




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	→	F
Technical Debt	3626	↗	F
Maturity Index	65 %	↘	C
Stability Index	84 %	↗	B
Reusability Index	44 %	↘	D

Squore 16.1.0

Installation and Administration Guide

Reference : SIM_Squore

Version : 16.1.0

Date : 28/06/2016

Installation and Administration Guide

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Abstract

This edition of the Installation and Administration Guide applies to Squore 16.1.0 and to all subsequent releases and modifications until otherwise indicated in new editions.

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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
<i>Italic</i>	A name of a user defined textual element. For example: Username : <i>admin</i>
Courier New	Files and directories; file extensions, computer output. For example: Edit the <code>config.xml</code> file
Courier Bold	Commands, screen messages requiring user action. For example: Username : <i>admin</i>
>	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 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.


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: <http://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. Responsibilities

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

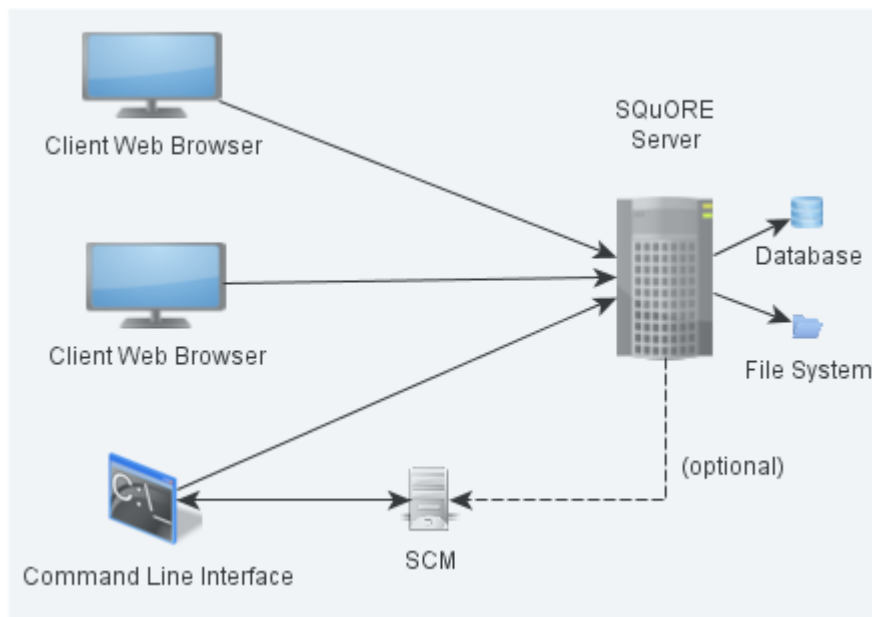
The version of this manual included in your Squore installation may have been updated. If you would like to check for updated user guides, consult the Squoring Technologies documentation site to consult or download the latest Squore manuals at <http://support.squoring.com/documentation/16.1.0>. Manuals 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
- 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, 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 Squore 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 **JBoss AS/J2EE** 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 Web 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: http://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 JBoss/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 operating systems:

- CentOS 6
- Fedora 19
- RedHat EL 5
- RedHat EL 6
- SuSe Linux 11.1
- Ubuntu Server 14.04
- Windows 7
- Windows 8
- Windows 10
- Windows Server 2008 R2
- Windows Server 2012 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 Release 1 (new in 16.1)

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 24 and up**
- **Mozilla Firefox 17 and up**
- **Apple Safari 6 and up**
- **Microsoft Internet Explorer 8 and up**
- **Microsoft Edge 20 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 http://support.squoring.com/download_area.php
- A user account with system administrator privileges
- The Oracle Java Development Kit version 1.7.0_51 or higher

Warning

- Java 1.8 is not supported.
- It is technically possible to run Squore using a 32-bit JDK, 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 2 GB of space available on the disk for a full installation
- 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.

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

Because a licence is linked to the hardware on which Squore Server is installed, Squoring usually delivers a temporary licence to try out Squore first. This give you time to send out your host-id to our team, who will then issue a permanent licence file. In order to find out what your host-id is, follow these steps:

1. Download the host-id checker from http://support.squoring.com/download_area.php
2. Open a terminal on the machine where you installed or plan to install Squore.
3. Run the command `java -jar squore-hostid.jar`.
4. Send the output to support@squoring.com.

3.1.7. Packages for Windows

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

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::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>]

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=UTF-8` 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 JDK 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-1.7.0-openjdk**
- **perl**
- **perl-Algorithm-Diff**
- **perl-Archive-Zip**
- **perl-Date-Calc**
- **perl-DBD-Pg** (unless you use a Oracle as your database backend)
- **perl-DBI** (unless you use a Oracle as your database backend)

- **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**

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 14.04.3 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-7-jdk**
- **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:

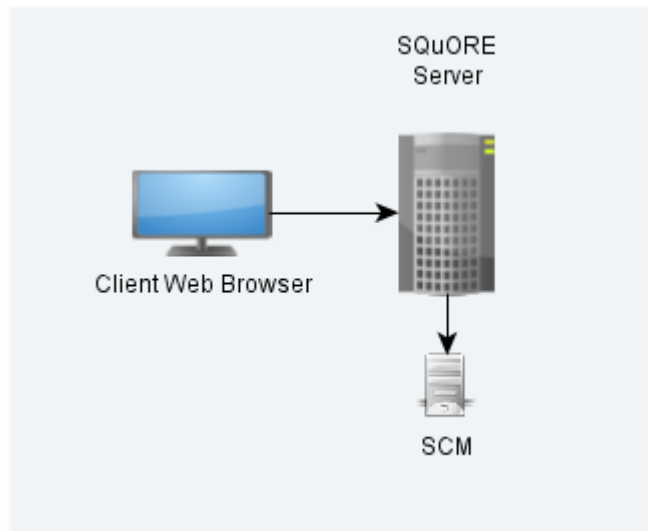
- **libtimedate-perl**
- **libmail-box-perl**
- **libmail-mbox-messageparser-perl**
- **libnet-github-perl**

Optional packages for working with Semios/Prometil systems:

- **libfile-slurp-perl**

3.2. Common Deployment Scenarios

3.2.1. Creating Projects using the Web Interface Only

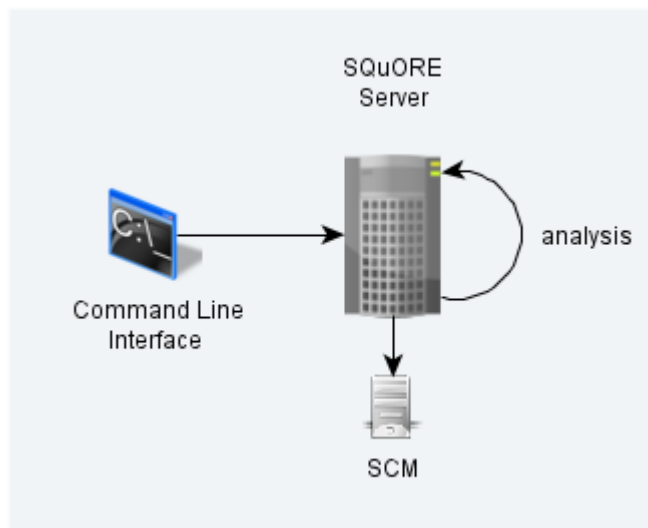


Squore in a configuration where projects are created via the web interface

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

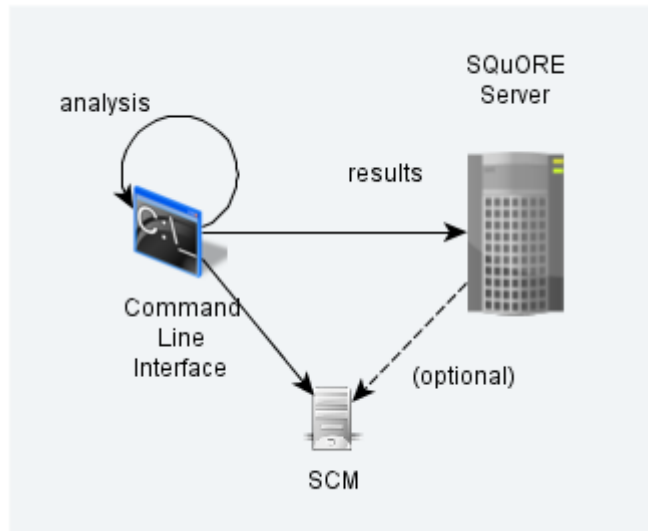


Squore in a configuration where projects creations are requested by a client and delegated to a server

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 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.

3.2.4. 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 (including its dedicated JBOSS and PostgreSQL instances as well as a portable Perl distribution in `<SquORE_HOME>\tools\perl`)

- <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:

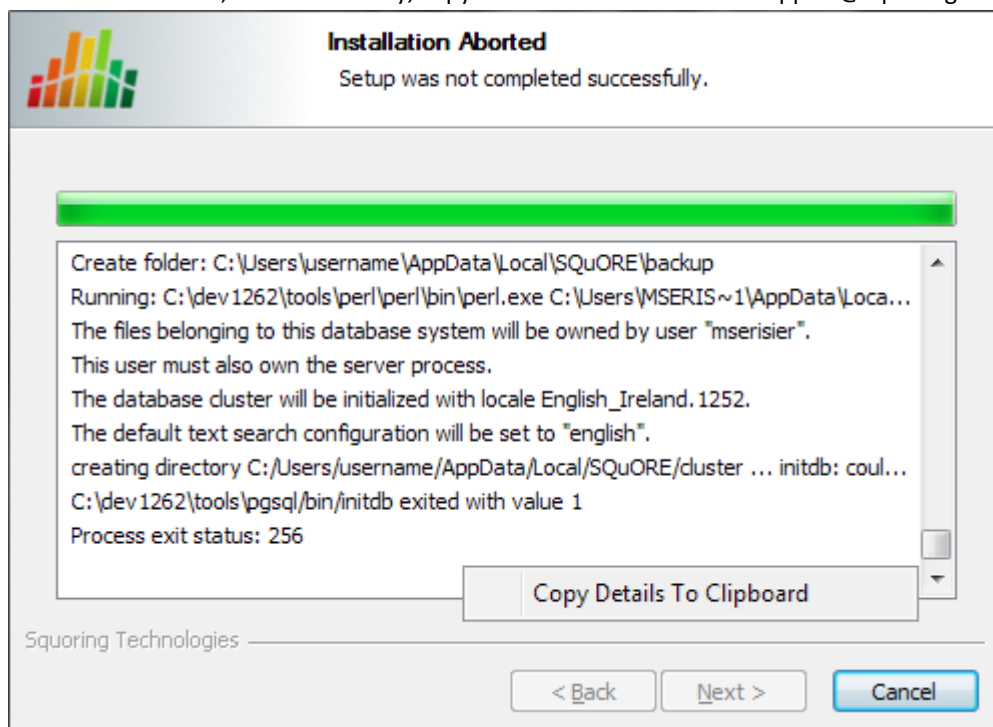
- use a different installation folder
- use a specific path for temporary data and project data
- use a specific path for the local PostgreSQL cluster and backup folder
- use an existing local PostgreSQL instance
- use a remote PostgreSQL or Oracle database (new in 16.1)
- use your own perl distribution

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

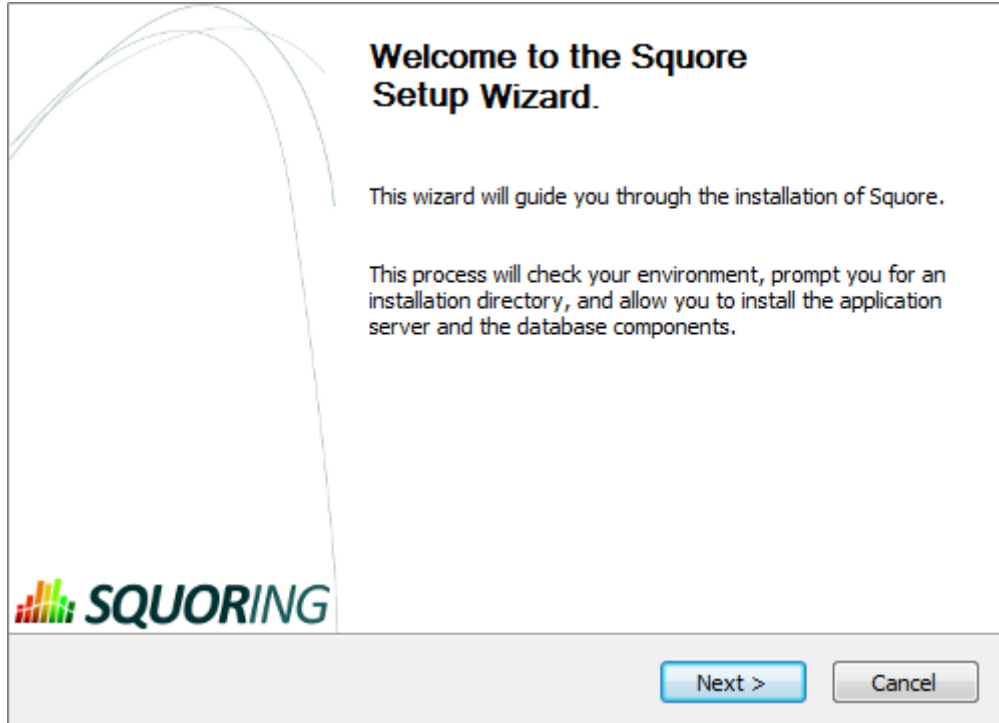
When an error occurs during the installation, the installer wizard remains open and display the log file of the installation, as shown on the screenshot below. When this happens, review the contents of the installer window, and if necessary, copy and send the contents to support@squoring.com.



The Installation Aborted screen

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

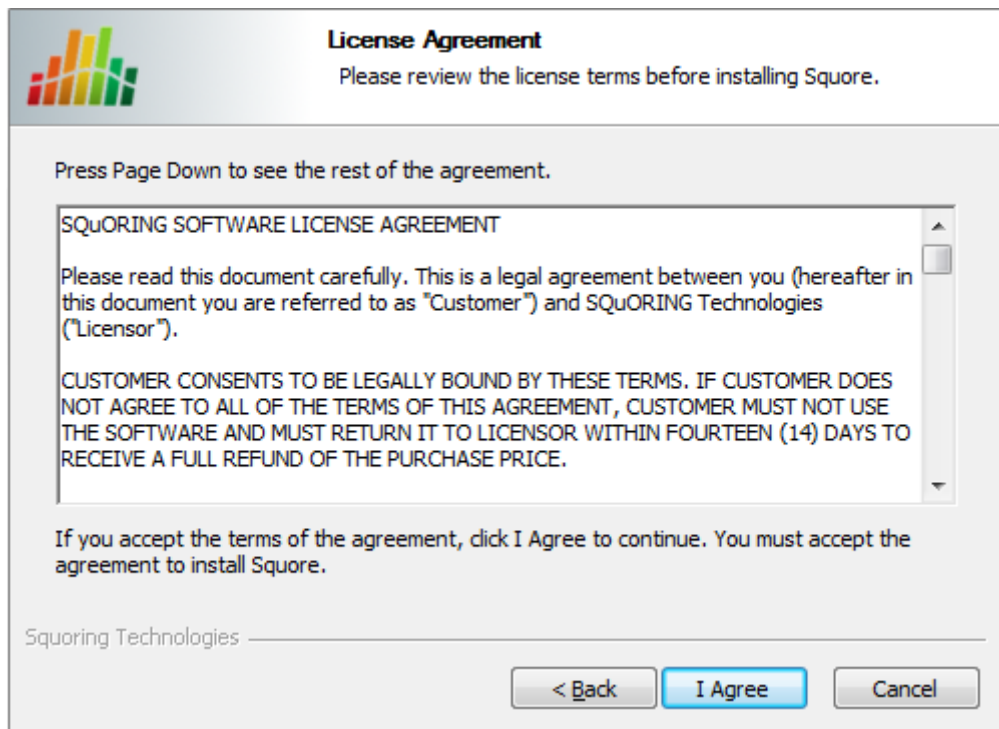
1. The Squore installer Welcome screen



The Squore installer Welcome screen

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

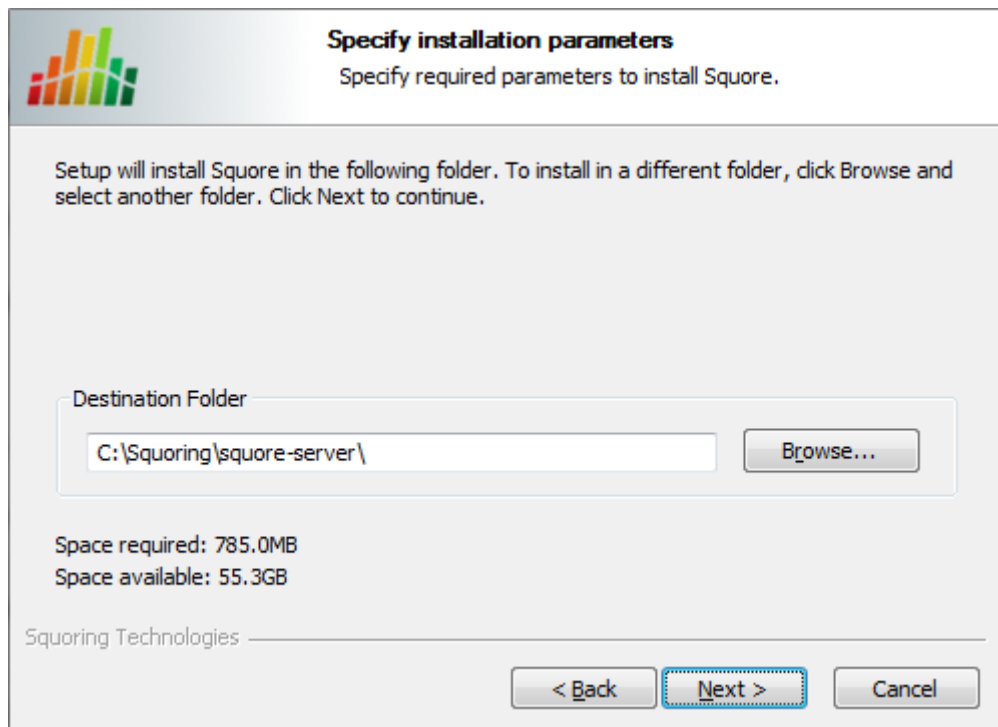
2. The Squore Licence Agreement screen



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.**

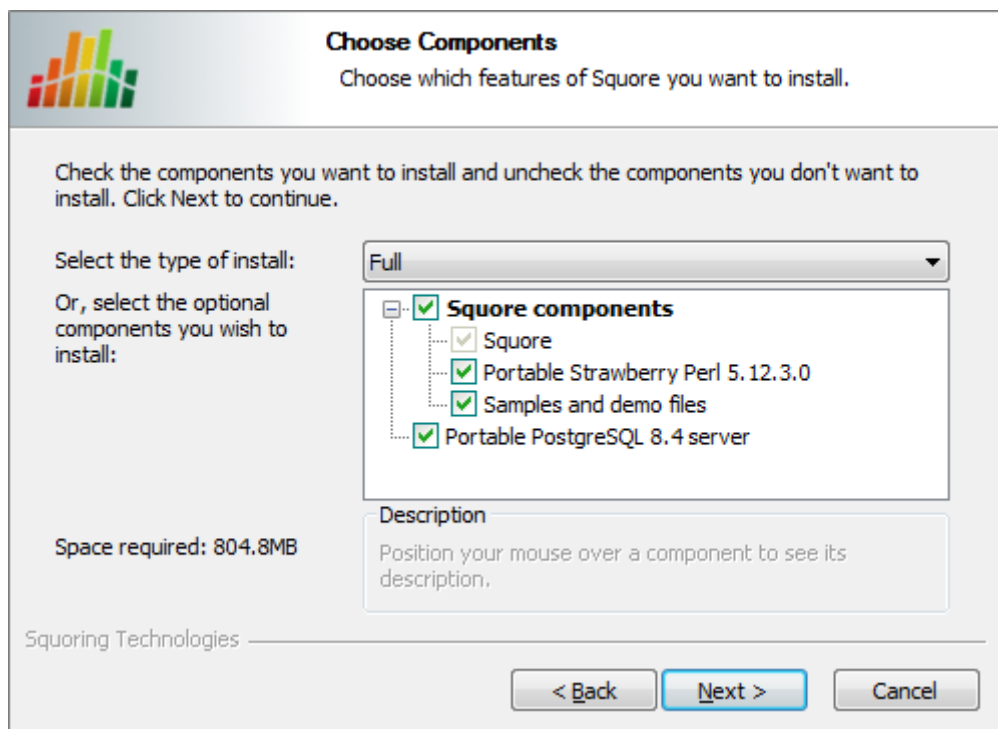
Tip

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

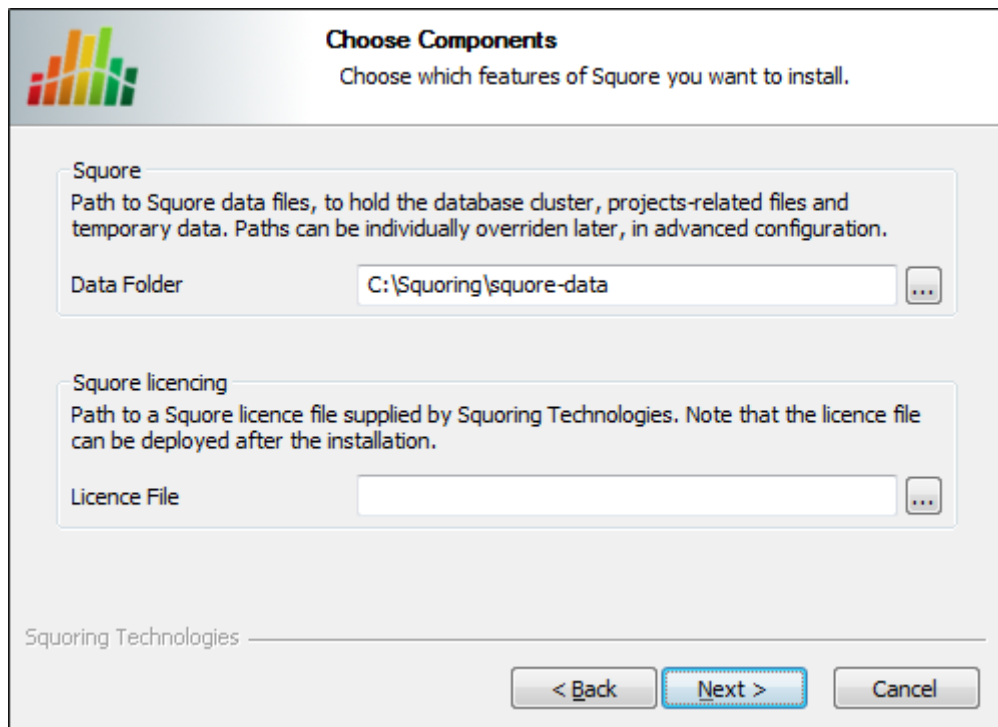
The Components screen allows you to choose between the three available types of installations:

- **Full:** all components will be installed
- **Minimal:** only Squore Server will be installed. Use this mode if a **PostgreSQL** server and a distribution of the **Perl** scripting environment are already available on the server
- **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



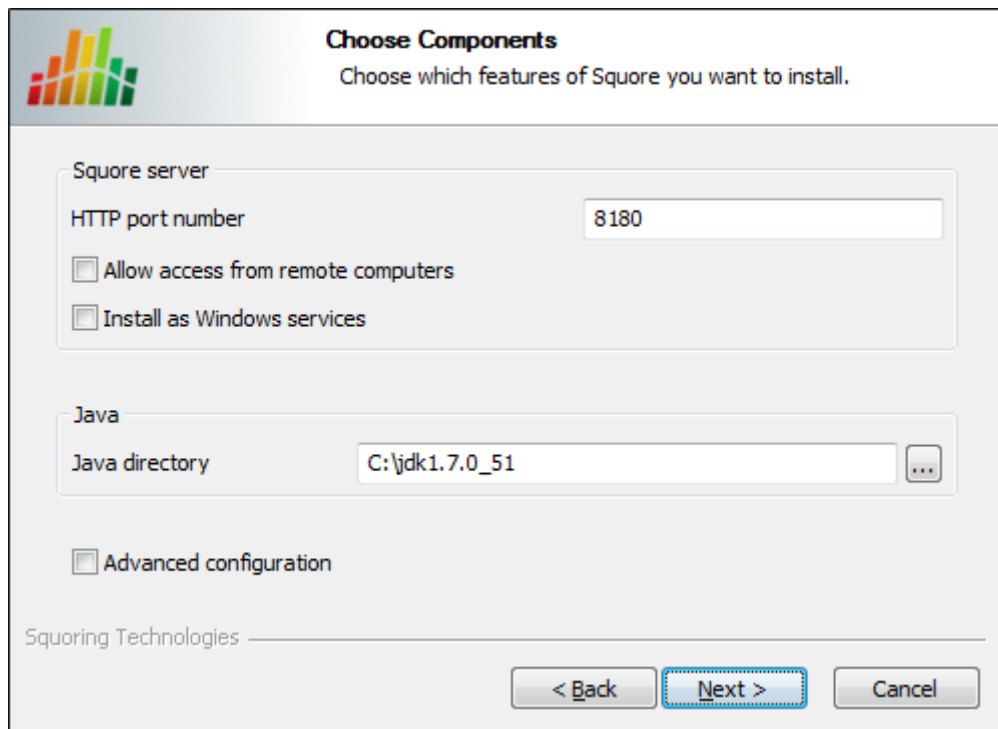
The General Options screen

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 5.11, “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



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 services:** Check this box if you want the Windows services to be installed, and optionally customise their names when clicking the **Next** button. After the installation completes, you will be able to manage the PostgreSQL 8.4 Server and JBoss Application Server 7.1.1 services from the Windows Services Console or from the command line using `net start | stop PG84SVC` and `net start | stop JBAS71SVC`.

Tip

The services can also be installed after running the wizard, refer to Section 4.2, “Running Squore as a Windows Service” for more details.

Note

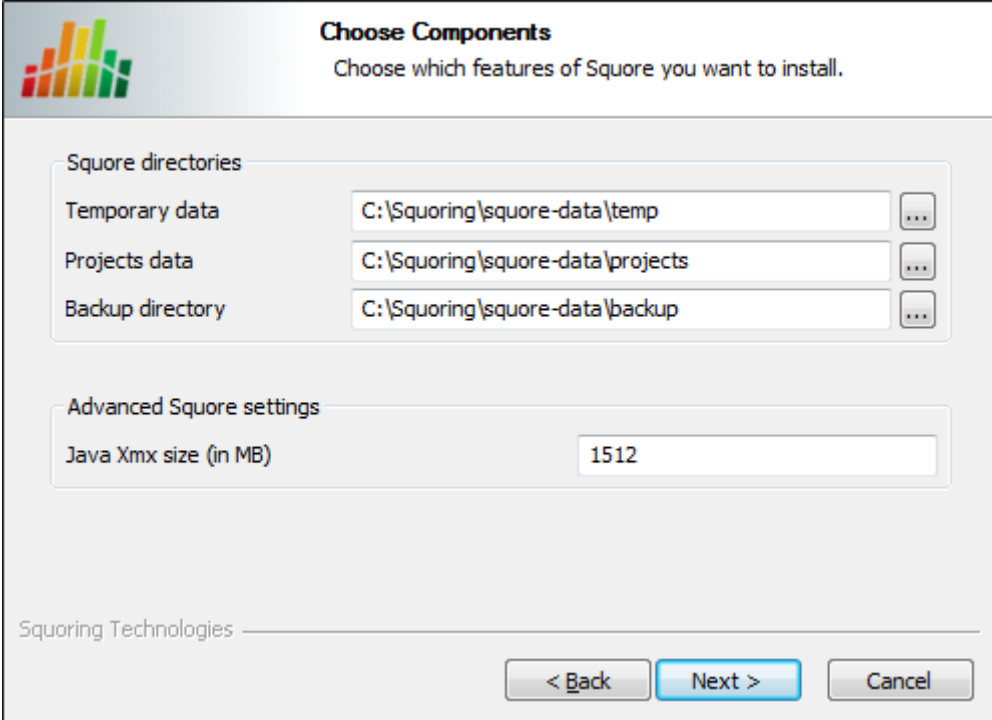
The PostgreSQL 8.4 Server service is only installed if you are using a local PostgreSQL cluster as your database backend.

- **Java directory:** the directory where the Oracle JDK or JRE is installed. The wizard should have found the appropriate Java installation on your server, but you can modify the value if the JDK you want to use is in a different location using the ... button. Note that Java 1.7.0_51 or higher is required and that Java 1.8 is not supported (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 settings screen



The Advanced Squore settings screen

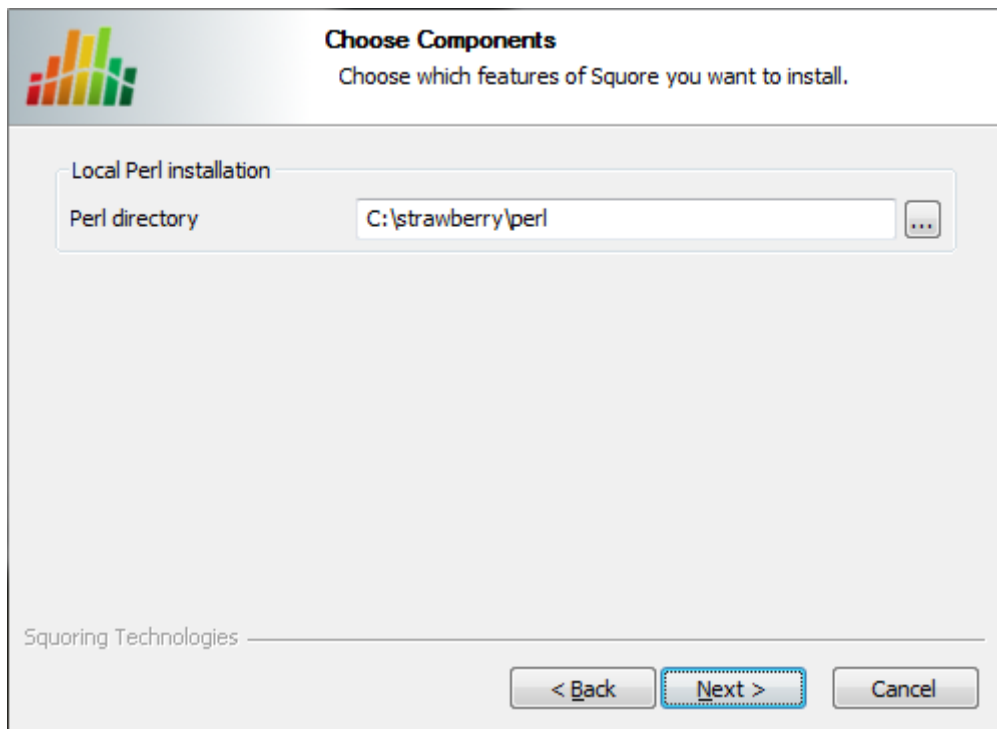
Note

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

On the Advanced Squore settings 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 5.6, “Changing the Java Heap Size”.

8. The Local Perl installation screen



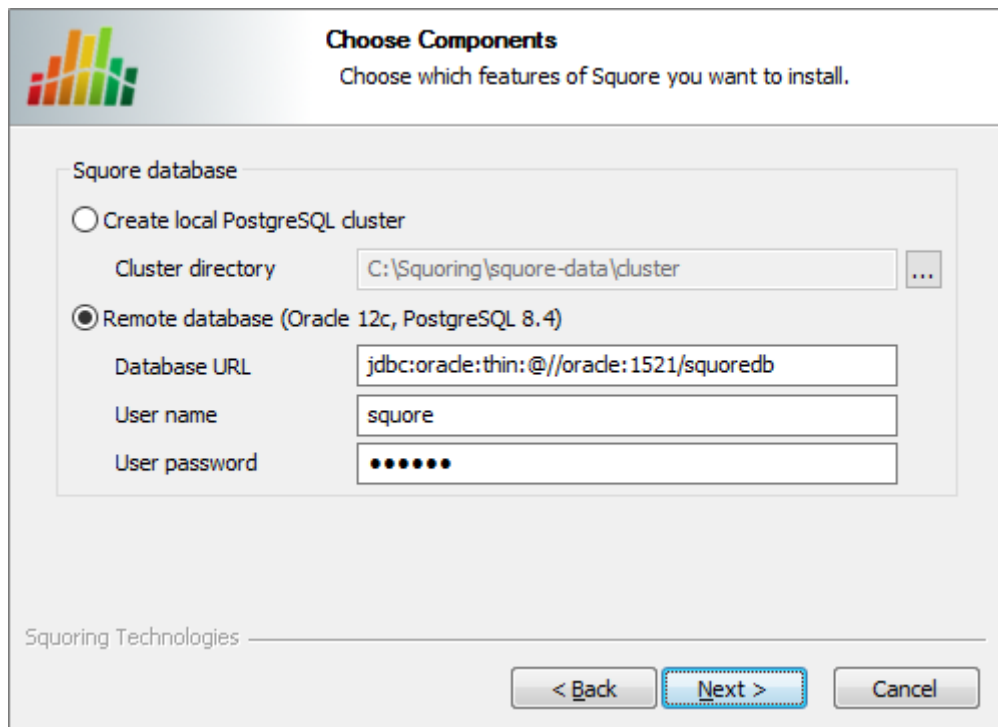
The Local Perl installation screen

Note

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

On the Local Perl installation 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 Database configuration screen



The Database configuration screen

On the Database configuration screen, you can specify if your Squore Server installation should use a local PostgreSQL cluster or a database in 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.

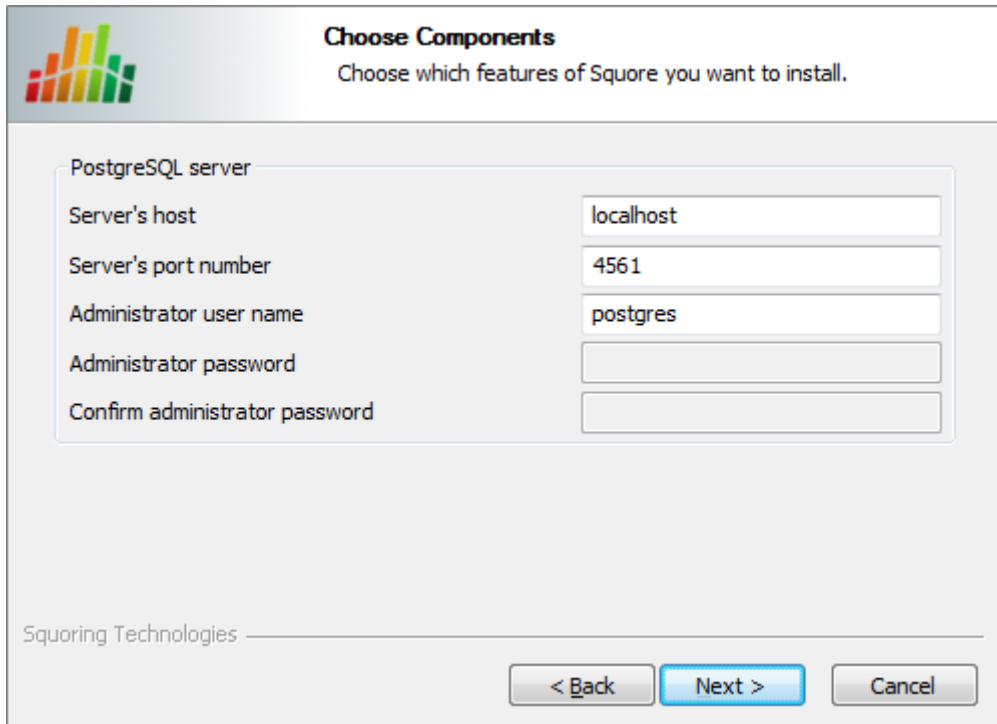
Tip

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 database 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 screenshot shows a dialog box titled "Choose Components" with the instruction "Choose which features of Squore you want to install." Below the title is a section for "PostgreSQL server" configuration. It includes the following fields:

Server's host	localhost
Server's port number	4561
Administrator user name	postgres
Administrator password	
Confirm administrator password	

At the bottom of the dialog, there are three buttons: "< Back", "Next >" (highlighted in blue), and "Cancel". The Squoring Technologies logo is visible in the bottom left corner of the dialog.

The PostgreSQL server configuration screen

Note

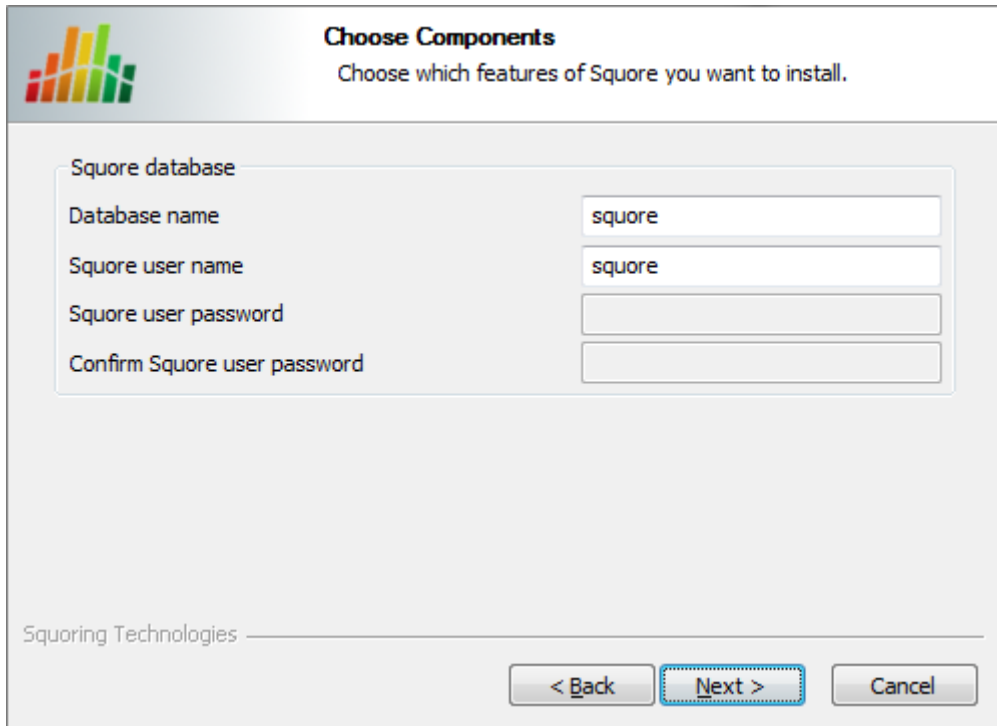
This screen is only displayed if you checked the **Advanced configuration** box in step 6 and are using a local PostgreSQL database.

On the PostgreSQL server 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 screen



The screenshot shows a dialog box titled "Choose Components" with the instruction "Choose which features of Squore you want to install." Below the title bar, there is a section for "Squore database" configuration. It includes four input fields: "Database name" (containing "square"), "Squore user name" (containing "square"), "Squore user password" (empty), and "Confirm Squore user password" (empty). At the bottom of the dialog, there are three buttons: "< Back", "Next >" (highlighted with a blue dashed border), and "Cancel". The Squoring Technologies logo is visible in the bottom left corner of the dialog.

The Squore database screen

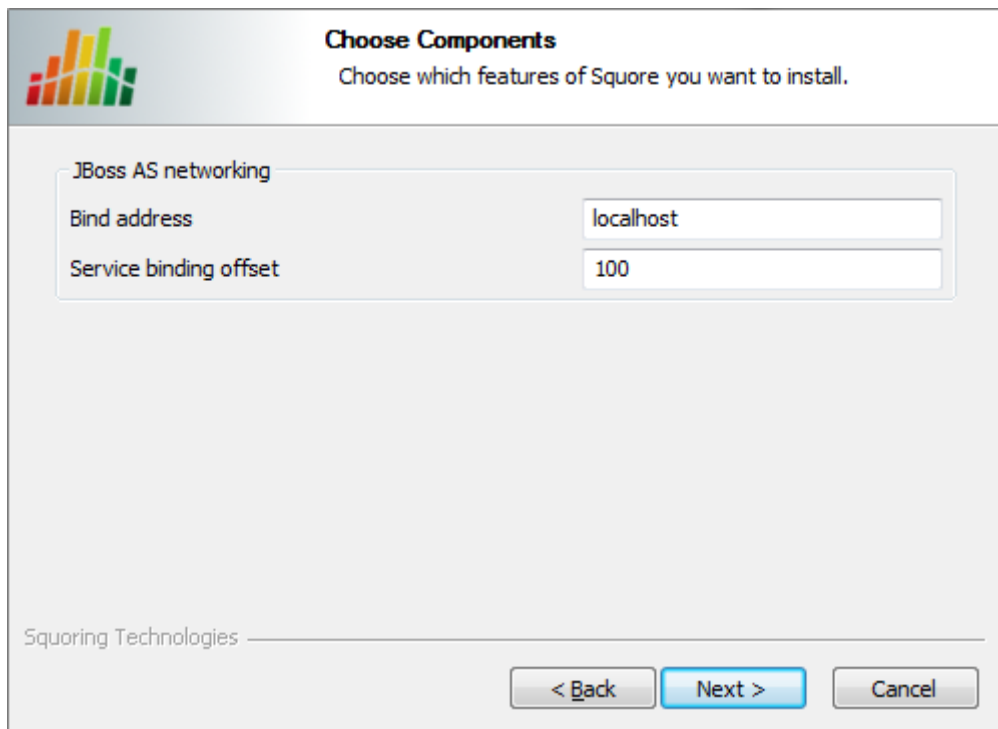
Note

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 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
- Note that the database password cannot be set manually. After adjusting your settings, click the **Next** button to continue.

12. The JBoss AS networking screen



The JBoss AS networking screen

Note

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

On the JBoss AS networking screen, you can specify the desired bind address and ports for Squore Server:

- **Bind address:** the bind-address configuration for the JBoss 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 JBoss ports (as described on <https://docs.jboss.org/author/display/AS71/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, remoting: 4547
 - 200: http: 8280, remoting: 4647
 - 300: http: 8380, remoting: 4747

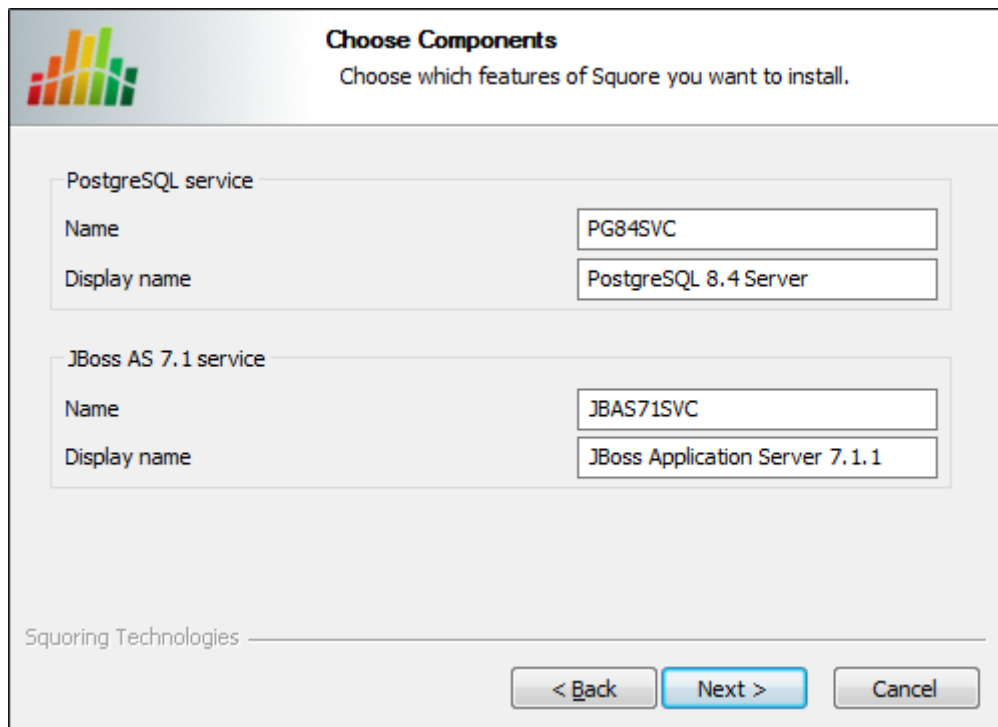
Tip

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 5.12, “Connecting to a Remote Licence Server”.

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

13. The Windows Services screen



The Windows Services screen

Note

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

On the Windows Services screen, you can specify the desired name and display name for the two services that control Squore Server:

- **The PostgreSQL service** allows starting and stopping the Squore database
- **The JBoss AS 7.1 service** allows starting and stopping the Squore web server

Tip

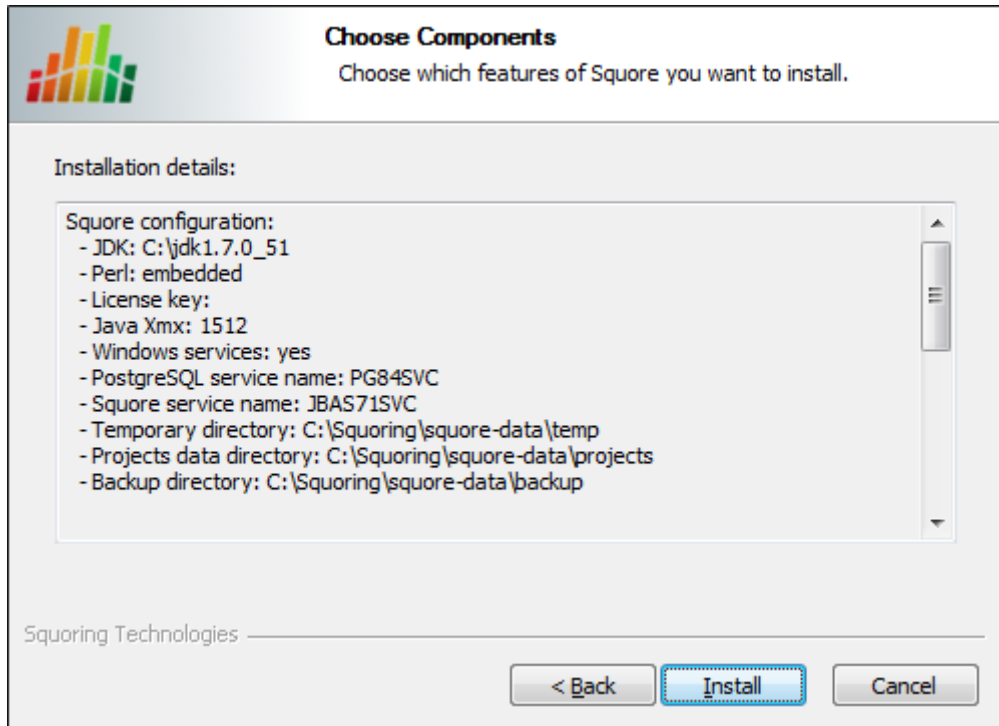
For a Windows Service, the Name is the alias used in the command line (for example: `net start PG84SVC`), and the Display Name is the name displayed in the graphical Windows Services Console.

The services are 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. This can be done after the installation process is finished from the Windows Services console. For more information, consult the Microsoft Windows documentation at <https://technet.microsoft.com/en-us/library/cc755249.aspx>.

Note that no PostgreSQL service is created if you are using Oracle as your database backend, or a remote PostgreSQL database.

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

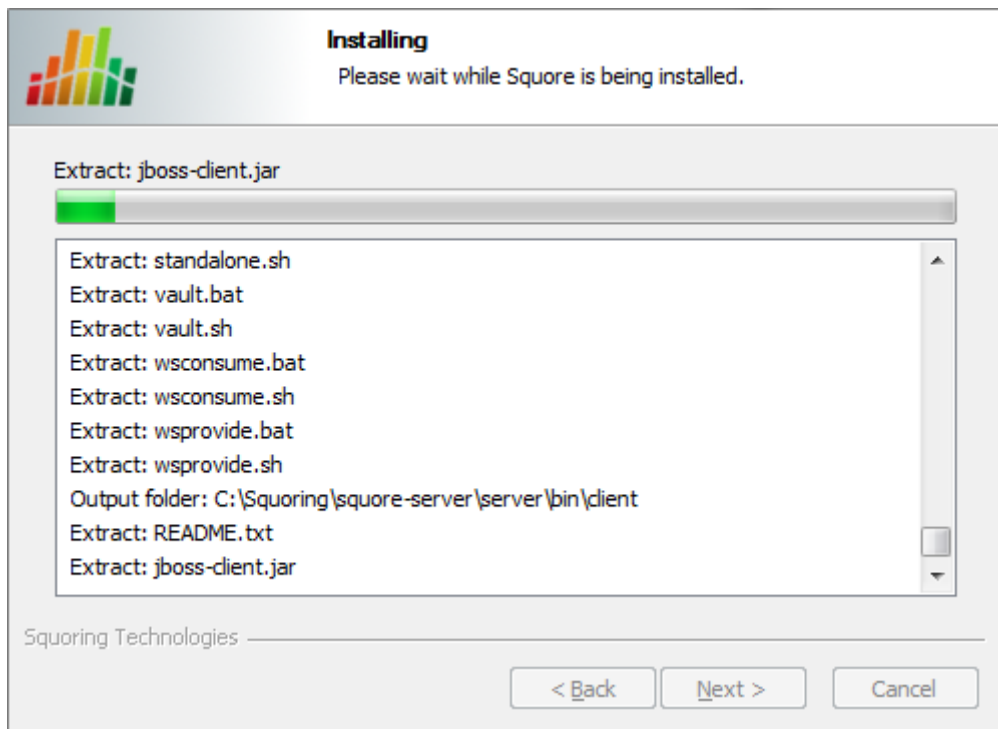
14. The Installation details screen



The Installation details screen

The Installation details 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



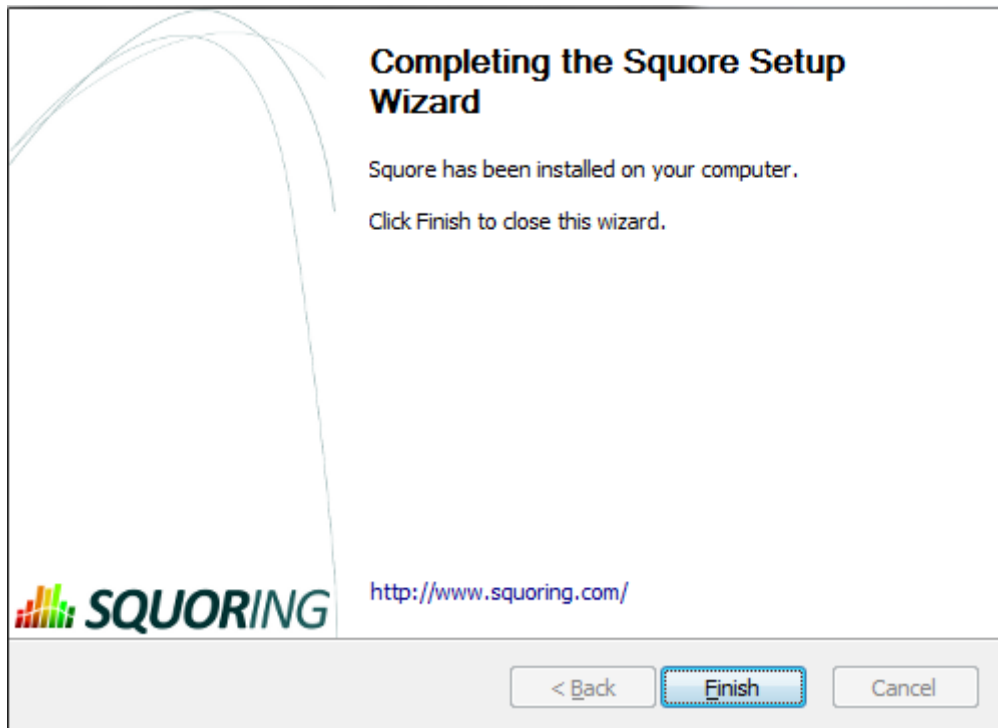
The Installation progress screen

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.

Squore is now ready for use. Refer to the next section to learn how to launch 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 JBOSS 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-server-linux-16.1.0.tar.bz2`) into the location where you want to install Squore Server (For example: `/home/user/squore/`).

2. Extract the contents of the archive into the selected installation directory.

```
tar xjf squore-server-linux-16.1.0.tar.bz2
```

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
```

The file `squore-license.p7s` should have been previously provided by Squoring Technologies according to the applicable Squore licensing agreement.

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 http://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
- CPD 4.2.6
- FindBugs 2.0 or 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 http://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 2012-A-SP6.

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`).

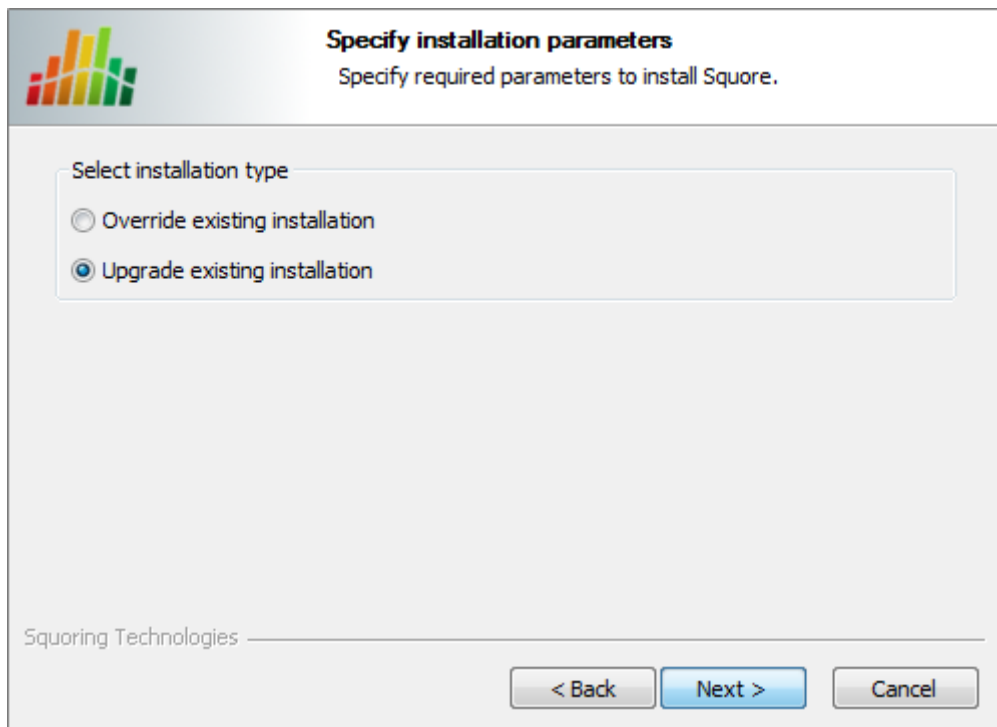
Warning

- **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 shared memory 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.
- Ensure that the server and the database are shut down before continuing.

3.6.1. On Windows

Follow these steps to upgrade your Windows installation.

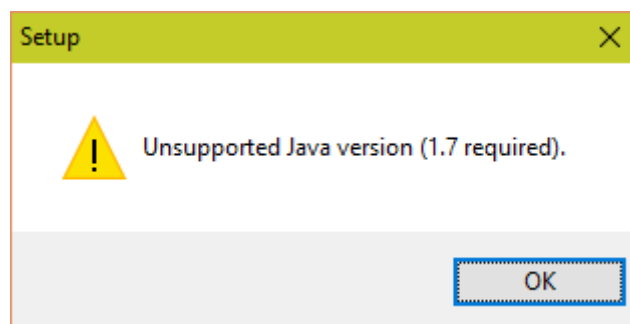
1. Run the Windows installer.
2. Click the **Next** button to get to the Licence Agreement screen.
3. Click the **Next** button to get to the Destination Folder screen.
4. Browse for the folder containing the old installation and click the **Next** button.
5. On the Upgrade Choice screen, select **Override** 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

Note

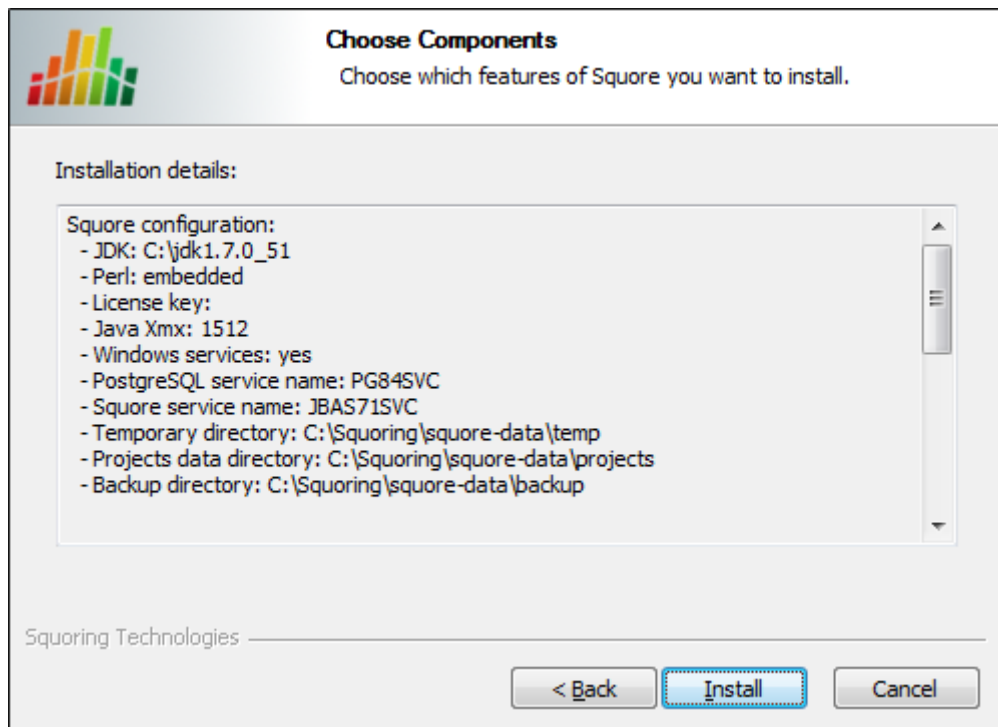
Clicking the the **Next** button on this screen checks that the version of java configured to run Squore Server is supported. If you are running an unsupported version, you will see the following error message:



The unsupported Java version message

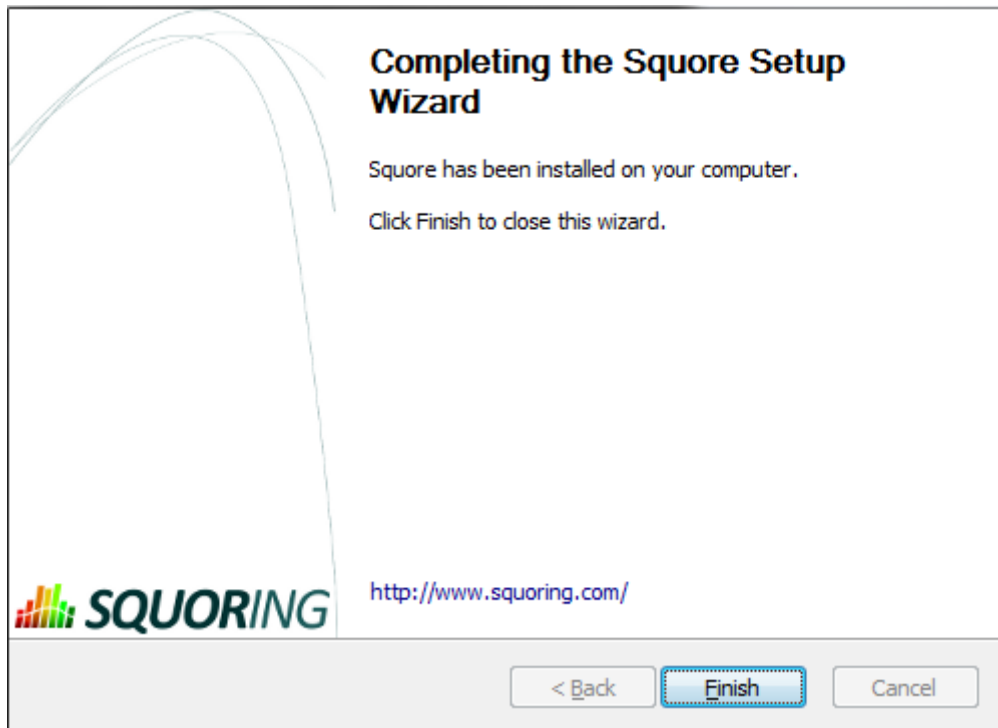
Edit your Squore Server installation to point to a supported version of Java, as explained in Section 5.7, “Changing the path to the Java Installation”, and click the **Next** button again the installer to continue the upgrade.

6. Wait while the installer retrieves the settings to apply to the upgrade and displays them on the Summary screen, and click **Install**.



The Summary screen

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



The Installation Complete screen

3.6.2. On Linux

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-server-linux-*.tar.bz2
```
3. Run the upgrade by executing:

```
cd /tmp/squore-server/bin
```



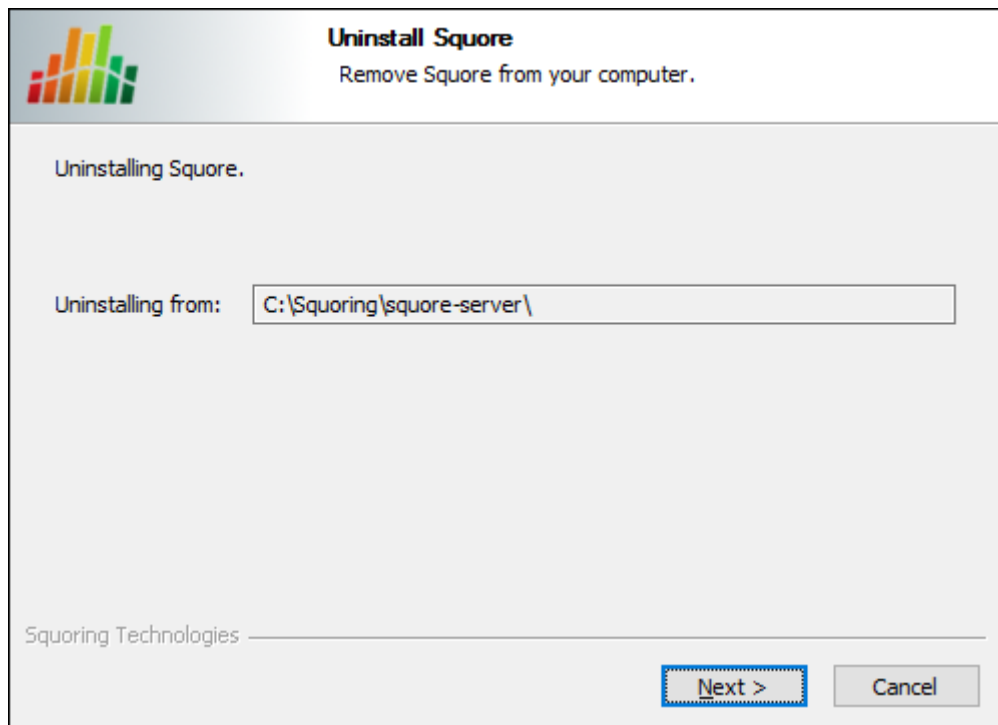
```
./install [options...] -U /path/to/old/installation
```

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:

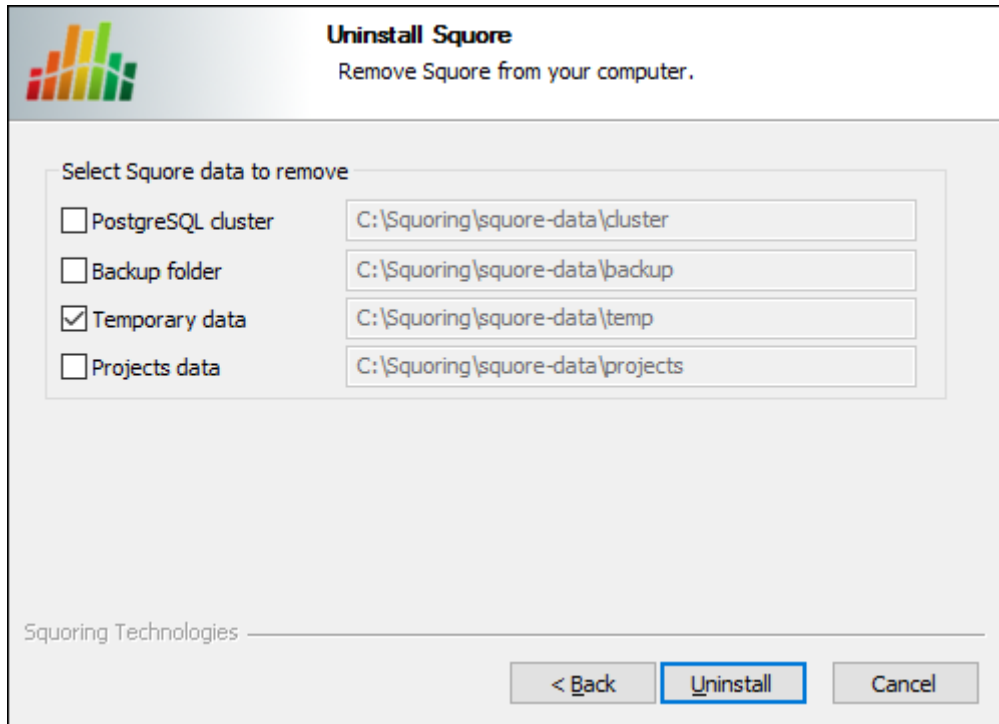
1. Stop Squore Server by running `<SQUORE_HOME>/stop.bat`.
2. Launch the uninstaller wizard from the **Add/Remove Programs** dialog in the control panel or directly by double-clicking `<SQUORE_HOME>/squore_Uninst.exe`. The wizard opens:



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

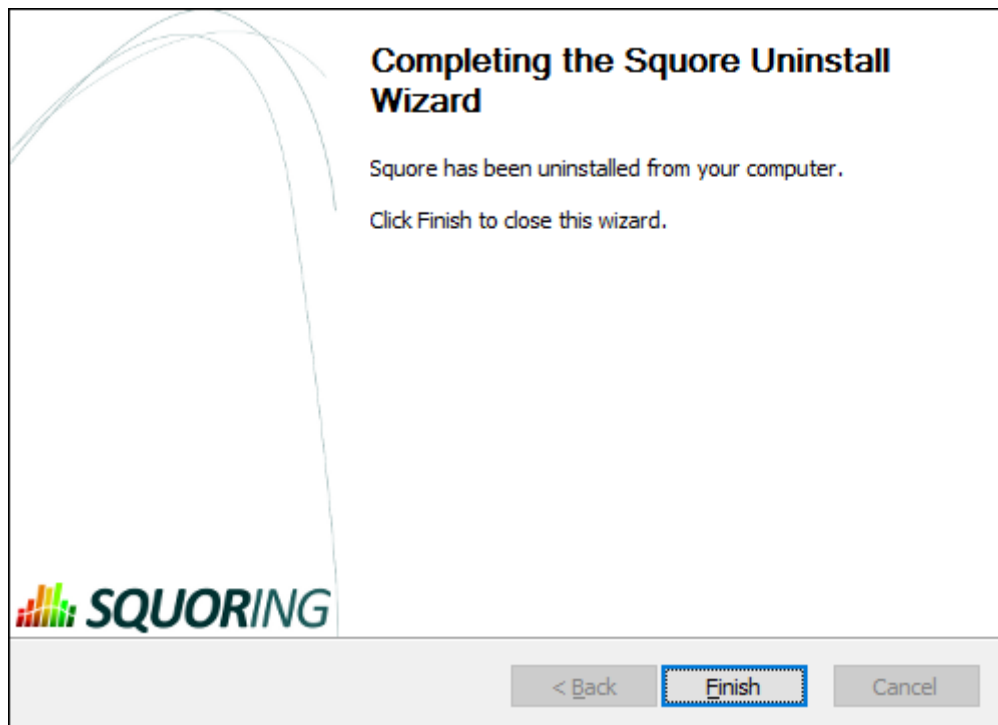
The data generated by Squore Server is left on the machine by default. If you do not need it, check all the boxes to delete all the folders.

Click **Uninstall** to proceed 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

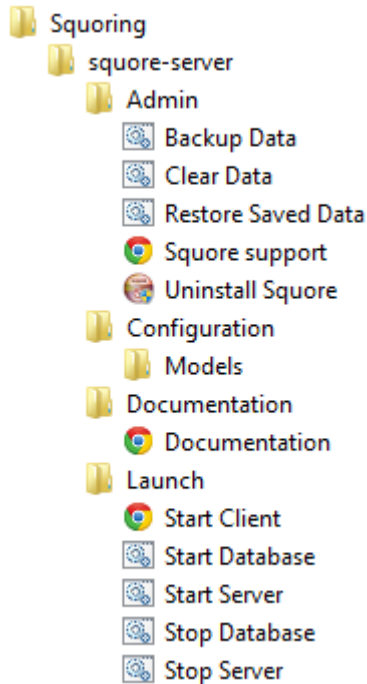
You can identify these locations by looking at `<SQUORE_HOME>/config.xml`, as described in Section 5.2, "Understanding `config.xml`".

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
- *ping-db.bat* allows checking if the database is up
- *stop-server.bat* terminates Squore Server
- *stop-db.bat* stops the Squore database
- *stop.bat* performs the two previous operations in succession

4.2. Running Squore as a Windows Service

During the installation of Squore on Windows, the installer provides the option to register two services to control Squore's startup and shutdown. When you install the Windows services, you should no longer use the start and stop scripts described in Section 4.1, "Starting Squore on Windows"

4.2.1. Manual installation

If you did not select to register the services automatically at installation time, you can still register the PostgreSQL 8.4 Server and JBoss Application Server 7.1.1 services manually with the help of the instructions below.

Tip

Before modifying your installation to use services, make sure that Squore Server starts up properly by following the steps described in Section 4.1, "Starting Squore on Windows".

Follow the steps below to install the Squore services:

1. Shutdown Squore Server
2. Choose aliases for both services. The instructions below use the default aliases PG84SVC and JBAS71SVC.
3. Find out what the location of the database cluster is from `<SQUORE_HOME>/config.xml`. The instructions below use the default location (`<SQUORE_DATA>\cluster`).
4. Install the services by running these commands in a command window as administrator:

```
"<SQUORE_HOME>\server\bin\service.bat" install "JBAS71SVC"  
"<SQUORE_HOME>\tools\pgsql\bin\pg_ctl.exe" register -N "PG84SVC" -D  
  "<SQUORE_DATA>\cluster"  
sc config "PG84SVC" DisplayName= "PostgreSQL 8.4 Server"  
sc config "JBAS71SVC" start= auto depend= "PG84SVC"
```

4.2.2. Services Configuration

After installing Squore Server and the Windows services, you should follow these steps on your server:

1. Configure both services to run with a dedicated user instead of the built-in `LocalSystem`
2. Ensure that the dedicated user you assigned to run the services is explicitly granted the **Full Control** permission on the following folders:
 - `<SQUORE_HOME>`
 - `<SQUORE_DATA>\cluster`
 - `<SQUORE_DATA>\backup`
 - `<SQUORE_DATA>\projects`
 - `<SQUORE_DATA>\temp`

→ <SQUORE_DATA>\temp\sources

By explicitly granting this permission instead of inheriting it from a group, you ensure that you will not run into issues with folder and file permissions, especially if User Account Control is enabled on your server.

3. Set the startup type for both services to **Run automatically**

Tip

You can manage and configure the two new services in the Windows Services console or from the command line. If you want to change their display names for example, you can use the following Windows command as administrator:

```
sc config "JBAS71SVC" DisplayName= "Squore Web"  
sc config "PG84SVC" DisplayName= "Squore DB"
```

4.2.3. Uninstalling the Services

Tip

These instructions only apply to user who installed the windows services manually. If you used the Windows installer to install the services, they will be automatically removed when you uninstall Squore Server, .

Uninstalling the services can be done with these commands:

```
"<SQUORE_HOME>\server\bin\service.bat" uninstall "JBAS71SVC"  
"<SQUORE_HOME>\tools\pgsql\bin\pg_ctl.exe" unregister -N "PG84SVC"
```

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)

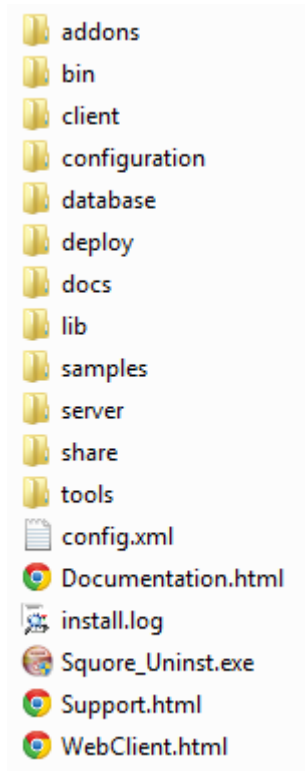
Tip

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 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>
  <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>
```

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.
- **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 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.

5.4. 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.

5.5. 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`.

5.6. 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

5.7. 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/jdk"
```

or

```
set "JAVA_HOME=C:\jdk1.7.0_51"
```

4. Start Squore Server

5.8. 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.

5.9. Number of Concurrent Analyses

You can change the size of the project queue on a Squore Server installation. The default value is 4, which means that 4 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: 4) 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 http://openwiki.squoring.com/openwiki/index.php/Deploying_A_Patch#Since_Squore_2014-B.

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.

5.10. 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
```

5.11. 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. Shutdown Squore Server
2. Copy the file `squore-license.p7s` in the following folder: `<SQUORE_HOME>/server/standalone/configuration`
3. Start Squore Server to apply the changes.

5.12. 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 default server embedded into each 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*.

Warning

Ensure that the local server and the remote server run the same version of java. Using java 1.6 on one server and java 1.7 on the other server is not supported.

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=ejbbc0deae7c29cd133a2de015f36ab6132
```

Note

bc0deae7c29cd133a2de015f36ab6132 is the output of the command you ran in the previous step.

- 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 `outbound-socket-binding` element with the `remote-ejb` attribute and edit its `remote-destination` definition accordingly so that the `host` and `port` match the hostname and remoting port of the remote server (4447 plus the offset you defined during installation, so 4547 by default). Here is an example of the complete configuration block:

```
<outbound-socket-binding name="remote-ejb">
  <remote-destination host="remoteLicenceServer" port="4547" />
</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="Y2hhbmdlbWU=" />
  </server-identities>
</security-realm>
```

- f. Restart Squore Server
- g. Run the following command, with `port` matching the controller port of the installation (9999 plus the offset defined at install time, so 10099 by default):

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

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

5.13. Managing Squore User Accounts

5.13.1. 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.

5.13.2. Importing and Exporting Users

Squore lets you export your list of user accounts to a CSV file in order to manage it and, if necessary, import it back into another Squore database.

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 5.14, "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 is 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
```

In order to import CSV files into the Squore database, use the same options with the **sqimport.pl**

Note: It is possible to import users or groups only, but in this case both the user and the group need to exist. The CSV files above can be manually edited, or generated by third-party tools (for example an LDAP utility). Ensure that the encoding used for the CSV files is UTF-8 before importing.

For more details on **sqimport.pl** options, and the format of CSV files, refer to `sqimport.pl(1)`.

The format of the csv files supported is described below.

users.csv

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

Note: When importing users, you can replace the encrypted password with a password in clear text and instruct **sqimport.pl** to treat it as clear text by using the **-P** option, as described in `sqimport.pl(1)`

members.csv

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

5.14. Setting Perl Environment

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

5.14.1. 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
```

5.14.2. Linux

```
SQUORE_HOME=<SQUORE_HOME>
```

```
export SQUORE_HOME
```

```
PERL5LIB=$SQUORE_HOME/share/perl
```

```
export PERL5LIB
```

5.15. 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.

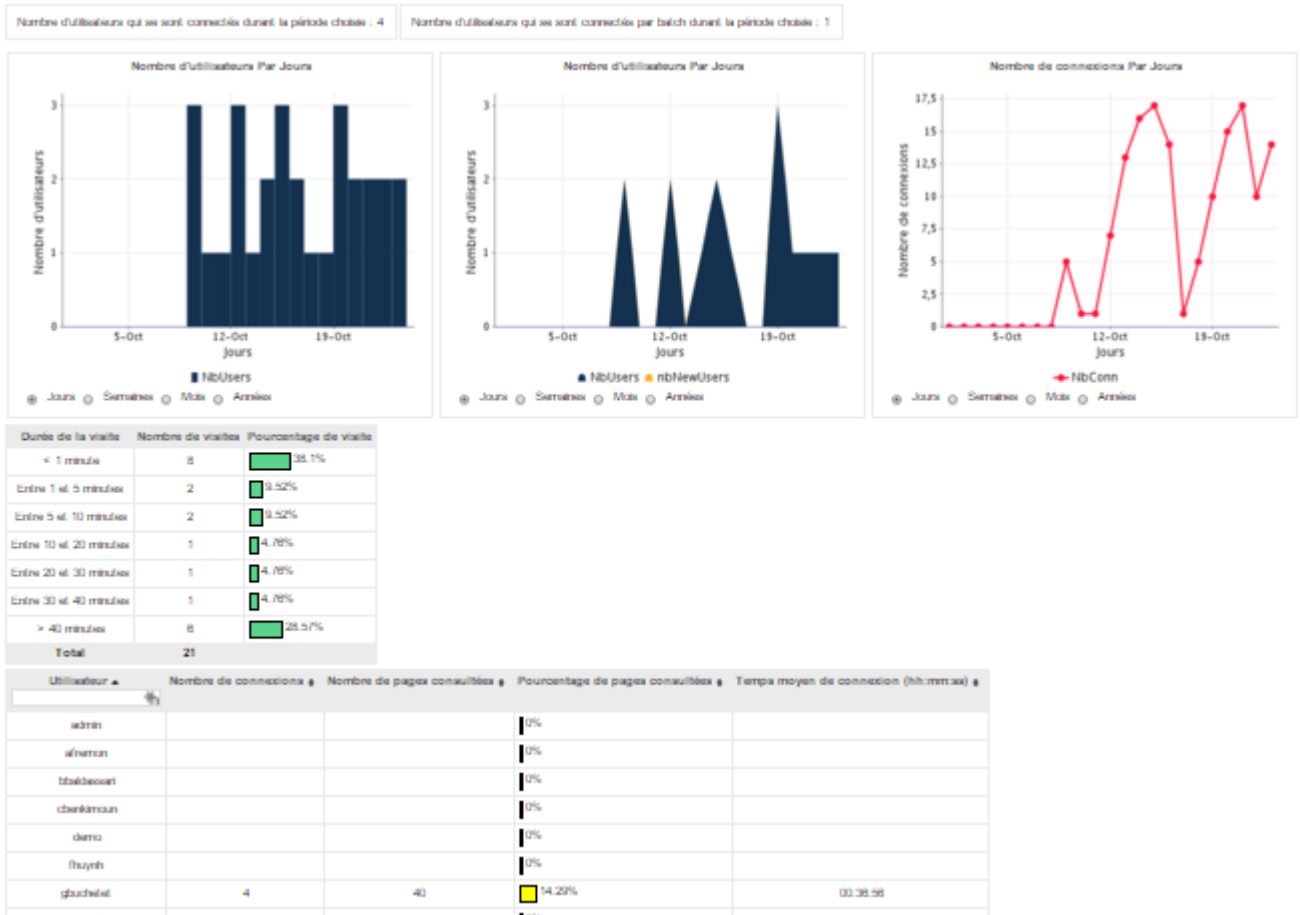
Tip

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, which can be overridden for individual charts later on.

5.15.1. 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 Web Users and Command Line 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 displaying session duration statistics
- A table detailing session information per user

Projects

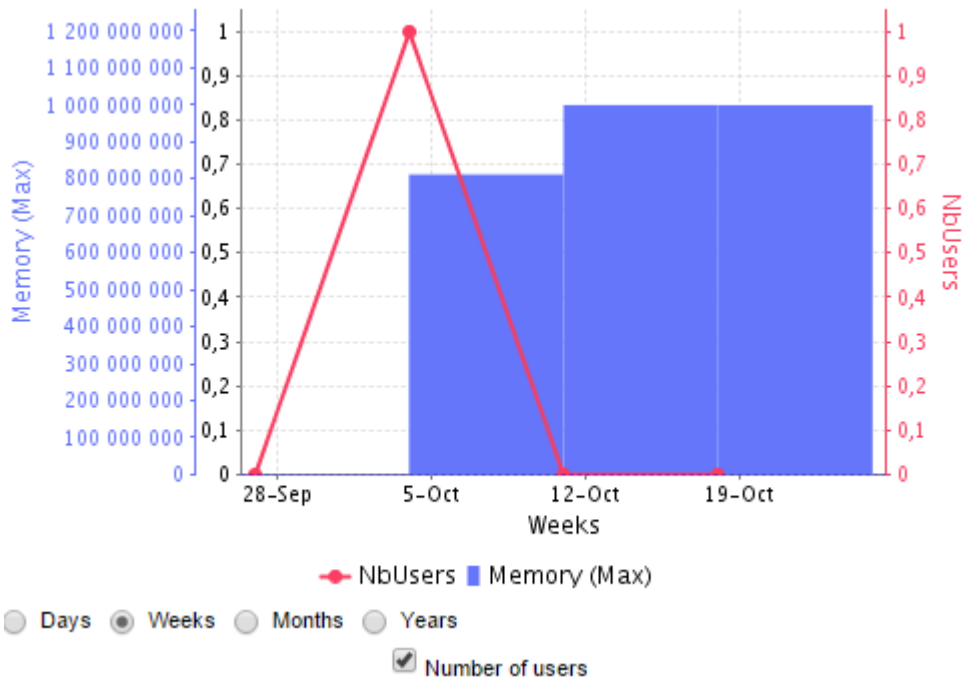


The Projects tab displays information about the number of projects viewed. You can get overall numbers of visits for all the projects on the server, or select specific projects to compare their number of views. The data is rendered as:

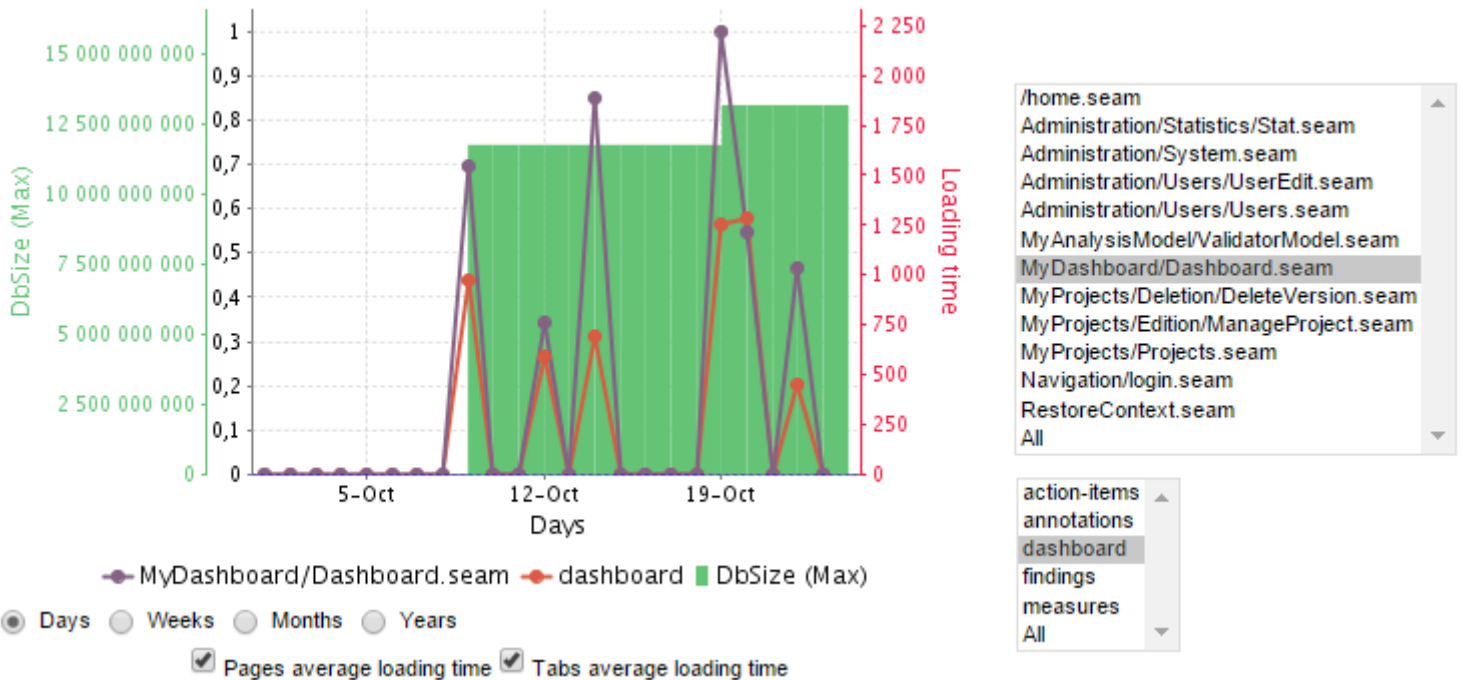
- A chart showing a trend of the total number of projects for the selected reporting period
- A chart where you can consult detailed view statistics about the projects of your choice. Select a project from the list to view viewing statistics, and overlay the same information for other projects by picking them from the list on the right hand side of 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. Number of Users: displays a history of the amount of memory used by the java process running the application. Optionally, a line indicating the number of users who logged in during this period can be displayed on the chart.



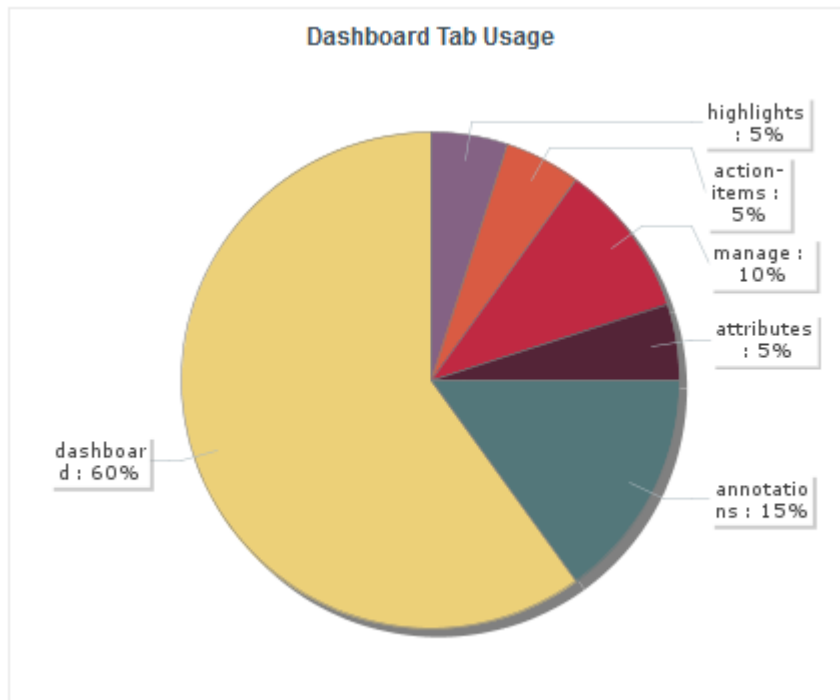
Database vs. Average Load Time: displays a history of the size of the database on disk. Optionally, trend lines displaying the average page or tab load times can be displayed on the chart.

Pages

URL ▲	Views ↓	% ↓	Average Time on Page (hh:mm:ss) ↓	Average Load Time (ms) ↓	Minimum Load Time (ms) ↓	Maximum Load Time (ms) ↓	Load Time under 2 seconds ↓
/home.seam	22	 5,56%	00:01:50	140	42	484	100 %
Administration/Groups/GroupEdit.seam	20	 5,05%	00:00:00	32	21	91	100 %
Administration/Groups/Groups.seam	3	 0,76%	00:00:01	45	16	83	100 %
Administration/Statistics/Stat.seam	26	 6,57%	00:02:10	211	25	536	100 %
Administration/Users/Users.seam	1	 0,25%	00:58:03	136	136	136	100 %
Exception/error.seam	4	 1,01%	00:01:26	49	32	93	100 %
MyAnalysisModel/statistics/StatModels.seam	35	 8,84%	00:00:25	166	23	875	100 %
MyDashboard/Dashboard.seam	219	 55,3%	00:00:26	708	47	26479	95,43 %
MyProjects/Creation/CreateProjectEnd.seam	2	 0,51%	00:00:01	376	50	701	100 %
MyProjects/Creation/CreateProjectGeneral.seam	2	 0,51%	00:00:04	123	47	198	100 %
MyProjects/Creation/CreateProjectTools.seam	2	 0,51%	00:00:16	108	70	146	100 %
MyProjects/Creation/CreateProjectWizard.seam	4	 1,01%	00:00:04	80	45	119	100 %
MyProjects/Edition/ManageProject.seam	4	 1,01%	00:00:04	93	66	134	100 %
MyProjects/Projects.seam	16	 4,04%	00:00:06	197	41	689	100 %
Navigation/login.seam	20	 5,05%	00:00:00	265	3	550	100 %
Navigation/UserMenu.seam	8	 2,02%	00:00:02	48	24	82	100 %
RestoreContext.seam	8	 2,02%	00:00:00	192	134	286	100 %
Total	396		00:00:41	461	3	26479	97,47 %

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

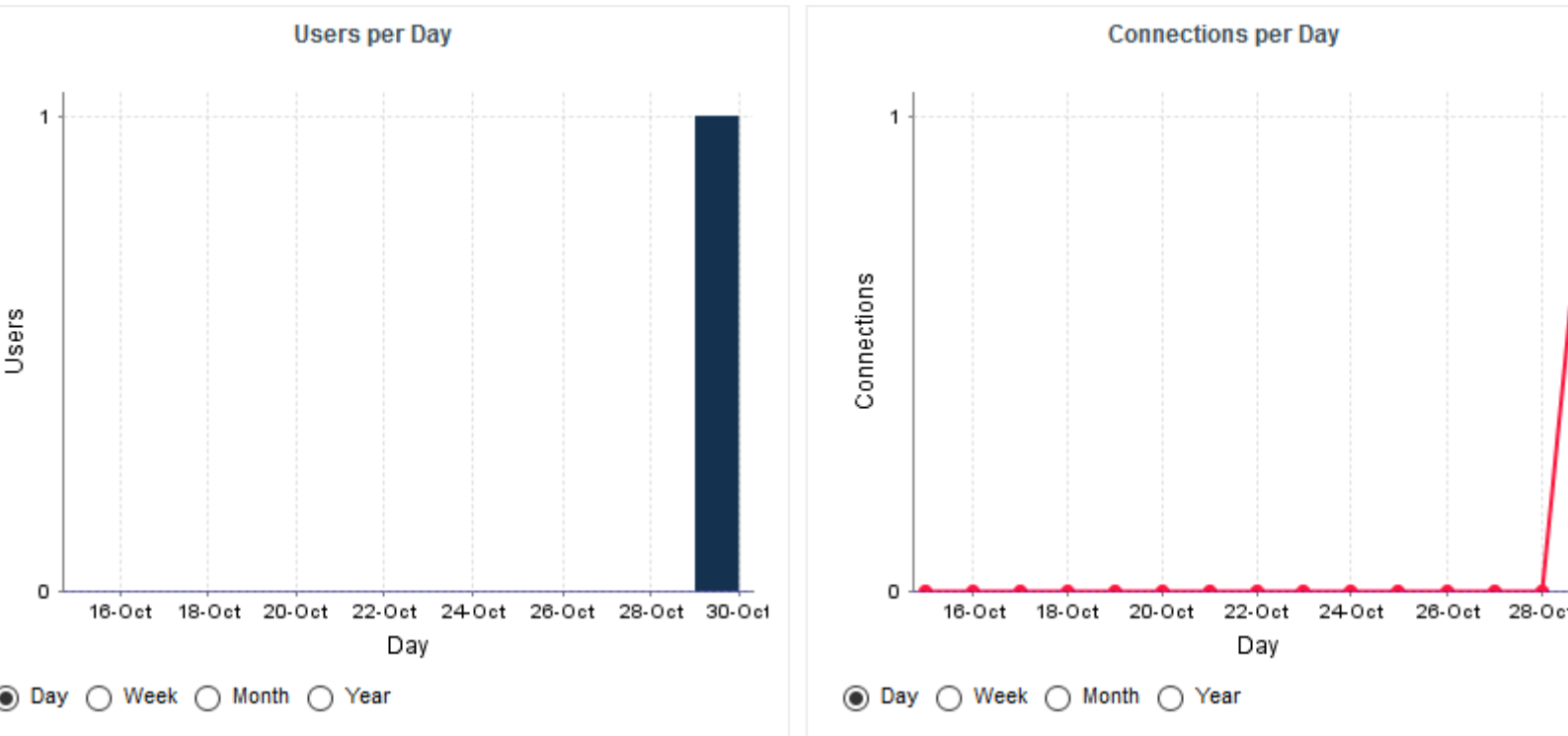


The Dashboard tab allows analysing the usage of each tab on the dashboard. Each tab is represented in a pie chart according to how many views it receives. This information can be used to adjust the default display status of each tab or their availability to end users.

5.15.2. Statistics for Model Developers

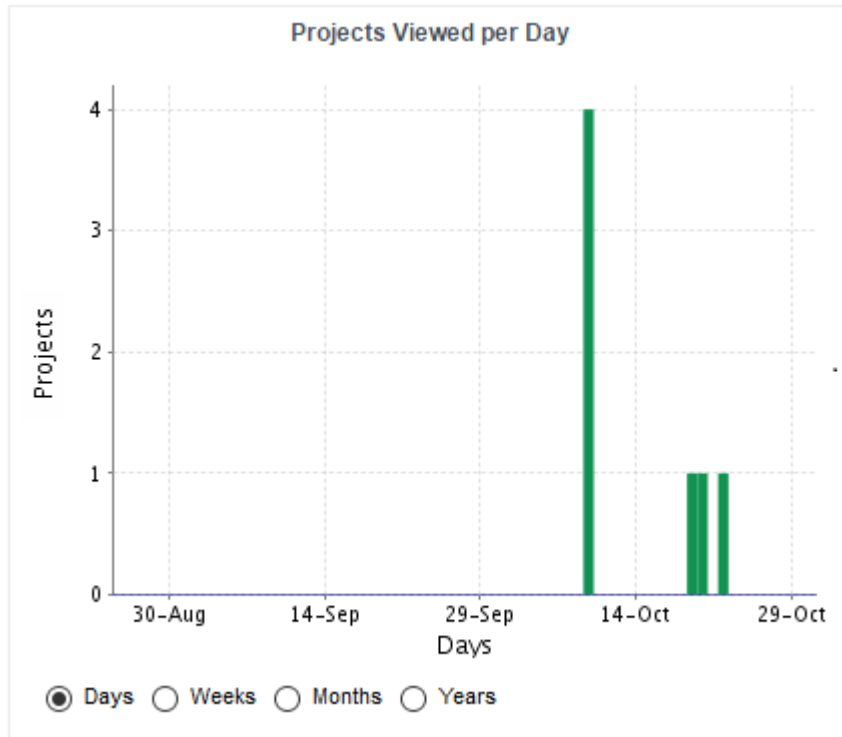
You can learn more about the usage of particular features of a model by clicking **Models > Statistics**. For each analysis model, find out how many users consult results, which projects are the most popular and which regions and charts of the dashboard are the most useful for users.

Users



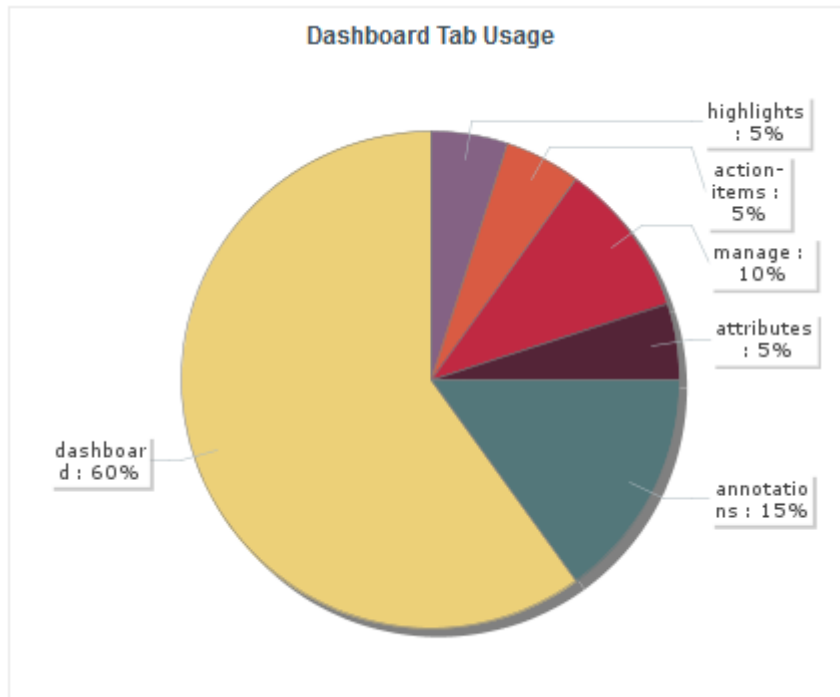
The Users tab displays the information about the number of users and overall connections to the server for projects in this analysis model.

Projects



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

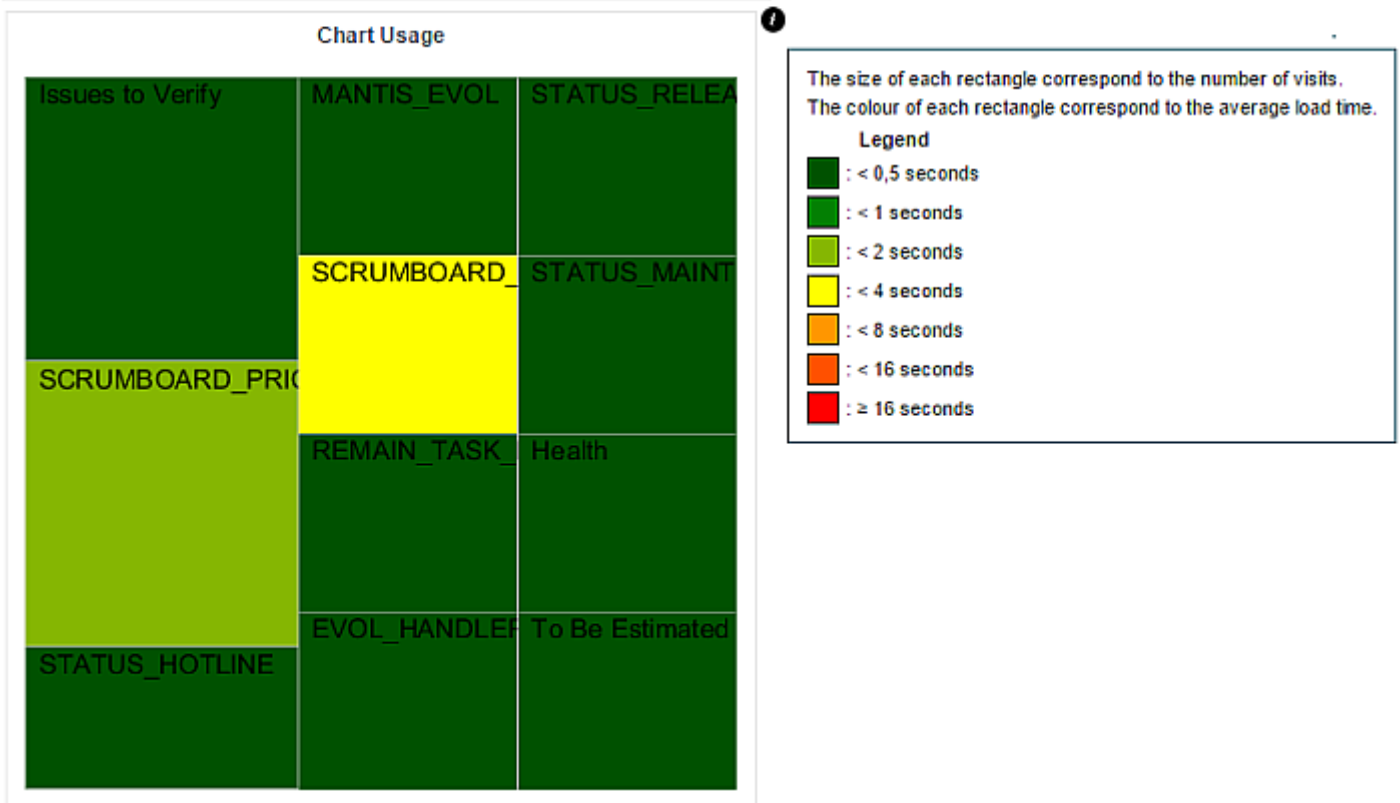
Dashboard



The Dashboard tab allows analysing the usage of each tab on the dashboard. Each tab is represented in a pie chart 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

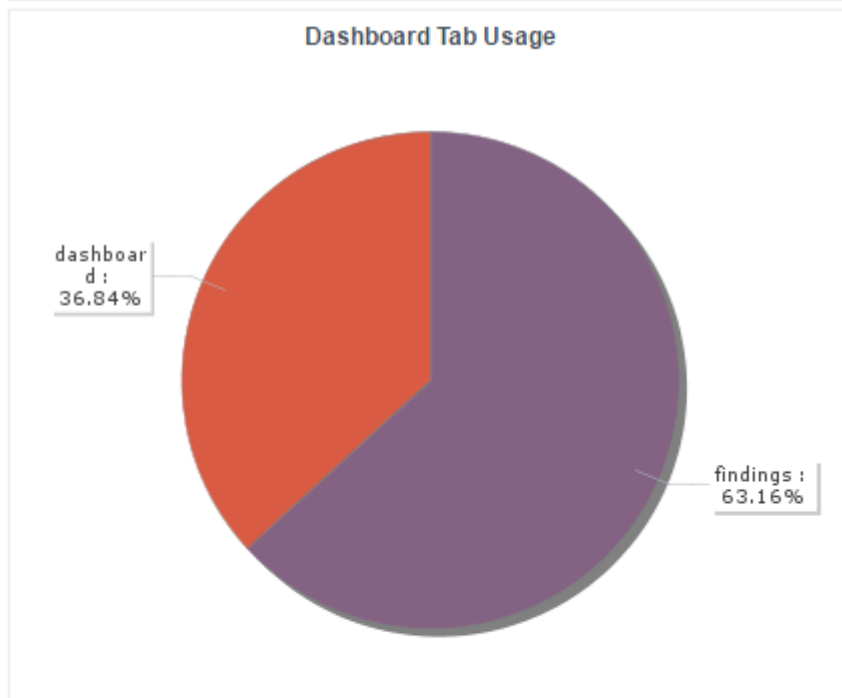
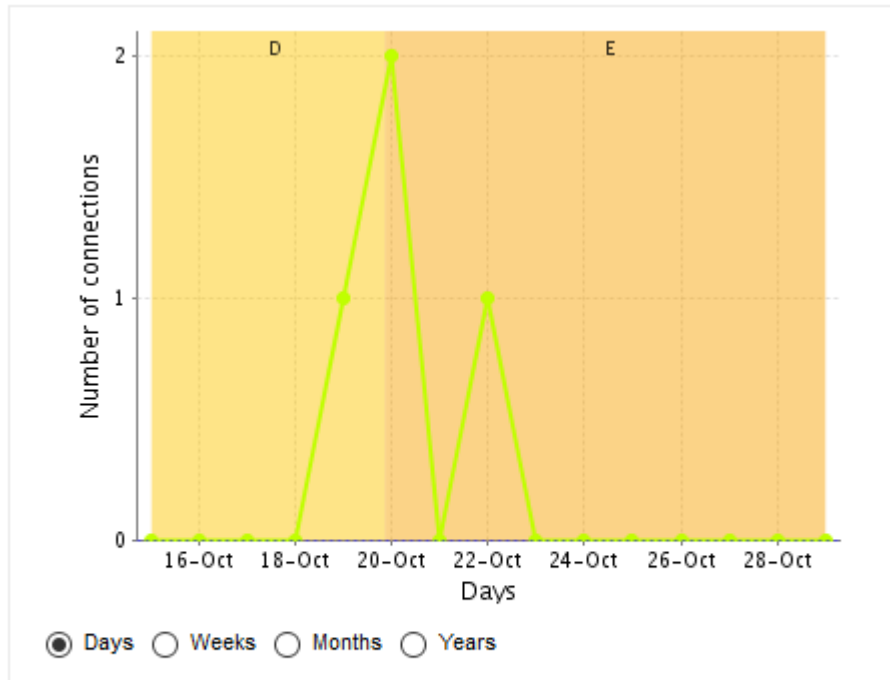
Chart ▲	Sessions ◊	Average Load Time ◊	Comments ◊
EVOL_HANDLER	1	0	0
Health	1	0	0
Issues to Verify	2	0	0
MANTIS_EVOL	1	0	0
REMAIN_TASK_ID	1	1	0
SCRUMBOARD_APPROVAL	1	2530	0
SCRUMBOARD_PRIORITY	2	1579	0
STATUS_HOTLINE	1	0	0
STATUS_MAINTENANCE	1	0	0
STATUS_RELEASE	1	0	0
To Be Estimated by Handlers	1	1	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.

5.15.3. 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**.



Username	Sessions	Comments
admin	0	0
jenkins	1	0
guest	0	0
Total	1	0

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 pie chart 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 JBoss to allow https access to Squore Server instead of http by following the instructions below.

Note

These instructions are based on the standard JBoss instructions 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".

If you want to use openssl instead of a java keystore and manage keys natively, refer to the advanced instructions on https://docs.jboss.org/author/display/AS71/SSL+setup+guide?_sscc=t.

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. Configure JBoss by adding a https connector to the subsystem called **default-host** in `<SQUORE_HOME>/server/standalone/configuration/standalone.xml`:

```
<subsystem xmlns="urn:jboss:domain:web:1.1" default-virtual-server="default-
host" native="false">
  <connector name="http" protocol="HTTP/1.1" scheme="http" socket-
binding="http" />

  <connector name="https" scheme="https" protocol="HTTP/1.1" socket-
binding="https" enable-lookups="false" secure="true">
```

```
<ssl name="foo-ssl" password="secret" protocol="TLSv1" key-alias="foo"
certificate-key-file="/path/to/foo.keystore" />
</connector>
(... )
</subsystem>
```

Note

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

3. 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.

Tip

It is also possible to use Apache as a reverse proxy in front of Squore Server to achieve the same result. For more information, consult the Apache documentation about the **mod_proxy** module at http://httpd.apache.org/docs/2.4/mod/mod_proxy.html.

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 redirect insecure traffic to HTTPS by modifying the web server's configuration and the Squore Server application:

1. Stop Squore Server
2. Extract the settings file:

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

3. Modify Squore Server's web.xml:

- Open `<SQUORE_HOME>/deploy/squore-web.war/WEB-INF/web.xml` in a text editor
- Add the following `security-constraint` element before the closing `web-app` element, as shown below:

```
<?xml version="1.0" encoding="UTF-8"?>
<web-app>
(... )
  <security-constraint>
    <web-resource-collection>
      <web-resource-name>SECURE</web-resource-name>
      <url-pattern>*/</url-pattern>
    </web-resource-collection>
    <user-data-constraint>
      <transport-guarantee>CONFIDENTIAL</transport-guarantee>
    </user-data-constraint>
  </security-constraint>
</web-app>
```

4. Repackage the application:

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

5. Edit the **http** connector in `<SQUORE_HOME>/server/standalone/configuration/standalone.xml` to add a redirection to the https port:


```
<connector name="http" protocol="HTTP/1.1" scheme="http" socket-binding="http" redirect-port="8543" />
```

6. Deploy the patched application following the instructions on http://openwiki.squoring.com/openwiki/index.php/Deploying_A_Patch#Since_Squore_2014-B.

Tip

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

6.3. Using the LDAP Authentication Module

By default, Squore Server uses its own authentication mechanism, storing user information in the PostgreSQL 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 JBoss: Edit `<SQUORE_HOME>/server/standalone/configuration/standalone.xml`, and locate the section providing the *squore-server* security domain, which by default looks like this:

```
<security-domain name="squore-server" cache-type="default">
```

```

<authentication>
  <login-module code="Database" flag="sufficient">
    (...)
  </login-module>
</authentication>
</security-domain>

```

4. Paste in the configuration LDAP and Active Directory before the default login module and uncomment the XML as needed. The `security-domain` should now look like this :

```

<security-domain name="squore-server" 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="id" />
    </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="allowEmptyPasswords" value="false" />

<module-option name="userCompositeName" value="CN" />
<module-option name="userMail" value="mail" />
<module-option name="userOrganizationUnit" value="department" />
<module-option name="userId" value="id" />
</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 authenticating. 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\(v=exch.65\).aspx](https://technet.microsoft.com/en-us/library/aa996205(v=exch.65).aspx). Note that the **&** characters must be written as an entity (**&**) 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.

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

For more details on the JBoss AS 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 JBoss AS 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">
```

.

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
```

6.5. 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 `smtp-server` element, 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:

```
<smtp-server ssl="true" outbound-socket-binding-ref="mail-smtp">
  <login name="username" password="password" />
</smtp-server>
```

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/`.

Note

If you need more information about SMTP server setup in JBoss, refer to <https://docs.jboss.org/author/display/AS71/Mail+Subsystem>

6.6. Notifying Users by E-Mail

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 6.5, "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 will be sent to all enabled users that have an e-mail address.

6.7. 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.

6.8. 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.

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

```
<security-domain name="squore-server" 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.

6.8.2. 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

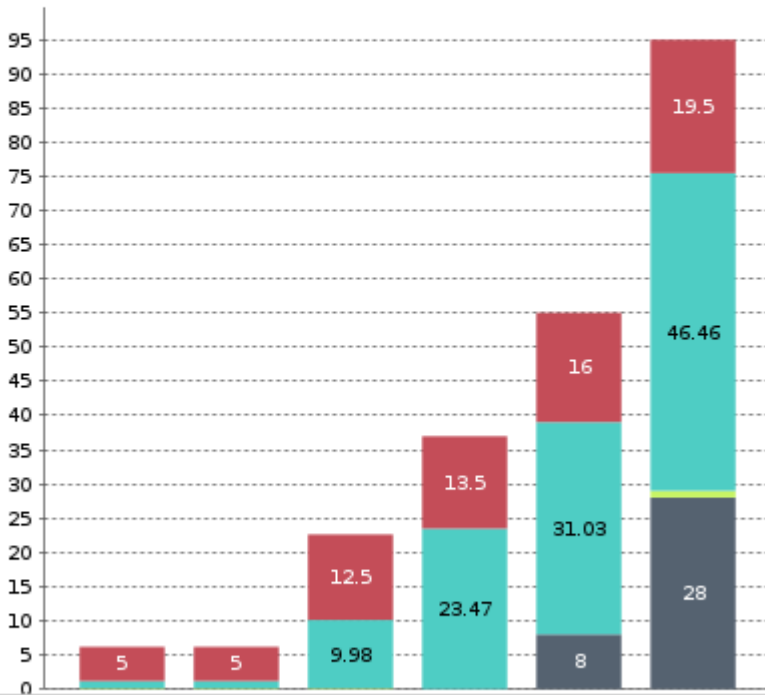
## @param squrl:title=Squore Server URL|type=string|required=true|desc=The Squore
  Server URL
## @param sqport:title=Squore Server Port|type=string|required=true|desc=The
  Squore Server Port
## @param chart:title=Squore Element URL|type=string|required=true|desc=The URL
  of the Squore Dashboard Element
## @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:$paramsqport/SQuORE_Server/
XHTML/Navigation/ChartExport.seam?user=$login&width=$paramsizex&height=
$paramsizex&chart=$paramchart$pversion" scrolling="no" width="$paramsizex"
height="$paramsizex">
</IFRAME>
```

6.8.3. 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**.

Modifier la macro 'SquORE Dashboard Element Importer'

Aperçu



SquORE Server URL *

The SquORE Server URL

SquORE Server Port *

The SquORE Server Port

SquORE Element URL *

The URL of the SquORE Dashboard Element

SquORE Element Width *

The SquORE Element Width

SquORE Element Height *

The SquORE Element Height

Version

[Sélectionner la macro](#)

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 6.7, "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.xhtml** or **.xhtml**. Using the link to the xhtml page allows you to display the chart's tooltips in Confluence, but the size of the iframe in Confluence has

to match the size of the original chart in Squore. Using the link to the png loses the tooltips, but allows you to set a different width and height than specified in the Squore dashboard.

Tip

You can add several charts on the same Confluence page.

6.9. Integration with CollabNet TeamForge

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

6.9.1. 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-server") / 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`.

6.9.2. 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/XHTML/Navigation/CollabNet.seam` (+ 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/XHTML/Navigation/CollabNet.seam?
squoreProjectId=13&trackerId=tracker1004](http://localhost:8180/SQuORE_Server/XHTML/Navigation/CollabNet.seam?squoreProjectId=13&trackerId=tracker1004)*

→ Squore project Id 13, Squore project version 14 and TeamForge tracker Id tracker1004
*[http://localhost:8180/SQuORE_Server/XHTML/Navigation/CollabNet.seam?
squoreProjectId=13&squoreVersionId=14&trackerId=tracker1004](http://localhost:8180/SQuORE_Server/XHTML/Navigation/CollabNet.seam?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_Artifact
- SQ_Path
- SQ_Comment

6.9.3. Integration Characteristics

Accessing Squore through TeamForge

The access to Squore is done through a new URL: *[http://localhost:8180/SQuORE_Server/XHTML/Navigation/
CollabNet.seam](http://localhost:8180/SQuORE_Server/XHTML/Navigation/CollabNet.seam)*

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 6.9.1, "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.

6.10. 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:

- **FINISHED**: The version has been successfully created.
- **WARNING**: Some warnings raised during last creation.
- **ERROR**: The version has some errors.
- **PROCESSING**: The version is being created. When this status is returned, the current phase of the analysis will be specified in the **step** field.

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.

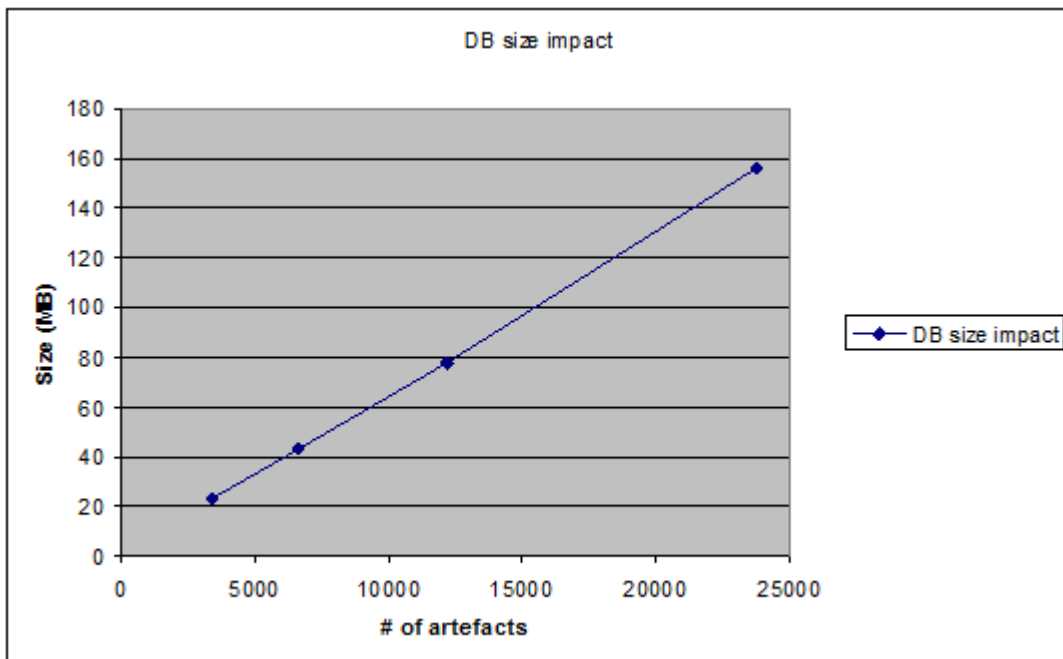
7. Sizing Squore Server and Database

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

7.1. Disk Usage

7.1.1. Project Size and Growth

The following chart shows that the Squore database growth is linear with regard to the project volume, measured in terms of the number of artefacts (i.e. the sum of the number of files, classes, functions defined in the project).



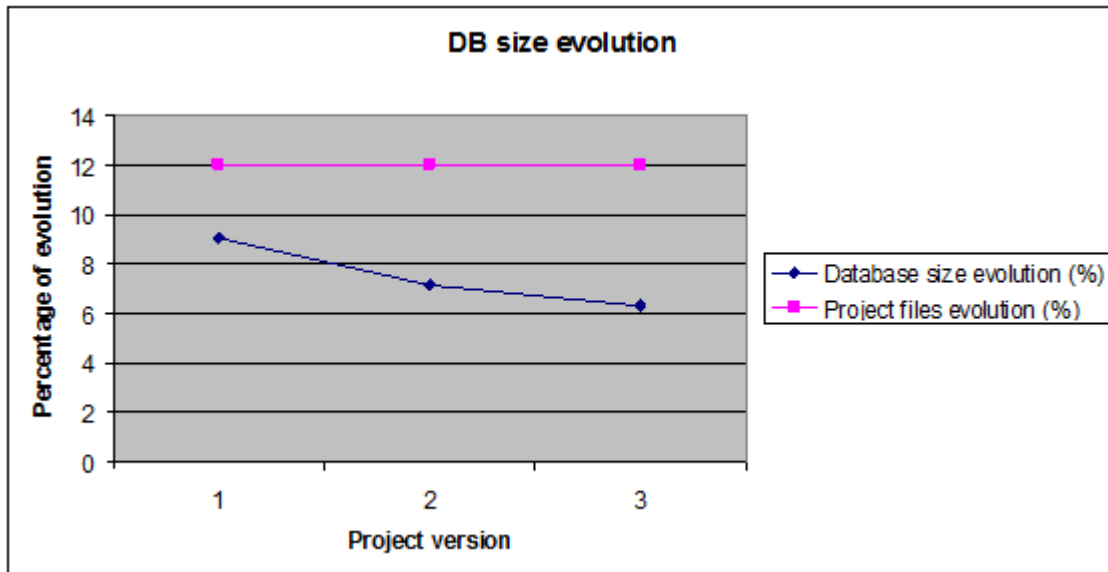
The chart is an analysis of the evolution of the database size for a sample project consisting of:

- 250 files
- 2200 functions
- 40000 lines of code

The following chart shows a project's evolution during three versions.

For the purpose of this benchmark, a fixed number of files were modified in the project, and the database size evolution was measured after the new version was created.

This benchmark shows that the database size evolution is consistent with the project's evolution through time: each time a certain amount of project artefacts are modified, an equivalent amount of new database entries are needed.



For a medium-sized project (10 000 artefacts):

- 500 files
- 20 artefacts per files (class and functions)
- 50 base measures per artefacts

The database space required for the first project analysis is about 60 MB.

After 50 versions the required space is evaluated to 1.1 GB.

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.

7.3. Performance Implications

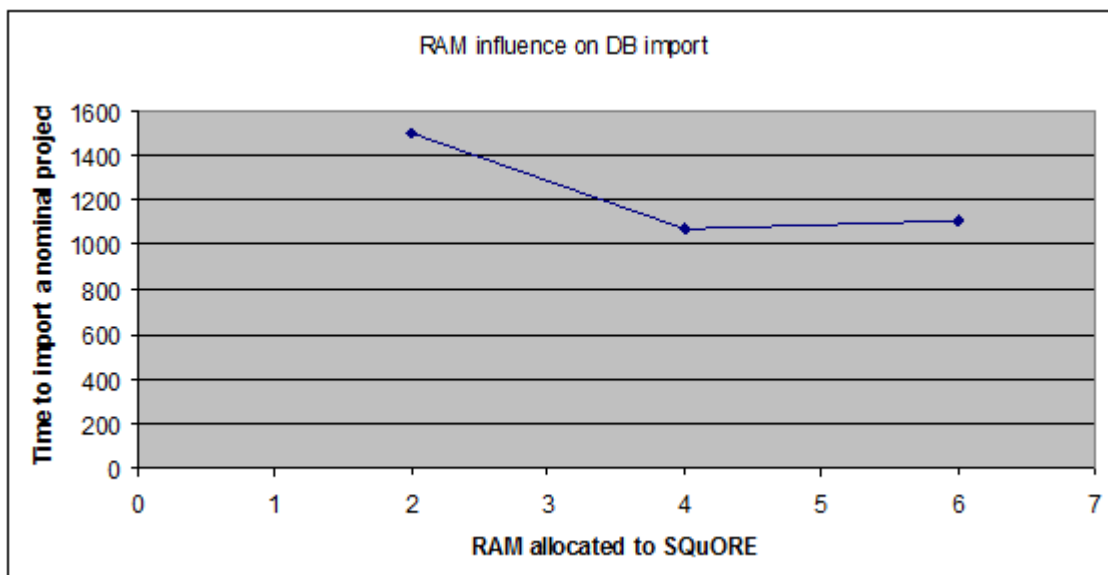
7.3.1. Available RAM

The amount of memory allocated to Squore Server has an impact on the overall performance of Squore. The following chart shows the influence of available RAM on the time needed to import a large-size project into the Squore database. This type of processing is normally the most time consuming in a typical Squore usage.

The test was performed with a project containing:

- 1,400,000 lines of code,
- 2,500 source code files,
- 21,000 functions,
- 1,100,000 base measures.

Running on a Windows Server 2003 64 bits machine, Squore is able to handle the project with 2GB of RAM. It could also manage this project with less memory, but at the expense of performance. It is however recommended to allow at least 4 GB of RAM to Squore Server. 8 GB may be required for large projects.

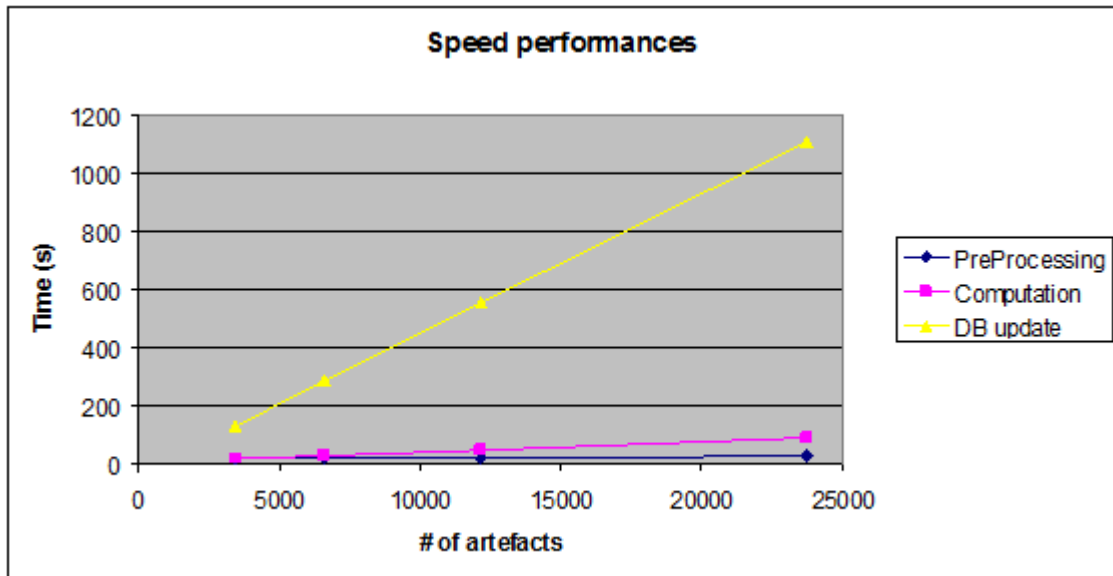


7.3.2. Project Volume

Using projects of increasing size, the following chart shows how all stages of the Squore project creation evolve linearly. These stages are respectively:

- Pre-processing: creating and managing the project data.
- Computation: running the analysis model on the project data.
- DB update: importing the artefacts, the base and derived measures values into the Squore database.

These measurements are associated to a new project, which means that all objects are inserted into the database. In the case of a project being updated (i.e. a new version of an existing project), only the new data is inserted into the database, resulting in a much reduced DB update time.



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

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

<code>-x size</code>	Java memory allocation pool, in MB (Xmx option). Defaults to 25% of the memory available on the server, with a minimum of 512 MB.
<code>-b bind_address</code>	JBoss AS bind address (default: <code>localhost</code>). If you plan to use Squore from your local network, use <code>0.0.0.0</code> for the bind address. Otherwise access is restricted to connections from localhost only.
<code>-o binding_offset</code>	JBoss AS binding port offset (default: <code>100</code>). 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 <code>http://localhost:8180/SQuORE_Server</code>
<code>-T tmp_dir</code>	Squore temporary directory (default: <code>/tmp/squore</code>)
<code>-k squore-license.p7s</code>	Squore licensing key.

Arguments

<code>data_dir</code>	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 id_user ] id_model
```

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

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

```
sqexport.pl [option...] artefacts -p [-R | -r id_rvers ] [--add-measure measure ...] [-T type ...] [-L level ] [-u id_user ] 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 id_user ]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 *id_user* 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 id_user ] 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 *id_user* 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 id_user ] 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 *id_user* 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 id_user ] 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 of 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 *id_user* 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 <i>host</i>	Overrides the database host name.
-p <i>port</i>	Overrides the database port number.
-d <i>dbname</i>	Overrides the database name.
-u <i>user</i>	Overrides the database user name.
-f <i>file</i>	Set the CSV output file. If not specified, the output is written to the standard output.
-s <i>sep</i>	Set the CSV separator. Defaults to the ';' character.
-S <i>slices</i>	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 <i>id_rvers</i>	Set the reference version for delta or trend computations to the version pointed to by the <i>id_rvers</i> .
-T <i>type ...</i>	Filter artefacts of types <i>type</i> , 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 <i>level</i>	Artefacts shall have the level <i>level</i> , 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

`sqimport.pl` — Squore import utility

Synopsis

```
sqimport.pl [option...] users [ -P | -r ]
```

```
sqimport.pl [option...] groups [ -m ]
```

Description

The **sqimport.pl** script imports CSV data into the Squore database.

The script stops as soon as an error is encountered (SQL constraint violation, invalid input format, etc.), and modifications are discarded.

Users import

```
sqimport.pl users [ -P | -r ]
```

This command imports Squore users.

The CSV shall contain these columns (columns are mandatory, unless explicitly specified):

1. *login* - the login of the user.
2. *fullname* - the full name of the user.
3. *email* - the e-mail of the user.
4. *password* - the SHA-1 of the user password, base 64 encoded, or the password in clear if the `-P` option has been specified (optional).
5. *department* - the department of the user (optional).

Users have additional properties in Squore, like the number of connections, the selected locale, etc. Such properties are set to their default value.

When the `-r` is set, this command imports Squore user profiles instead. The CSV shall contain these columns (columns are mandatory):

1. *login* - the login of the user.
2. *profile* - the profile of the user.

Groups import

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

This command imports Squore groups.

The CSV shall contain this column:

1. *group* - the name of the group.

When the `-m` option is used, group members are imported into Squore, and the input file shall have these columns:

1. *group* - the name of the group.

2. *login* - the login of the group member.

Global options

These options are common to all import types.

<code>-h host</code>	Overrides the database host name.
<code>-p port</code>	Overrides the database port number.
<code>-d dbname</code>	Overrides the database name.
<code>-u user</code>	Overrides the database user name.
<code>-f file</code>	Set the CSV input file. If not specified, CSV data is read from the standard input.
<code>-s sep</code>	Set the CSV separator. Defaults to the ';' character.
<code>-n</code>	The CSV file does not contain the header line.
<code>-S slices</code>	Specifies the subset of columns to use, in the CSV input file, starting from 0. This can be used to reorder input columns as well. Separate column numbers with the ',' character.
<code>-v</code>	Turns on the verbose mode.

Import options

- `-m` The CSV input contains group membership definitions.

Examples

```
sqimport.pl -f users.csv users
```

This command imports users defined in the *users.csv* file into the database.

Exit status

- 0 CSV successfully imported.
- 2 Syntax or usage error.
- * The script failed. See `stderr` for an error message.

Name

`sqadm-reset` — 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 **sqadm-reset** 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.
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.

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