VALUING AND IMPROVING SOFTWARE CAPITAL

SQUORING Technologies

Key Performance Indicator

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

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

Squore 15-A-SP2

Installation and Administration Guide

Reference : SIM_Squore
Version : 15-A-SP2
Date : 07/10/2015

Installation and Administration Guide

Copyright © 2015 Squoring Technologies

Abstract

This edition of the Installation and Administration Guide applies to Squore 15-A-SP2 and to all subsequent releases and modifications until otherwise indicated in new editions.

Table of Contents

Ref : SIM_Squore

Version : 15-A-SP2
Date : 07/10/2015

http://www.squoring.com/

Typographical Conventions

The following conventions are used in this manual.

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

→ Jump to Chapter 4, *Starting Squore* to learn how to to start Squore Server.

→ Jump to Chapter 5, *Squore Administration* to discover how to maintain a Squore installation.

→ Jump to Chapter 6, *Integrating Squore on Your Network* to understand how to integrate Squore Server within your network.

→ Jump to Chapter 7, *Sizing Squore Server and Database* to evaluate the resources that Squore will require in your environment.

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

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. Responsabilities

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

1.5. Getting the Latest Version of this Manual

The version of this manual included in your Squore installation may have been updated. If you would like to check for updated user guides, consult the Squoring Technologies documentation site to consult or download the latest Squore manuals at http://support.squoring.com//documentation/15-A-SP2. 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
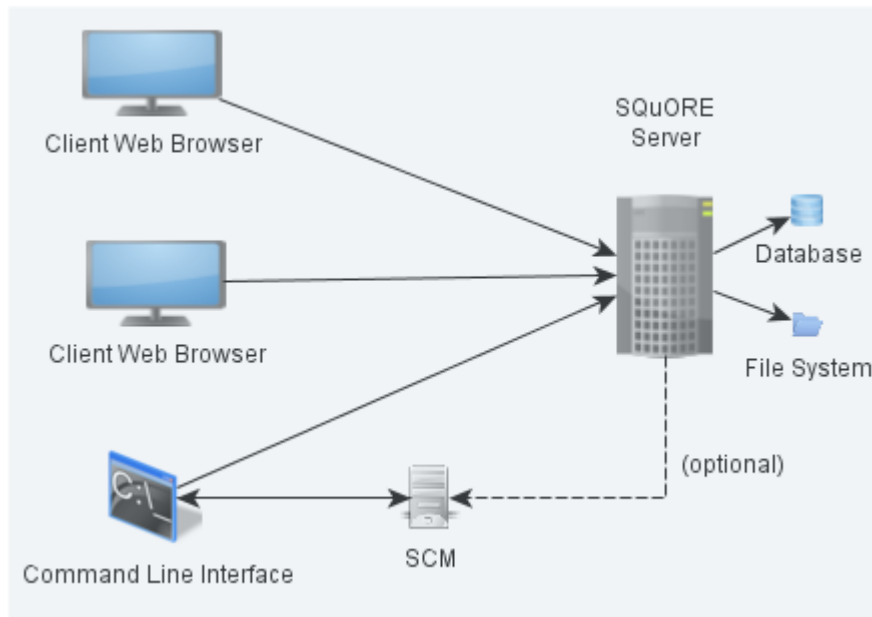
The Squore Architecture

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** 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 5.4, "Backing-Up the Squore Installation".

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 Client

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

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**

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 `<INSTALLDIR>/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 3.1.4, "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

Important: Squore 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.

Tip

It is good practice to use separate folders for the product, the database cluster and the data files, in order to make the backup process more intuitive. Refer to the specific options of the setup package for your platform below to know how to specify the desired paths when installing Squore.

3.1. Installation Prerequisites

3.1.1. Supported Operating Systems

The following is a list of the officially supported operating systems for Squore Server:

→ 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

3.1.2. 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**

3.1.3. For All Systems

For a successful installation of Squore, you will need:

→ The latest version of the Squore 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 1.6.0_45 (64 bit) 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 is 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

→ A valid 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.

3.1.4. 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.

3.1.5. Packages for Windows

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

3.1.6. 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:

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

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

    → **Date::Calc** (since 14-A-SP2) [module details] [http://search.cpan.org/~stbey/Date-Calc/lib/Date/Calc.pod]

    → **DBI** [module details] [http://search.cpan.org/~timb/DBI/DBI.pm]

    → **DBD::Pg** [module details] [http://search.cpan.org/~turnstep/DBD-Pg/Pg.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]

- → **LWP::Protocol::https** [module details] [http://search.cpan.org/~gaas/LWP-Protocol-https/lib/LWP/Protocol/https.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:
  - → **Spreadsheet::XLSX** [module details] [http://search.cpan.org/~dmow/Spreadsheet-XLSX/lib/Spreadsheet/XLSX.pm]
  - → **Spreadsheet::WriteExcel** [module details] [http://search.cpan.org/~jmcnamara/Spreadsheet-WriteExcel/lib/Spreadsheet/WriteExcel.pm]
  - → **Spreadsheet::ParseExcel** [module details] [http://search.cpan.org/~jmcnamara/Spreadsheet-ParseExcel/lib/Spreadsheet/ParseExcel.pm]
  - → **Spreadsheet::BasicRead** [module details] [http://search.cpan.org/~gng/Spreadsheet-BasicRead/BasicRead.pm]
  - → **HTML::Entities** (since 14-A-SP3) [module details] [http://search.cpan.org/dist/HTML-Parser/lib/HTML/Entities.pm]
  - → **OLE::Storage_Lite::PPS** [module details] [http://search.cpan.org/~jmcnamara/OLE-Storage_Lite/lib/OLE/Storage_Lite.pm]
  - → **Digest::Perl::MD5** [module details] [http://search.cpan.org/~delta/Digest-Perl-MD5/lib/Digest/Perl/MD5.pm]
  - → **Crypt::RC4** [module details] [http://search.cpan.org/~sifukurt/Crypt-RC4/RC4.pm]

- → Optional packages for working with OSLC systems:
  - → **HTML::TreeBuilder** [module details] [http://search.cpan.org/~cjm/HTML-Tree/lib/HTML/TreeBuilder.pm]
  - → **HTTP::Server::Simple** [module details] [http://search.cpan.org/~jesse/HTTP-Server-Simple/lib/HTTP/Server/Simple.pm]
  - → **HTTP::Server::Simple::CGI** [module details] [http://search.cpan.org/~jesse/HTTP-Server-Simple/lib/HTTP/Server/Simple/CGI.pm]
  - → **WWW::Mechanize** [module details] [http://search.cpan.org/~ether/WWW-Mechanize/lib/WWW/Mechanize.pm]
  - → **Date::Parse** [module details] [http://search.cpan.org/~gbarr/TimeDate/lib/Date/Parse.pm]
  - → **Date::Language** [module details] [http://search.cpan.org/~gbarr/TimeDate/lib/Date/Language.pm]
  - → **Date::Format** [module details] [http://search.cpan.org/~gbarr/TimeDate/lib/Date/Format.pm]
  - → **Time::Zone** [module details] [http://search.cpan.org/~gbarr/TimeDate/lib/Time/Zone.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 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 server, java-1.6.0-openjdk is not sufficient, as it lacks some fonts to render Squore graphics. This is why using Oracle's JDK is recommended.

3.2. Common Deployment Scenarios

3.2.1. Creating Projects using the Web Interface Only
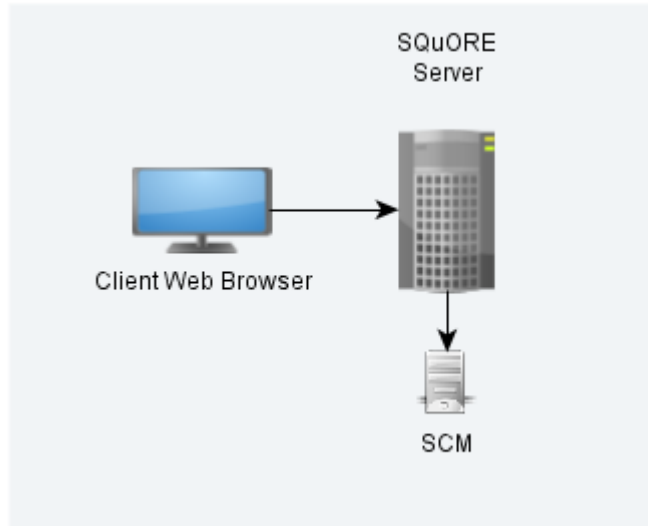
Squore in a configuration where projects are created via the web interface

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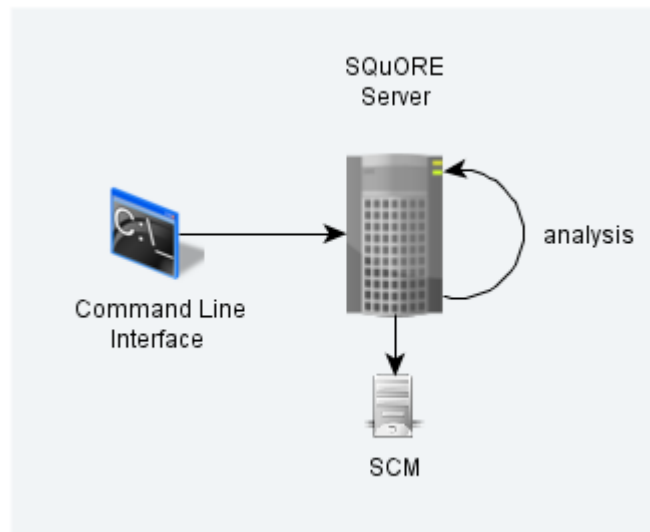
Squore in a configuration where projects creations are requested by a client and delegated to a server

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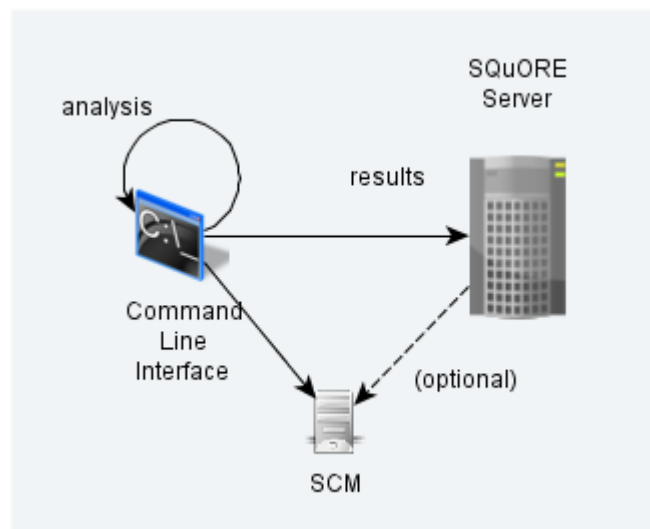
Squore in a configuration where projects creations are run locally on a client and results are sent to a server

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 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 Server (including its dedicated JBOSS and PostgreSQL instances) in `%SYSTEMDRIVE%\Squoring\squore-server`

→ The portable Perl distribution in `<INSTALLDIR>\tools\perl`

→ The Squore database in `%SYSTEMDRIVE%\Squoring\squore-data\cluster`

→ The Squore database backup directory in `%SYSTEMDRIVE%\Squoring\squore-data\backup`

→ The Squore project data directory in `%SYSTEMDRIVE%\Squoring\squore-data\projects`

→ The Squore temporary data directory in `%SYSTEMDRIVE%\Squoring\squore-data\temp`

→ The Squore temporary source code directory in `%SYSTEMDRIVE%\Squoring\squore-data\temp\sources`

The installer provides options to modify the locations of the installation directory as well as the path to the temporary data, project data, cluster and backup folder. You can also choose to use an already existing PostgreSQL instance and your perl distribution, provided that it meets the requirements mentioned earlier.

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.
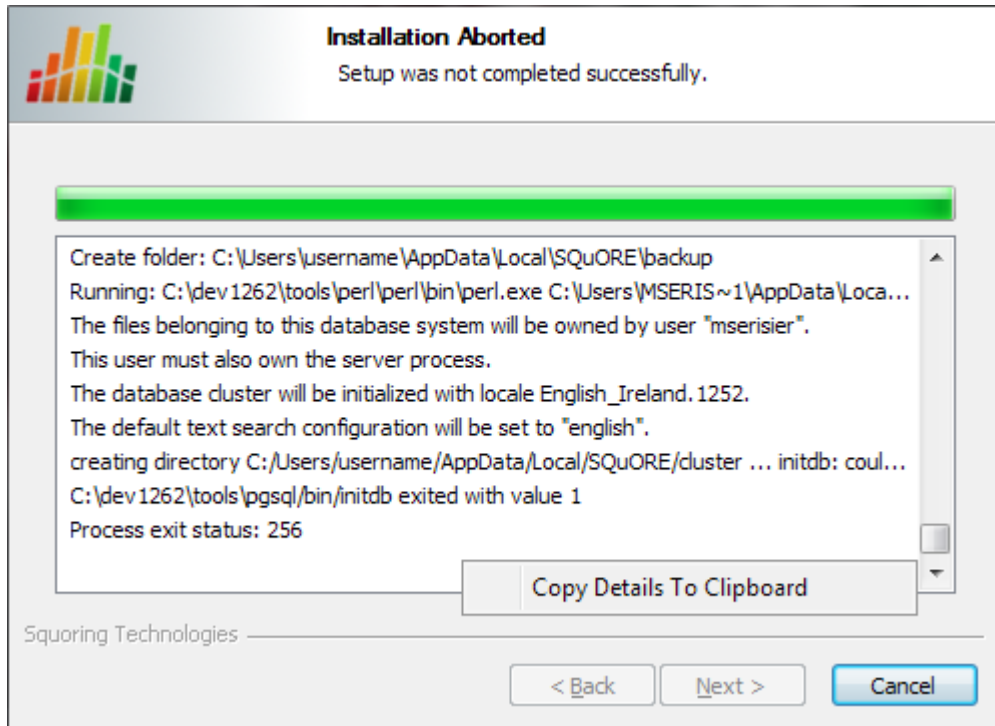
The Installation Aborted screen

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
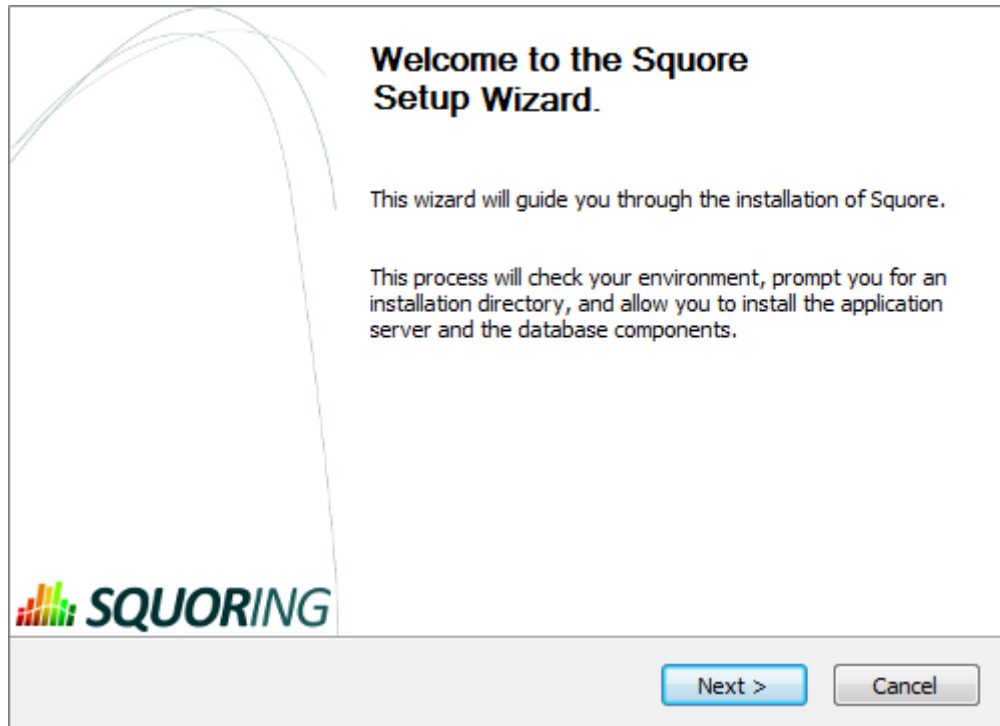
The Squore installer Welcome screen

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

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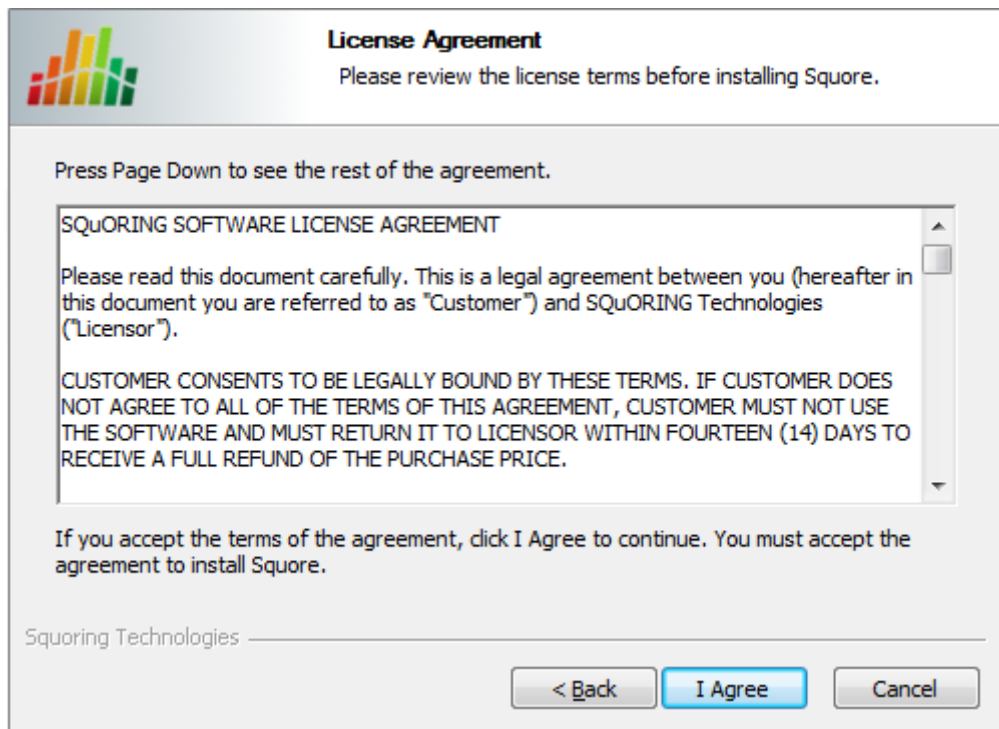
The Squore Licence Agreement screen

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
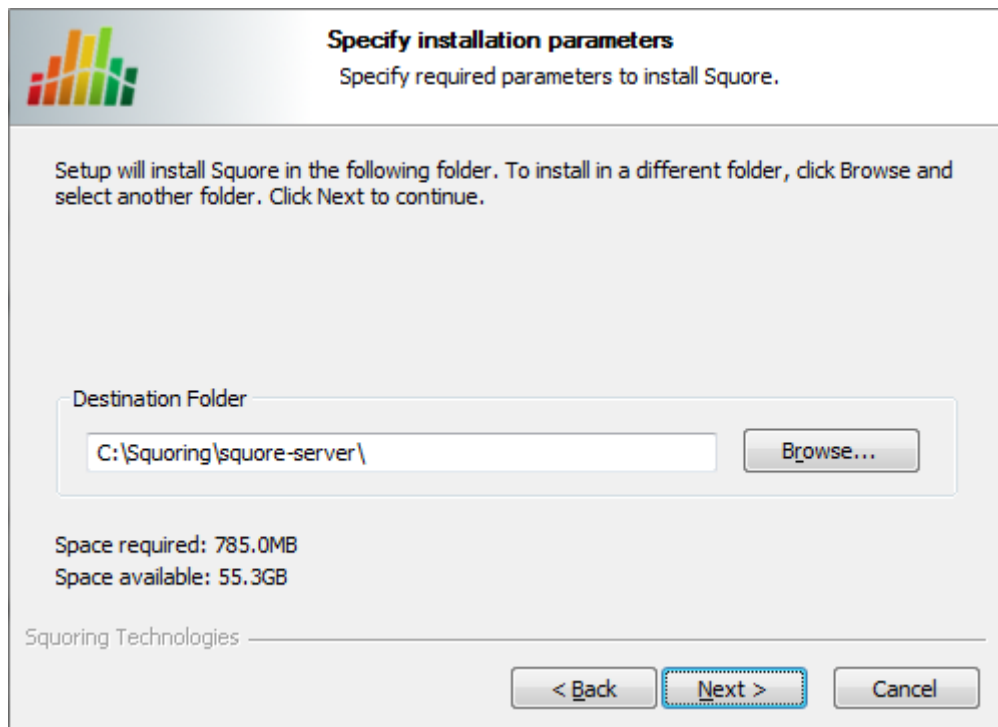
Squore Server Destination Folder screen

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
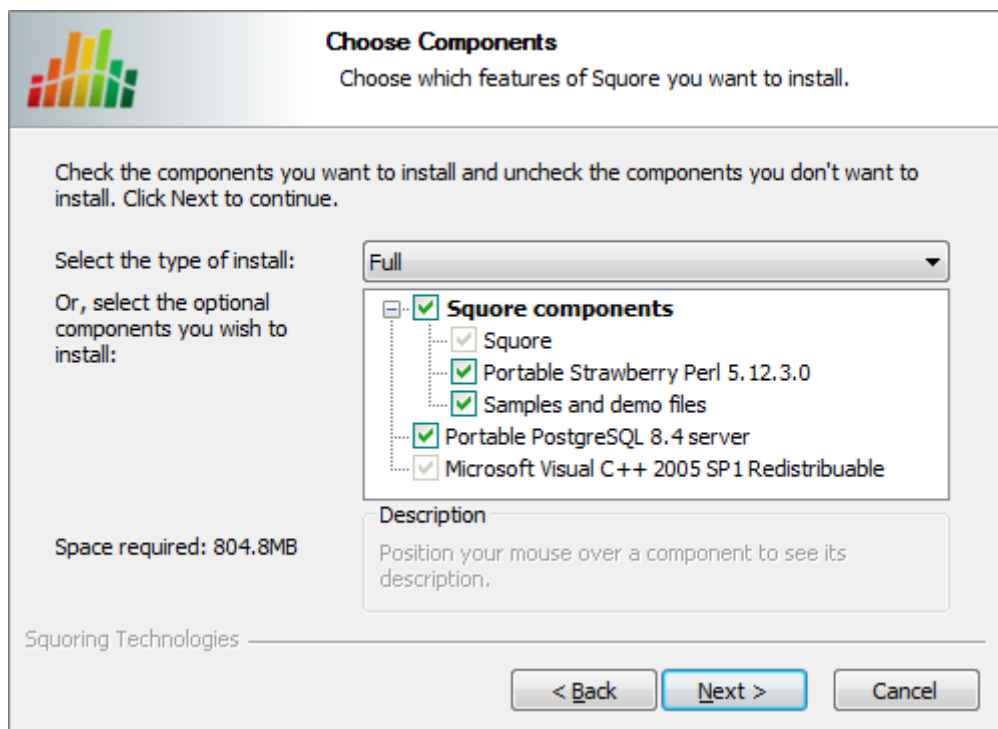
The Squore Components screen

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
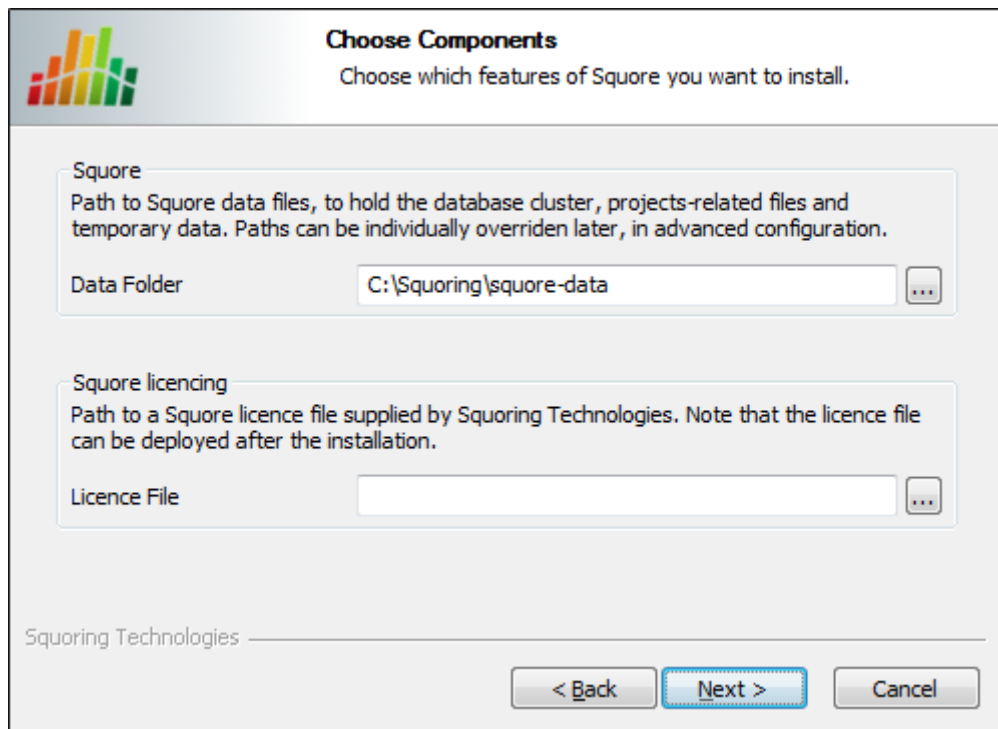
The General Options screen

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
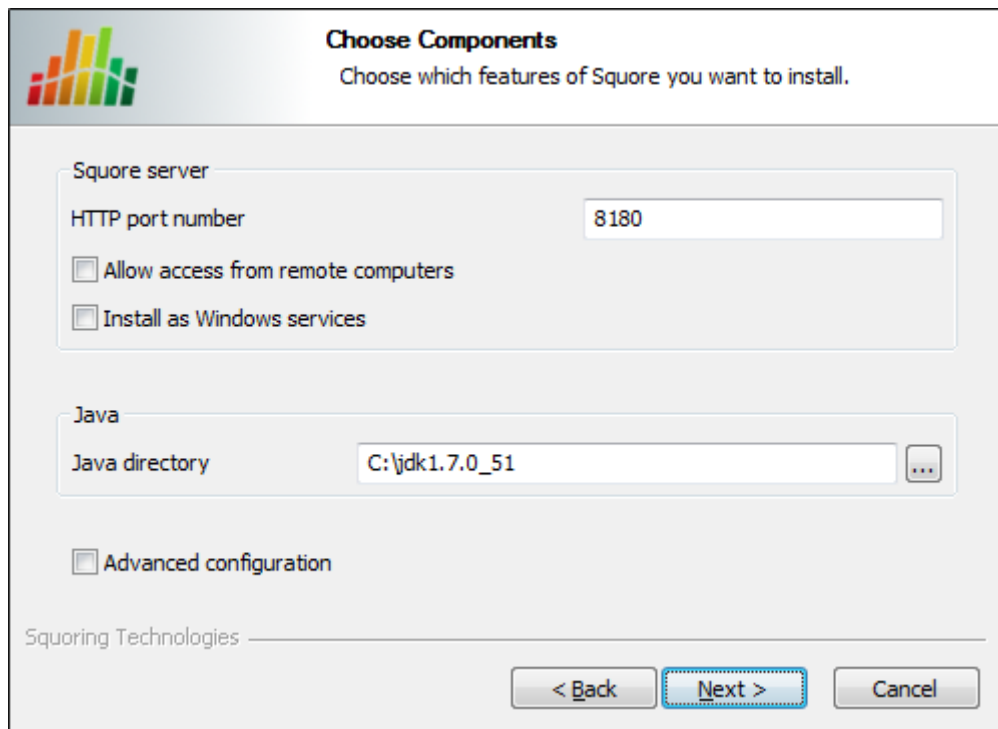
The Squore Additional Options screen

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 5.13, "Running Squore as a Service" for more details.

→ **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 1.6.0_45 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 settings.

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
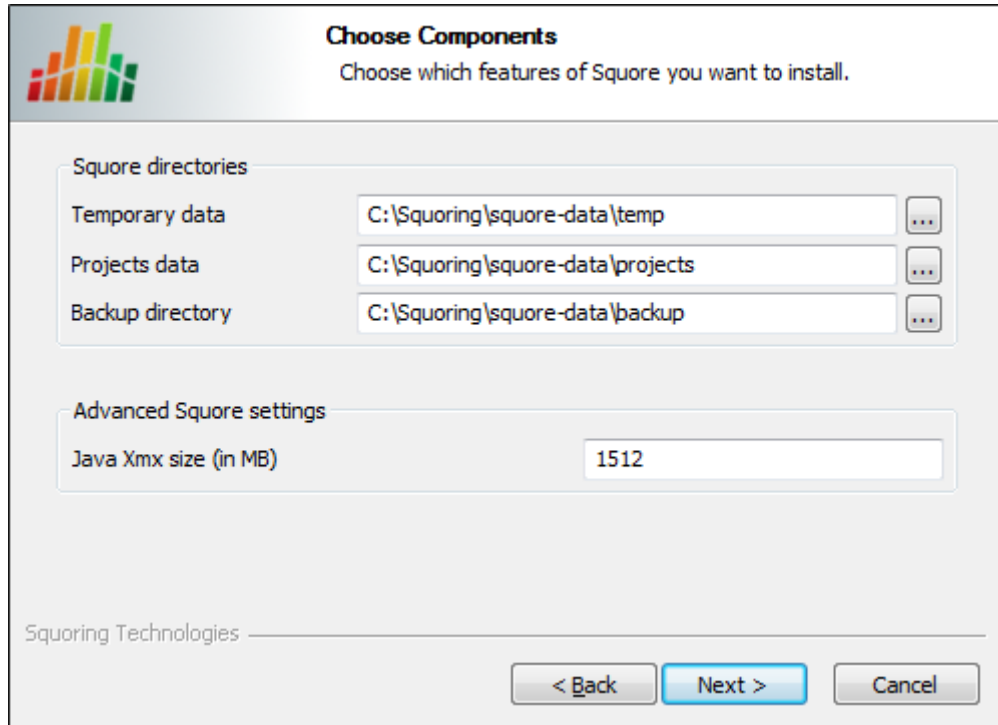
The Advanced Squore settings screen

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 5.4, "Backing-Up the Squore Installation"

→ **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.

8.   The Local Perl installation screen
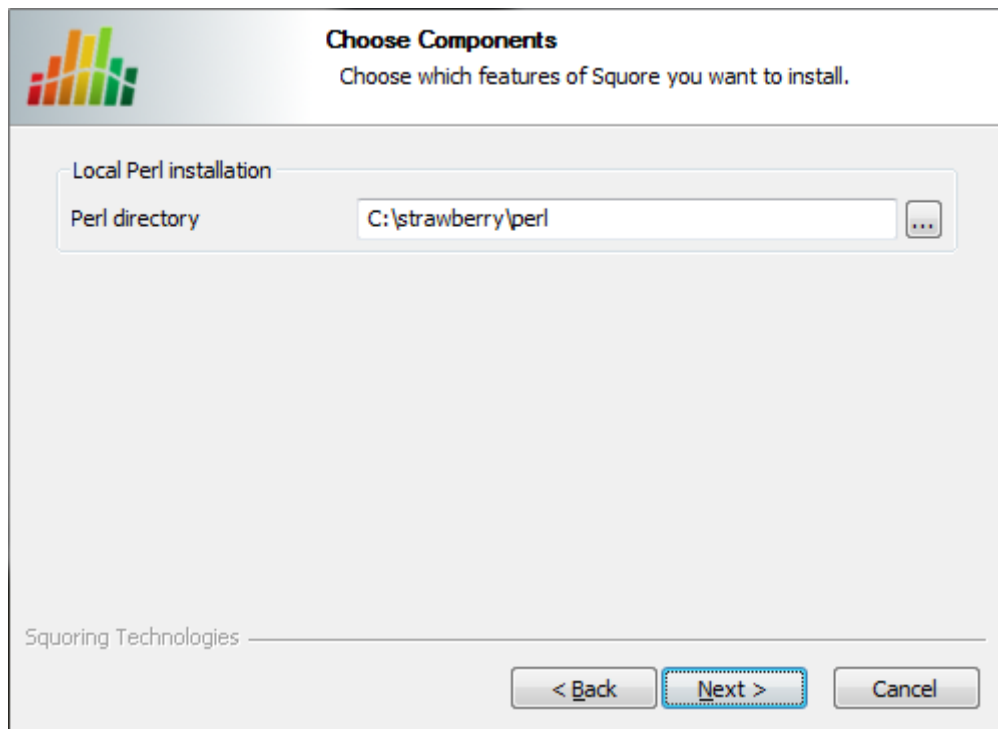
The Local Perl installation screen

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 Local PostgreSQL installation screen
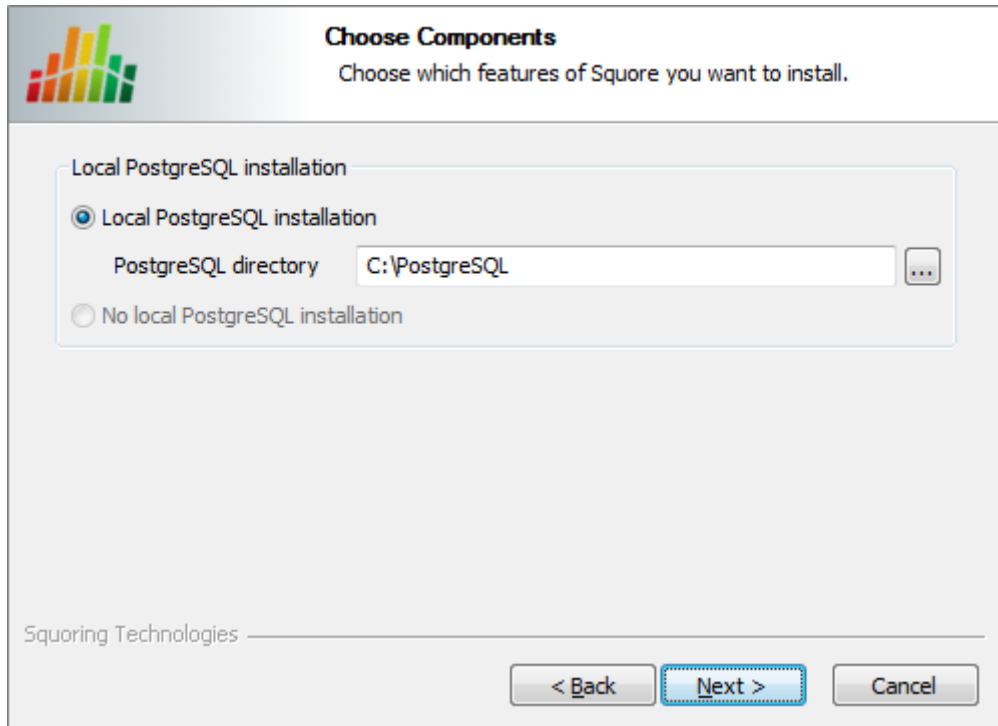
The Local PostgreSQL installation screen

Note

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

On the Local PostgreSQL installation screen, you can 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.

10. The PostgreSQL cluster configuration screen
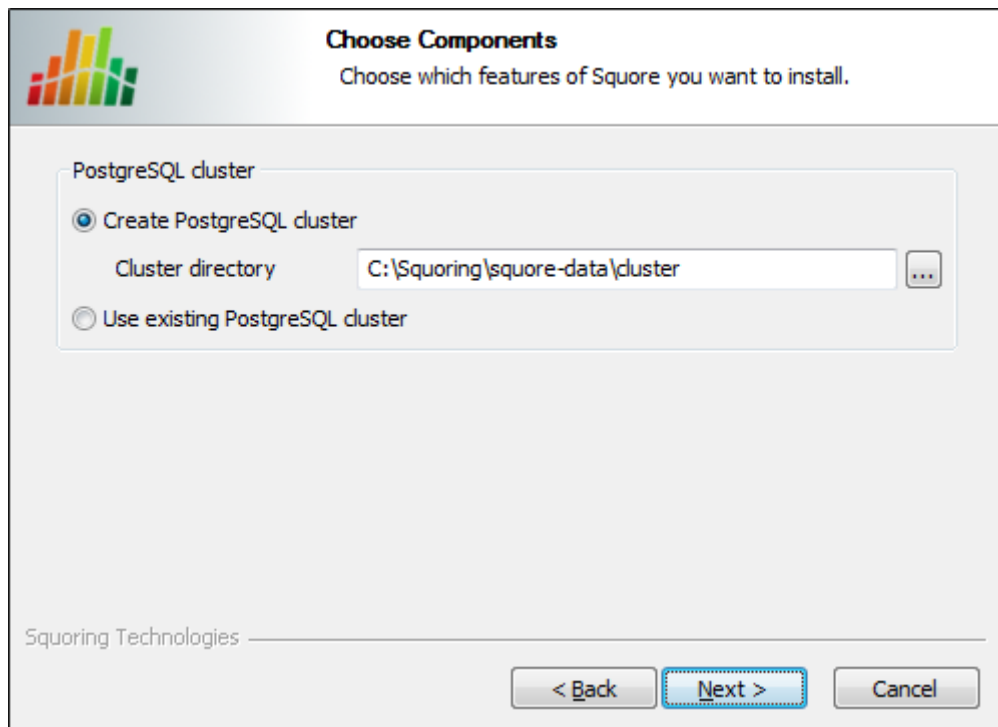
The PostgreSQL cluster configuration screen

Note

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

On the PostgreSQL cluster configuration screen, you can instruct the installer to create a new cluster to create the Squore database, or use an existing one that you may have installed separately.

→ **Create PostgreSQL cluster:** Specify the path of the PostgreSQL cluster to create. Use the **...** button to specify the path.

→ **Use existing PostgreSQL cluster:** Skip the cluster creation. The installer will find the running cluster using information specified in the next screen of the wizard to create the Squore database.

Note that in both cases, the Squore installer will create the Squore database where instructed. The difference between both options is whether the cluster hosting the database is also created or not. After making your selection, click the **Next >** button to continue.

11. The PostgreSQL server configuration screen

The PostgreSQL server configuration screen

Note

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

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.

12. The Squore database screen

The Squore database screen

Note

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

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.

13. 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+port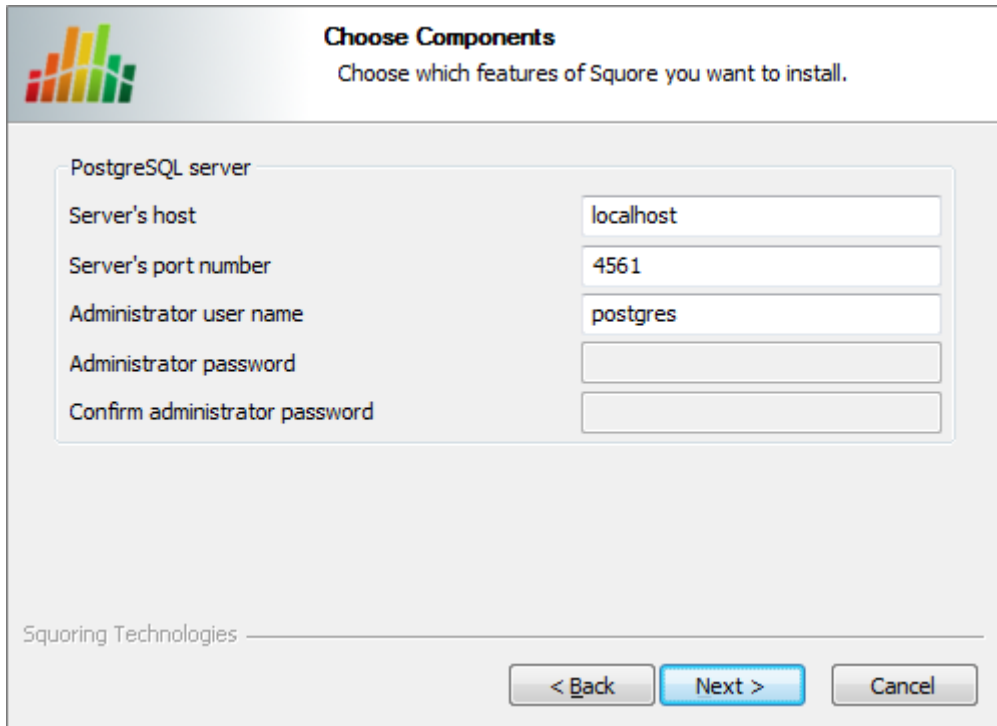s#Interfacesandports-SocketBindingGroups) for this installation of Squore, resulting in the following ports being assigned for the following offset values:

  → 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.

14. The Installation details screen
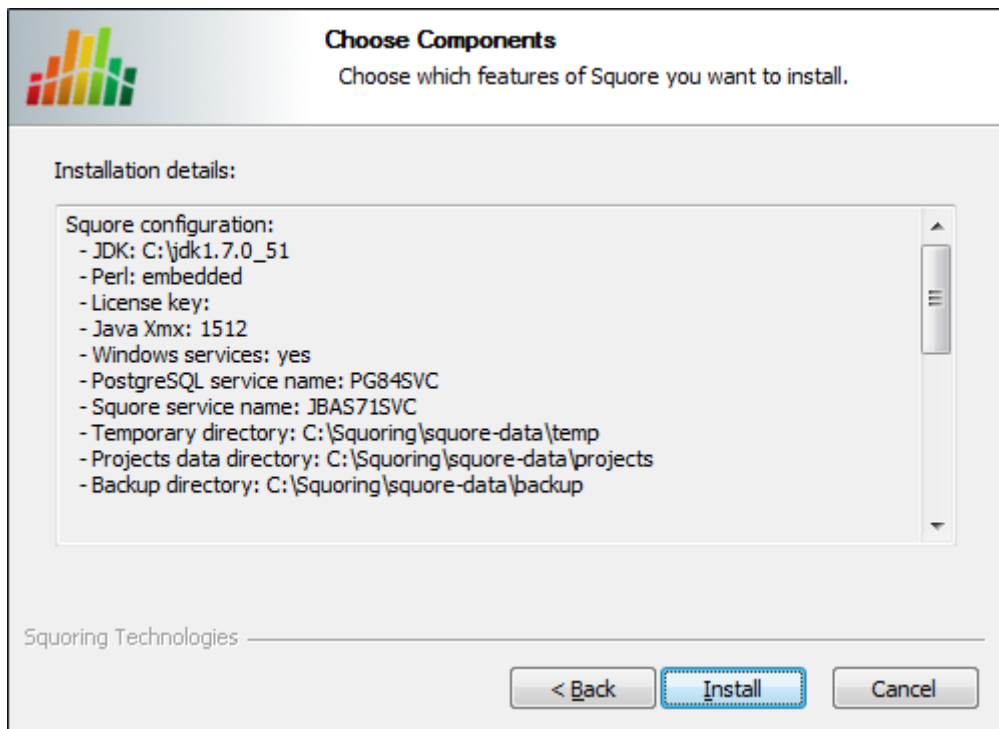
The Installation details screen

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
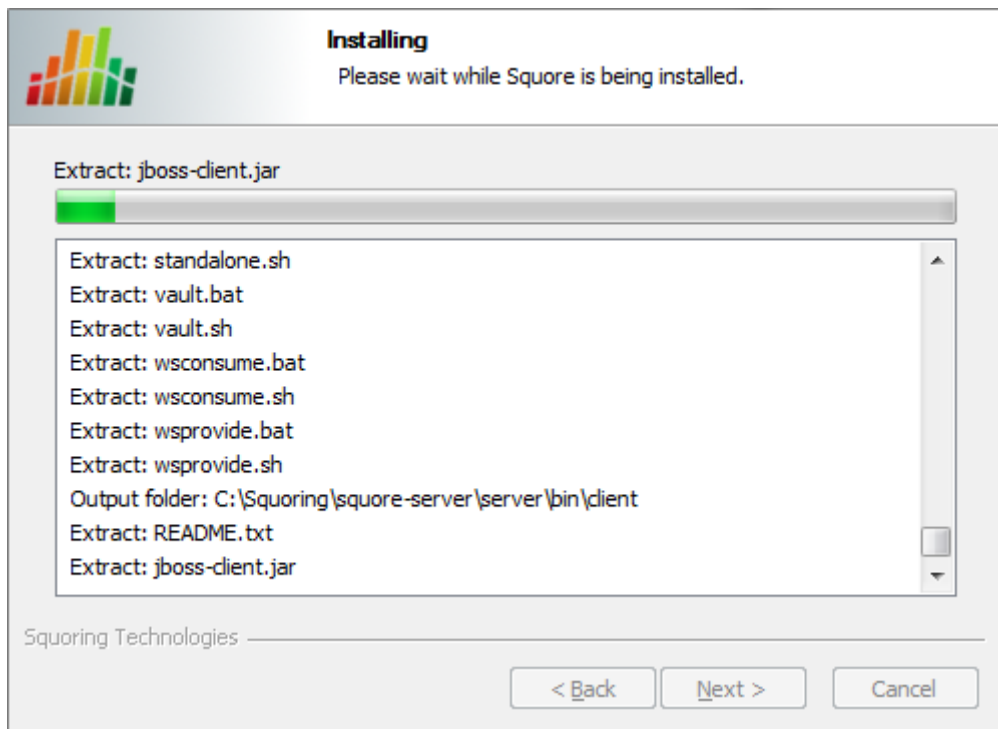
The Installation progress screen

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
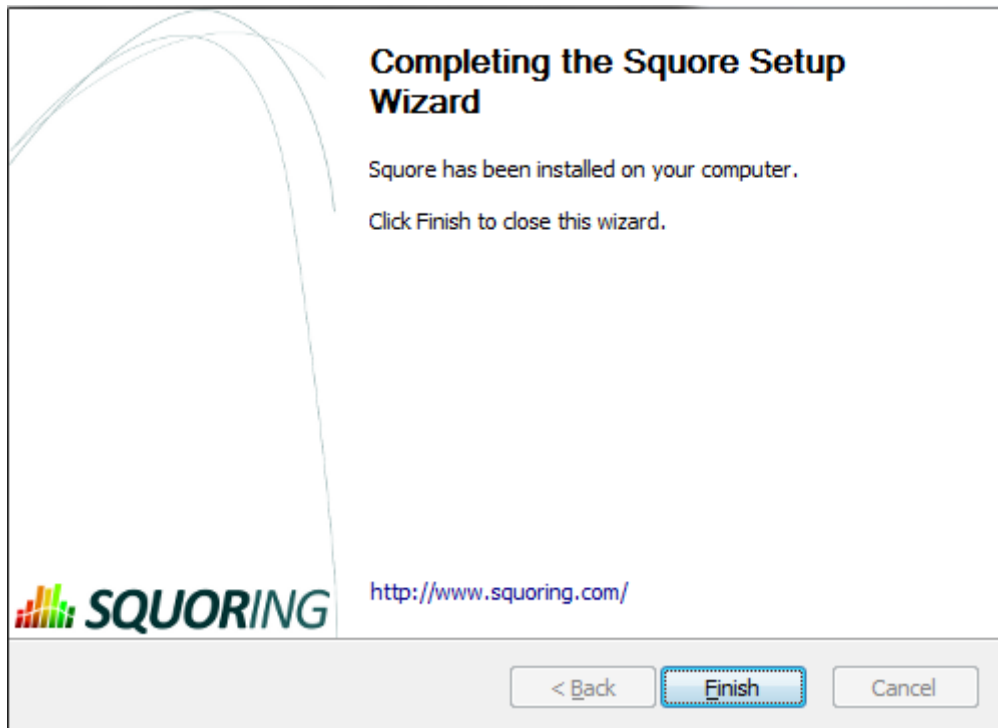
The Squore installation completed screen

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 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 and PostgreSQL instances) in `<INSTALLDIR>`

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

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

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

Ensure that you have read and write access to these locations as the user that will be used to install and run Squore.

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. Unzip the `squore-server-linux-15-A-SP2.<buildNumber>.tar.bz2` archive file and then extract the content of the tar file in **`<INSTALLDIR>`** : i.e. the selected Squore installation directory.
   ```
   tar xjf squore-server-linux-15-A-SP2.<buildNumber>.tar.bz2
   ```

   `<INSTALLDIR>` now contains a new folder called `squore-server`. As an example: `/home/user/squore/squore-server/`.

2. Run the Squore installation script in a command shell:
   ```
   <INSTALLDIR>/bin/install -T /path/to/temp/folder  -D /path/to/database/
   cluster  -b 0.0.0.0 -k /path/to/squore-license.p7s   /path/to/project/
   data
   ```

   > **Warning**
   > Do not run the installation script as root, as this causes the installation of postgreSQL to fail.

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

   For more details on **install** options, refer to install(1).

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 <INSTALLDIR>/addons/tools/CheckStyle_auto.

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

> **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 <INSTALLDIR>/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 `<INSTALLDIR>/config.xml` and `<INSTALLDIR>/server/standalone/configuration/standalone.xml` are backed up for your convenience next to the new ones (i.e. <INSTALLDIR>/config.xml.bkp and <INSTALLDIR>/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 <INSTALLDIR>) using the provided backup scripts described in Section 5.4, "Backing-Up the Squore Installation"
>
> → **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.
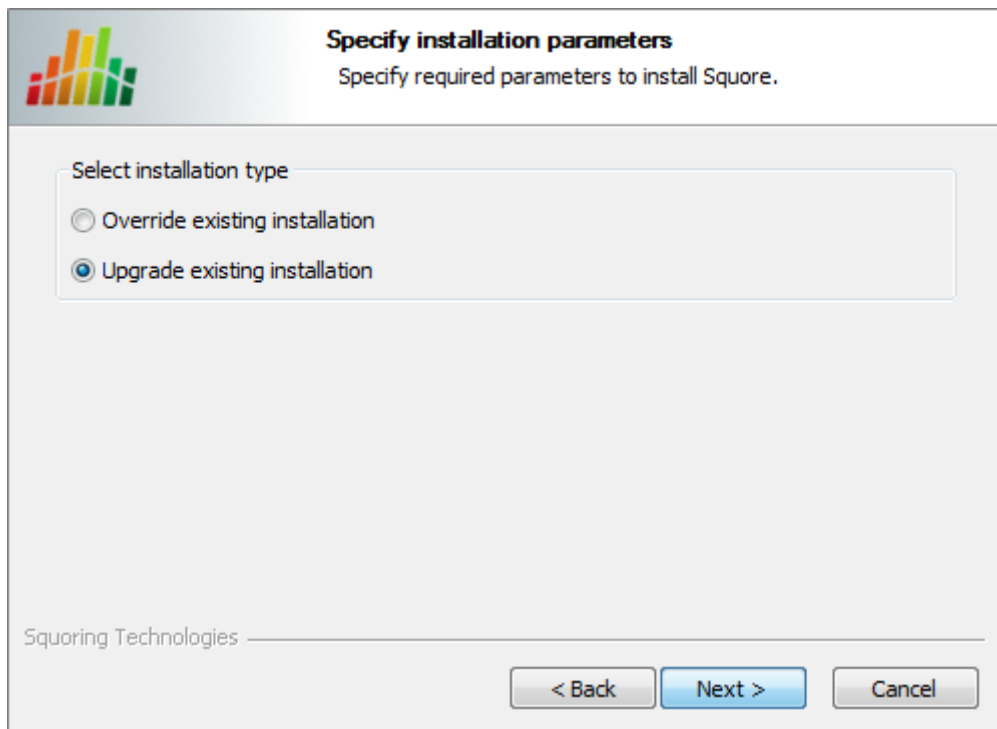
The Upgrade Choice screen

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

http://www.squoring.com/
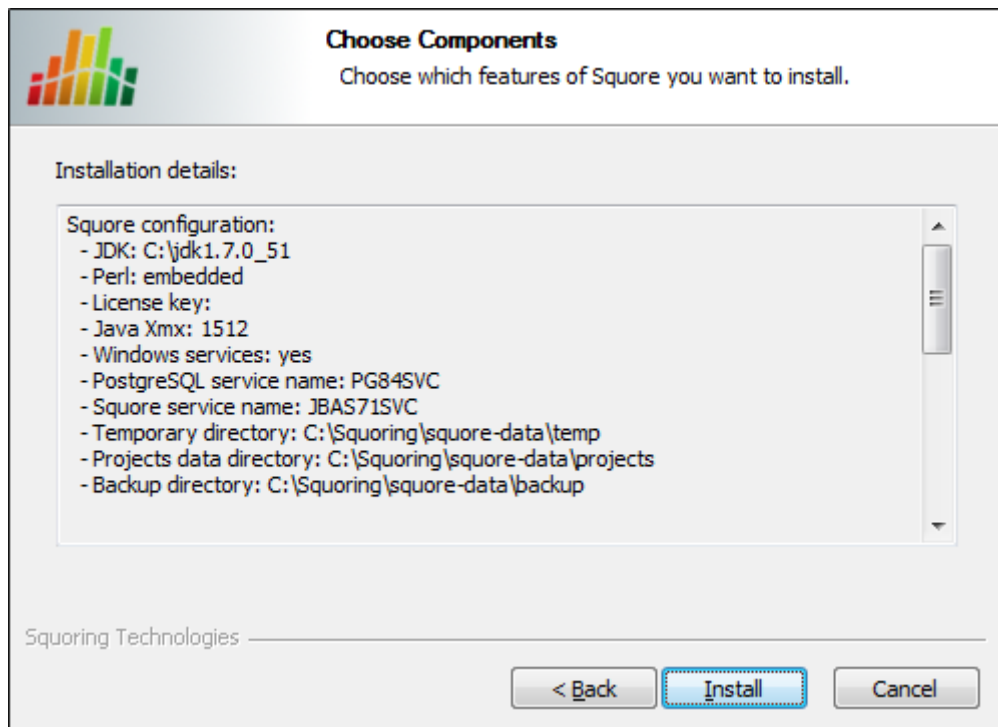
The Summary screen

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

http://www.squoring.com/
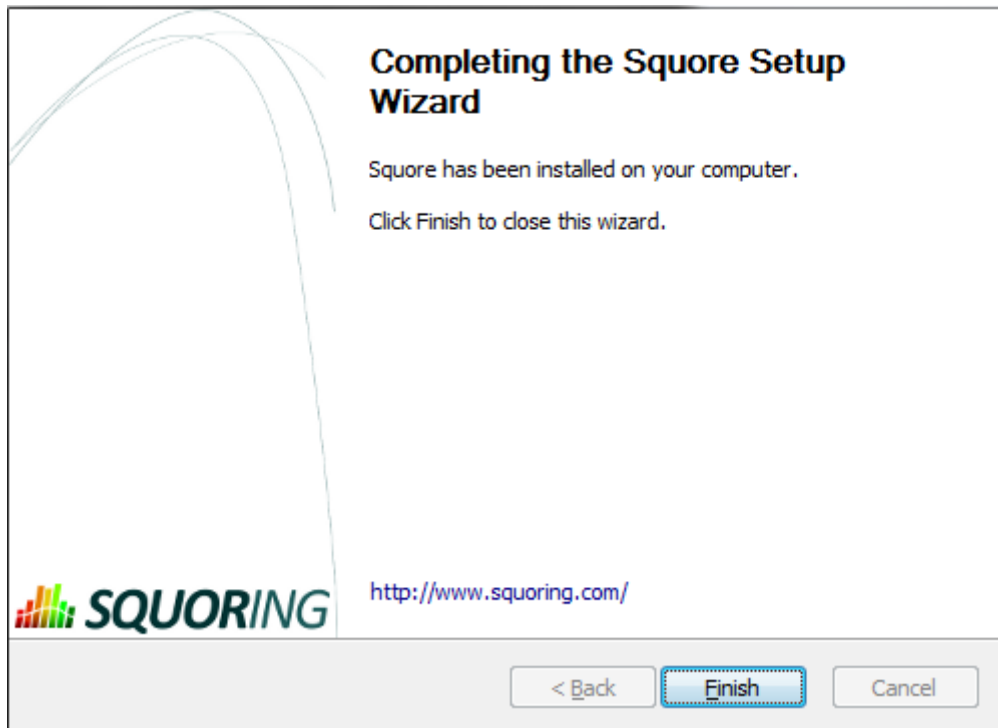
The Installation Complete screen

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`

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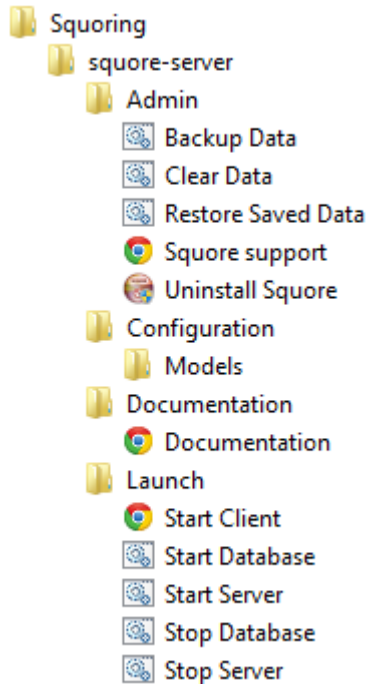
1.   Start the Squore Database Server: **Start > Squoring > Squore > Launch > start-db.bat**

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 <INSTALLDIR>/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. Starting Squore on Linux

1. Go to the Squore bin directory **cd <INSTALLDIR>/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 **`<INSTALLDIR>`** :
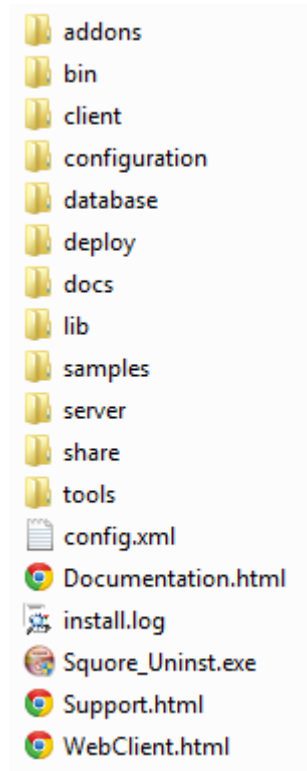
<INSTALLDIR>/addons contains the Data Providers and Repository Connectors available in Squore

<INSTALLDIR>/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.

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

<INSTALLDIR>/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.

<INSTALLDIR>/database contains PostgreSQLtools to administer the database.

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

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

<INSTALLDIR>/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.

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

<INSTALLDIR>/share contains some custom perl modules.

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

<INSTALLDIR>/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
<?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 <INSTALLDIR>/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 <INSTALLDIR>/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 <INSTALLDIR>/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
<?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
<?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="/tmp/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 <INSTALLDIR>/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 5.4, "Backing-Up the Squore Installation");

→ Restore a previously saved snapshot (See Section 5.5, "Restoring Squore Data");

→ Reset the Squore installation to its initial state to erase all projects and users (See Section 5.6, "Resetting the Squore Installation");

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

Note: Squore Server must be in stopped state before any backup or restore operation is attempted.

5.3.1. Configuring Squore's Data Storage

By editing <INSTALLDIR>/config.xml, you can modify:

→ The path to the PostgreSQL installation via the postgresql element

→ The path to the database cluster via the cluster element

→ The path to the default backup folder via the `backup` element

→ The database username via the `user-name` element

→ The path to the file storage folder via the `projects` element

> **Tip**
> If you need to modify other settings after installation, like the database port or password, contact support@squoring.com.

5.4. Backing-Up the Squore Installation

The contents of the Squore Database and file system can be saved using the backup script located in the `<INSTALLDIR>/bin` folder of the Squore installation directory.

Executing this script creates a folder containing a database dump and a backup of the file system in the location configured in `<INSTALLDIR>/config.xml`. This backup folder can later be used by a script that restores database and file system snapshots, which we will cover in the next section.

5.4.1. On Windows

→ Launch **Start > Squoring > Squore > Admin > Backup Data**

> **Tip**
> You can also run **backup.bat** from <INSTALLDIR>/bin followed by a path to backup directly to this folder.

5.4.2. On Linux

→ Run the Squore backup script in a command shell: **<INSTALLDIR>/bin/backup**

> **Tip**
> The script accepts an optional path argument to backup directly to the specified folder instead of using the default one specified at installation time.

5.5. Restoring Squore Data

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

The script uses the data dump in the `backup` folder specified when installing Squore to restore the database and file data for this snapshot.

5.5.1. On Windows

1. Shutdown Squore Server: **Start > Squoring > Squore > Launch > stop-server.bat**
2. Launch **Start > Squoring > Squore > Admin > Restore Saved Data**
3. Start the Squore Application server again after the script finishes via **Start > Squoring > Squore > Launch > start-server.bat**

5.5.2. On Linux

1. Shutdown Squore Server: **<INSTALLDIR>/bin/sqctl stop**
2. Start the database cluster: **<INSTALLDIR>/bin/pgctl start**
3. Run the restore script in a command shell: **<INSTALLDIR>/bin/restore backup_folder**

4. Start Squore Server again after the script finishes via `<INSTALLDIR>/bin/sqctl start`

5.6. Resetting the Squore Installation

You can reset the Squore installation to its initial state, and therefore delete all your projects and users using the restore script located in the `<INSTALLDIR>/bin` folder of the Squore installation directory.

5.6.1. On Windows

1. Shutdown Squore Server: **Start > Squoring > Squore > Launch > ShutdownServer**
2. Launch **Start > Squoring > Squore > Admin > Clear Data**
3. Start Squore Server after the script finishes, via **Start > Squoring > Squore > Launch > start-server.bat**

Alternatively, you can use <INSTALLDIR>/restore-empty.bat instead of using the Start Menu entry.

5.6.2. On Linux

1. Shutdown the Squore server: `<INSTALLDIR>/bin/sqctl stop`
2. Start the database cluster: `<INSTALLDIR>/bin/pgctl start`
3. Run the Squore Database reset script in a command shell: `<INSTALLDIR>/bin/restore -E`
4. Start Squore Server after the script completes via `<INSTALLDIR>/bin/sqctl start`

5.7. 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 `<INSTALLDIR>/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.

5.8. 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 `<INSTALLDIR>/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 <INSTALLDIR>/deploy
jar xf squore-server.ear
jar xf squore-ejb.jar
```

2. Make the necessary modifications:
   → Open `<INSTALLDIR>/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 <INSTALLDIR>/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 `<INSTALLDIR>/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: **`<INSTALLDIR>/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* 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. Edit `<INSTALLDIR>/server/standalone/configuration/application-users.properties`.

    b. Get a new password with this command:

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

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

    c. Restart Squore Server.

2. On the local server:

    a. Stop Squore Server.

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

    ```
    license.remote = true
    ```

    c. Edit `<INSTALLDIR>/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 this content returned by 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):

```
# <INSTALLDIR>/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. Running Squore as a Service

During the installation of Squore on Windows, the installer provides the option to register two services to control Squore's startup and shutdown. If you did not select this option at installation time, you can still register the PostgreSQL 8.4 Server and JBoss Application Server 7.1.1 services manually following these instructions:

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 <INSTALLDIR>/config.xml. The instructions below use the default location (%SYSTEMDRIVE%\Squoring\squore-data\cluster).

4.   Install the services by running these commands in a command window as administrator:

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

Note: After you configured Squore to run as a service, you no longer have to use the start and stop scripts in the `bin` folder. Instead, you can configure the services to start automatically when the server starts.

Tip

Uninstalling the services can be done with these commands:

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

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"
```

5.14. Managing Squore User Accounts

5.14.1. 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.

5.14.2. 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 5.15, "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 `<INSTALLDIR>/addons/scripts/export-scripts`, which the location of the **sqexport.pl** script.

2. Run the perl script with the appropriate options to export users, groups and their members respectively:
   ```
   perl sqexport.pl -f users.csv users

   perl sqexport.pl -f groups.csv groups

   perl sqexport.pl -f members.csv groups -m
   ```

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
```

5.15. Setting Perl Environment

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

5.15.1. Windows

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

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

Then type all commands in the new command prompt window.

```
SET SQUORE_HOME=<INSTALLDIR>
```

```
SET PERL5LIB=%Squore_HOME%\share\perl
```

5.15.2. Linux

```
Squore_HOME=<INSTALLDIR>
```

```
export Squore_HOME
```

```
PERL5LIB=$Squore_HOME/share/perl
```

```
export PERL5LIB
```

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 <INSTALLDIR>/server/standalone/configuration/standalone.xml:

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

  <connector name="https" scheme="https" protocol="HTTP/1.1" socket-binding="https
    <ssl name="foo-ssl" password="secret" protocol="TLSv1" key-alias="foo" certifi
  </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 from of Squore Server to achieve the same result. For more information, consult the Apache documentaion 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 <INSTALLDIR>/deploy
jar xf squore-server.ear
jar xf squore-web.war
```

3. Modify Squore Server's web.xml:

    → Open `<INSTALLDIR>/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 <INSTALLDIR>/deploy
jar cf squore-web.war
jar cf squore-server.ear
```

5. Edit the **http** connector in <INSTALLDIR>/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" red
```

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 `<INSTALLDIR>/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">
```

```
        <module-option name="dsJndiName"
            value="java:jboss/datasources/squore"/>
        <module-option name="principalsQuery"
            value="SELECT password FROM users WHERE login = ? AND local_account"/>
        <module-option name="rolesQuery"
            value="SELECT 'squore-user', 'Roles' FROM users WHERE login = ?"/>
        <module-option name="hashAlgorithm" value="SHA1"/>
        <module-option name="hashEncoding" value="base64"/>
        <module-option name="unauthenticatedIdentity" value="guest"/>
    </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"/>
 </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"/>
</login-module>
-->
<login-module code="Database" flag="sufficient">
      <module-option name="dsJndiName"
          value="java:jboss/datasources/squore"/>
      <module-option name="principalsQuery"
          value="SELECT password FROM users WHERE login = ? AND local_account"/>
      <module-option name="rolesQuery"
          value="SELECT 'squore-user', 'Roles' FROM users WHERE login = ?"/>
      <module-option name="hashAlgorithm" value="SHA1"/>
      <module-option name="hashEncoding" value="base64"/>
      <module-option name="unauthenticatedIdentity" value="guest"/>
    </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

→ *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.
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 `<INSTALLDIR>/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 <INSTALLDIR>/server/standalone/configuration/standalone.xml from

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

to

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

.

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 <INSTALLDIR>/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 bottom-left corner to view it in a new browser window or tab.

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

The URL `http://localhost:8180/SQuORE_Server/squore/resource/chart/ <CHART_UID>.png.xhtml` 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 <INSTALLDIR>/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
```

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 Ser
## @param sqport:title=Squore Server Port|type=string|required=true|desc=The Squore S
## @param chart:title=Squore Element URL|type=string|required=true|desc=The URL of th
## @param sizex:title=Squore Element Width|type=string|required=true|desc= The Squore
## @param sizey:title=Squore Element Height|type=string|required=true|desc= The Squor
## @param version:title=Version|type=enum|enumValues=Current version,Last draft,Last
#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/
</IFRAME>
```
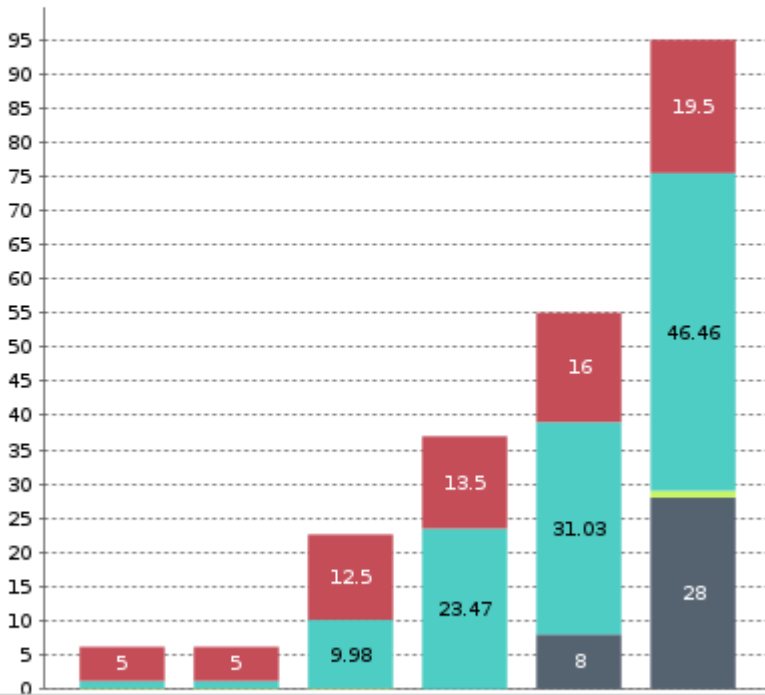
6.8.3. Adding Dashboard Elements

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

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 `<INSTALLDIR>/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

→ 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

Tracker configuration

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

→ SQ_Status

→ SQ_Since

→ SQ_Reasons

→ SQ_Scope

→ SQ_Artefact

→ SQ_Path

→ SQ_Comment

6.9.3. 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*

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 b
```

.

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.

http://www.squoring.com/

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).
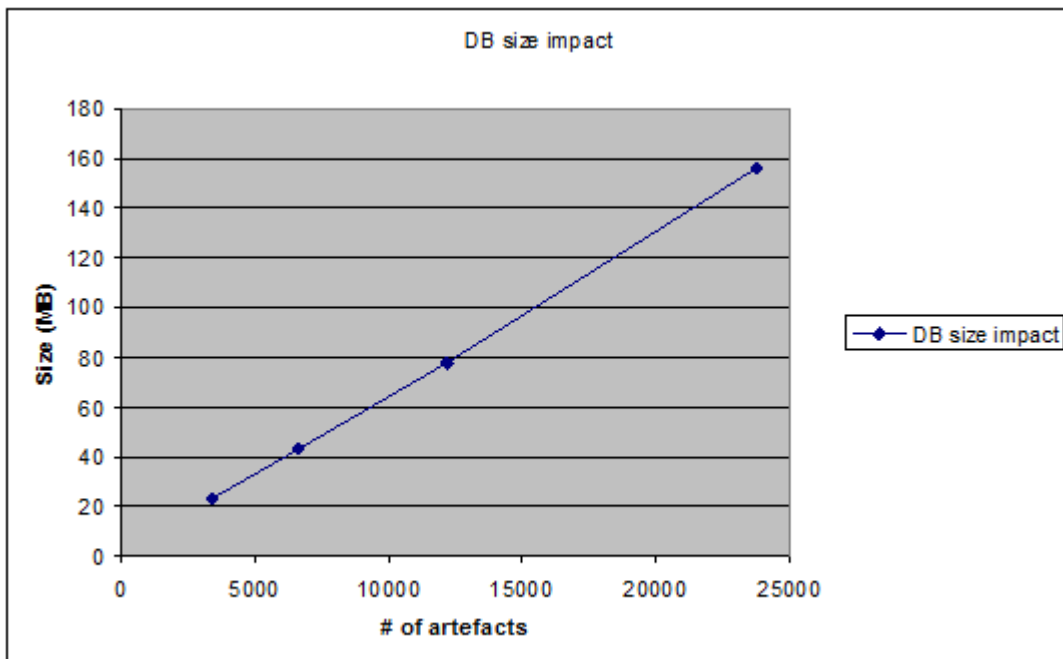

The chart is an analysis of the evolution of the database size for a sample project consisting of:

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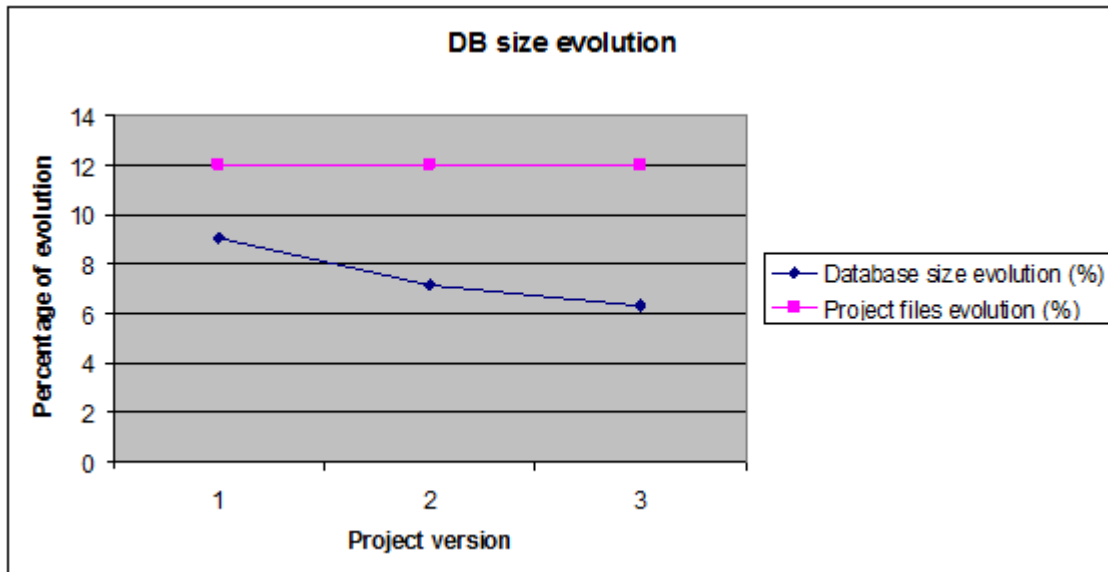
For a medium-sized project (10 000 artefacts):

→ 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 <INSTALLDIR>/ 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 <INSTALLDIR>/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.
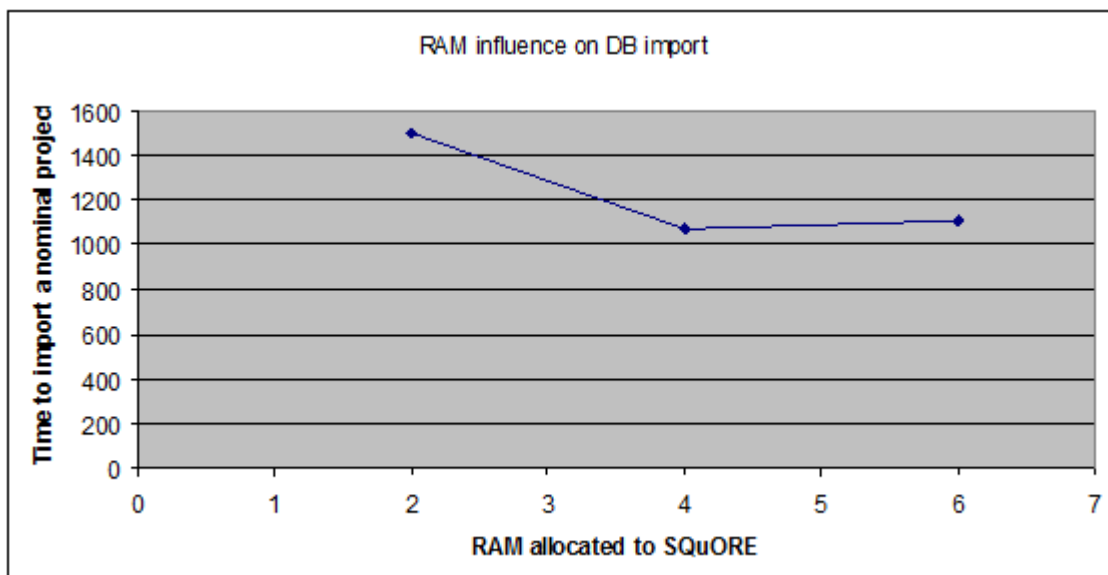

7.3.2. Project Volume

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.

Speed performances

http://www.squoring.com/
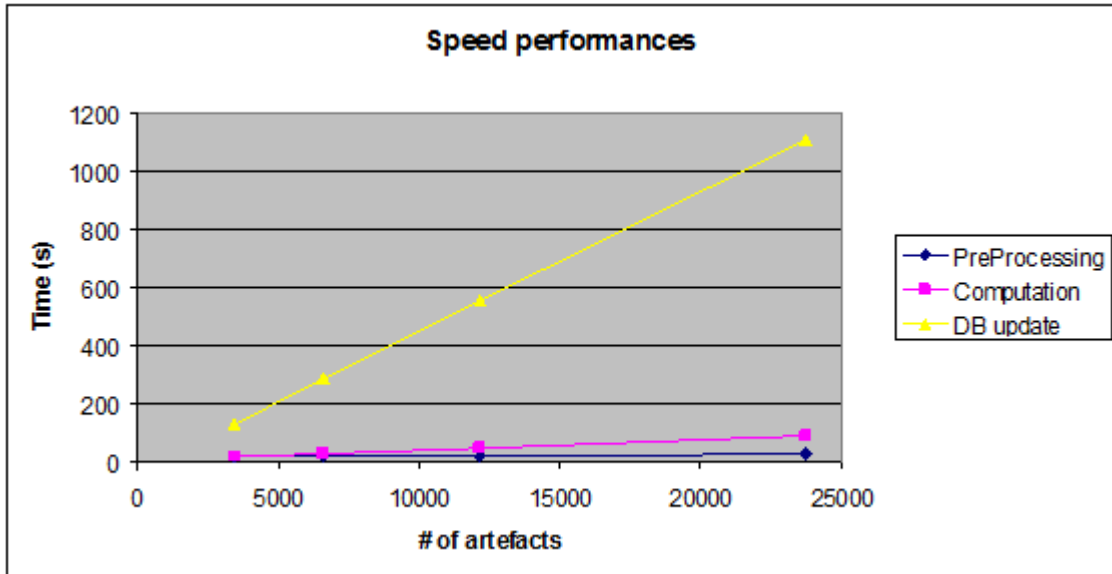
Appendix A. Reference pages

Name

install — Squore install script

Synopsis

`install` [`options` …] `data_dir`

`install -C` [`options` …] `data_dir`

`install -U` `inst_dir` [`options` …]

Description

Installs and configures Squore.

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

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

Squore data is stored in the `data_dir` directory.

Options

`-C`	Configure files only, does not create any database schema. This option may be used to reconfigure Squore after installation.
`-U` `inst_dir`	Upgrade the installation pointed to by `inst_dir`.
`-v`	Increase verbosity level.
`-S`	Use remote PostgreSQL server. This option may be used to point on an existing server (no cluster is created).
`-P` `pg_dir`	Location of PostgreSQL executables.
`-D` `cluster_dir`	PostgreSQL cluster directory to create (default: `data_dir`/`cluster`).
`-s` `size`	PostgreSQL shared buffers size, in MB. Defaults to 25% of the memory available on the server.
`-r` `dbms`	Supported DBMS vendor (default: `postgresql`). Note: only `postgresql` is supported at this time.
`-h` `db_host`	Database server's host name (default: `localhost`).
`-p` `db_port`	Database server's port number (default: DMBS dependent `4561` for postgresql).
`-A` `db_admin`	Database administrator name (default: DMBS dependent `postgres` for postgresql).
`-d` `db_name`	Squore database name (default: `squore`).
`-u` `db_user`	Squore database user (default: `squore`).
`-N`	Do not prompt for a database user password during the setup process.
`-x` `size`	Java memory allocation pool, in MB (Xmx option). Defaults to 25% of the memory available on the server, with a minimum of 512 MB.

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

Arguments

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

Name

sqexport.pl — Squore export utility

Synopsis

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

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

`sqexport.pl [ option …] versions -m [ -l ] [ -u 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 ]`

`sqexport.pl [ option …] findings -m [ -M measure …] [ -u id_user ] id_model`

`sqexport.pl [ option …] findings -p [ -c [ -R | -r id_rvers ] ] [ -M measure …] [ -u id_user ] id_project [ id_vers ]`

`sqexport.pl [ option …] findings -a [ -c ] [ -r id_rvers ] id_art 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`, `artefacts`, `findings` 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 if the project is used. Artefacts may be filtered out with the `-T type` and `-L level` options.

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

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

The `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.

Findings export

These additional columns are exported:

1. *measure_id* - the database identifier of the measure (verbose mode only).
2. *measure* - the external identifier of the measure.
3. *tool* - the tool name that produced the measure.
4. *finding_id* - the database identifier of the finding.
5. *art_id* - the database identifier of the artefact.
6. *art_path* - the path of the artefact.
7. *art_name* - the name of the artefact.
8. *art_location* - the location of the finding, within the artefact.

In counting mode (see `-c` option), these columns are exported instead:

1. *measure_id* - the database identifier of the measure (verbose mode only).
2. *measure* - the external identifier of the measure.
3. *tool* - the tool name that produced the measure.
4. *count* - the number of findings in the `id_vers` version.
5. *delta* - the variation of findings from `id_rvers` to `id_vers` (with `-c` only).
6. *** - there is one additional column per scale in the model for this measure.

```
sqexport.pl findings -m [-M measure …] [-u id_user ] id_model
```

This form exports all findings found in the model identified by `id_model`, using the last version of each project.

One line is exported per localisation of findings (that is, there is one line per cloned artefact, for example). Use the *finding_id*, which is unique per finding, to identity multiple localisations.

Use the `-M measure` option to filter findings per rule. Multiple rules are OR-ed.

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

```
sqexport.pl findings -p [-c [-R | -r id_rvers ]] [-M measure …] [-u id_user ]
id_project [ id_vers ]
```

This form exports findings of the project identified by `id_project` found in the `id_vers` version. If `id_vers` is not supplied, the last version of the project is used.

Use the `-M measure` option to filter findings per rule. Multiple rules are OR-ed.

The `-c` option turns on findings counting (grouped by the measure id).

Delta computation can be turned on with either the `-R` to use the version right before `id_vers`, or with the `-r id_rvers` option to explicitly set the reference version. Available in counting mode only.

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

```
sqexport.pl findings -a[-c][-r id_rvers ]id_art id_vers
```

Exports findings of the `id_art` artefact, and all its descendants, that exist in the `id_vers` version. The `-c` option is currently mandatory, and turns on counting (there is no full listing of findings so far).

If `-r` is set, delta are computed against the `id_rvers` version. There is no delta computing by default.

Global options

These options are common to all export types.

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

Export options

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

Examples

```
sqexport.pl artefacts -m -T FILE -L LEVELG 1
```

This command lists all artefacts of type `FILE`, that are rated `LEVELG`. The scope of the search is limited to the artefacts that belong to the model `1`, which is its database id. There is no trend computation.

Exit status

0   CSV successfully generated.

2   Syntax or usage error.

*   The script failed. See stderr for an error message.

Name

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.

`-h host`	Overrides the database host name.
`-p port`	Overrides the database port number.
`-d dbname`	Overrides the database name.
`-u user`	Overrides the database user name.
`-f file`	Set the CSV input file. If not specified, CSV data is read from the standard input.
`-s sep`	Set the CSV separator. Defaults to the ';' character.
`-n`	The CSV file does not contain the header line.
`-S slices`	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.
`-v`	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.

Index