Installation and Configuration Manual

# Scheduler Installation and Setup

1.2.88

31.05.2021

# Contents

This document is intended for Way4 system administrators (bank or processing center employees) responsible for system maintenance and describes operations required to install and set up Scheduler.

Way4 Scheduler is a tool used to execute jobs such as programs or scripts by running Way4 Manager/ DB Manager client application menu items according to specific rules on workstations with access to the database.

When working with this document, it is recommended to use the following resources from the OpenWay documentation series:

- "Working with Scheduler"
- "Administering Way4 Application Server"
- "Way4 Dictionaries"
- "DB Manager User Management"

The following notation is used in the document:

- Screen form field labels are shown in *italics*.
- Screen form button labels are shown in square brackets, such as [Approve].
- Sequences for selecting user menu items are shown using arrows as follows: "Full → Issuing → Contracts Input & Update".
- Key combinations used while working with the client application are shown in angular brackets, such as <Ctrl>+<F3>.
- Variables that differ for each local instance, for example, directory and file names, as well as file paths, are shown in angular brackets; for example <OWS_HOME>.
  Warnings and information messages are indicated as follows:

> Warnings about potentially hazardous situations or actions.

> Information about important features, additional options, or the best use of certain system functions.

# 1 Scheduler installation

Scheduler is an application that runs on Application Server. Before installing Scheduler, make sure that Application Server has been installed and is running (see the document "Administering Way4 Application Server").

The Scheduler distribution is an archive named "scheduler<version number>.war". This archive contains files for installing applications (instances) on Application Server, as well as additional data.

To install a Scheduler instance, start the installation process using the "creinst" console utility located in the "<AppServer_HOME>/bin" directory. The "creinst" utility is started specifying the following parameters in the command line:

```
creinst app_name=<application name, for example scheduler_web> file=<path to the
application's archive file, for example C:/Distr/scheduler.war or /home/way4/Distr/
scheduler.war> http_port=<free port number, for example 11111>
```

The port number should be specified if Scheduler must support web services. Web services allow Scheduler to accept tasks from external applications to manage Way4 jobs (see the section "External management of Scheduler jobs (Scheduler web services)" of the document "Working with Scheduler").

For more information about rules for installing applications on Application Server, see the section "Managing Way4 Applications" of the document "Administering Way4 Application Server".

# 2 Scheduler setup

To set up Scheduler, use the application configuration file <AppServer_HOME>/appserver/applications/<name of the application on Application Server, set during installation>/conf/config.properties.

The values of the following parameters are specified in the file:

```
Site_name=<bank name and instance ID>
scheduler_instance=<instance code>
ows_home=<home directory>
ows_work=<work directory>
db_url=<DB connection string in java notation, for example jdbc:oracle:thin:@TEST:
1521:OWSMODEL>
db_owner=<DB schema owner name>
db_user=<name of user during whose session Scheduler connects to the DB>
db_password=<db_user password>
db_password_encryption_key=<password encryption key>
bpm_log=no
log_console=no
log_level=<the default value is 30; other values are specified according to
OpenWay's recommendation for more detailed logging of the Scheduler service>
log_level_bpm=<the default value is 30; other values are specified according to
OpenWay's recommendation for more detailed logging of the BPM service>
cancel_bpm_sql_connection_on_timeout=<the default value is yes. Determines whether
to break the connection after the timeout specified in the parameter
bpm_execute_sql_timeout>
bpm_execute_sql_timeout=<the default value is 5m. Specifies the timeout after which
the result of executing a stored procedure or sql block will be considered an error>
bpm_sql_warning_timeout=<the default value is 30s. Specifies the timeout after which
the execution of a stored procedure or sql block will result in a warning>
jpipe_jvm_parameters=<default value: -Xmx128m -Xms128m -Duser.region=US
-Duser.language=en; other values of parameters for the virtual java machine are
specified according to OpenWay's recommendation>
max_bpm_threads=<maximum number of simultaneous Scheduler jobs, i.e. menu items. The
default value is 32>
min_bpm_db_connections=<minimum number of DB connections that are established on
startup and supported during Scheduler operation. The default value is 2>
log_level_mail=<the default value is 20; other values are specified by OpenWay's
recommendation for more detailed logging of information in email messages>
mail_server=<mail server that is used to send messages about Scheduler job statuses,
as well as about changes in the state of a Scheduler instance>
mail_address_from=<email address used for sending messages about Scheduler job
statuses, as well as about changes in the state of a Scheduler instance>
mail_address_to=<email address used as a recipient address for sending messages
about Scheduler job statuses, as well as about changes in the state of a Scheduler
instance>
mail_port=<TCP/IP port for access to the mail server>
mail_protocol=<protocol for connection to the mail server from a list of supported
protocols>
List of protocols:
- imap - IMAP
- imaps - IMAP with TLS/SSL
- smtp - SMTP
- smtps - SMTP with TLS/SSL
- pop3 - POP3
- pop3s - POP3 with TLS/SSL
mail_user=<login for access to the mail server>
mail_password=<password for access to the mail server>
polling_interval=<frequency for running Scheduler jobs, in seconds. The default
 value is 1 (jobs are run no more frequently than once per second)>
```

```
Parameters defining the value of the parameters "Ignore Appl Error" and "Handle
errors as application error" for all menu items with the Java Pipe, Sql Cycle and DB
Procedure Cycle types. Parameter values specified in the configuration file have a
higher priority than the values specified in menu item settings:
jpipe__ignore_application_error=<false/true>.
jpipe__any_error_is_application=<false/true>.
Parameters defining the value of the "Ignore Appl Error" and "Handle errors as
application error" parameters for menu items with the Sql Cycle and DB Procedure
Cycle types. Parameter values specified in the configuration file have a higher
priority than the values specified in menu item settings:
sql_cycle__ignore_application_error=<false/true>.
sql_cycle__any_error_is_application=<false/true>.
If parameters with the "jpipe" and "sql_cycle" prefixes are defined simultaneously,
the value of the parameter with the "jpipe" prefix will have a higher priority.
odbc_dsn=Oracle
oracle_tns_name=<tns name of the DB instance>
keep_alive_period=<enable a timer for monitoring the operability of connections with
the database. The value is set in seconds>
sch_get_connection_timeout=<the default value is 30s. Timeout for Scheduler to
create a connection>
bpm_get_connection_timeout=<the default value is 30s. Timeout for the Scheduler BPM
service to create a connection>
use_bpm_task_wrapper=<the default value is false. If the value is "true", the
parameter enables an SQL call (by default, this is a call of the procedure
glob.reget_base_parms)>
```

The slash ("/") must be used in "ows_home" and "ows_work" variables to separate elements when specifying the filepath.

- The parameters site_name, scheduler_instance, ows_home, ows_work, db_url, db_owner, db_user, db_password are mandatory.
- The parameters log_level_mail, mail_server, mail_address_from, mail_address_to are used to set up email.
- The parameters odbc_dsn and oracle_tns_name are used during C pipe operation.
- The parameter db_password_encryption_key is used if the db_user is registered in a client application, and password encryption is used in this application (see the section "Limiting data access with user password encryption" of the document "DB Manager User Management").

Parameters for log cleaning and file deletion "services can be additionally specified in the "config.properties" file (see the section "Cleaning Logs" of the document "Working with Scheduler").

When Way4 High Availability is used, the parameter "ha_service=<service_code>" "must be specified in the file <AppServer_HOME>/appserver/applications/<name of the application on Application Server that was specified during installation>/conf/config.properties. In the parameter's value, specify the service code for distributed processing of operations in the High Availability solution. The service code is specified in settings for switching service processing between DB nodes.

Way4 High Availability is a licensed option and is supplied according to a separate agreement with OpenWay.

# 3 Access to standard network resources

For Scheduler to get access to system home and work directories on the network disk, in some cases it is necessary to connect a system resource.

## 3.1 For MS Windows

Connect the network resource using the "net use" command.

Example:

```
net use <disk name:> //<server name>/path /user:<user name> <password>
```

This can be done using the "before_start_cmd" command before starting Application Server. To do this, add the following command to the file "<AppServer_HOME>/conf/AppContainer.properties":

```
before_start_cmd=<operating system command>
```

Examples of commands added to the file "<AppServer_HOME>/conf/AppContainer.properties":

- Basic option:

```
before_start_cmd=net use <disk name> <path to the network resource> /user:<user
name> <password>
```

- A more flexible way of specifying settings:
  - The password is entered from the keyboard (recommended):

```
before_start_cmd=cmd.exe /c call mount_disks.bat <password>
```

The file mount_disks.bat must contain the commands:

```
net use <name of disk 1> <path to network resource 1> /user:<user name> %1 net use
<name of disk 2> <path to network resource 2> /user:<user name> %1
```

Where %1 is the password passed as an input parameter.

  - The password is specified in the batch command file (this option is used if the password contains special characters, for example "#"):

```
before_start_cmd=<filepath>/mount_disks.bat
```

The mount_disks.bat file must contain the command:

```
net use <disk name> <path to network resource> /user:<user name> <password> >> <path
to log file>/<name of log file> 2>&1
```

If the code in the mount_disks.bat file does not work, add the command to output information to a file. The command must be added to the end of the mount_disks.bat file or to the end of the before_start_cmd command.

```
net use >> <path to output file>/<file name> 2>&1
```

If the command must be encrypted, this can be done using the "nscipher" utility included in the Application Server distribution (see the document "Administering Way4 Application Server"). For encryption, run the utility, specifying the "ApplicationServer-E55X74D" product code as the parameter:

```
<AppServer_HOME>/appserver/bin/tools/nscipher ApplicationServer-E55X74D
```

During execution of this program, the user will be asked in dialogue mode to specify and confirm data. Then the encrypted data will be shown on the screen.

The following encrypted command must be added to the file "<AppServer_HOME>/conf/AppContainer.properties":

```
encr_before_start_cmd= <encrypted command>
```

## 3.2 For Unix

Connect the network resource using the "mount" command. Instructions for connecting depend on the Unix operating system. For more information, see Unix documentation.

## 3.3 Parameter encryption

If necessary, Scheduler passwords can be encrypted.

If the password must be stored in encrypted form, in the configuration file, specify the "_encrypted_" prefix for the parameter containing the password ("db_password"):

```
_encrypted_db_password=<encrypted db_user password>
```

Passwords are encrypted using the "nscipher.exe" utility. To encrypt a password, run the utility, specifying the Product code as the parameter, for example:

```
<AppServer_HOME>/appserver/bin/tools/nscipher ows_application
```

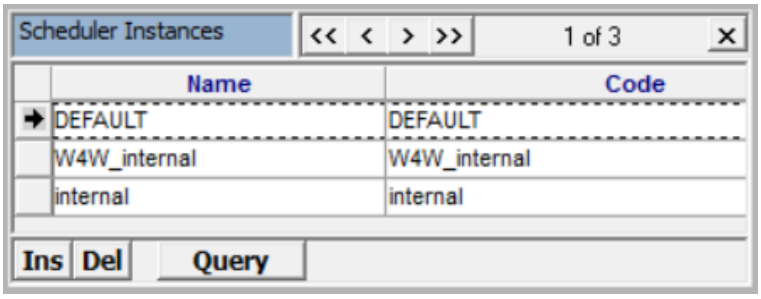
If the Product code is not provided by OpenWay, it is recommended to use the value "ows_application" as the parameter value.

During execution of the utility, a prompt to enter and confirm the password will be displayed. After doing this, the encrypted password will be shown on the screen.

# 4 Registering Scheduler instances

Scheduler instances are registered in the "Scheduler Instances" data table opened with the "WAY4 Scheduler → Configuration Setup → Scheduler Instances" menu item .

When the Way4 High Availability solution is used, Scheduler instances installed in the primary and secondary nodes must be registered in the data table.



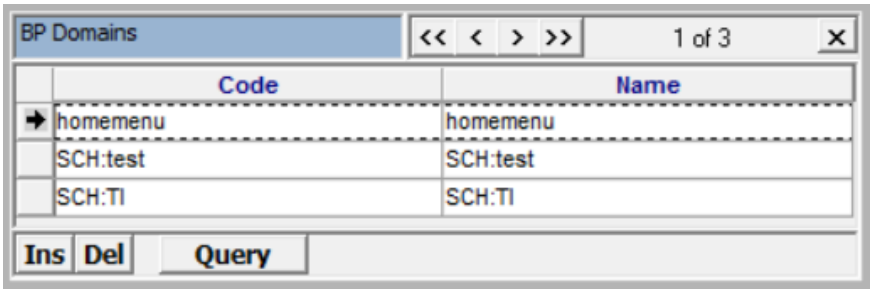

*Registering a Scheduler instance*

This form contains the following fields:

- *Name* – Scheduler instance name.
- *Code* – instance code.

> The value of the *Code* field is specified in the corresponding parameter of the "config.properties" configuration file for the Scheduler instance on Application Server, see "Scheduler setup".

For the Scheduler service and the application BPM service to interact, in the "BP Domains" table (WAY4 Scheduler → Configuration Setup → BP Domains) for each instance, register a BPM transaction identifier element, as shown in the figure. The *Code* field for each instance must contain a value in the format "SCH:<instance name>". A record is automatically created in this table when a Scheduler instance is started.




*BPM transaction identifier*

# 5 Registering Scheduler users

Users who can start Scheduler (see the section "Managing a Scheduler instance" of the document "Working with Scheduler") must have certain privileges to access DB tables and user menu items.

To register a user with these privileges in Way4, the administrator must register a special user group (see the section "WAY4 users" of the document "DB Manager User Management"). The group must be granted privileges to work with the user menu folder containing all the menu items for running Scheduler. The folder must also contain a link to the menu item "WAY4 Scheduler → Privileges → Privileges".

New users with these privileges must be registered in this group.

# 6 Working with logs

During Scheduler operation, information about all actions is recorded in the process log. Logs can be created in the following directories:

- <AppServer directory>/appserver/applications/<Scheduler Instance>/webapps/<Scheduler Instance>/logs – Scheduler's main logs. Separate processes (pipes) can create their own log files in subdirectories.
- <AppServer directory>/appserver/applications/<Scheduler Instance>/webapps/<Scheduler Instance>/temp – temporary files. Separate processes (pipes) can create their own temporary files located in subdirectories.
- <AppServer directory>/appserver/applications/<Scheduler Instance>/logs – web application logs.
- Application Server log files (see the section "WAY4 Application Server Log Files" of the document "Administering Way4 Application Server").

## 6.1 Cleaning Logs

Log Cleaner is a service that makes it possible to delete old additional log files and temporary files (these files are created by pipes when a high logging level is enabled). Log Cleaner always runs in the background. The Service supports cleaning the following subdirectories:

- <AppServer directory>/appserver/applications/<Scheduler Instance>/webapps/<Scheduler Instance>/WEB-INF/logs.
- <AppServer directory>/appserver/applications/<Scheduler Instance>/webapps/<Scheduler Instance>/WEB-INF/temp.

The Log Cleaner procedure deletes old files.

The way in which the Service operates is determined by the values of the following parameters:

- log_cleaner_interval – interval between calls of Log Cleaner. The measurement unit is seconds. The default value is 600.
- log_cleaner_saving_period – period for storing extra log files and temporary files. The value is specified in "Xd, Xh, Xs, Xm" format, where d is days, h is hours, m is minutes and s is seconds (the default value is "5d").
- log_cleaner_max_file_size_total – maximum allowed size of extra log files and temporary files (i.e. if the total volume of all files stored in the folder exceeds this value, the oldest file will be deleted). The unit of measurement is bytes; the default value is 1000000000.

Default values can be changed with a job in the config.properties file of the Scheduler instance on Application Server, see the section "Scheduler setup".

A log file or temporary file will be deleted if the values of the log_cleaner_saving_period parameter or log_cleaner_max_file_size_total parameter are exceeded.

Log Cleaner can only delete an empty directory. A log file or temporary file will be deleted first, and an empty directory will be deleted after.

Example:

```
log_cleaner_interval=800
log_cleaner_saving_period=2d
log_cleaner_max_file_size_total=20000000
```

Other directories can also be cleaned. To do so, the extra_file_cleaner Service is used. It is possible to simultaneously set up calling nine instances of the extra_file_cleaner Service with various parameters. Service instance parameters are set in the config.properties file of the Scheduler instance on Application Server (see the section "Scheduler setup".

The Service is called in the following format:

```
extra_file_cleaner_*=<base dir>;<regex mask>;<total size limit>;<saving
period>;<delete dirs>
```

where:

- * is a digit from 1 to 9 (mandatory parameter).
- base dir is the path to the directory which must be cleaned (mandatory parameter).
- regex_mask is a file deletion mask set with a regular expression.
- total_size_limit is the maximum allowed size of files (i.e. if the total volume of all files stored in the folder exceeds that specified, the oldest file will be deleted). The unit of measurement is bytes; the default value is 1000000000.
- saving period is the period for saving files. The value is specified in "Xd, Xh, Xs, Xm" format, where d is days, h is hours, m is minutes and s is seconds (the default value is "7d").
- delete dirs – indicates whether empty directories will be deleted (possible values: "true"/"false", the default value is "false").

Example 1: Deletion of a file with the name "logfile" located in the directory "C:/Temp/Log" if its size exceeds 50000000 bytes or it was created more than one day ago.

```
extra_file_cleaner_1=C:/Temp/Log;logfile;50000000;1d
```

Example 2: Deletion of files in the directory which is a third-level subdirectory of "C:/ows_works/my_work" that meet the following conditions: the volume of all files stored in the directory exceeds 50000000 bytes, or a file was created more than three days ago.

```
extra_file_cleaner_2=C:/ows_works/my_work;.*/.*/.*;50000000;3d
```

The extra_file_cleaner Service can delete files with any attributes, including system files. Make sure Service parameters are set correctly to avoid disruption of system performance.

Optional parameters of the extra_file_cleaner Service can be skipped. In this case, replace the skipped parameter with a ";" character. Example (the "total size limit" parameter is skipped):

```
extra_file_cleaner_1=C:/iz/tmp/test;2/.*;;10s
```

Deletion of the main log's old files (<AppServer directory>/appserver/applications/<Scheduler Instance>/webapps/<Scheduler Instance>/WEB-INF/logs) is configured using the following parameters:

- log_max_files – maximum number of log files after which the oldest file will be deleted and a new file will be used for logging. The default value is "100".
- log_file_size – maximum size of the log file (in bytes). When it is exceeded, a new file will be used for logging. The default value is "10240000".