeration value="MEASURE_POPUP_ROW_FIRST" />
<xs:enumeration value="MEASURE_POPUP_ROW" />
<xs:enumeration value="CHART_POPUP" />
<xs:enumeration value="CHART_POPUP_GRAPH" />
<xs:enumeration value="CHART_POPUP_COMPARE_OPTION" />
<xs:enumeration value="CHART_POPUP_PREVIOUS_ARROW" />
<xs:enumeration value="CHART_POPUP_NEXT_ARROW" />
<xs:enumeration value="CHART_POPUP_NAV_BAR" />
<xs:enumeration value="CHART_POPUP_ASIDE" />
<xs:enumeration value="CHART_POPUP_ASIDE_HEAD" />
```

```
<xs:enumeration value="CHART_POPUP_DESCR" />
<xs:enumeration value="CHART_POPUP_COMMENTS" />
<xs:enumeration value="CHART_POPUP_FAVORITES" />
<xs:enumeration value="CHART_POPUP_COMPARATIVE_CHART" />
<xs:enumeration value="ACTION_ITEMS" />
<xs:enumeration value="ACTION_ITEMS_TABLE" />
<xs:enumeration value="ACTION_ITEMS_TABLE_HEAD" />
<xs:enumeration value="ACTION_ITEMS_TABLE_HEAD_CHECK" />
<xs:enumeration value="ACTION_ITEMS_ADD_REVIEW_SET" />
<xs:enumeration value="ACTION_ITEMS_EXPORT_LIST" />
<xs:enumeration value="ACTION_ITEMS_EXPORT_BUTTON" />
<xs:enumeration value="ACTION_ITEMS_SEARCH" />
<xs:enumeration value="ACTION_ITEMS_ROW" />
<xs:enumeration value="ACTION_ITEMS_REASON" />
<xs:enumeration value="ACTION_ITEMS_ADVANCED_SEARCH" />
<xs:enumeration value="ACTION_ITEMS_ADVANCED_SEARCH_SELECT_FIRST" />
<xs:enumeration value="ACTION_ITEMS_ADVANCED_SEARCH_SELECT" />
<xs:enumeration value="HIGHLIGHTS" />
<xs:enumeration value="HIGHLIGHTS_TABLE" />
<xs:enumeration value="HIGHLIGHTS_TABLE_HEAD" />
<xs:enumeration value="HIGHLIGHTS_TABLE_HEAD_CHECK" />
<xs:enumeration value="HIGHLIGHTS_SEARCH" />
<xs:enumeration value="HIGHLIGHTS_SEARCH_FILTER" />
<xs:enumeration value="HIGHLIGHTS_SEARCH_TYPE" />
<xs:enumeration value="HIGHLIGHTS_EXPORT_BUTTON" />
<xs:enumeration value="HIGHLIGHTS_ADD_REVIEW_SET" />
<xs:enumeration value="HIGHLIGHTS_ROW_FIRST" />
<xs:enumeration value="FINDINGS" />
<xs:enumeration value="FINDINGS_TABLE" />
<xs:enumeration value="FINDINGS_TABLE_HEAD" />
<xs:enumeration value="FINDINGS_SEARCH" />
<xs:enumeration value="FINDINGS_INFO" />
<xs:enumeration value="FINDINGS_RULE" />
<xs:enumeration value="FINDINGS_ARTEFACT" />
<xs:enumeration value="FINDINGS_ROW_FIRST" />
<xs:enumeration value="FINDINGS_ADVANCED_SEARCH" />
<xs:enumeration value="FINDINGS_ADVANCED_SEARCH_SELECT_FIRST" />
<xs:enumeration value="FINDINGS_ADVANCED_SEARCH_SELECT" />
<xs:enumeration value="REPORTS" />
<xs:enumeration value="REPORTS_REGION" />
<xs:enumeration value="REPORTS_OPTIONS" />
<xs:enumeration value="REPORTS_OPTION_TEMPLATE" />
<xs:enumeration value="REPORTS_OPTION_FORMAT" />
<xs:enumeration value="REPORTS_OPTION_SYNTHETIC_VIEW" />
<xs:enumeration value="REPORTS_CREATE" />
<xs:enumeration value="EXPORT_REGION" />
<xs:enumeration value="EXPORT_OPTIONS" />
<xs:enumeration value="EXPORT_CREATE" />
<xs:enumeration value="FORMS" />
<xs:enumeration value="FORMS_ATTRIBUTE" />
<xs:enumeration value="FORMS_ATTRIBUTE_FIELD" />
<xs:enumeration value="FORMS_ATTRIBUTE_COMMENT" />
<xs:enumeration value="FORMS_HISTORY" />
<xs:enumeration value="FORMS_BLOCK" />
<xs:enumeration value="INDICATORS" />
<xs:enumeration value="INDICATORS_TABLE" />
<xs:enumeration value="INDICATORS_TABLE_HEAD" />
<xs:enumeration value="INDICATORS_ROW" />
<xs:enumeration value="MEASURES" />
```

```
    <xs:enumeration value="MEASURES_TABLE" />
    <xs:enumeration value="MEASURES_TABLE_HEAD" />
    <xs:enumeration value="MEASURES_ROW" />
    <xs:enumeration value="COMMENTS" />
    <xs:enumeration value="COMMENTS_TABLE" />
    <xs:enumeration value="COMMENTS_TABLE_HEAD" />
    <xs:enumeration value="COMMENTS_ROW" />
    <xs:enumeration value="CREATE_PROJECT_BUTTON" />
    <xs:enumeration value="WIZARD_PANEL" />
    <xs:enumeration value="WIZARD_ROW" />
    <xs:enumeration value="WIZARD_ROW_FIRST" />
    <xs:enumeration value="WIZARD_NEXT_BUTTON" />
    <xs:enumeration value="GENERAL_INFORMATION" />
    <xs:enumeration value="PROJECT_IDENTIFICATION_BLOCK " />
    <xs:enumeration value="GENERAL_INFO_BLOCK" />
    <xs:enumeration value="GENERAL_INFO_ROW" />
    <xs:enumeration value="PROJECT_NEXT_BUTTON" />
    <xs:enumeration value="DP_PANEL" />
    <xs:enumeration value="DP_PANEL_BLOCK" />
    <xs:enumeration value="DP_PANEL_ROW" />
    <xs:enumeration value="DP_PANEL_NEXT_BUTTON" />
    <xs:enumeration value="CONFIRMATION_PANEL" />
    <xs:enumeration value="SUMMARY" />
    <xs:enumeration value="CONFIRMATION_PANEL_PARAMETERS" />
    <xs:enumeration value="RUN_NEW_PROJECT_BUTTON" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="colors">
 <xs:union>
  <xs:simpleType>
   <xs:restriction base="xs:string">
    <xs:pattern value="#[A-Fa-f0-9]{6}" />
   </xs:restriction>
  </xs:simpleType>
  <xs:simpleType>
   <xs:restriction base="xs:string">
    <xs:pattern value="(rgb|RGB)\([0-9]{3},[0-9]{3},[0-9]{3}\)" />
   </xs:restriction>
  </xs:simpleType>
  <xs:simpleType>
   <xs:restriction base="xs:string">
    <xs:enumeration value="aqua" />
    <xs:enumeration value="black" />
    <xs:enumeration value="blue" />
    <xs:enumeration value="gray" />
    <xs:enumeration value="lime" />
    <xs:enumeration value="green" />
    <xs:enumeration value="maroon" />
    <xs:enumeration value="navy" />
    <xs:enumeration value="olive" />
    <xs:enumeration value="orange" />
    <xs:enumeration value="purple" />
    <xs:enumeration value="red" />
    <xs:enumeration value="silver" />
    <xs:enumeration value="teal" />
    <xs:enumeration value="white" />
    <xs:enumeration value="yellow" />
    <xs:enumeration value="transparent" />
```

Ref : SIM_Squore

Version : 17.1.11
Date : 27/09/2019

```
      </xs:restriction>
    </xs:simpleType>
   </xs:union>
 </xs:simpleType>

 <xs:simpleType name="text-positions">
  <xs:restriction base="xs:string">
   <xs:enumeration value="INTERNAL" />
   <xs:enumeration value="EXTERNAL" />
   <xs:enumeration value="LEFT" />
   <xs:enumeration value="RIGHT" />
   <xs:enumeration value="TOP" />
   <xs:enumeration value="BOTTOM" />
  </xs:restriction>
 </xs:simpleType>

 <xs:simpleType name="phase-type">
  <xs:restriction base="xs:string">
   <xs:enumeration value="PARALLEL" />
   <xs:enumeration value="PROGRESSIVE" />
   <xs:enumeration value="SEQUENTIAL" />
   <xs:enumeration value="FREE" />
  </xs:restriction>
 </xs:simpleType>

 <xs:element name="item">
  <xs:complexType>
   <xs:attribute name="element" use="required" type="external-id" />
   <xs:attribute name="param" use="optional" default="" type="xs:string" />
   <xs:attribute name="descrId" use="required" type="xs:string" />
   <xs:attribute name="textPosition" use="optional" default="EXTERNAL"
type="text-positions" />
   <xs:attribute name="maskColor" use="optional" default="#2aa0d5"
type="colors" />
   <xs:attribute name="maskOpacity" use="optional" default="0.8" type="opacity" /
>
   <xs:attribute name="textSize" use="optional" default="25" type="positive-
integer" />
   <xs:attribute name="textColor" use="optional" default="white" type="colors" />
  </xs:complexType>
 </xs:element>

 <xs:element name="preAction">
  <xs:complexType>
   <xs:attribute name="action" use="required" type="actions" />
   <xs:attribute name="param" use="optional" default="" type="xs:string" />
   <xs:attribute name="clickIndicator" use="optional" default="false"
type="xs:boolean" />
  </xs:complexType>
 </xs:element>

 <xs:element name="phase">
  <xs:complexType>
   <xs:sequence maxOccurs="unbounded">
    <xs:choice>
     <xs:element minOccurs="0" maxOccurs="unbounded" ref="item" />
     <xs:element minOccurs="0" maxOccurs="unbounded" ref="preAction" />
    </xs:choice>
   </xs:sequence>
```

```
    <xs:attribute name="element" use="required" type="external-id" />
    <xs:attribute name="param" use="optional" default="" type="xs:string" />
    <xs:attribute name="type" use="optional" default="PARALLEL" type="phase-
type" />
    <xs:attribute name="textPosition" use="optional" default="EXTERNAL"
 type="text-positions" />
    <xs:attribute name="textSize" use="optional" default="25" type="positive-
integer" />
    <xs:attribute name="textColor" use="optional" default="white" type="colors" />
    <xs:attribute name="maskColor" use="optional" default="#2aa0d5"
 type="colors" />
    <xs:attribute name="maskOpacity" use="optional" default="0.6" type="opacity" /
>
  </xs:complexType>
</xs:element>

<xs:element name="help">
  <xs:complexType>
    <xs:sequence minOccurs="1" maxOccurs="unbounded">
     <xs:element ref="phase" />
    </xs:sequence>
    <xs:attribute name="name" use="required" type="external-id" />
    <xs:attribute name="descrId" use="required" type="external-id" />
    <xs:attribute name="opacity" use="optional" default="0.4" type="opacity" />
    <xs:attribute name="textPosition" use="optional" default="EXTERNAL"
 type="text-positions" />
    <xs:attribute name="textSize" use="optional" default="25" type="positive-
integer" />
    <xs:attribute name="textColor" use="optional" default="white" type="colors" />
    <xs:attribute name="maskColor" use="optional" default="#2aa0d5"
 type="colors" />
    <xs:attribute name="maskOpacity" use="optional" default="0.6" type="opacity" /
>
    <xs:attribute name="firstConnexionGroup" use="optional" default=""
 type="xs:string" />
    <xs:attribute name="icon" use="optional" default="" type="xs:string" />
  </xs:complexType>
</xs:element>
</xs:schema>
```

Download wizards.xsd [../shared_manual/wizards.xsd]

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
 elementFormDefault="qualified">

<xs:simpleType name="id">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z_][A-Z0-9_]+' />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="list-id">
  <xs:restriction base="xs:string">
   <xs:pattern value='[A-Z_][A-Z0-9_]+(;[A-Z_][A-Z0-9_]+)*' />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="alignment">
  <xs:restriction base="id">
```

```xml
    <xs:enumeration value="LEFT"/>
    <xs:enumeration value="RIGHT"/>
 </xs:restriction>
</xs:simpleType>

<xs:simpleType name="project-status">
 <xs:restriction base="id">
  <xs:enumeration value="IGNORE"/>
  <xs:enumeration value="WARNING"/>
  <xs:enumeration value="ERROR"/>
 </xs:restriction>
</xs:simpleType>

<xs:element name="Bundle">
 <xs:complexType>
  <xs:sequence>
   <xs:choice minOccurs="0" maxOccurs="unbounded">
    <xs:element ref="tags"/>
    <xs:element ref="wizard"/>
   </xs:choice>
  </xs:sequence>
 </xs:complexType>
</xs:element>

<xs:element name="tags">
 <xs:complexType>
  <xs:sequence>
   <xs:element minOccurs="0" maxOccurs="unbounded" ref="tag"/>
  </xs:sequence>
  <xs:attribute name="textAlign" type="alignment"/>
  <xs:attribute name="valueAlign" type="alignment"/>
 </xs:complexType>
</xs:element>

<xs:element name="tag">
 <xs:complexType>
  <xs:sequence>
   <xs:element minOccurs="0" maxOccurs="unbounded" ref="value"/>
  </xs:sequence>
  <xs:attribute name="defaultValue"/>
  <xs:attribute name="displayType"/> <!-- Not display-type because it is case
insensitive -->
  <xs:attribute name="group"/>
  <xs:attribute name="measureId" use="required" type="id"/>
  <xs:attribute name="name"/>
  <xs:attribute name="placeholder"/>
  <xs:attribute name="required" type="xs:boolean"/>
  <xs:attribute name="review" type="xs:boolean"/>
  <xs:attribute name="suffix"/>
  <xs:attribute name="targetArtefactTypes" type="list-id"/>
  <xs:attribute name="textAlign" type="alignment"/>
  <xs:attribute name="type" use="required"/> <!-- Not tag-type because it is
case insensitive -->
  <xs:attribute name="valueAlign" type="alignment"/>
 </xs:complexType>
</xs:element>

<xs:element name="value">
 <xs:complexType>
```

```
    <xs:attribute name="key" use="required"/>
    <xs:attribute name="value" use="required" type="xs:decimal"/>
 </xs:complexType>
</xs:element>

<xs:element name="wizard">
 <xs:complexType>
  <xs:sequence>
   <xs:choice minOccurs="0" maxOccurs="unbounded">
    <xs:element ref="tags"/>
    <xs:element ref="milestones"/>
    <xs:element ref="repositories"/>
    <xs:element ref="tools"/>
   </xs:choice>
  </xs:sequence>
  <xs:attribute name="autoBaseline" type="xs:boolean"/>
  <xs:attribute name="group"/>
  <xs:attribute name="groups"/>
  <xs:attribute name="hideRulesEdition" type="xs:boolean"/>
  <xs:attribute name="img"/>
  <xs:attribute name="users"/>
  <xs:attribute name="versionPattern"/>
  <xs:attribute name="wizardId" use="required" type="id"/>
 </xs:complexType>
</xs:element>

<xs:element name="milestones">
 <xs:complexType>
  <xs:sequence minOccurs="0">
   <xs:element minOccurs="0" maxOccurs="unbounded" ref="goals"/>
   <xs:element minOccurs="0" maxOccurs="unbounded" ref="milestone"/>
  </xs:sequence>
  <xs:attribute name="canCreateMilestone" type="xs:boolean"/>
  <xs:attribute name="canCreateGoal" type="xs:boolean"/>
  <xs:attribute name="hide" type="xs:boolean"/>
 </xs:complexType>
</xs:element>

<xs:element name="goals">
 <xs:complexType>
  <xs:sequence minOccurs="0">
   <xs:element ref="goal"/>
  </xs:sequence>
  <xs:attribute name="displayableFamilies" use="required" type="list-id"/>
 </xs:complexType>
</xs:element>

<xs:element name="goal">
 <xs:complexType>
  <xs:attribute name="mandatory" use="required" type="xs:boolean"/>
  <xs:attribute name="measureId" use="required" type="id"/>
 </xs:complexType>
</xs:element>

<xs:element name="milestone">
 <xs:complexType>
  <xs:sequence>
   <xs:element ref="defaultGoal"/>
  </xs:sequence>
```

```
    <xs:attribute name="id" use="required" type="id"/>
    <xs:attribute name="mandatory" type="xs:boolean"/>
  </xs:complexType>
</xs:element>

<xs:element name="defaultGoal">
  <xs:complexType>
    <xs:attribute name="measureId" use="required" type="id"/>
    <xs:attribute name="value" use="required" type="xs:integer"/>
  </xs:complexType>
</xs:element>

<xs:element name="repositories">
  <xs:complexType>
    <xs:sequence>
      <xs:element maxOccurs="unbounded" ref="repository"/>
    </xs:sequence>
    <xs:attribute name="all" use="required" type="xs:boolean"/>
    <xs:attribute name="hide" use="required" type="xs:boolean"/>
  </xs:complexType>
</xs:element>

<xs:element name="repository">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" ref="param"/>
    </xs:sequence>
    <xs:attribute name="checkedInUI" type="xs:boolean"/>
    <xs:attribute name="name" use="required"/>
  </xs:complexType>
</xs:element>

<xs:element name="tools">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="unbounded" ref="tool"/>
    </xs:sequence>
    <xs:attribute name="all" type="xs:boolean"/>
    <xs:attribute name="expandedInUI" type="xs:boolean"/>
  </xs:complexType>
</xs:element>

<xs:element name="tool">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="unbounded" ref="param"/>
    </xs:sequence>
    <xs:attribute name="checkedInUI" type="xs:boolean"/>
    <xs:attribute name="expandedInUI" type="xs:boolean"/>
    <xs:attribute name="name" use="required"/>
    <xs:attribute name="optional" type="xs:boolean"/>
    <xs:attribute name="projectStatusOnFailure" type="project-status"/>
    <xs:attribute name="projectStatusOnWarning" type="project-status"/>
  </xs:complexType>
</xs:element>

<xs:element name="param">
  <xs:complexType>
    <xs:attribute name="availableChoices"/>
```

```
     <xs:attribute name="name" use="required"/>
     <xs:attribute name="value" use="required"/>
  </xs:complexType>
 </xs:element>
</xs:schema>
```

# Appendix C. Licences

```
Squoring Software

End-User License and Support Agreement

Please read this document carefully. This is a legal agreement by which Squoring
 Technologies SAS ("Squoring") permits use of its Software products ("Squoring
 Software").  The user ("Customer") accepts the terms of this Agreement by taking
 any or all of the following actions: (a) by signing an order form or purchase
 order referencing either this Agreement or a Technical and Financial proposal
 issued by Squoring (an "Order Form"), (b) by opening the package containing
 the Software, and/or (c) by installing the Software on a computer ("Target
 Hardware").

CUSTOMER CONSENTS TO BE LEGALLY BOUND BY THESE TERMS. IF CUSTOMER DOES NOT AGREE
 TO ALL OF THE TERMS OF THIS AGREEMENT, CUSTOMER MUST NOT USE THE SOFTWARE AND
 MUST RETURN IT, INCLUDING ANY PRINTED ASSOCIATED DOCUMENTATION, TO SQUORING
 WITHIN FOURTEEN (14) DAYS TO RECEIVE A FULL REFUND OF THE PURCHASE PRICE.


1) DEFINITION
(a) "Squoring Software" includes (i) the Software identified in an Order Form
 or delivered with this Agreement; (ii) any authorized copies thereof; (iii)
 all related documentation ("Documentation") delivered with or included in that
 software; and (iv) any update to that software that Customer may receive from
 Squoring.
(b) Squoring Software is based on a traditional 3-tier architecture consisting
 of:
. a database and a data folder for storing project and user management data
. an application server running the "Squore Server Software" and the "License
 Server Software"
. a client front-end accessible through a Web Browser and a Command Line
 Interface to interact with the application server from a client machine
(c) Target hardware ("Target Hardware") is uniquely identified by the hardware
 specification and the operating system running on it.


2) LICENSE
Squoring grants to Customer, and Customer accepts from Squoring, a non-exclusive
 and non-transferable right and license to use the Squoring Software that is
 specified in the Order Form and/or that accompanies this Agreement, but only
 (i) in accordance with the related Documentation, (ii) subject to Customer's
 payment of applicable license fees and (iii) subject to the terms and conditions
 specified below.
Customer agrees that Customer does not have, and does not hereby acquire, any
 title or rights of ownership in any Squoring Software or, except for the license
 rights hereby granted, any right to use, copy, transfer or disclose all or
 any portion of any Squoring Software. The Squoring Software is protected by
 copyright laws and international treaties.


3) FEES
The fees for the license under this Agreement are set forth in the applicable
 Order Form or, if no Order Form exists, in the applicable Technical and
 Financial proposal  issued by Squoring, or, if no proposal exists, then in
 accordance with Squoring current list prices.
```

```
4) USE
(a) Unless otherwise stated in a special agreement, all dissemination or
 commercial exploitation of Squoring Software results is strictly forbidden.
(b) The license granted by this Agreement is a license under which a maximum
 number of active users and projects specified in the Order Form may use the
 Squoring Software.  An "Active User" is a physical user registered in the
 Squoring Software database.  Active Users are not shared among several Squoring
 software databases. A user is active if any activity has been recorded by the
 Squore Server Software in the past 6 months.  Activities include remote project
 creation, viewing of analysis results, and e-mail notification.
(c) The management and regulation of Active Users is managed by the License
 Server Software hosted on the Target hardware designated by the Customer.
(d) Except for continuous integration purpose, it is strictly forbidden to share
 the same Squoring Software login between different physical users.
(e) Customer will ensure that at least one of its employees has completed the
 two days on-site training course "Administrating Squoring software" given by a
 Squoring Software certified trainer, and that such trained employee(s) are the
 people within Customer's organization who are responsible for interactions with
 Squoring on maintenance and support matters.
(f) Customer may make a reasonable number of back-up or archival copies of the
 Software. Customer will reproduce all confidentiality and proprietary notices on
 each of these copies and maintain an accurate record of the location of each of
 these copies.
(g) Customer will not:
. Reverse compile, disassemble, or otherwise reverse engineer any Squoring
 Software, or allow anyone else to do so (except only to the extent such
 prohibition is contrary to applicable law).
. Remove or destroy any proprietary markings or legends or any encrypted license
 keys or similar security devices placed upon or contained in any Squoring
 Software.
. Modify or adapt the Squoring Software or create a derivative work based on or
 incorporate the Squoring Software into or with other software.
. Unless otherwise stated in a special agreement, distribute, sublicense, share,
 display, or in any manner make the Squoring Software available to any third
 party, with or without compensation.
. Use all or any part of the Squoring Software to create other software a
 principal purpose of which is to perform the same or similar functions as, or to
 replace any component of, the Squoring Software.


5.  MAINTENANCE AND SUPPORT
(a) Depending on the type of licenses bought by the Customer, Squoring will
 provide support and maintenance services according to the following schedule:
i. In case of perpetual licenses bought by Customer
. Maintenance fees will be charged in addition to the price of the purchase of
 the Squoring Software licenses. The annual initial amount of maintenance fees
 will be calculated on the basis of a 20% percentage of the net list price of the
 software licenses purchased by the Customer.
. After one year, Maintenance and Support services will be renewed by tacit
 agreement of the parties, for annual periods. Before the anniversary date of
 each license for which Support Services are in effect, Squoring shall advise the
 Customer of the applicable Maintenance and Support Service fees for the coming
 year.
. The termination of maintenance contract will be effective only by sending a
 registered letter with acknowledgement of receipt denouncing the contract at
 least 60 days before the end of the period of validity.
ii. In case of software licenses subscription
```

If the license to use the software is subject to a periodic subscription, the
maintenance cost for these licenses is included in the subscription price. The
maintenance is so provided during all the duration of the subscription, and
stops automatically at the end of the subscription validity.
(b) Conditions.  Maintenance and support services as defined hereafter in
paragraph 5-(c) are applicable subject to the following conditions:
. Squoring Software is covered by a valid maintenance contract for all acquired
Squoring software licenses.
. Squoring Software was not modified by the Customer.
. The version of the installed Squoring Software corresponds to one of the two
latest annual major updates distributed by Squoring Technologies.
. Customer engages to comply with the normal use of the software, strictly comply
with the instructions given by the Squoring Technologies and to respect all
provisions in the present agreement.
. Customer shall nominate from among its staff a technical coordinator and an
alternate coordinator at the Customer Site(s), with up to date knowledge of
Squoring licensed products usage and sufficient technical knowledge to interact
with Squoring support staff. In case of change of the coordinators, the Customer
will provide written notification to Squoring Technologies.
(c) Maintenance and support services include:
. Assistance from support: the online support (hot line) is available during
Squoring normal business hours from 9 am to 6 pm (Central European Time)
to answer the questions of the technical coordinator when technical facts
encountered in the use of the Squoring Software. Support will help to identify
problems and provide, where appropriate, temporary fixing patches. Contact
information for support is:
- support site: https://support.squoring.com
- email: support@squoring.com
. Corrective maintenance: the corrective maintenance includes the development,
to the extent commercially reasonable, of workarounds or program fixes for
malfunctions submitted by Customer. Are considered as malfunctions recognized
or reproducible defects resulting in distorted results compared to those defined
in the software Manual and not coming from non-observance of the instructions of
the said Manual.
. Updates: updates include the delivery of successive versions of the software,
being either due to bug fixes or to enhancements of performances or features
(this delivery does not necessarily provide new additional features). Customer
will destroy any prior version before installing a new update.
. Rehost: any change of "Target hardware" implies a change of license keys and
shall be subject to the prior written authorization of Squoring and to the
signature by the Customer of a letter of destruction of all the license files
already installed.
d) Maintenance and support services do not include:
. Time spent, after request of the Customer by Squoring Technologies staff not
directly attributable to maintenance services: search for non-reproducible
anomalies, malfunction due to non-compliance with the Manual without the
Software itself being an issue, unavailability of the system, operating
activities prior to the intervention (such as preliminary backup ...).
. Installation of the Software by Squoring Technologies.
. Additional services which do not fall within the scope of maintenance services
as defined above in paragraph 5-(c).
. On-site support: Squoring may offer on-site support to Customer at additional
charges
e) Procedure for the submission of requests:
. To be taken into account, Customer requests shall be sent using the support
site at https://support.squoring.com
. Customer agrees to give, in support of a request for correction due to an
anomaly, any information likely to facilitate the search for the causes of this
anomaly, and to give for free to Squoring Technologies an open access to its

premises and development stations in the day and hours necessary to perform the
contract, and to ensure the conservation, under the conditions of appropriate
security and condition of the latest version, of the sources of programs in case
of this is necessary to enable Squoring Technologies to perform its maintenance
services.
. Regarding correction of anomalies, Squoring is committed to act as soon as
possible to correct the anomalies detected. Squoring will transfer to the
Customer either a technique to bypass the anomaly or a patch of necessary
corrections or a new version of the software.
. Any issues not resolved with the initial response will be investigated
using the data provided. Below are the targeted response times for continued
investigations.
- Blocker: 1 day, daily update. A request is "blocking" when the incident has a
significative impact with a risk of operating loss or when datas are corrupted.
The significative impact is appreciated by Squoring Technologies.
- Serious: 2 days, weekly update
- Major: 3 days, monthly update
- Minor: 1 week, monthly update
 (f) Limitations
. Squoring is expressly subject to an obligation of means.
. Squoring is not required to (i) develop and release any, or any particular
type of enhancements or (ii) customize the enhancements to satisfy Customer's
particular requirements.
. The Updates will not include any upgrade or new version of the Products that
Squoring decides, in its sole discretion, to make generally available as a
separately priced item.
. Squoring will be released from any responsibility in case of breach by the
Customer of any provision of this maintenance terms and conditions.


6. WARRANTIES AND REMEDIES
(a) Limited Warranty. Squoring warrants that it has the right to (i) enter into
this Agreement and (ii) grant the licenses hereunder. Squoring also warrants
that the Squoring Software will perform substantially as described in the
Documentation during a 90 days Warranty Period. Customer acknowledges that (i)
the Products may not satisfy all of Customer's requirements and (ii) the use of
the Products may not be uninterrupted or error-free.
(b) Remedies. Squoring or its representative will correct or replace any
defective Software. Customer acknowledges that this paragraph sets forth
Customer's exclusive remedy, and Squoring exclusive liability, for any breach of
warranty or other duty related to the quality of the Products.
(c) Disclaimer. EXCEPT AS EXPRESSLY PROVIDED IN THIS AGREEMENT OR REQUIRED BY
APPLICABLE LAW, ALL WARRANTIES, CONDITIONS, REPRESENTATIONS, INDEMNITIES AND
GUARANTEES WITH RESPECT TO THE PRODUCTS, WHETHER EXPRESS OR IMPLIED, ARISING
BY LAW, CUSTOM, PRIOR ORAL OR WRITTEN STATEMENTS BY SQUORING, ITS SQUORINGS
OR REPRESENTATIVES OR OTHERWISE (INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF
MERCHANTABILITY, SATISFACTION AND FITNESS FOR A PARTICULAR PURPOSE) ARE HEREBY
OVERRIDDEN, EXCLUDED AND DISCLAIMED.
IN NO EVENT SHALL THE AGGREGATE LIABILITY OF SQUORING TO CUSTOMER ON ACCOUNT OF
ANY MATTER ARISING WITH RESPECT TO THE SQUORING SOFTWARE EXCEED THE LICENSE FEES
PAID BY CUSTOMER UNDER THIS AGREEMENT.
(d)  Infringement Indemnity. If an action is brought against Customer claiming
that the Product infringes a patent, trade secret or copyright, Squoring will
defend Customer at Squoring expense and, subject to this Section, pay the
damages and costs finally awarded against Customer in the infringement action,
but only if (i) Customer notifies Squoring promptly upon learning that the claim
might be asserted, (ii) Squoring has sole control over the defense of the claim
and any negotiation for its settlement or compromise, and (iii) Customer takes
no action that is contrary to Squoring interest. If a claim described above may

be or has been asserted, Customer will permit Squoring, at Squoring option and
expense, to (A) procure the right to continue using the Product, (B) replace or
modify the Product to eliminate the infringement while providing functionally
equivalent performance, or (C) accept the return of the Product and refund
to Customer the License Fee actually paid to Squoring for such Product, less
depreciation based on a 5-year straight-line-depreciation schedule.
Squoring shall have no indemnity obligation to Customer under this Section
if the patent or copyright infringement claim results from (i) a correction
or modification of the Product not provided by Squoring, (ii) the failure to
promptly install an Update or Enhancement at Squoring direction with knowledge
that installation thereof would have avoided the infringement or (iii) the
combination of the Product with other non-Squoring software or (iv) any
unauthorized use of the Squoring Software, or (v) any version of the Software
other than the latest update offered by Squoring to Customer at no additional
charge.


7. LIMITATION OF LIABILITY
UNDER NO CIRCUMSTANCES WILL SQUORING OR ITS SQUORINGS BE LIABLE FOR ANY
CONSEQUENTIAL, INDIRECT, SPECIAL, PUNITIVE OR INCIDENTAL DAMAGES OR LOST
PROFITS, WHETHER FORESEEABLE OR UNFORSEEABLE, BASED ON CUSTOMER'S CLAIMS OR
THOSE OF ITS CUSTOMERS (INCLUDING, BUT NOT LIMITED TO, CLAIMS FOR LOSS OF
DATA, GOODWILL, USE OF MONEY OR USE OF THE PRODUCTS, INTERRUPTION IN USE OR
AVAILABILITY OF DATA, STOPPAGE OF OTHER WORK OR IMPAIRMENT OF OTHER ASSETS),
ARISING OUT OF BREACH OR FAILURE OF EXPRESS OR IMPLIED WARRANTY, BREACH OF
CONTRACT, MISREPRESENTATION, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHERWISE.
IN NO EVENT WILL THE AGGREGATE LIABILITY WHICH SQUORING OR ITS SQUORINGS MAY
INCUR IN ANY ACTION OR PROCEEDING EXCEED THE LICENSE FEES ACTUALLY PAID BY
CUSTOMER FOR THE SPECIFIC PRODUCT THAT DIRECTLY CAUSED THE DAMAGE. THIS SECTION
WILL NOT APPLY ONLY WHEN AND TO THE EXTENT THAT APPLICABLE LAW SPECIFICALLY
REQUIRES LIABILITY, DESPITE THE FOREGOING EXCLUSION AND LIMITATION.


8. OWNERSHIP
All trademarks, service marks, patents, copyrights, trade secrets and other
proprietary rights in or related to the Products are and will remain the
exclusive property of Squoring, whether or not specifically recognized or
perfected under local applicable law. Customer will not take any action that
jeopardizes Squoring proprietary rights or acquire any right in the Products,
except the limited use rights specified in Section 4. Squoring will own all
rights in any copy, translation, modification, adaptation or derivation of the
Products, including any improvement or development thereof.


9. CONFIDENTIALITY
(a) Confidentiality. Customer acknowledges that the Products constitute and
incorporate confidential and proprietary information developed or acquired by
or licensed to Squoring. Customer will take all reasonable precautions necessary
to safeguard the confidentiality of the Products, including at a minimum those
taken by Customer to protect Customer's own confidential information. Customer
will not allow the removal or defacement of any confidentiality or proprietary
notice placed on the Products. The placement of copyright notices on these items
will not constitute publication or otherwise impair their confidential nature.
(b) Disclosure. Customer will not disclose, in whole or in part, the Products
or any portion thereof or other information that has been designated as
confidential to any individual, entity or other person, except to those of
Customer's employees or consultants who require access for Customer's authorized
use of the Products, provided such consultants agree in writing to comply with
the use and non-disclosure restrictions applicable to the Products under this

Agreement. Customer acknowledges that any unauthorized use or disclosure of
the Products may cause irreparable damage to Squoring. If an unauthorized use
or disclosure occurs, Customer will immediately notify Squoring and take, at
Customer's expense, all steps which may be available to recover the Products
and to prevent their subsequent unauthorized use or dissemination. Squoring
agrees to take the same action regarding any information designated in writing
as proprietary which it receives from Customer ("Customer Information").
(c) Limitation. Neither Squoring nor Customer will have any confidentiality
obligation with respect to any portion of the Products or Customer Information
that (i) the receiving party knew or independently developed before receiving
such Products or Customer Information under this Agreement, (ii) the receiving
party lawfully obtained from a third party under no confidentiality obligation,
or (iii) became available to the public other than as a result of any act
or omission by the receiving party or any of receiving party's employees or
consultants.


10. TERMINATION
Customer may terminate this Agreement or any Order Form, without right to
refund, by notifying Squoring of such termination and returning the Product
and copies thereof to Squoring. Squoring may terminate this Agreement, upon
reasonable notice and without judicial or administrative resolution, if Customer
or any of Customer's employees or consultants breach any material term or
condition hereof. This Agreement will terminate automatically if Customer
becomes insolvent or enters into bankruptcy, suspension of payments, moratorium,
or any other proceeding that relates to insolvency or protection or creditors'
rights.
Upon the termination of this Agreement for any reason, all rights granted to
Customer hereunder will cease, and Customer will stop using Squoring Software,
return or destroy all copies and so certify to Squoring in writing. The
provisions of Sections 6-8 will survive the termination of this Agreement.


11. INSPECTION
During the term of this Agreement, Squoring or its representative, if in receipt
of credible evidence of non-compliance, may, upon prior notice to Customer,
inspect the files, computer processors, equipment and facilities of Customer
during normal working hours to verify Customer's compliance with this Agreement.
While conducting such inspection, Squoring or its representative will be
entitled to copy any item that Customer may possess in violation of this
Agreement, without disruption of Squoring business and violation of Laws and
Regulations.


12. ASSIGNMENT
Customer shall not assign, delegate or otherwise transfer this Agreement or any
of its rights or obligations hereunder without Squoring prior approval which
shall not he unreasonably withheld.


13. MISCELLANEOUS
. Any terms and conditions of any unilateral letter, memorandum, purchase order
or other writing issued by Customer shall not be binding on Squoring. Any waiver
or modification of this Agreement will not be effective unless executed in
writing and signed by an authorized representative of Squoring and Customer.
This Agreement will bind Customer's successors-in-interest.
. This Agreement will be governed by and interpreted in accordance with the laws
of France. If any provision of this Agreement is held to be unenforceable,
in whole or in part, such holding will not affect the validity of the other

provisions of this Agreement, unless the Parties in good faith deem the
unenforceable provision to be essential, in which case either Party may
terminate this Agreement effective immediately upon notice to the other Party.
This Agreement constitutes the complete and entire statement of all conditions
and representations of the agreement between Squoring and Customer with respect
to its subject matter and supersedes all prior writings or understandings.

```
Redistributed Software     Version   License File
----------------------
Wildfly          10.1.0.Final lgpl-2.1.txt
PostgreSQL       8.4    postgresql-bsd.txt
Perl       5.12.3   al.txt
TCL        8.5    tcltkl.txt,tcllib.txt
PhantomJS        2.1.1   bsd3.txt


Components     Sub component  Version    License File
----------
Richfaces        4.5.17   lgpl-2.1.txt
PostgreSQL JDBC Driver     42.0.0   bsd2.txt
Oracle JDBC driver       12.1.02   otn.txt
Omnifaces        2.6    apache-2.0.txt
ANTLR        3.1    antlr3.txt
JasperReports Library      4.8    lgpl-2.1.txt
Checkstyle       5.6    lgpl-2.1.txt
JTcl       2.8    jtcl.txt, amd.txt, itcl.txt, janino.txt, tcllib.txt,
 tcltk.txt, ucb.txt
log4j          1.2.17   apache-2.0.txt
Apache Commons   commons-lang3  3.1    apache-2.0.txt
Apache HttpComponents httpclient  4.1.2    apache-2.0.txt
Apache HttpComponents httpmime  4.1.2    apache-2.0.txt
Apache XML Graphics  batik-transcoder 1.7    apache-2.0.txt
Bouncy Castle    bcmail-jdk16  1.46   bouncy-castle.txt
com.beust      jcommander  1.48   apache-2.0.txt
com.google.collections google-collections 1.0    apache-2.0.txt
com.googlecode.juniversalchardet juniversalchardet 1.0.3 mpl1.1.txt
com.sun.mail     javax.mail  1.5.3   gf.txt
commons-cli      commons-cli  1.2    apache-2.0.txt
commons-collections  commons-collections 3.2.2   apache-2.0.txt
javax.enterprise  cdi-api    1.2    apache-2.0.txt
javax.validation   validation-api  1.1.0.Final  apache-2.0.txt
net.java.dev.jna   jna    4.1.0    lgpl-2.1.txt
net.sf.jsci      jsci    1.2    lgpl-2.1.txt
net.sf.saxon     saxon-xom  8.7    mpl1.0.txt
nux        nux    1.6    nux.txt
org.glassfish    javax.json  1.0.4   gf.txt
org.jdom     jdom2    2.0.5   jdom.txt


Resources        Version   License File
---------
CodeMirror       4.4.0   mit.txt
font-awesome       4.7.0   mit.txt, ofl-1.1.txt
JavaScript InfoVis Toolkit     2.0.1   mit.txt
jquery         1.12.3   jquery.txt
jquery-mobile      1.4.2   jquery-mobile.txt
jquery-ui-resizable      1.11.4   mit.txt, jquery.txt
notify.js        0.4.2   mit.txt
splitter.js      1.51   mit.txt
gridstack.js     1.0.0   mit.txt
spectrum.js      1.8.0   mit.txt
```

## al

```
The "Artistic License"

    Preamble

The intent of this document is to state the conditions under which a
Package may be copied, such that the Copyright Holder maintains some
semblance of artistic control over the development of the package,
while giving the users of the package the right to use and distribute
the Package in a more-or-less customary fashion, plus the right to make
reasonable modifications.

Definitions:

 "Package" refers to the collection of files distributed by the
 Copyright Holder, and derivatives of that collection of files
 created through textual modification.

 "Standard Version" refers to such a Package if it has not been
 modified, or has been modified in accordance with the wishes
 of the Copyright Holder as specified below.

 "Copyright Holder" is whoever is named in the copyright or
 copyrights for the package.

 "You" is you, if you're thinking about copying or distributing
 this Package.

 "Reasonable copying fee" is whatever you can justify on the
 basis of media cost, duplication charges, time of people involved,
 and so on.  (You will not be required to justify it to the
 Copyright Holder, but only to the computing community at large
 as a market that must bear the fee.)

 "Freely Available" means that no fee is charged for the item
 itself, though there may be fees involved in handling the item.
 It also means that recipients of the item may redistribute it
 under the same conditions they received it.

1. You may make and give away verbatim copies of the source form of the
Standard Version of this Package without restriction, provided that you
duplicate all of the original copyright notices and associated disclaimers.

2. You may apply bug fixes, portability fixes and other modifications
derived from the Public Domain or from the Copyright Holder.  A Package
modified in such a way shall still be considered the Standard Version.

3. You may otherwise modify your copy of this Package in any way, provided
that you insert a prominent notice in each changed file stating how and
when you changed that file, and provided that you do at least ONE of the
following:

    a) place your modifications in the Public Domain or otherwise make them
    Freely Available, such as by posting said modifications to Usenet or
    an equivalent medium, or placing the modifications on a major archive
    site such as uunet.uu.net, or by allowing the Copyright Holder to include
    your modifications in the Standard Version of the Package.
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```
    b) use the modified Package only within your corporation or organization.

    c) rename any non-standard executables so the names do not conflict
    with standard executables, which must also be provided, and provide
    a separate manual page for each non-standard executable that clearly
    documents how it differs from the Standard Version.

    d) make other distribution arrangements with the Copyright Holder.

4. You may distribute the programs of this Package in object code or
executable form, provided that you do at least ONE of the following:

    a) distribute a Standard Version of the executables and library files,
    together with instructions (in the manual page or equivalent) on where
    to get the Standard Version.

    b) accompany the distribution with the machine-readable source of
    the Package with your modifications.

    c) give non-standard executables non-standard names, and clearly
    document the differences in manual pages (or equivalent), together
    with instructions on where to get the Standard Version.

    d) make other distribution arrangements with the Copyright Holder.

5. You may charge a reasonable copying fee for any distribution of this
Package.  You may charge any fee you choose for support of this
Package.  You may not charge a fee for this Package itself.  However,
you may distribute this Package in aggregate with other (possibly
commercial) programs as part of a larger (possibly commercial) software
distribution provided that you do not advertise this Package as a
product of your own.  You may embed this Package's interpreter within
an executable of yours (by linking); this shall be construed as a mere
form of aggregation, provided that the complete Standard Version of the
interpreter is so embedded.

6. The scripts and library files supplied as input to or produced as
output from the programs of this Package do not automatically fall
under the copyright of this Package, but belong to whoever generated
them, and may be sold commercially, and may be aggregated with this
Package.  If such scripts or library files are aggregated with this
Package via the so-called "undump" or "unexec" methods of producing a
binary executable image, then distribution of such an image shall
neither be construed as a distribution of this Package nor shall it
fall under the restrictions of Paragraphs 3 and 4, provided that you do
not represent such an executable image as a Standard Version of this
Package.

7. C subroutines (or comparably compiled subroutines in other
languages) supplied by you and linked into this Package in order to
emulate subroutines and variables of the language defined by this
Package shall not be considered part of this Package, but are the
equivalent of input as in Paragraph 6, provided these subroutines do
not change the language in any way that would cause it to fail the
regression tests for the language.

8. Aggregation of this Package with a commercial distribution is always
permitted provided that the use of this Package is embedded; that is,
when no overt attempt is made to make this Package's interfaces visible
```

to the end user of the commercial distribution.  Such use shall not be
construed as a distribution of this Package.

9. The name of the Copyright Holder may not be used to endorse or promote
products derived from this software without specific prior written permission.

10. THIS PACKAGE IS PROVIDED "AS IS" AND WITHOUT ANY EXPRESS OR
IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED
WARRANTIES OF MERCHANTIBILITY AND FITNESS FOR A PARTICULAR PURPOSE.

    The End

## amd

license.amd

The following license terms apply to the TJC compiler source
and test files located in the src/tjc, src/tests/tjc, and
tests/tjc directories.

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OUT OF THE USE OF THIS SOFTWARE ITS DOCUMENTATION OR ANY DERIVATIVES
THEREOF, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. BY USING THIS
SOFTWARE WITHOUT CHARGE, YOU ACCEPT THIS ALLOCATION OF RISK. THIS
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ADVANCED MICRO DEVICES, INC. HAS NO OBLIGATION TO PROVIDE MAINTENANCE,
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In the redistribution and use of this software, each party shall at all
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rules, regulations, orders, and other requirements, including without
limitation such governmental requirements applicable to environmental
protection, health, safety, wages, hours, equal employment opportunity,
nondiscrimination, working conditions, import or export control, and

transportation. Without limiting the foregoing, each party shall adhere
to the U.S. Export Administration Regulations (EAR), currently found at
15 C.F.R. Sections 730 through 744, and, unless properly authorized by
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*/
```

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