

# **Scheduler. Installation and Setup**

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# Introduction

This document is intended for bank or processing centre employees responsible for WAY4™ setup and for OpenWay employees responsible for installing and setting up WAY4 applications.

WAY4™ Scheduler is a tool used to execute various jobs such as programs or scripts by starting WAY4 Manager/DB Manager client application menu items following predetermined rules set up on workstations with access to the database.

This document is intended for WAY4 system administrators (bank or processing centre employees) responsible for the daily operation of the system and describes operations involved in Scheduler installation and configuration.

While working with this document, it is recommended that users refer to the following reference material from OpenWay's documentation series:

- Scheduler R2 Manual
- Administering WAY4™ Application Server
- Administering WAY4™ Universe
- Administering WAY4™ Universe BPM
- WAY4™ Dictionaries
- DB Manager User Management

The following notation is used in this document:

- Field labels in screen forms are shown in *italics*.
- Button labels used in screen forms are enclosed in square brackets, such as [Approve].
- Menu selection sequences are shown using arrows, such as Full → Issuing → Contracts Input & Update
- Key combinations used while working with the client application are shown in angular brackets, such as <Ctrl>+<F3>.
- The names of directories and/or files that vary for each local instance of the program are also displayed in angular brackets, like <OWS\_HOME>.
- Warnings and information messages are marked as follows:



Warnings about potentially hazardous situations or actions.



Messages with information about important features, additional options, or the best use of some WAY4 functions.


# Chapter 1. Scheduler Installation

Scheduler is a WAY4U application started on the application server, meaning that before installing Scheduler, it is necessary to make sure that the application server is installed and operating (see the document "Administering WAY4™ Application Server").

The Scheduler distribution kit is an archive named scheduler<version number>.war. This archive contains files for installing WAY4U applications (instances) on the 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 string:

```
creinst app_name=<application name, for example scheduler_web> file=<path to  
application 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 "Scheduler R2 Manual").

Rules for installing applications on the application server are described in more detail in the section "Managing WAY4 Applications" of the document "Administering WAY4™ Application Server".

## Chapter 2. Scheduler Setup

To set up Scheduler, use the application configuration file "<AppServer\_HOME>/appserver/applications/<application name on the application server specified during installation>/conf/config.properties.

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

```
site_name=<bank name and instance ID specified in logs for WAY4 system vendor>
scheduler_instance=<instance code>
ows_home=<home directory>
ows_work=<work directory>
db_url=<connection string in java notation, for example, jdbc:oracle:thin:@TEST:1521:OWSMODEL>
db_owner=<name of database scheme owner>
db_user=<name of user during whose session Scheduler connects to the database>
db_password=<password of scheduler_db_user>
db_password_encryption_key=<password_encryption_key>
bpm_log=no
log_console=no
log_level=<the default value is 30; other values are specified by the WAY4 vendor's recommendation for more detailed logging of the Scheduler service>
log_level_bpm=<the default value is 30; other values are specified by the WAY4 vendor's recommendation for more detailed logging of the BPM service>
cancel_bpm_sql_connection_on_timeout=<the default value is "yes". Specifies whether to break the connection after the time specified in the bpm_execute_sql_timeout parameter expires>
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 result of executing a stored procedure or sql block will be recorded a warning>
jpipe_jvm_parameters=<the default value is -Xmx128m -Xms128m -Duser.region=US -Duser.language=en. Other values for the virtual java machine are specified by the WAY4 vendor'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 in Scheduler operation. The default value is 2>
log_level_mail=<the default value is 20; other values are specified by the WAY4 vendor's recommendation for more detailed logging in e-mail messages>
mail_server=<the mail server used to send messages about Scheduler job statuses, as well as about changes in the state of a Scheduler instance>
mail_address_from=<e-mail address used to send messages about Scheduler job statuses, as well as about changes in the state of a Scheduler instance>
mail_address_to=<e-mail address used as 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=<Scheduler job launch frequency in seconds. The default value
is 1 (a job starts no more than once per second)>
Parameters defining values of the "Ignore Appl Error" and "Handle errors as
application error" parameters for all steps with the Java Pipe, Sql Cycle and DB
Procedure Cycle type. Parameter values specified in the configuration file have
the higher priority than the values specified in settings of the menu item:
jpipe__ignore_application_error=<false/true>.
jpipe__any_error_is_application=<false/true>.
Parameters defining values of the "Ignore Appl Error" and "Handle errors as
application error" parameters for all steps with the Sql Cycle и DB Procedure
Cycle type. Parameter values specified in the configuration file have the higher
priority than the values specified in settings of the menu item:
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=<database instance tns name>
keep_alive_period=<run a keep-alive timer. The value is set in seconds>
sch_get_connection_timeout=<the default value is 30s; Timeout for connection
with the Scheduler service>
bpm_get_connection_timeout=<the default value is 30s; Timeout for connection
with the BPM service>

```

 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 configure e-mail.
- The parameters odbc\_dsn and oracle\_tns\_name are used during C-pipe operation.
- The db\_password\_encryption\_key parameter is used if user db\_user is registered in WAY4 Manager, where password encryption is used (see section "Data Access Restriction through User Password Encryption |" in 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 "Scheduler R2 Manual").

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 the application server that was specified on installation>/conf/config.properties. The service code is specified in settings for switching service processing between DB nodes (for more information, see the document "WAY4™ Distributed Processing Installation and Setup". The document is optional and is provided according to an additional agreement with the WAY4 vendor).

# Chapter 3. Access to Standard Network Resources

For Scheduler to get access to WAY4's home and work directories on the network disk, in some cases it is necessary to connect a system resource.

## For MS Windows

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

For example:

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

This can be done using the "before\_start\_cmd" before starting WAY4 Application Server. To do so, the following command must be added 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=<path to file>/mount_disks.bat
```

The mount\_disks.bat file must contain the command:

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

**i** If the code contained 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
```

**i** If the command must be encrypted, this can be done using the "nscipher" programme included in the WAY4 Application Server distribution (see the document "Administering WAY4™ Application Server"). To encrypt, run this programme, specifying the Product code "ApplicationServer-E55X74D" as its parameter.

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

During execution of this programme, a prompt will be made in dialogue mode to specify data for encryption, and to confirm them. After doing so, 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>
```

## For Unix

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

## Parameter Encryption


If necessary, Scheduler passwords can be encrypted.

If the password must be entered in encrypted form, in the configuration file (see "Scheduler ") the parameter containing the password ("db\_password") should be specified with the prefix "encrypted":

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

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

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

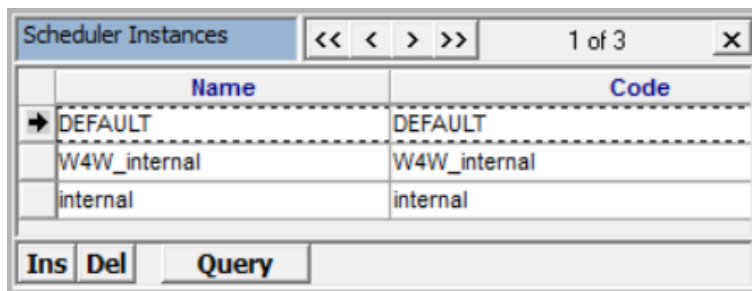
 If the Product code is not provided by the vendor, it is recommended to use the value "ows\_application" as the parameter value.

During execution of this program, the password and its confirmation will be requested in dialogue mode. After these data are entered, the encrypted password will be shown on the screen.

## Chapter 4. Registering Scheduler Instances

Scheduler instances are registered in the "Scheduler Instances Setup" grid from opened through the "WAY4 Scheduler → Configuration Setup → Scheduler Instances" menu item (see Fig. 1).

When the WAY4 High Availability solution is used, Scheduler instances installed in the primary and secondary nodes must be registered in the grid form.



Scheduler Instances	
Name	Code
→ DEFAULT	DEFAULT
W4W_internal	W4W_internal
internal	internal

Buttons: Ins, Del, Query

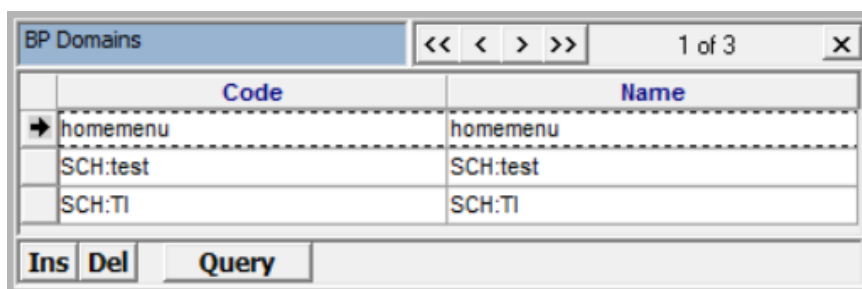
Fig. 1. Registering a Scheduler instance

This form contains the following fields:

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

**i** The value of the Code field is specified in the corresponding parameter of the configuration file "config.properties" for the Scheduler instance on the application server, see "Scheduler Setup".

To ensure interaction between Scheduler service and WAY4U BPM service, in the "BP Domains" table (WAY4U → Configuration Setup → BP Domains) for each instance, register a BPM transaction identifier element as shown in the figure Fig. 2. In the Code field for each instance, specify a value in the format "SCH:<name of instance>". A record in this table is created automatically when a Scheduler instance is started.



BP Domains	
Code	Name
→ homemenu	homemenu
SCH:test	SCH:test
SCH:TI	SCH:TI

Buttons: Ins, Del, Query

Fig. 2. BPM transaction identifier element

## Chapter 5. Registering Scheduler Officers [Installation and Setup]

Users who can run Scheduler under their own login names (see "Working with Scheduler" of the document "Scheduler R2 Manual") must have certain privileges to access DB tables and user menu items.

To register WAY4 users with the required privileges, the administrator must register a special user group (see the section "WAY4 System Users" in 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 the above privileges must be registered in this group.

# Chapter 6. Working with Logs

During Scheduler operation, information about all activities 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 located in embedded directories.
- <AppServer directory>/appserver/applications/<Scheduler Instance>/webapps/<Scheduler Instance>/temp – temporary files. Separate processes (pipes) can create their own temporary files located in embedded directories.
- <AppServer directory>/appserver/applications/<Scheduler Instance>/logs – web application logs.
- WAY4 Application Server log files (see the section "WAY4 Application Server Log Files" of the document "Administering WAY4™ Application Server").

## Cleaning Logs

Log Cleaner is a service that makes it possible to delete old 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 directories:


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

The Log Cleaner procedure deletes old files.

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

- log\_cleaner\_interval – interval between calls of Log Cleaner. The unit of measurement 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 values is "5d").
- log\_cleaner\_max\_file\_size\_total – maximum permissible size of extra log files and temporary files (i.e. if the total amount 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.

Default values can be changed with a job in the config.properties file of the Scheduler instance on the application server, see the section "Scheduler Setup" of the document "Scheduler R2 Installation and Configuration".

 Log files and temporary files are deleted if 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 configured in the `config.properties` file of the Scheduler instance on the application server (see the section "Scheduler Setup" of the document "Scheduler R2 Installation and Configuration").

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 number from 1 to 9 (mandatory parameter).
- `base_dir` is the path to the directory to be cleaned (mandatory parameter).
- `regex_mask` is a file deletion mask set with a regular expression.
- `total_size_limit` is the maximum permissible size of files (i.e. if the total amount 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 which files will be stored. 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 values is "5d").
- `delete_dirs` - indicator for deletion of empty directories (possible values are "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 nested in the third level of the directory "C:/ows\_works/my\_work" that meet the following conditions: the amount of all files stored in the directory exceeds 50000000 bytes, or file was created more than three days ago.

```
extra_file_cleaner_2=C:/ows_works/my_work;.*/*.*/.*;500000000;3d
```

 The extra\_file\_cleaner Service can delete files with any attributes, including system files. It is recommended to ensure Service parameters are set correctly, to avoid violation of system performance.

Optional parameters of the extra\_file\_cleaner Service can be skipped. In this case, a ";" should be used in the place of the skipped parameter. Example (the "total\_size\_limit" parameter is skipped):

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

The main log's old files (<AppServer directory>/appserver/applications/<Scheduler Instance>/webapps/<Scheduler Instance>/WEB-INF/logs) are deleted according to the following parameters:

- log\_max\_files – maximum number of log files. When the number is exceeded, 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".