

JobScheduler - Installation Guide

Installation and Configuration

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This product includes software developed by the Apache Software Foundation (http://apache.org/)

We would appreciate any feedback you have, or suggestions for changes and improvements; please forward your comments to info@sos-berlin.com.

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1 Installation

The steps described below should be carried out when making a new installation of the JobScheduler, in the order presented below:

Database Configuration (page 27)

The JobScheduler requires a database except it will be used as an agent. The JobScheduler needs the database to archive logs and to remember *jobs* and *order* states. A JobScheduler agent doesn't have own jobs or orders and the logging is made by the JobScheduler which calls the agent. So an agent is running without a database.

You find the supported database management systems here.

Because of licensing restrictions when used with MySql®, Sybase or Microsoft® SQL Server databases, a JDBC® driver appropriate to the database version used must be provided by the end user themselves. Alternatively, a jTDS JDBC® driver, delivered with the JobScheduler setup, can be used for Microsoft® SQL Server and Sybase databases. Similarly, the MariaDB® driver is delivered with the JobScheduler setup, for use for MySql® Server and MariaDB® databases. For IBM® DB2 a JDBC® driver inlusive the license file must be provided by the end user too. Drivers for Oracle® Database and PostgreSQL are contained in the JobScheduler setup.

JobScheduler Installation (page 6)

Installation of the JobScheduler is carried out using a setup program. This can be downloaded from http://www.sos-berlin.com for Microsoft® Windows® and Linux®.

Look here to get an overview of the supported operating systems.

1.1 Requirements

The JobScheduler is for Linux® and Microsoft® Windows® in 64-bit and 32-bit available, for other operating systems currently still only in 32-bit.

1.1.1 Requirements for 32-Bit JobScheduler

- Oracle® Database Java® Runtime Environment (JRE) 32-Bit at least version 1.8.x. For IBM® AIX® you can use the IBM® Java 32-Bit at least version 1.8.x, too.
- For Unix®:

  A shell in /bin/sh (or a symlink)

  The JobScheduler requires some 32-Bit libraries. These are on Linux®:
  - `linux-gate.so.1`
  - `libz.so.1`
  - `libpthread.so.0`
  - `libdl.so.2`
  - `libm.so.6`
  - `ld-linux.so.2`

Two components (JobScheduler Object Editor (JOE) and JobScheduler Information Dashboard (JID)) of the JobScheduler are SWT applications which requires an X-windows system and GTK2. The installation includes a 32-Bit swt.jar, so you need the 32-Bit libraries:

- `libgtk-x11-2.0.so.0`
- `libXtst.so.6`

- For Microsoft® Windows®:

  The library `msvcr100.dll` must be stored in `C:\windows\system32` and also in `C:\windows\SysWOW64` on 64-Bit Microsoft® Windows®.

  You find the `msvcr100.dll` in the Java installation `[Java® Runtime Environment (JRE) install path]\bin`.

- If you use "Remote Configuration" then the Workload JobSchedulers and its Supervisor JobScheduler should have the same version. Further information about "Remote Configuration" can be found here.

1.1.2 Requirements for 64-Bit JobScheduler

- Oracle® Database Java® Runtime Environment (JRE) 64-Bit at least version 1.8.x. For IBM® AIX® you can use the IBM® Java 64-Bit at least version 1.8.x, too.

- For Unix®:

  A shell in /bin/sh (or a symlink)

  The JobScheduler requires some 64-Bit libraries. These are on Linux®:
  - `linux-vdso.so.1`
  - `libz.so.1`
  - `libpthread.so.0`
  - `libdl.so.2`
  - `libm.so.6`
  - `libc.so.6`
  - `ld-linux-x86-64.so.2`

  Two components (JobScheduler Object Editor (JOE) and JobScheduler Information Dashboard (JID)) of the JobScheduler are SWT applications which requires an X-window system and GTK2. The installation includes a 64-Bit swt.jar, so you need the 64-Bit libraries:
  - `libgtk-x11-2.0.so.0`
  - `libXtst.so.6`

- If you use "Remote Configuration" then the Workload JobSchedulers and its Supervisor JobScheduler should have the same version. Further information about "Remote Configuration" can be found here.

1.2 Installation Using the Setup Program

The following archive files including installer are available:

- `jobscheduler_linux-x64.[release].tar.gz` for Linux® 64-Bit
- `jobscheduler_linux-x86.[release].tar.gz` for Linux® 32-Bit
- `jobscheduler_windows-x64.[release].zip` for Microsoft® Windows® 64-Bit
- `jobscheduler_windows-x86.[release].zip` for Microsoft® Windows® 32-Bit

Unpack the archive in an arbitrary directory and change to the extracted directory `./jobscheduler.[release]`.

The installer can be started as a dialog or in batch mode (see Batch Installation (page 20)). If you use the installer as a dialog on Unix® then it requires an X-Server. If an X-Server is not installed, then use the Batch Installation.

```
/tmp/jobscheduler.[release]> ./setup.sh
```

Example: Start installer on Unix®

```
c\windows\Temp\jobscheduler.[release]>setup.cmd
```

Example: Start installer on Microsoft® Windows®

The setup requires administrator privileges on Microsoft® Windows®. The setup opens a dialog for this on Microsoft® Windows® if necessary. On Unix® a sudo prompt will be open. Don't log in as root on Unix® but use sudo!

Under Unix®, the root privileges are not required. If you want to install the JobScheduler without root privileges, then call

```
/tmp/jobscheduler.[release]> ./setup.sh -u
```

Example: Start installer on Unix® without root permissions

The setup dialog starts with the selection of the language to be used in the setup. This is followed by a greeting, acceptance of the license conditions and the specification of two installation directories. The binaries and libraries are stored under the first path. The configuration and log files are stored under the second path.

For the rest of this documentation the first installation directory will be referred to as `$SCHEDULER_HOME` and the second as `$SCHEDULER_DATA`. Specification of the installation directories is followed by the Package Selection (page 11) dialog.

The forms which are subsequently presented for the configuration of the JobScheduler depend on the packages which are selected for installation alongside the JobScheduler. Further details of the JobScheduler configuration are to be found in the Setup Forms (page 12) chapter. After selection of the required packages, the necessary files are copied into the installation directories. After this, the scripts that configure the installation packages are executed. The processing of the installation scripts run during the setup is logged. This log file is to be found in the folder `$SCHEDULER_DATA/logs` and is named `Install_V[release]_[date][time]_[series number].log`.

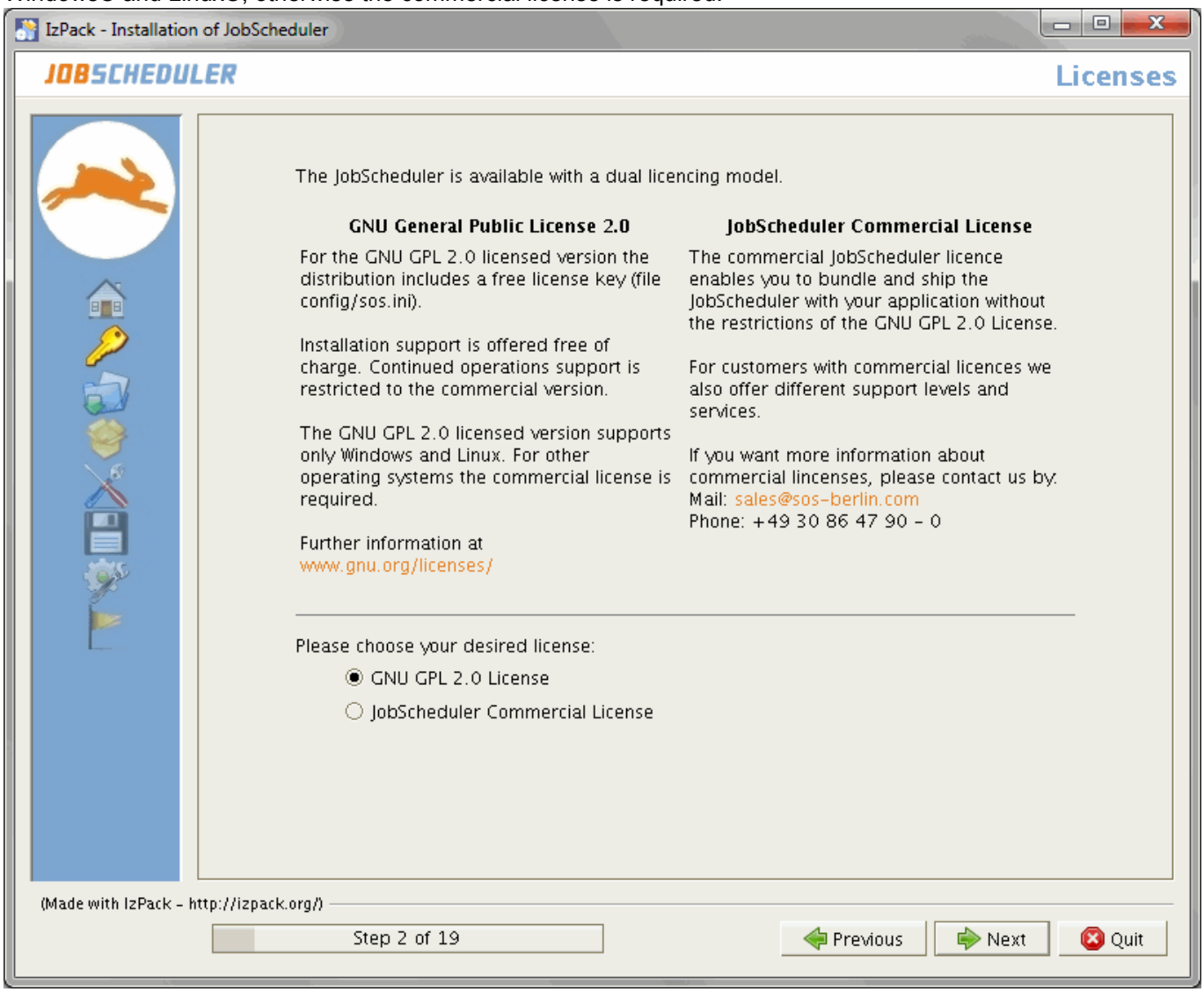
JobScheduler Operations Center (JOC) can be accessed after the setup by entering the following URL in a web browser (Firefox, Microsoft® Internet Explorer, Chrome are supported):

`http://localhost:[port]`

where [port] is the port specified for the JobScheduler instance during setup.

1.3 Licenses

The JobScheduler is available with a dual licensing model. The GNU GPL 2.0 license is available for Microsoft® Windows® and Linux®, otherwise the commercial license is required.



If you choose the commercial license then an input field is shown to enter the license key. The license key will be written in the file `$SCHEDULER_DATA/config/sos.ini`. Even so the license key is invalid you can continue the installation and edit the `$SCHEDULER_DATA/config/sos.ini` later.

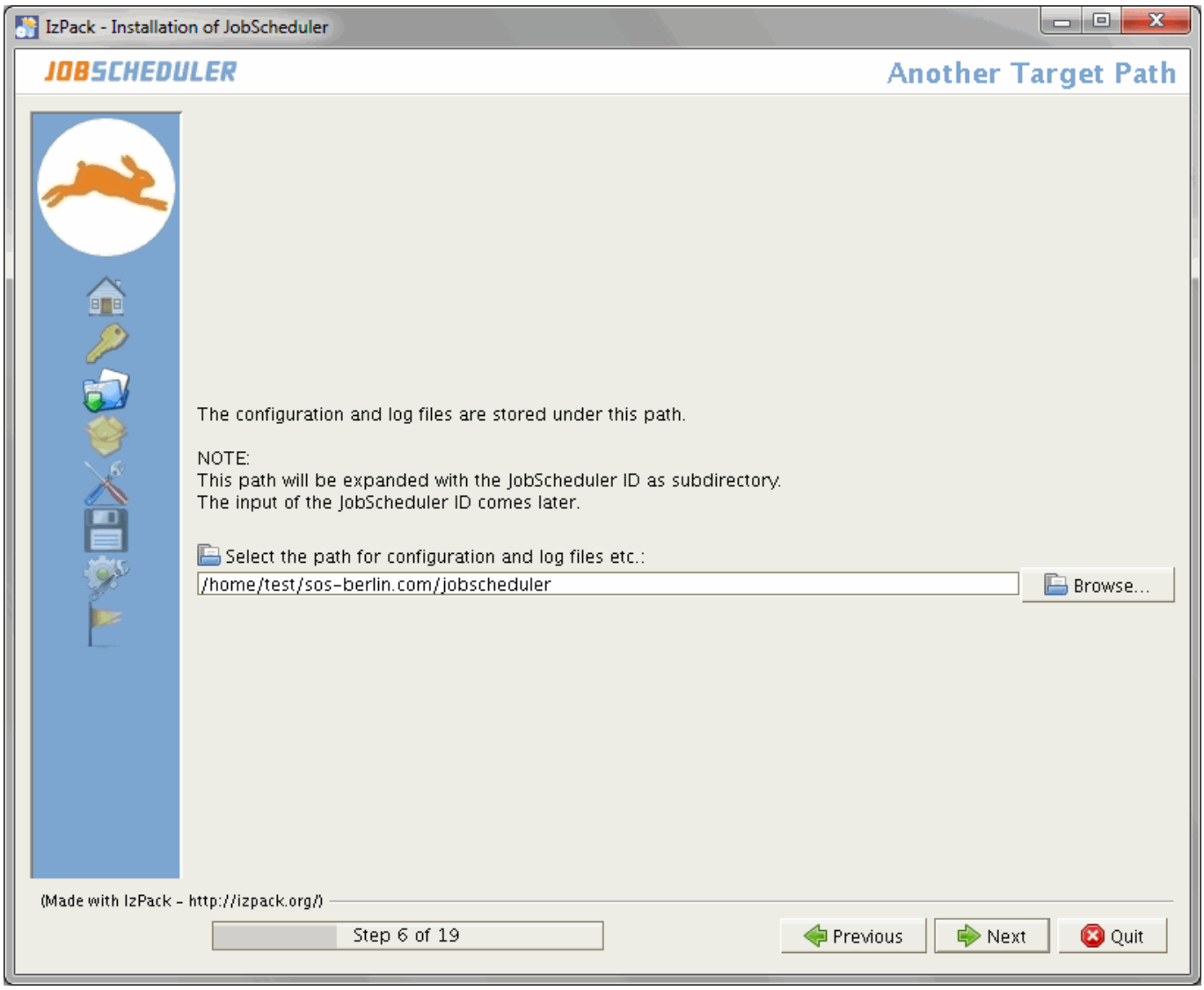
1.4 Installation Paths

The setup knows two paths. Both paths are expanded with the JobScheduler ID as subdirectory. The form to enter the JobScheduler ID will be described later on.



The binaries and libraries are stored in this first path (`$SCHEDULER_HOME`). The default is

- `/opt/sos-berlin.com/jobscheduler` for Unix®. If you use the installer without root permissions then you must choose another folder (e.g. `/home/[user]/sos-berlin.com/jobscheduler`).
- `C:\Program Files\sos-berlin.com\jobscheduler` for Microsoft® Windows®



The configuration and log files are stored in this second path (`$SCHEDULER_DATA`). The default is

- `/home/[user]/sos-berlin.com/jobscheduler` for Unix®
- `C:\ProgramData\sos-berlin.com\jobscheduler` for Microsoft® Windows® Vista/2008/7
- `C:\Documents and Settings\All Users\Application Data\sos-berlin.com\jobscheduler` for Microsoft® Windows® XP/2003

1.5 Setup Packages

The following packages may be selected during setup:

JobScheduler

This is the basic package and must be installed. The package contains JobScheduler Operations Center (JOC) which is a Ajax based interface for monitoring and controlling the JobScheduler objects, like *jobs*, *job chains* and *orders*. Further the package contains JobScheduler Object Editor (JOE) to create, edit and maintain the JobScheduler objects and JobScheduler Information Dashboard (JID), which provides an overview of the *jobs* planned and those that have successfully been completed.

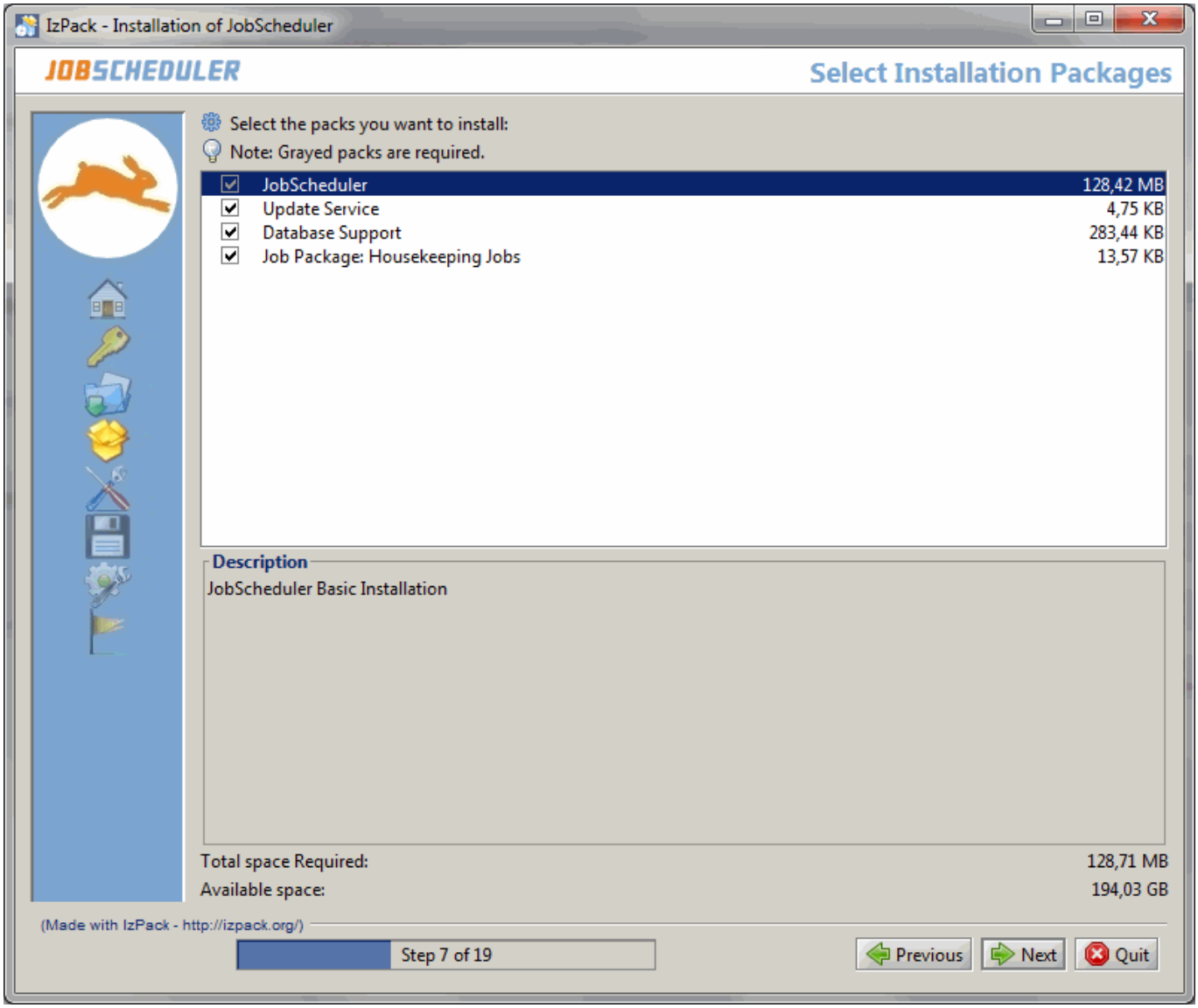
Database Support

This package allows the job protocols to be stored in a database. MySql® (5.x ++), Oracle® Database (8.1.x, 9.2, 10g, 11g), Microsoft® SQL Server (2000, 2005, 2012), PostgreSQL (8.x, 9.x), IBM® DB2 (8.x ++) und Sybase ASE 15.0. are supported.

Housekeeping Jobs

Housekeeping *Jobs* are automatically carried out by the JobScheduler, for example, resending temporarily stored protocol mails after a mail server failure; deleting temporary files or restarting the JobScheduler automatically. In addition, the Housekeeping *Jobs* package enables the JobScheduler to be configured as an event handler.

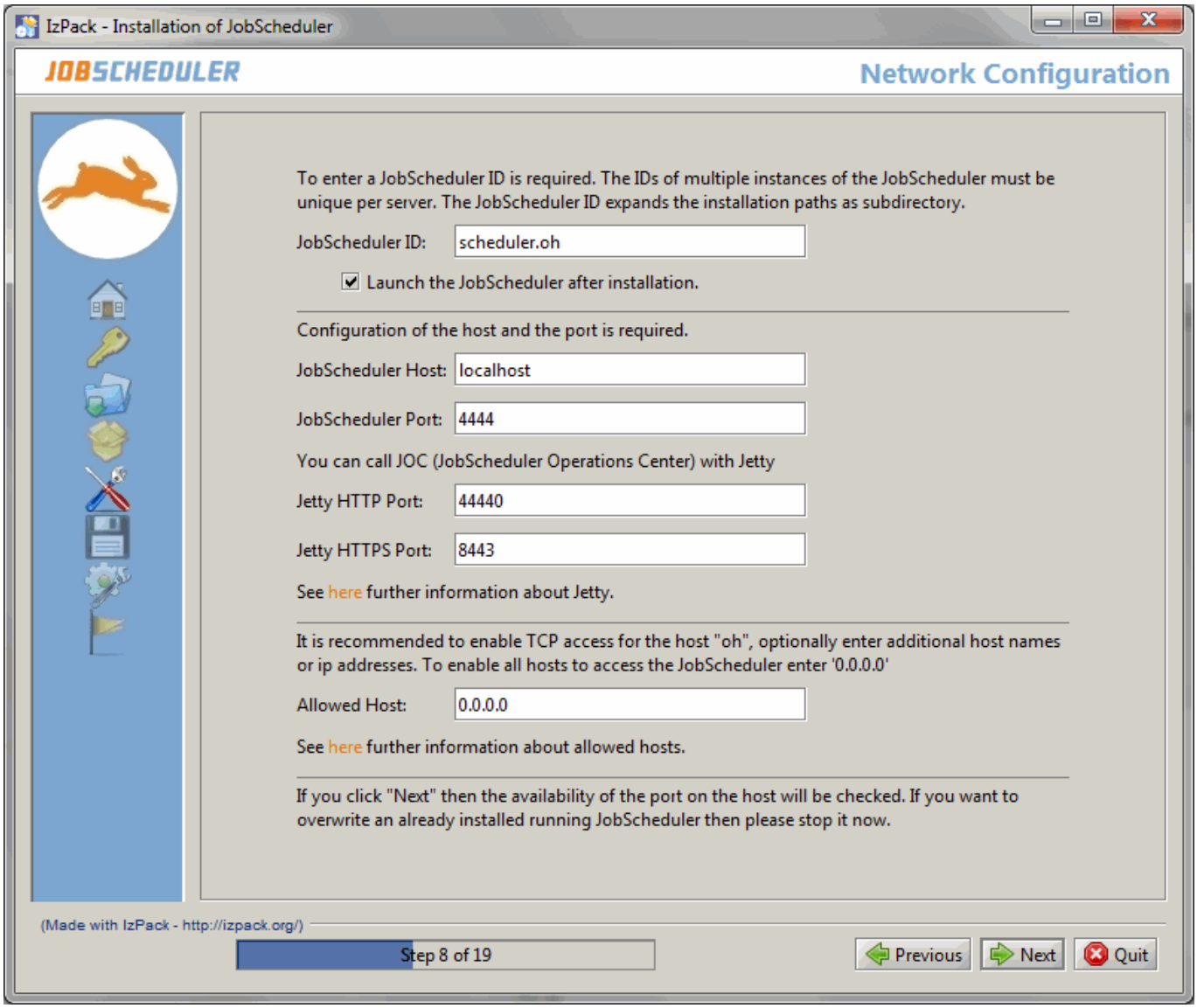
Package selection is made using the following dialog form:



1.6 Setup Forms

The number of forms shown during setup depends on the packages which have been chosen for installation.

1.6.1 The Basic JobScheduler Forms



The JobScheduler ID is entered in the *JobScheduler ID* input box. Omit special characters like `/ \ : ; * ? ! $ % & " < > ( ) | ^`

The ID is used on Microsoft® Windows® for the name of the service after setup. The service name has the syntax `sos_scheduler_[scheduler_id]`.

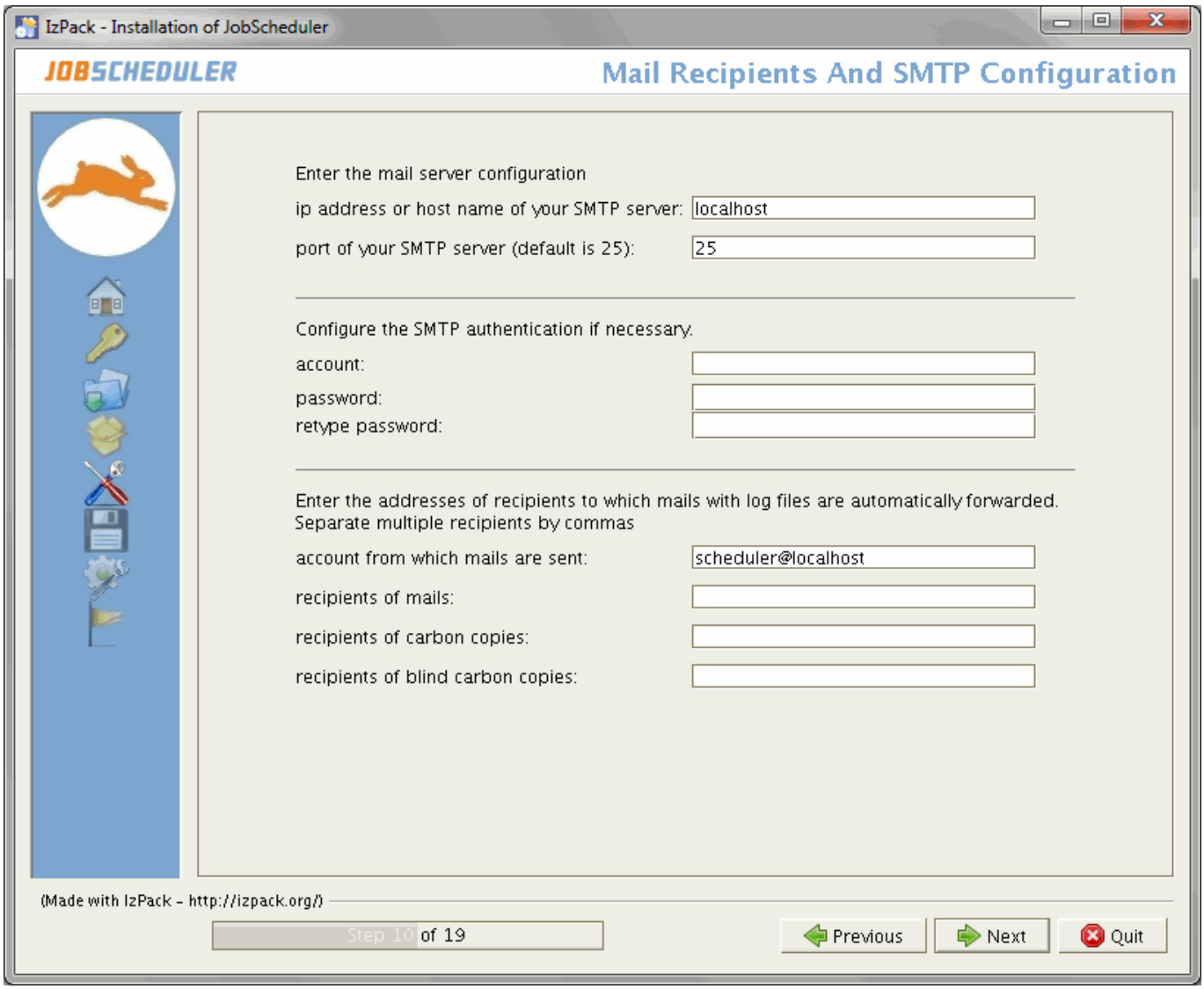
The *JobScheduler ID* must be unique over all installed JobScheduler (except you want to build a cluster). Futher, the *JobScheduler ID* expands both installation paths as a subdirectory.

The next entry - the *JobScheduler Port* - is used for TCP communication with the JobScheduler e.g. for JOC.

You can call JOC with Jetty. Jetty needs a unique port for HTTP and HTTPS. See also here for more details about Jetty.

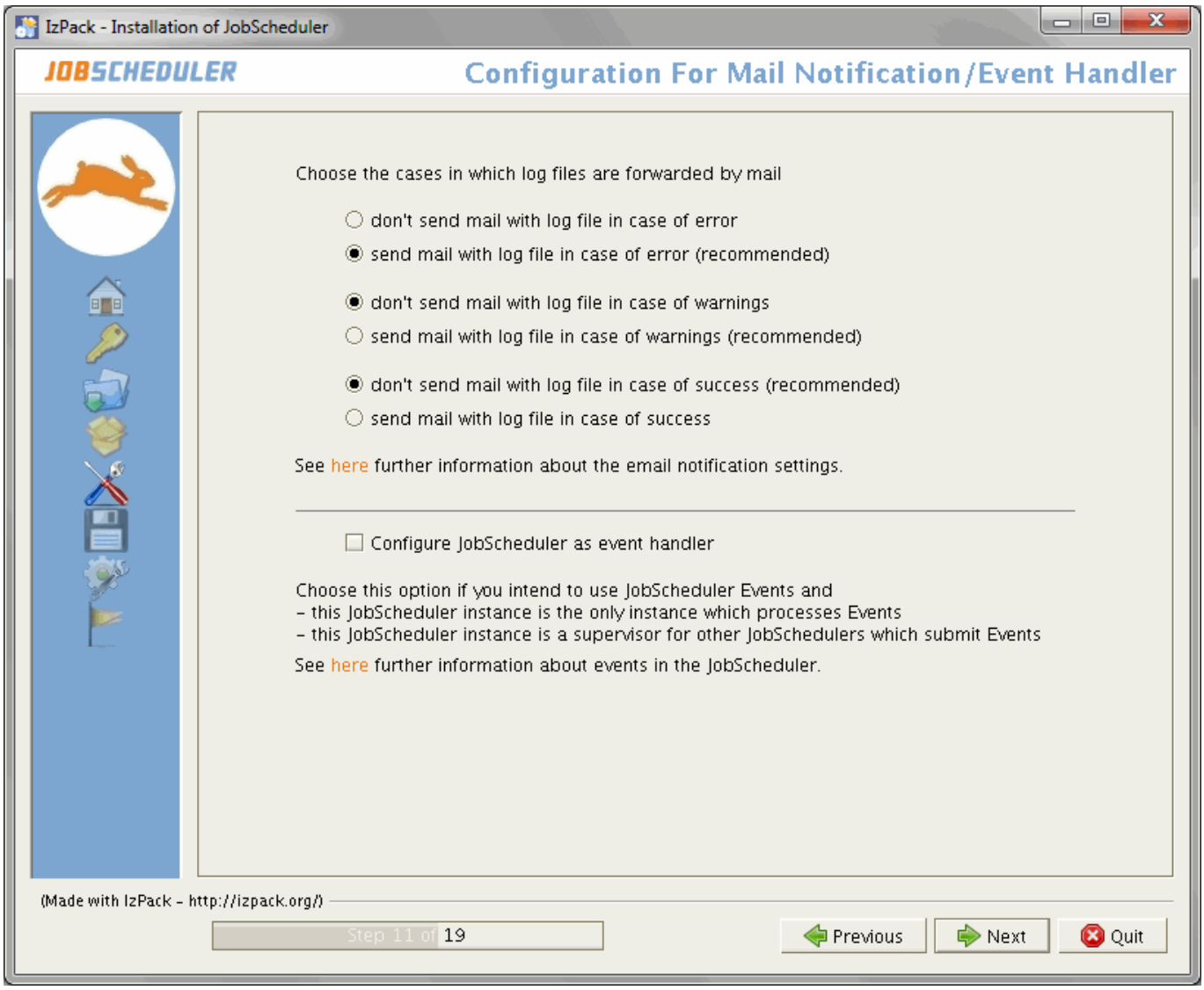
The *Allowed Host* field is required as a security feature of the JobScheduler, whereby communication can be restricted to particular computers. This is explained in more detail in the JobScheduler documentation.

The *Port* and the *Allowed Host* entries are also written to the `$SCHEDULER_DATA/config/scheduler.xml` file. The JobScheduler ID is written to the `$SCHEDULER_HOME/bin/jobscheduler_environment_variables.(cmd|sh)` file. The ports for Jetty are written to the `$SCHEDULER_DATA/config/jetty.xml` file. The configuration files can be changed manually (page 36) later on.



The SMTP Server is specified here along the mail sender, recipient and if required CC und BCC. Multiple addresses are to be separated by commas.

The values entered here configure the `$SCHEDULER_DATA/config/factory.ini` file, which can also be changed manually (page 36) at a later date.



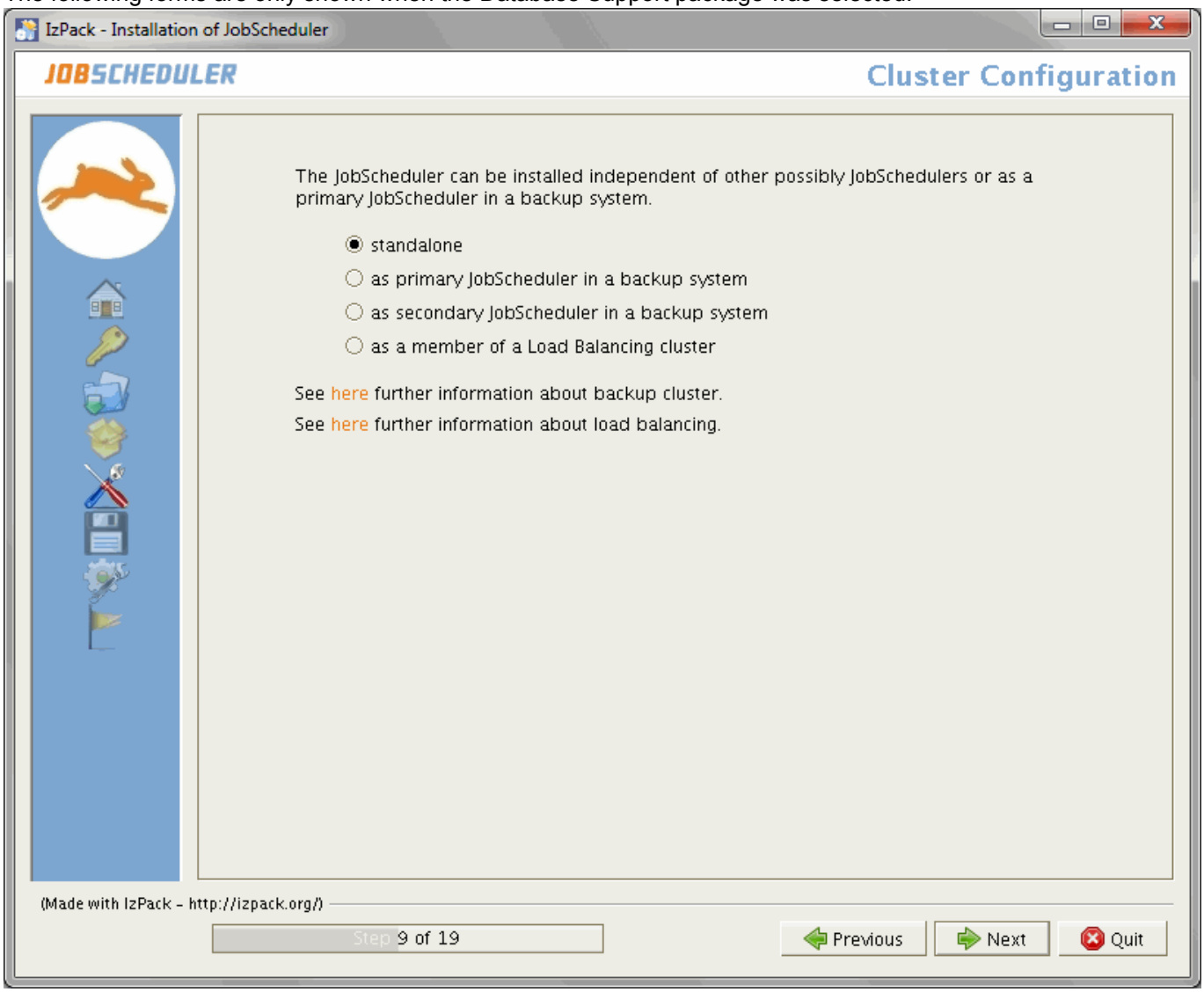
Specify information regarding whether the JobScheduler should automatically forward job log files by e-mail.

The entries made using this form are saved in the `$SCHEDULER_DATA/config/factory.ini` file, which can also be subsequently changed manually (page 36).

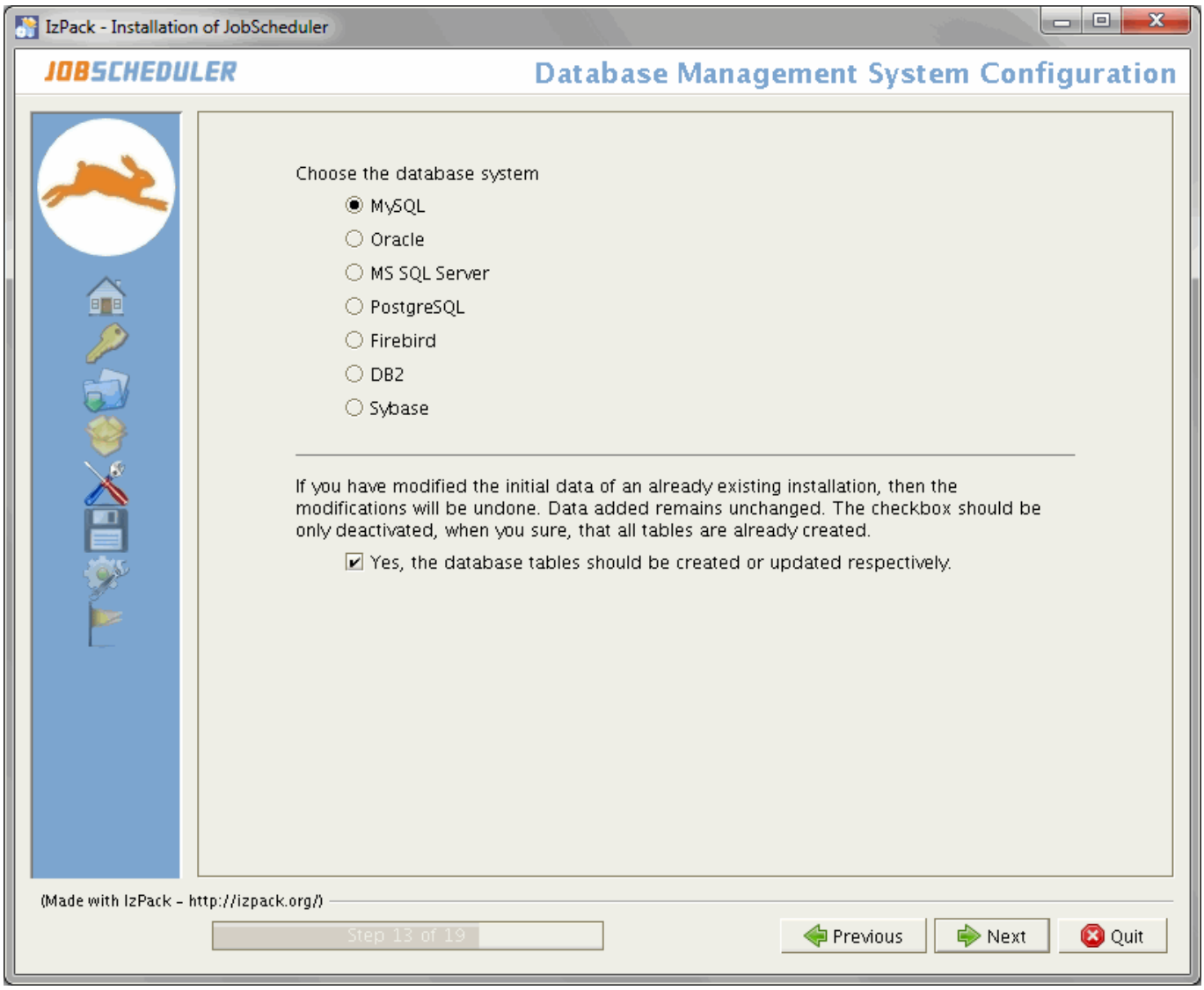
The lower part is only shown when the housekeeping package was selected. It enables the JobScheduler to be configured as an event handler. Corresponding objects will be created in `$SCHEDULER_DATA/config/live/sos/events` respectively. This is explained in more detail in the Events documentation.

1.6.2 The Database Support Package Forms

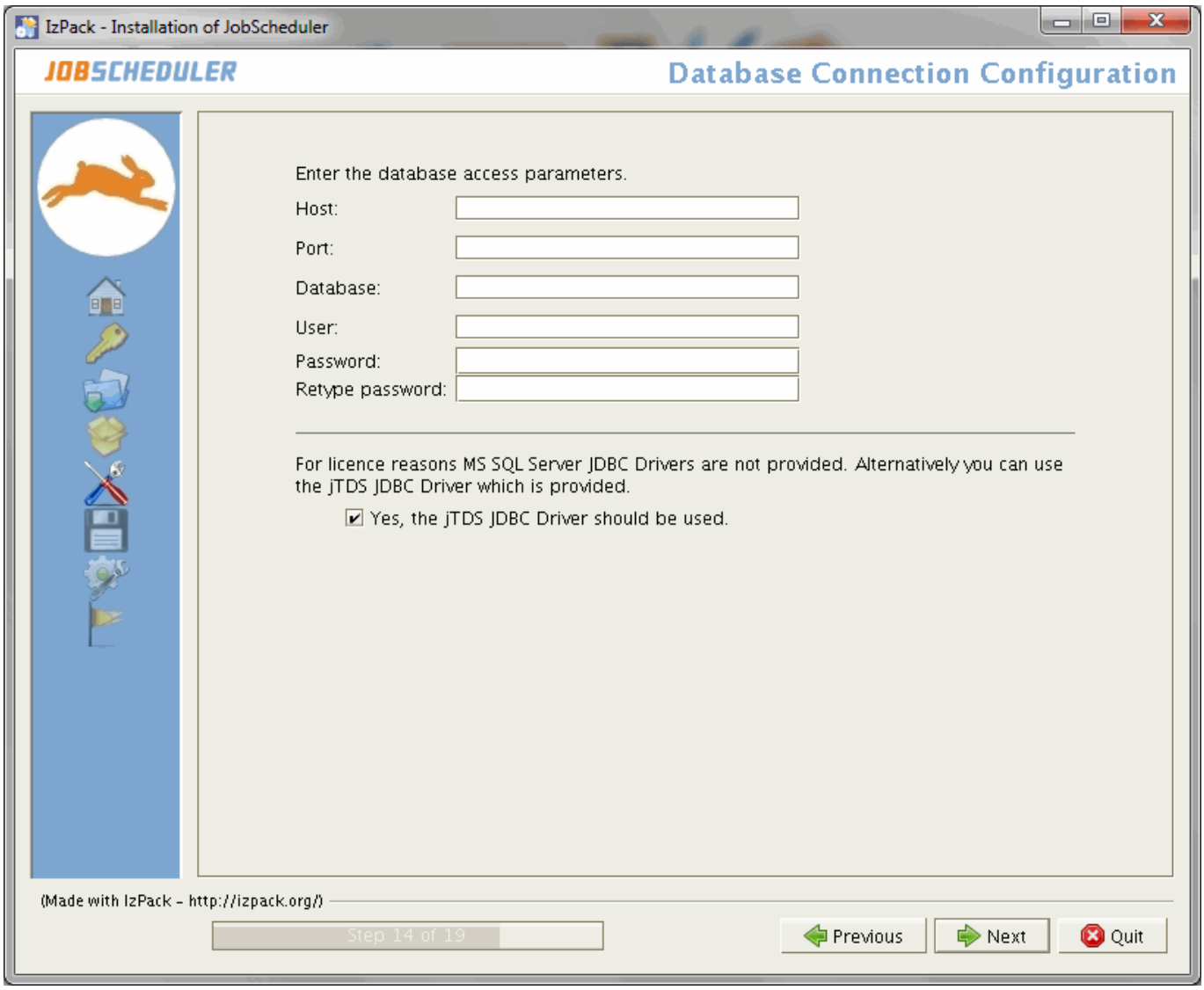
The following forms are only shown when the Database Support package was selected.



The radio buttons in the form shown above determine whether the JobScheduler should be installed "stand-alone" or in a backup system or a load balancing cluster (see also Installation of a Cluster (page 41)). Further information about Backup Cluster can be found here, about Load Balancing look here. You can change the cluster option later (see here).

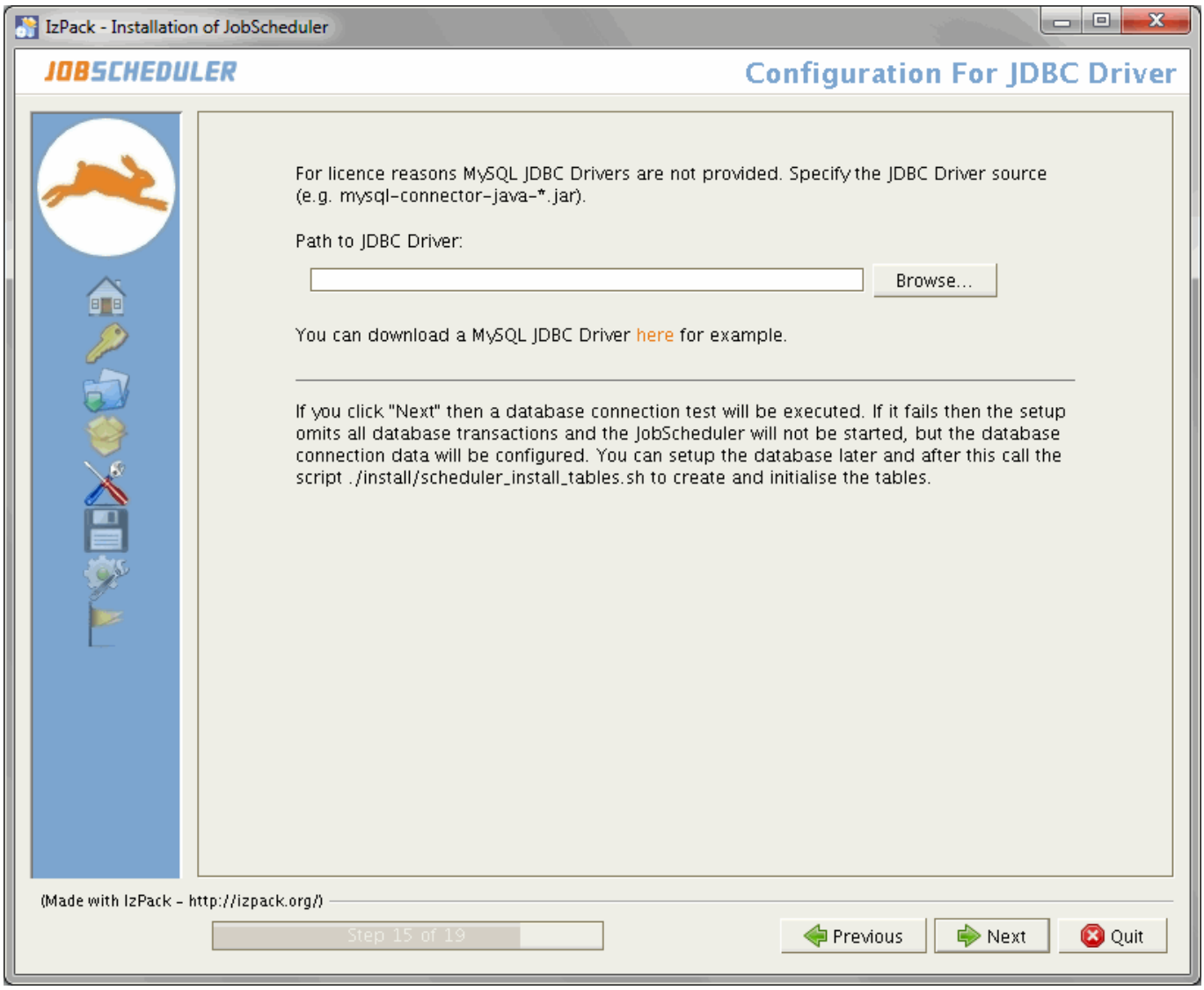


The database system is specified in the upper selection on this form. It is recommended that the box in the center of the form is checked, so that a script which creates and fills the necessary database tables can be executed. Alternatively, the tables can be created manually (page 28). If you have already installed another JobScheduler with the same database connection then abandon this option.



The database connection information is specified in the input fields. The middle part where you can choose the provided jTDS JDBC® driver is only shown for Sybase and Microsoft® SQL Server. If you selected MySql® then you get a checkbox for alternatively use of the MariaDB® JDBC® driver. If the jTDS JDBC® driver or the MariaDB® JDBC® driver is unchecked then you must enter your own JDBC® driver in a next dialog.

This configuration is saved in the `$SCHEDULER_DATA/config/factory.ini`, `$SCHEDULER_DATA/config/hibernate.cfg.xml` and `$SCHEDULER_DATA/config/sos_settings.ini` files. All files can be changed manually (page 36) if required.



This dialog form is offer for

- ... IBM® DB2.
- ... MySql® and you have unchecked the MariaDB® JDBC® driver for MySql® databases.
- ... Microsoft® SQL Server or Sybase and you have unchecked the jTDS JDBC® driver for Sybase and Microsoft® SQL Server databases.

The script for the creation of the database tables is started by the setup program and requires a JDBC® driver appropriate to the database system being used. The drivers for Oracle® Database and PostgreSQL are included in the setup. However, the relevant IBM® DB2, MySql®, Sybase and Microsoft® SQL Server JDBC® driver must be manually specified here. Note that for Microsoft® SQL Server and Sybase databases the jTDS JDBC® driver and for MySql® the MariaDB® JDBC® driver that is delivered as part of the JobScheduler setup can be used when the appropriate checkbox in the previous form is activated. For IBM® DB2 you have to provide a license file for the driver too.

As this driver will also be required by the JobScheduler later on, it is copied by the setup into the `$SCHEDULER_HOME/lib/user_lib` folder.

2 Batch Installation

Note that when the JobScheduler installation is started with a parameterized XML file, no dialog forms will appear. The file `scheduler_install.xml` included in the extracted directory `./jobscheduler.[release]` can be used for this purpose. You can start the setup as follows AFTER you have edited this file with the installation paths, host, port, database connection, etc..

```
/tmp/jobscheduler.[release]> ./setup.sh scheduler_install.xml
```

Example: Start installer on Unix® with parameter file

```
c:\windows\Temp\jobscheduler.[release]>setup.cmd scheduler_install.xml
```

Example: Start installer on Microsoft® Windows® with parameter file

The setup requires administrator privileges on Microsoft® Windows®. The setup opens a dialog for this on Microsoft® Windows® if necessary. On Unix® a sudo prompt will be open. Don't log in as root on Unix® but use sudo.

Under Unix®, the root privileges are not required. If you want to install the JobScheduler without root privileges, then call

```
/tmp/jobscheduler.[release]> ./setup.sh -u scheduler_install.xml
```

Example: Start installer on Unix® with parameter file and without root privileges

This `scheduler_install.xml` mirrors all the values which can specified during a setup dialog. Please read the Installation Using the Setup Program (page 6) in the above chapter to get information about all setup settings.

2.1 Licenses

The JobScheduler is available with a dual licensing model. The GNU GPL 2.0 license is available for Microsoft® Windows® and Linux®, otherwise the commercial license is required. In the following part of the `scheduler_install.xml` file you can choose the license model and enter the license key if necessary.

```
<com.izforge.izpack.panels.UserInputPanel id="licences">
    <userInput>

        <!-- Select the license model (GPL or Commercial) -->
        <entry key="licenceOptions" value="GPL"/>

        <!-- If you selected GPL as license model than the licence must be empty.
             Otherwise please enter a license key if available.
             It is also possible to modify the license key later. -->
        <entry key="licence" value=""/>

    </userInput>
</com.izforge.izpack.panels.UserInputPanel>
```

Example: License in scheduler_install.xml

Please read the section Licenses (page 8) in the above chapter for more information.

2.2 Installation Paths

You have to edit the following parts of the scheduler_install.xml file instead using the forms in the dialog setup.

```
    <com.izforge.izpack.panels.TargetPanel id="target">

        <!-- SELECT THE INSTALLATION PATH FOR THE BINARIES AND LIBRARIES
             The installation expands this path with the JobScheduler ID as subdirectory.
             The path must be absolute!
             Default paths are
             /opt/sos-berlin.com/jobscheduler for Unix®
             C:\Program Files\sos-berlin.com\jobscheduler for Microsoft® Windows® -->
        <installpath>[:choose absolute installation path of the JobScheduler:]</installpath>

    </com.izforge.izpack.panels.TargetPanel>
```

Example: $SCHEDULER_HOME in scheduler_install.xml

```
    <com.izforge.izpack.panels.UserPathPanel id="userpath">

        <!-- SELECT THE DATA PATH FOR CONFIGURATION AND LOG FILES
             The installation expands this path with the JobScheduler ID as subdirectory.
             The path must be absolute!
             Default paths are
             /home/[user]/sos-berlin.com/jobscheduler for Unix®
             C:\ProgramData\sos-berlin.com\jobscheduler for newer Microsoft® Windows®
             C:\Documents and Settings\All Users\Application Data\sos-berlin.com\jobscheduler for older Microsoft®
Windows® -->
        <UserPathPanelElement>[:choose absolute data path of the JobScheduler configuration and log files:]<
/UserPathPanelElement>

    </com.izforge.izpack.panels.UserPathPanel>
```

Example: $SCHEDULER_DATA in scheduler_install.xml

Please read the section Installation Paths (page 9) in the above chapter for more information.

2.3 Setup Packages

You have to edit the following part of the scheduler_install.xml file instead using the form in the dialog setup.

```
    <com.izforge.izpack.panels.PacksPanel id="package">

        <!-- SELECT THE PACKS WHICH YOU WANT INSTALL -->

        <!-- Package: JobScheduler
             JobScheduler Basic Installation
             THIS PACK IS REQUIRED. IT MUST BE TRUE -->
        <pack index="0" name="Job Scheduler" selected="true"/>

        <!-- Package: Database Support
             Job history and log files can be stored in a database. Database support is
             available for MySql®, PostgreSQL, Oracle® Database, Microsoft® SQL Server, IBM® DB2.
             THIS PACK IS REQUIRED. IT MUST BE TRUE -->
        <pack index="2" name="Database Support" selected="true"/>

        <!-- Package: Housekeeping Jobs
             Housekeeping Jobs are automatically launched by the JobScheduler, e.g. to send
             buffered logs by mail, to remove temporary files or to restart the JobScheduler. -->
        <pack index="5" name="Housekeeping Jobs" selected="true"/>

    </com.izforge.izpack.panels.PacksPanel>
```

Example: Packages in scheduler_install.xml

Please read the section Setup Packages (page 11) in the above chapter for more information.

2.4 JobScheduler's Host, Port, ID

You have to edit the following part of the `scheduler_install.xml` file instead using the form in the dialog setup.

```
<com.izforge.izpack.panels.UserInputPanel id="network">
    <userInput>
        <!-- Network Configuration -->

        <!-- Enter the name or ip address of the host on which the JobScheduler is operated -->
        <entry key="schedulerHost" value=""/>

        <!-- Enter the port for TCP communication -->
        <entry key="schedulerPort" value="4444"/>

        <!-- Enter the port for Jetty HTTP -->
        <entry key="jettyHTTPPort" value="44440"/>

        <!-- Enter the port for Jetty HTTPS -->
        <entry key="jettyHTTPSPort" value="8443"/>

        <!-- To enter a JobScheduler ID is required.
             The IDs of multiple instances of the JobScheduler must be unique per server.
             The JobScheduler ID expands the above installation paths as subdirectory.
             Please omit special characters like: / \ : ; * ? ! $ % & " < > ( ) | ^ -->
        <entry key="schedulerId" value="scheduler"/>

        <!-- It is recommended to enable TCP access for the host where the JobScheduler will install,
             optionally enter additional host names or ip addresses. To enable all hosts in your
             network to access the JobScheduler enter '0.0.0.0'. -->
        <entry key="schedulerAllowedHost" value="localhost"/>

        <!-- Choose (yes or no) wether the JobScheduler should be started at the end of the installation -->
        <entry key="launchScheduler" value="yes"/>

    </userInput>
</com.izforge.izpack.panels.UserInputPanel>
```

Example: Host, Port, ID in scheduler_install.xml

Please read the section The Basic JobScheduler Forms (page 13) in the above chapter for more information.

2.5 Cluster

In the following part of the `scheduler_install.xml` file you can choose wether the JobScheduler runs standalone or in a cluster (see also Installation of a Cluster (page 41)).

```
<com.izforge.izpack.panels.UserInputPanel id="cluster">
    <userInput>
        <!-- Cluster Configuration -->

        <!-- The JobScheduler can be installed independent of other possibly JobSchedulers,
             as a primary JobScheduler in a backup system or as a backup JobScheduler.
             Use '' for a standalone, '-exclusive' for a primary
             or '-exclusive -backup' for a backup JobScheduler.
             A database is required for a backup system. All JobSchedulers in a backup system
             must have the same JobScheduler ID and the same database.
             Further you can set '-distributed-orders' for a load balancing cluster.
             For more information see
             http://www.sos-berlin.com/doc/de/scheduler.doc/backupscheduler.xml
             http://www.sos-berlin.com/doc/de/scheduler.doc/distributed_orders.xml -->
        <entry key="clusterOptions" value=""/>

    </userInput>
</com.izforge.izpack.panels.UserInputPanel>
```

Example: Cluster in scheduler_install.xml

If the value of the `clusterOptions` entry element ...

- ... is empty then the JobScheduler runs standalone.
- ... is equal `-exclusive` then the JobScheduler is the primary in a Backup Cluster.
- ... is equal `-exclusive -backup` then the JobScheduler is the secondary in a Backup Cluster.
- ... is equal `-distributed-orders` then the JobScheduler is a member of a Load Balancing Cluster.

Further information about Backup Cluster can be found here, about Load Balancing look here.

2.6 Mail Settings

You have to edit the following parts of the `scheduler_install.xml` file instead using the forms in the dialog setup.

```
<com.izforge.izpack.panels.UserInputPanel id="smtp">
    <userInput>
        <!-- Mail Recipients Configuration / SMTP Authentication -->

        <!-- Enter the ip address or host name and port (default: 25) of your SMTP server -->
        <entry key="mailServer" value=""/>
        <entry key="mailPort" value="25"/>

        <!-- Configure the SMTP authentication if necessary. -->
        <entry key="smtpAccount" value=""/>
        <entry key="smtpPass" value=""/>

        <!-- Enter the addresses of recipients to which mails with log files are automatically
             forwarded. Separate multiple recipients by commas -->

        <!-- Account from which mails are sent -->
        <entry key="mailFrom" value=""/>

        <!-- Recipients of mails -->
        <entry key="mailTo" value=""/>

        <!-- Recipients of carbon copies: -->
        <entry key="mailCc" value=""/>

        <!-- Recipients of blind carbon copies -->
        <entry key="mailBcc" value=""/>

    </userInput>
</com.izforge.izpack.panels.UserInputPanel>
```

Example: Mail Configuration in scheduler_install.xml

```
<com.izforge.izpack.panels.UserInputPanel id="email">
    <userInput>
        <!-- Mail Configuration / Event Handler -->

        <!-- Choose in which cases mails with log files are automatically forwarded. -->
        <entry key="mailOnError" value="yes"/>
        <entry key="mailOnWarning" value="yes"/>
        <entry key="mailOnSuccess" value="no"/>

        <!-- The Housekeeping package is required for configure JobScheduler as event handler
             Choose this option if you intend to use JobScheduler Events and
             - this JobScheduler instance is the only instance which processes Events
             - this JobScheduler instance is a supervisor for other JobSchedulers which submit Events -->
        <entry key="jobEvents" value="off"/>

    </userInput>
</com.izforge.izpack.panels.UserInputPanel>
```

Example: Mail Configuration der scheduler_install.xml

Please read the section The Basic JobScheduler Forms (page 13) in the above chapter for more information.

2.7 The Database Support Package Settings

You have to edit the following parts of the `scheduler_install.xml` file instead using the forms in the dialog setup.

```
<com.izforge.izpack.panels.UserInputPanel id="database">
    <userInput>
        <!-- Database Configuration
             These entries are only necessary if the package 'Database Support' is chosen.-->

        <!-- Choose the database management system. Supported values are 'mysql' for MySql®,
             'Oracle® Database' for Oracle® Database, 'mssql' for Microsoft® SQL Server, 'pgsql' for PostgreSQL,
             'db2' for IBM® DB2 and 'sybase' for Sybase. -->
        <entry key="databaseDbms" value="mysql"/>

        <!-- You can choose between 'on' or 'off' to create the database tables.
             If you have modified the initial data of an already existing installation,
             then the modifications will be undone. Data added remains unchanged.
             This entry should be only 'off', when you sure, that all tables are already created. -->
        <entry key="databaseCreate" value="on"/>

    </userInput>
</com.izforge.izpack.panels.UserInputPanel>
```

Example: Database Support in scheduler_install.xml

```
<com.izforge.izpack.panels.UserInputPanel id="dbconnection">
    <userInput>
        <!-- Database Configuration
             These entries are only necessary if the package 'Database Support' is chosen. -->

        <!-- Enter the name or ip address of the database host -->
        <entry key="databaseHost" value=""/>

        <!-- Enter the port number for the database instance. Default ports are for MySql® 3306,
             Oracle® Database 1521, Microsoft® SQL Server 1433, postgreSQL 5432, IBM® DB2 50000,
             Sybase 5000. -->
        <entry key="databasePort" value=""/>

        <!-- Enter the schema -->
        <entry key="databaseSchema" value=""/>

        <!-- Enter the user name for database access -->
        <entry key="databaseUser" value=""/>

        <!-- Enter the password for database access -->
        <entry key="databasePassword" value=""/>

        <!-- You must provide the MySql®, Microsoft® SQL Server or Sybase JDBC® Driver respectively if you selected
             corresponding DBMS type. For license reasons MySql®, Sybase and Microsoft® SQL Server JDBC® Drivers
             are not provided. Alternatively you can use the MariaDB® JDBC® Driver for MySql® and
             the jTDS JDBC® Driver for Microsoft® SQL Server and Sybase which is provided.-->

        <!-- You can choose between 'yes' or 'no' for using the jTDS JDBC® Driver
             This entry has only an effect for Microsoft® SQL Server or Sybase -->
        <entry key="connectorJTDS" value="yes"/>

        <!-- You can choose between 'yes' or 'no' for using the MariaDB® JDBC® Driver
             This entry has only an effect for MySql® -->
        <entry key="connectorMaria" value="yes"/>

    </userInput>
</com.izforge.izpack.panels.UserInputPanel>
```

Example: License in scheduler_install.xml

```
<com.izforge.izpack.panels.UserInputPanel id="jdbc">
    <userInput>
        <!-- Configuration for JDBC® Driver
             This entry is only necessary if the package 'Database Support' is chosen and you
             selected a DBMS type like MySql®, Microsoft® SQL Server or Sybase in the previous
             <userInput> element. -->

        <!-- You must provide the MySql®, Microsoft® SQL Server or Sybase JDBC® Driver respectively if you selected
             corresponding DBMS type. For license reasons MySql® and Microsoft® SQL Server JDBC® Drivers are
             not provided. Specify the JDBC® Driver source (e.g. mysql-connector-java-*.jar for MySql®,
             sqljdbc.jar for Microsoft® SQL Server, jconn3.jar for Sybase). Alternatively you can use the MariaDB®
             JDBC® Driver for MySql® and the jTDS JDBC® Driver for Microsoft® SQL Server and Sybase which is
             provided. -->

        <!-- Select the path to JDBC® Driver -->
        <entry key="connector" value=""/>

    </userInput>
</com.izforge.izpack.panels.UserInputPanel>
```

Example: License in scheduler_install.xml

Please read the section The Database Support Package Forms (page 16) in the above chapter for more information.

3 Database Configuration

It is required that the JobScheduler is allocated a database and/or database schema and a database user except the JobScheduler is running as an agent. Instructions for the creation of the database itself are to be taken from the database documentation. MySql® (5.x ++), Oracle® Database (8.1.x, 9.2, 10g, 11g), Microsoft® SQL Server (2000, 2005, 2012), PostgreSQL (8.x, 9.x), IBM® DB2 (8.x ++) und Sybase ASE 15.0. are supported. The JobScheduler setup program creates the necessary database tables if the *Database Support* package is installed and the database connection is specified in the appropriate setup form.

The setup also requires a sufficient database permissions for `CREATE TABLE`, `CREATE INDEX`, `CREATE TRIGGER`, `INSERT`, `UPDATE`, `DELETE` und `SELECT` statements.

The database configuration information is saved in the following configuration files (page 36).

- `$SCHEDULER_DATA/config/factory.ini` (using by JobScheduler)
- `$SCHEDULER_DATA/config/hibernate.cfg.xml` (used by JID)
- `$SCHEDULER_DATA/config/sos_settings.ini` (used by `scheduler_install_tables.(sh|cmd)`)

3.1 MySql®

Because of licensing restrictions a MySql® JDBC® Driver is not provided. Please download a MySql® JDBC® driver before you start the JobScheduler installer. Alternatively, the MariaDB® JDBC® driver, delivered with the JobScheduler setup, can be used for MySql®

3.2 Microsoft® SQL Server and Sybase

Because of licensing restrictions when used with Sybase or Microsoft® SQL Server databases, a JDBC® driver appropriate to the database version used must be provided by the end user themselves. Alternatively, a jTDS JDBC® driver, delivered with the JobScheduler setup, can be used for Microsoft® SQL Server and Sybase databases. Otherwise please download a Microsoft® SQL Server or Sybase JDBC® driver before you start the JobScheduler installer.

If you want to use a Windows domain user instead of a sql user for the Microsoft® SQL Server connection then please read here for more details.

3.3 PostgreSQL

PostgreSQL requires PL/pgSQL. Check the languages that are available for your database by using

```
createlang -U postgres -l scheduler
```

where "postgres" is the user name and "scheduler" is the database name. "createlang" is available from the PostgreSQL `bin` directory. Should "plpgsql" not be listed in the output of this command then please enable this language by

```
createlang -U postgres plpgsql scheduler
```

The following two PostgreSQL server variables must have the following values

- `standard_conforming_strings = off`
- `bytea_output = 'escape'`

For all those that do not want to change this globally, this setting can be changed on a per user level:

```
alter user scheduler set standard_conforming_strings = off;
alter user scheduler set bytea_output = 'escape';
```

Example: Set standard_conforming_strings and bytea_output per user level

where "scheduler" is the user name of the JobScheduler database.

3.4 Manual Creation of Database Table

SQL scripts which create the database tables required by the JobScheduler are available, should they not have been correctly created by the setup program. These scripts can be run using `$SCHEDULER_HOME/install/scheduler_install_tables.(sh|cmd)`.

Ensure that the database connection is correctly entered in the `$SCHEDULER_DATA/config/sos_settings.ini` configuration file (page 36).

4 Directory Structure after Installation

The contents of some of the following directories depend on the packages installed during setup and on the operating system used. In such cases the package name and/or operating system is noted in brackets after the directory or file name. Should a package name or an operating system be specified for a directory, then all the files in the directory will share this dependency.

The following directory structure should be found in `$SCHEDULER_HOME`:

+ `bin` (Microsoft® Windows®)
  - `dashboard.cmd` Start script for JobScheduler Information Dashboard (JID)
  - `jobeditor.cmd` Start script for JobScheduler Object Editor (JOE)
  - `jobscheduler.cmd` Start script for the JobScheduler
  - `jobscheduler_environment_variables.cmd` Script to set the JobScheduler environment
  - `jobscheduler_event.cmd` Event handling script
  - `jobscheduler_client.pl` Perl script (TCP/UDP client for sending XML commands to a JobScheduler)
  - `scheduler.exe` JobScheduler engine
  - `scheduler.exe.local` File for local usage of DLLs
  - `spidermonkey.dll` JavaScript (Mozilla) program library
+ `bin` (Unix®)
  - `dashboard.sh` Start script for JobScheduler Information Dashboard (JID)
  - `jobeditor.sh` Start script for JobScheduler Object Editor (JOE)
  - `jobscheduler.sh` Start script for the JobScheduler
  - `jobscheduler_environment_variables.sh` Script to set the JobScheduler environment
  - `jobscheduler_event.sh` Event handling script
  - `jobscheduler_client.pl` Perl script (TCP/UDP client for sending XML commands to a JobScheduler)
  - `scheduler` JobScheduler engine
  - `scheduler_safe.sh` Watchdog script to respawn the JobScheduler
+ `db` SQL files to create database tables
  + `mssql` Microsoft® SQL Server (2000, 2005, 2012)
    - `scheduler.sql`
    - `scheduler_events.sql`
    - `scheduler_loganalyzer.sql`
    - `sosdailyschedule.sql`
    - `sosftphistory.sql`

    + mysql MySql® (5.x ++)
        - *.sql (see mssql directory)
    + Oracle® Database Oracle® Database 8.1.x, 9.2, 10g, 11g
        - *.sql (see mssql directory)
    + pgsql PostgreSQL (8.x, 9.x)
        - *.sql (see mssql directory)
        - hibernate_sequence.sql
    + db2 IBM® DB2 (8.x ++)
        - *.sql (see mssql directory)
    + sybase Sybase
        - *.sql (see mssql directory)

+ doc Documentations

+ install
    - scheduler_install_tables.sh Script for execute manually above SQL files (Unix®)
    - scheduler_install_tables.cmd Script for execute manually above SQL files (Microsoft® Windows®)

+ lib
    - *.jar Java archives (e.g. for JITL (JobScheduler Integrated Template Library) jobs)
    - *.so libraries (Unix®)

+ operations_gui HTML and Javascript files used by JobScheduler Operations Center (JOC)

+ Uninstaller Program to uninstall the JobScheduler

+ user_bin
    - dashboard_environment_variables.cmd-example Script example to set the JID environment (Microsoft® Windows®)
    - jobeditor_environment_variables.cmd-example Script example to set the JOE environment (Microsoft® Windows®)
    - jobscheduler_environment_variables.cmd-example Script example to set the JobScheduler environment (Microsoft® Windows®)
    - dashboard_environment_variables.sh-example Script example to set the JID environment (Unix®)
    - jobeditor_environment_variables.sh-example Script example to set the JOE environment (Unix®)
    - jobscheduler_environment_variables.sh-example Script example to set the JobScheduler environment (Unix®)

The following directory structure should be found in $SCHEDULER_DATA:

+ config
    + cache Configuration directory in a Workload JobScheduler (Replicate of a Supervisor JobScheduler remote directory)

- + `events` (Housekeeping jobs/event handling)
- + `live` Local configuration directory for the JobScheduler (live Folder)
  - + `sos`
    - + `events` (Event Handler Jobs)
    - + `housekeeping` (Housekeeping Jobs)
- + `operations_gui`
  - `custom.js` Configuration file for JOC
- + `remote` Local configuration directory for a Workload JobScheduler on a Supervisor JobScheduler
- `factory.ini` JobScheduler configuration file
- `hibernate.cfg.xml` Database connection for hibernate classes
- `jetty.xml` Configuration file for Jetty
- `scheduler.xml` JobScheduler configuration file
- `scheduler.xsd` The XML schema definition for the JobScheduler configuration file
- `scheduler_mail.xsl` A stylesheet for emails with log files
- `sos.ini` License file
- `sos_settings.ini` Database connection
- `web.xml` Configuration file for Jetty

+ `jobs` Documentation of JITL (JobScheduler Integrated Template Library)

+ `logs` Folder for the log files of jobs, job chains and orders

5 Starting and Stopping the JobScheduler

5.1 JobScheduler Demon on Unix®

On Unix® systems, the JobScheduler is operated as a demon. To start and stop the JobScheduler use the script:

```
$SCHEDULER_HOME/bin/jobscheduler.sh start
```

Example: Starting the JobScheduler on Unix®

```
$SCHEDULER_HOME/bin/jobscheduler.sh stop
```

Example: Stopping JobScheduler on Unix®

In addition to `start` and `stop`, this script accepts additional parameters, e.g. `debug, restart, abort` and `kill`.

If you want the JobScheduler to be started automatically at server startup, then please follow the step which are describe here

If the JobScheduler doesn't start then look into the `$SCHEDULER_DATA/logs/scheduler.log` for the reason. You may be missing dependent libraries. This can be checked with

```
$SCHEDULER_HOME/bin/jobscheduler.sh ldd
```

5.2 JobScheduler Service for Microsoft® Windows®

On Microsoft® Windows® systems, the JobScheduler is installed as service. You can find the JobScheduler service by opening the Microsoft® Windows® service panel and looking for a service with a name starting with "SOS JobScheduler". The service has the system account after the setup. The service is configured to be started automatically at server startup.

You can start and stop the service in the Microsoft® Windows® service panel or with

```
sc.exe start sos_scheduler_[JobSchedulerId]
```

Example: Starting the JobScheduler service on Microsoft® Windows®

```
sc.exe stop sos_scheduler_[JobSchedulerId]
```

Example: Stopping the JobScheduler service on Microsoft® Windows®

...where [JobSchedulerId] is the Id of the JobScheduler.

Further you can start the JobScheduler from the command line. Ensure that the service has not already been started and use the following script:

```
$SCHEDULER_HOME\bin\jobscheduler.cmd start
```

Example: Starting the JobScheduler on Microsoft® Windows®

```
$SCHEDULER_HOME\bin\jobscheduler.cmd stop
```

Example: Stopping the JobScheduler on Microsoft® Windows®

In addition to `start` and `stop`, this script accepts additional parameters, e.g. `debug`, `restart`, `abort` and `kill`.

If the JobScheduler doesn't start then look into the `$SCHEDULER_DATA/logs/scheduler.log` for the reason.

6 Open JOC, JOE and JID

6.1 Open JobScheduler Operations Center (JOC)

JobScheduler Operations Center (JOC) is a GUI for monitoring and operating the JobScheduler. You open JOC in a browser (Firefox, Microsoft® Internet Explorer, Chrome are supported) with the following URL.

```
http://[scheduler_host]:[scheduler_port]/
```

You can open JOC also with Jetty with the following URLs.

```
http://[scheduler_host]:[jetty_http_port]/
```

```
https://[scheduler_host]:[jetty_https_port]/
```

When you open JOC from another computer, you must make sure that the communication is not blocked by a firewall or by the Security setting of the JobScheduler.

If you have updated the JobScheduler installation, it may be necessary to clear the browser cache for the changes to take effect in JOC.

6.2 Open JobScheduler Object Editor (JOE)

JobScheduler Object Editor (JOE) is an application to create, edit and maintain the JobScheduler objects (*jobs*, *job chains*, *orders* and *schedules*).

You start JOE with ...

```
$SCHEDULER_HOME\bin\jobeditor.cmd
```

Example: Starting JOE on Microsoft® Windows®

```
$SCHEDULER_HOME/bin/jobeditor.sh
```

Example: Starting the JOE on Unix®

An X-Server and GTK2 is necessary on Unix® systems. The necessary libraries must be installed with the same number of bit like JOE.

When you start JOE on Microsoft® Windows®, it may be that not happened. Then an initial fatal error occurred. Use debug as the argument of the call to see the error.

```
$SCHEDULER_HOME\bin\jobeditor.cmd debug
```

Example: Debug JOE on Microsoft® Windows®

For example when you get the error

```
Cannot load 32-bit SWT libraries on 64-bit Java® Virtual Machine (JVM)
```

after starting JOE you have to adjust the environment variable `$JAVA_HOME` in the file (page 37) `$SCHEDULER_HOME/user_bin/jobeditor_environment_variables`.

6.3 Open JobScheduler Information Dashboard (JID)

JobScheduler Information Dashboard (JID) is an application to provide an overview of the *jobs* planned and those that have successfully been completed. See also the Dashboard documentation for more details.

You start JID with ...

```
$SCHEDULER_HOME\bin\dashboard.cmd
```

Example: Starting JID on Microsoft® Windows®

```
$SCHEDULER_HOME/bin/dashboard.sh
```

Example: Starting JID on Unix®

An X-Server and GTK2 is necessary on Unix® systems. The necessary libraries must be installed with the same number of bit like JID.

When you start JID on Microsoft® Windows®, it may be that not happened. Then an initial fatal error occurred. Use `debug` as the argument of the call to see the error.

```
$SCHEDULER_HOME\bin\jobeditor.cmd debug
```

Example: Debug JOE on Microsoft® Windows®

For example when you get the error

```
Cannot load 32-bit SWT libraries on 64-bit Java® Virtual Machine (JVM)
```

after starting JID then you must adjust the environment variable `$JAVA_HOME` in the file (page 37) `$SCHEDULER_HOME/user_bin/dashboard_environment_variables`.

7 Configuration

The JobScheduler is configured using the following files:

- `$SCHEDULER_DATA/config/sos.ini`
- `$SCHEDULER_DATA/config/factory.ini`
- `$SCHEDULER_DATA/config/scheduler.xml`
- `$SCHEDULER_DATA/config/operations_gui/custom.js` (for JOC)
- `$SCHEDULER_DATA/config/hibernate.cfg.xml` (database connection of JID)
- `$SCHEDULER_HOME/bin/jobscheduler_environment_variables.(sh|cmd)`

These files are configured during the JobScheduler setup, using the information entered at the time. In addition, you can create further three files to adjust the environment. These are:

- `$SCHEDULER_HOME/user_bin/jobscheduler_environnment_variables` (for JobScheduler)
- `$SCHEDULER_HOME/user_bin/jobeditor_environment_variables` (for JOE)
- `$SCHEDULER_HOME/user_bin/dashboard_environment_variables` (for JID)

7.1 The sos.ini File

In the file `$SCHEDULER_DATA/config/sos.ini` the license key is included. In addition, Java options and if necessary the location of the Java® Virtual Machine (JVM) can be configured. Further details about the entries in this file are to be found here.

7.2 The factory.ini File

E-mail settings, information about the database connection and the Java archives classpath are saved in the `$SCHEDULER_DATA/config/factory.ini` file. Further details about the entries in this file are to be found here.

7.3 The scheduler.xml File

The JobScheduler port information are to be found in the `$SCHEDULER_DATA/config/scheduler.xml` file. Further details about this file are to be found here.

7.4 The custom.js File

The `$SCHEDULER_DATA/config/operations_gui/custom.js` file is used by JobScheduler Operations Center (JOC). Beside other settings you can configure the language and filters in particular. See also here for more details.

7.5 The hibernate.cfg.xml File

The $SCHEDULER_DATA/config/hibernate.cfg.xml file is used by JobScheduler Information Dashboard (JID) to get the database connection. See also the Dashboard documentation for more details.

7.6 The jobscheduler_environment_variables.(sh|cmd) File

In this file the start parameter and the ID of the JobScheduler are set.

This file should not be changed because the changes after a JobScheduler Update may have been lost. If environment variables need to be adjusted, then please put them in a file $SCHEDULER_HOME/user_bin/jobscheduler_environnment_variables. You can use the file $SCHEDULER_HOME/user_bin/jobscheduler_environment_variables.(sh|cmd)-example as a template. $SCHEDULER_HOME/user_bin/jobscheduler_environnment_variables must be executable on Unix®.

The $SCHEDULER_HOME/bin/jobscheduler_environment_variables.sh file is particularly relevant for Linux®/Unix® systems because the LD_LIBRARY_PATH or $JAVA_HOMEis set, which must be customized, if the JobScheduler should not find the Java virtual machine.

In this case the following error is logged in $SCHEDULER_DATA/logs/scheduler.log:

```
[ERROR Z-JAVA-100 Java Virtual Machine cannot be loaded [0509-022 Cannot load module
... System error: A file or directory in the path name does not exist.] [libjvm.so]]
```

If you modify the JobScheduler Id on Microsoft® Windows® then note that the corresponding service must be reinstalled.

```
$SCHEDULER_HOME/bin/jobscheduler.cmd remove
$SCHEDULER_HOME/bin/jobscheduler.cmd install
```

Example: Reinstall the JobScheduler service

7.7 The jobeditor_environment_variables File

In this file the environment of JobScheduler Object Editor (JOE) can be set.

You start JOE with $SCHEDULER_HOME/bin/jobeditor.(sh|cmd). This file should not be changed because the changes after a JobScheduler Update may have been lost. If environment variables (e.g. $JAVA_HOME) need to be adjusted, then please put them in a file $SCHEDULER_HOME/user_bin/jobeditor_environment_variables. You can use the file $SCHEDULER_HOME/user_bin/jobeditor_environment_variables.(sh|cmd)-example as a template. $SCHEDULER_HOME/user_bin/jobeditor_environment_variables must be executable on Unix®.

7.8 The dashboard_environment_variables.(sh|cmd) File

In this file the environment of JobScheduler Information Dashboard (JID) can be set.

You start JID with $SCHEDULER_HOME/bin/dashboard.(sh|cmd) but this file should not be changed because the changes after a JobScheduler Update may have been lost. If environment variables (e.g. $JAVA_HOME) need to be adjusted, then please put them in a file $SCHEDULER_HOME/user_bin/dashboard_environment_variables.(sh|cmd). You can use the file $SCHEDULER_HOME

`/user_bin/dashboard_environment_variables.(sh|cmd)-example` as a template. `$SCHEDULER_HOME/user_bin/dashboard_environment_variables.(sh|cmd)` must be executable on Unix®.

8 Update the JobScheduler

A special "Update-Setup" of the JobScheduler is available.

- `jobscheduler_linux_update-x64.[release].tar.gz` for Linux® 64 bit
- `jobscheduler_linux_update-x86.[release].tar.gz` for Linux® 32 bit
- `jobscheduler_windows_update-x64.[release].zip` for Microsoft® Windows® 64 Bit
- `jobscheduler_windows_update-x86.[release].zip` for Microsoft® Windows® 32 Bit

Call of this setup runs analogous to the "Full-Setup (page 6)".

You can also use the "Full-Setup" to update the JobScheduler, but is only pratical with reservation, because if you want to update a JobScheduler installation where the first installation was done before release 1.3.9 then the directory tree is not identical. Instead of that please use the "Update-Setup".

9 Multiple Installation

You can install any number of JobScheduler.

The following points must be taken into account when completing the (page 13)*Network Configuration* form of the JobScheduler basic package setup:

- The *JobScheduler ID* should be unique amongst all the JobScheduler except you want to install a cluster (page 41).

  On Microsoft® Windows® the JobScheduler ID is used after the setup is completed to set the name of the JobScheduler service in the `sos_scheduler_[scheduler_id]` form.

- The *TCP port* must also be unique amongst all the JobSchedulers installed on one computer.

It is recommended that all JobSchedulers installed on a computer or in a network use the same database connection. This must be the case a Backup Cluster or Load Balancing is to be used.

10 Installation of a Cluster

Each JobScheduler in a cluster has almost the same setup configuration. Particularly, they have the same JobScheduler Id and the same database connection. After the installation of the first JobScheduler of the cluster the file `$SCHEDULER_HOME/scheduler_install.xml` will be created. An easy way to install the other clustered JobScheduler is to use this file for a Batch-Installation (page 20). You must only edit the *schedulerHost* value in the `scheduler_install.xml` and in addition the *clusterOptions* when building a Backup Cluster. The value of *databaseCreate* should be set to `off`, as the database has already been created when the primary JobScheduler was set up.

```
...
<entry key="schedulerHost" value="[other host]"/>
...
<!-- for Backup Cluster -->
<entry key="clusterOptions" value="-exclusive -backup"/>
...
<entry key="databaseCreate" value="off"/>
...
```

Example: Snippet of $SCHEDULER_HOME/scheduler_install.xml

Further information about the Backup Cluster configuration can be found here, about Load Balancing look here.

If you want to change the cluster option of an already installed JobScheduler then you can use the setup once more to update the installation or you change it manually (see here).

11 Deinstallation

11.1 Removal Using the Uninstaller

The Uninstaller `$SCHEDULER_HOME/Uninstaller/uninstall.jar` is initialized by the setup program used to install the JobScheduler. The Uninstaller is started using:

```
unix-shell> $SCHEDULER_HOME/Uninstaller/uninstall.sh
```

Example: Start uninstaller on Unix®

```
windows-shell> $SCHEDULER_HOME\Uninstaller\uninstall.cmd
```

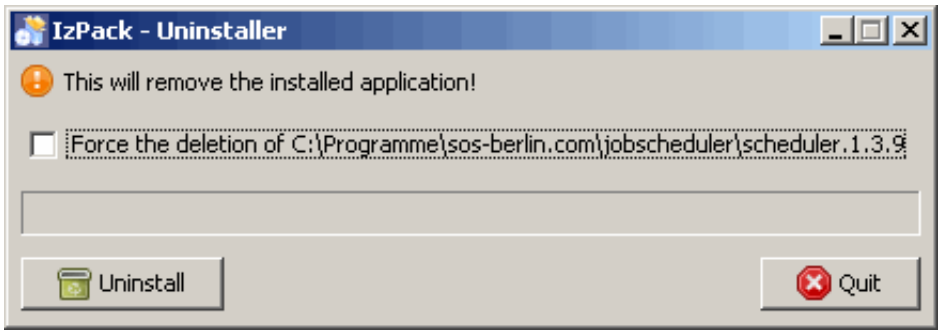
Example: Start uninstaller on Microsoft® Windows®

On Unix® the uninstaller ask for root permissions via sudo. I you have installed the JobScheduler without root permission then the uninstaller doesn't need root permission. In this case you type:

```
unix-shell> $SCHEDULER_HOME/Uninstaller/uninstall.sh -u
```

Example: Start uninstaller on Unix® without root permissions

On Microsoft® Windows® a dialog box asks for the removal of the JobScheduler to be confirmed.



A database created for the JobScheduler must be deleted manually.

The "SOS JobScheduler id=[scheduler_id]" service on Microsoft® Windows® should be removed manually after uninstalling a JobScheduler. It is important to note here the correct [scheduler_id] - that is the ID specified during installation of the JobScheduler. It may be that this service is marked as being `deactivated`. In this case, the service will only be removed after the computer has been restarted. This can be verified by opening the service panel (Start->Run services.msc) or by entering:

Should the service only have been deactivated, then a renewed installation of a JobScheduler with the same [scheduler_id] will only be possible after the computer has been restarted.

11.2 Manual Removal on Microsoft® Windows®

To manually remove a JobScheduler, it is necessary to open a shell (Start->Run cmd) and then carry out the following steps.

- Stop the JobScheduler

```
$SCHEDULER_HOME\bin\jobscheduler.cmd stop
```

An error message will be shown, should the JobScheduler already have been stopped. This message can be ignored.

- Remove the JobScheduler Service

```
$SCHEDULER_HOME\bin\jobscheduler.cmd remove
```

- Remove the database

  The documentation for any database which may have been installed for the JobScheduler should be consulted for instructions as to its removal.

- Deregister the hostole.dll program library (only for 32Bit $js;)

```
regsvr32 /u $SCHEDULER_HOME\bin\hostole.dll
```

- Delete all files and directories

```
rmdir /S /Q $SCHEDULER_HOME
rmdir /S /Q $SCHEDULER_DATA
```

11.3 Manual Removal on Unix®

To manually remove the JobScheduler, a shell should be opened and then the following steps carried out.

- Stop the JobScheduler

```
$SCHEDULER_HOME/bin/jobscheduler.sh stop
```

An error message will be shown, should the JobScheduler already have been stopped. This message can be ignored.

- Remove the database

  The documentation for any database which may have been installed for the JobScheduler should be consulted for instructions as to its removal.

- Delete all files and directories

```
rm -r -f $SCHEDULER_HOME
rm -r -f $SCHEDULER_DATA
```

12 32bit JobScheduler on 64bit Systems

The JobScheduler is implemented as a 32-Bit and a 64-Bit application. You can operate the 32-Bit JobScheduler in a 64-Bit environment on the supported platforms. The JobScheduler requires furthermore a 32-Bit Java® Runtime Environment (JRE) and some 32-Bit libraries (see requirements (page 5)).

If you have a 64-Bit Java® Runtime Environment (JRE) installed then it is possible that the JobScheduler setup use it and writes the path of the 64-Bit Java® Runtime Environment (JRE) installation into the `$JAVA_HOME` variable in the `$SCHEDULER_HOME/bin/jobscheduler_environment_variables.(sh|cmd)`. In this case the JobScheduler doesn't start and you must change the `$JAVA_HOME` in the file (page 37)`$SCHEDULER_HOME/user_bin/jobscheduler_environnment_variables`.

If the JobScheduler doesn't start then look into the `$SCHEDULER_DATA/logs/scheduler.log` for the reason. You may be missing dependent libraries. This can be checked with

```
$SCHEDULER_HOME/bin/jobscheduler.sh ldd
```

12.1 32bit JOE and JID on 64bit Systems

It can happen that neither JOE nor JID can start because a 64-Bit Java® Runtime Environment (JRE) is called. In this case you must change the `$JAVA_HOME` variable in der Datei (page 37) `$SCHEDULER_HOME/user_bin/jobeditor_environment_variables` and `$SCHEDULER_HOME/user_bin/dashboard_environment_variables.(sh|cmd)`.

For Linux® and Microsoft® Windows® you can install a 64-Bit version of JOE and JID. 32-Bit JOE and JID can also be started with a 64-Bit Java® Runtime Environment (JRE). The following steps are necessary.

- Download a 64-Bit swt.jar and copy it to `$SCHEDULER_HOME/lib`.
- Set `$JAVA_HOME=[/path/to/64-Bit Java® Runtime Environment (JRE)]` for JOE `$SCHEDULER_HOME/user_bin/jobeditor_environment_variables` and for JID`$SCHEDULER_HOME/user_bin/dashboard_environment_variables.(sh|cmd)`.
- The libraries mentioned below must installed as 64-Bit version on Unix®.
  - `libgtk-x11-2.0.so.0`
  - `libXtst.so.6`

13 Troubleshooting

Assistance in troubleshooting issues can be found in the Home Page, in our Product Knowledge Base or on Sourceforge.

Glossary

Job Chains

A series of jobs that process orders one after the other. The **JobScheduler** starts the jobs in a job chain automatically, once a order has been started for the chain. Job chains allow a number of orders to be processed in parallel, by starting multiple instances of jobs (tasks).

Jobs

Programs and scripts that are executed by the **JobScheduler** have to be embedded in jobs. Jobs can contain either start executable files or contain job scripts that use the **JobScheduler** program interface. More than one instance of a job (task) may run at any one time, should this be required to scale performance.

There are two types of jobs: standalone and order jobs. Whereas order jobs are started by orders within a job chain, standalone jobs can be started independently: either manually, scheduled or by directory monitoring. Standalone jobs cannot be run in job chains.

JOC (JobScheduler Operations Center)

JOC (JobScheduler Operations Center) is the **JobScheduler** interface for monitoring and controlling **JobScheduler** objects such as jobs, job chains and orders.

JOC is opened in a web browser using the address `http://[scheduler_host]:[scheduler_port]`, where `[scheduler_host]` and `[scheduler_port]` are the host name and the TCP ports number of the **JobScheduler** (e.g. `http://localhost:4444`).

JOE (JobScheduler Object Editor)

JOE is the **JobScheduler** Object Editor. This is used to configure **JobScheduler** objects (jobs, job chains, orders, schedules, process classes and locks).

JOE is started using the script:

- `$SCHEDULER_HOME\bin\jobeditor.cmd` (Windows™)
- `$SCHEDULER_HOME/bin/jobeditor.sh` (Unix™)

Orders

Orders activate the processing of job chains. Orders may also contain parameters for the jobs in a job chain. Every job in a job chain has access to the order parameters. Order parameters overwrite job parameters of the same name. Orders can be started according to time.

An order processes the jobs in a job chain one after the other. Orders can be configured so that, if a error in processing a job occurs, the order ...

- is removed from the job chain;
- continues with a further job in the chain;
- continues with the job that caused the initial error being repeated
- stands still - that is the order processing is suspended until it is restarted manually.

Schedules

Time-based starting of jobs or orders can either be directly specified for each job or order or can be delegated to a schedule. Individual jobs or orders are then referred to this schedule. This means that if several jobs or orders have the same start parameters, these need only be specified once in the schedule. In addition, one schedule can be replaced by another for a particular period of time, thereby increasing the flexibility of setting job and order start parameters.