IBM Z Workload Scheduler Agent

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Mode opératoire d’installation et montée de version d’IBM Z Workload Scheduler Agent

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Lien documentation IBM en ligne : [IBM Z Workload Scheduler Agent (z-centric agent) - IBM Documentation](https://www.ibm.com/docs/en/workload-automation/9.5.0?topic=installation-z-workload-scheduler-agent)

1. **Installing the IBM Z Workload Scheduler Agent**

This chapter describes how to perform a first-time installation of the current version of IBM Z Workload Scheduler Agent (also known as z-centric agent).

You install this agent to run workload from the mainframe to distributed systems with a low cost of ownership.

Using this agent you can run your workload:

**Statically**

To run existing job types, for example scripts, on a specific IBM Z Workload Scheduler Agent. In this case, you install the IBM Z Workload Scheduler Agent on the distributed systems and connect it to the z/OS system through the IBM Z Workload Scheduler controller.

**Statically including job types with advanced options**

In this case, you install the IBM Z Workload Scheduler Agent on the distributed systems adding the Java™ run time, and connect it to the z/OS system through the IBM Z Workload Scheduler controller.

**Dynamically**

To run existing job types allowing the product to assign them to the workstation that best meets both the hardware and software requirements needed to run them. In this case, you install the IBM Z Workload Scheduler Agent on the distributed systems adding the dynamic capabilities, and connect it to the dynamic domain manager. For a detailed description about how to install a dynamic domain manager for a Z controller, see the *IBM Workload Scheduler: Planning and Installation*.

During the installation of the dynamic domain manager for a Z controller, you must provide the **master domain manager** and the **IBM Workload Scheduler Netman port** values, even if these values are not used in a z/OS lightweight end-to-end configuration because the fault-tolerant agent is not needed.

**Dynamically including job types with advanced options**

To run existing job types and job types with advanced options allowing the product to assign them to the workstation that best meets both the hardware and software requirements needed to run them. In this case, you install the IBM Z Workload Scheduler Agent on the distributed systems adding the dynamic capabilities and the Java run time, then connecting it to the dynamic domain manager. For a detailed description about how to install a dynamic domain manager for a Z controller, see the *IBM Workload Scheduler: Planning and Installation*.

During the installation of the dynamic domain manager for a Z controller, you must provide the **master domain manager** and the **IBM Workload Scheduler Netman port** values, even if these values are not used in a z/OS lightweight end-to-end configuration because the fault-tolerant agent is not needed.

For information how to use it, see *IBM Z Workload Scheduler: Scheduling End-to-end with z-centric Capabilities*.

* 1. **Authorization roles for running the twsinst script**

The following table provides the authorization roles required to use the **twsinst** method.

| **Activity** | **Required role** |
| --- | --- |
| Running the **twsinst** script | **Windows™ operating systems**  Your login account must be a member of the Windows **Administrators** group or domain administrators with **Act as Part of the Operating System**.  **UNIX™ and Linux™ operating systems**  **root** access. |
| Table 1. Required authorization roles for running twsinst | |

* 1. **Installing using twsinst**

You use the **twsinst** script to install IBM Z Workload Scheduler Agent.

Optionally, you can add to the IBM Z Workload Scheduler Agent:

* Dynamic capabilities, to provide your distributed environment with dynamic scheduling capabilities.
* Java™ run time to run job types with advanced options, both those supplied with the product and the additional types implemented through the custom plug-ins. The run time environment also enables the capability to remotely run, from the agent, the dynamic workload broker resource command on the server.

For a complete list of the supported operating systems, see the Detailed System Requirements document at [IBM Workload Scheduler Detailed System Requirements](http://www.ibm.com/support/docview.wss?uid=ibm10742497).

* + 1. **twsinst**

During the installation process, if you do not specify the installation directory in the command, **twsinst** creates files in the following directories for each of the installation steps:

**On Windows™ operating systems**

%ProgramFiles%\IBM\TWA\_TWS\_USER

**On UNIX™ and Linux™ operating systems**

/opt/HCL/TWA\_TWS\_USER

Where TWS\_USER is the user for which you are installing the IBM Workload Scheduler instance that you specify in the command. If you stop and restart the installation, the installation process starts from the installation step where it was stopped.

To install the IBM Z Workload Scheduler Agent and all the supported language packs, perform the following steps:

**On Windows operating systems**

1. Download the IBM Z Workload Scheduler Agent eImage related to your operating system.
2. Log in as administrator on the workstation where you want to install the product.
3. From image\_directory\TWS\operating\_system, run **twsinst** using the syntax described in the following section.

Note: **twsinst** for Windows operating systems is a Visual Basic Script (VBS) that you can run in CScript and WScript mode.

The IBM Z Workload Scheduler user is automatically created. The software is installed by default in the IBM Z Workload Scheduler installation directory. The default value is %ProgramFiles%\IBM\TWA.

**On UNIX and Linux operating systems**

1. Download the IBM Z Workload Scheduler Agent eImage related to your operating system.
2. Create the IBM Z Workload Scheduler user. The software is installed by default in the user's home directory, referred to as /installation\_dir/TWS

**User:**

TWS\_user

**Home:**

/installation\_dir/TWS (for example: /home/user1/TWS where user1 is the name of the IBM Z Workload Scheduler user.)

1. Log in as root on the workstation where you want to install the product.
2. From the image\_directory/TWS/operating\_system directory, run **twsinst** using the syntax described in the following section.

A successful installation using the **twsinst** script issues the return code RC = 0. If the installation fails to understand the cause of the error, see [Analyzing return codes for agent installation, upgrade, restore, and uninstallation](https://www.ibm.com/docs/en/SSGSPN_9.5.0/distr/src_pi/awspiagentrct.html).

Synopsis

**On Windows operating systems**

**Show command usage and version**

**twsinst.vbs -u | -v**

**Install a new instance**

**twsinst.vbs -new -uname** user\_name

**-password** user\_password

[**-addjruntime** true|false]

[**-displayname** agentname]

[**-domain** user\_domain]

[**-hostname** hostname]

[**-inst\_dir** install\_directory]

[**-jmport** port\_number]

[**-jmportssl** true|false]

[**-lang** lang\_id]

[**-skip\_usercheck**]

[**-stoponcheckprereq**]

[**-tdwbport** tdwbport\_number]

[**-tdwbhostname** hostname]

[**-work\_dir** working\_directory]

[**-zhostname** zconn\_hostname

[**-zport** zconn\_portnumber]

**On UNIX and Linux operating systems**

**Show command usage and version**

**twsinst -u | -v**

**Install a new instance**

**twsinst -new -uname** user\_name

[**-addjruntime** true|false]

[**-displayname** agentname]

[**-hostname** hostname]

[**-inst\_dir** install\_directory]

[**-jmport** port\_number]

[**-jmportssl** true|false]

[**-lang** lang\_id]

[**-reset\_perm**]

[**-skip\_usercheck**]

[**-stoponcheckprereq**]

[**-tdwbport** tdwbport\_number]

[**-tdwbhostname** hostname]

[**-work\_dir** working\_directory]

[**-zhostname** zconn\_hostname

[**-zport** zconn\_portnumber]

Parameters

**-addjruntime**true|false

Adds the Java™ runtime to run job types with advanced options, both those supplied with the product and the additional types implemented through the custom plug-ins. Valid values are **true** and **false**. The default is **true**.

If you decided not to install Java runtime, you can still add this feature at a later time as it is described in [Adding a feature](https://www.ibm.com/docs/en/SSGSPN_9.5.0/distr/src_pi/awspiaddnewfeatu.html#addnewfeatu).

**-domain**user\_domain

Windows operating systems only. The domain name of the IBM Workload Scheduler user. The default is the name of the workstation on which you are installing the IBM Z Workload Scheduler Agent.

**-displayname**agentname

The name to be assigned to the IBM Z Workload Scheduler Agent. The default is the host name.

**-hostname**hostname

The fully qualified host name or IP address on which the agent will be contacted by the dynamic workload broker.

**-inst\_dir**install\_directory

The directory where to install the IBM Z Workload Scheduler Agent. On UNIX and Linux, this path cannot contain blanks. On Windows operating systems, if you specify a path that contains blanks, enclose it in double quotes. On any operating system, specify an absolute path. If you do not manually specify a path, the path is set to the default home directory. On UNIX and Linux, the path is set to the user\_name home directory, and on Windows operating systems it is set to %ProgramFiles%\IBM\TWA%ProgramFiles%\HCL\TWA.

**-jmport**port\_number

The port used by the IBM Z Workload Scheduler controller or the dynamic workload broker to connect to the IBM Z Workload Scheduler Agent. The default value is **31114**. The valid range is from 1 to 65535.

**-jmportssl**true|false

The port used by the IBM® Z Workload Scheduler controller, or by the dynamic workload broker to connect to the IBM Z Workload Scheduler Agent. This number is registered in the ita.ini file, located in ITA\cpa\ita on Windows operating systems and ITA/cpa/ita on UNIX and Linux.

**For communication using SSL or HTTPS**

Set **jmportssl = true**. To communicate with the dynamic workload broker, it is recommended that you set the value to **true**. In this case, the port specified in **jmport** communicates in HTTPS. If you specify **true**, ensure that you also configure the HTTPS communication on the z/OS® master.

**For communication without using SSL, or through HTTP**

Set **jmportssl = false**. In this case the port specified in **jmport** communicates in HTTP.

The default value is **true**.

To increase the performance of the IBM Z Workload Scheduler server, it is recommended that you set this value to **false**.

**-lang**lang\_id

The language in which the **twsinst** messages are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used.

Note: This is the language in which the installation log is recorded, and not the language of the installed engine instance. **twsinst** installs all languages as default.

**-new**

A fresh installation of the agent. Installs an agent and all supported language packs.

**-password**user\_password

Windows operating systems only. The password of the user for which you are installing IBM Z Workload Scheduler Agent. The password can include alphanumeric, dash (-), and underscore (\_) characters, and the following symbols: ()!?=ˆ\*/˜ [] $`+;:.,@.

**-reset\_perm**

UNIX and Linux only. Reset the permissions of the **libatrc** library.

**-skip\_usercheck**

Enable this option if the authentication process within your organization is not standard, thereby disabling the default authentication option. On UNIX and Linux operating systems if you specify this parameter, the program skips the check of the user in the /etc/passwd file or the check you perform using the **su** command. On Windows operating systems if you specify this parameter, the program does not create the user you specified in the -uname username parameter. If you specify this parameter you must create the user manually before running the script.

**-stoponcheckprereq**

Stop the installation whenever a problem occurs during the prerequisite check. For more information about the prerequisites, see [IBM Workload Scheduler download document](http://www.ibm.com/support/docview.wss?uid=ibm10742761).

**-tdwbhostname**hostname

The fully qualified host name of the dynamic domain manager of backup dynamic domain manager used to connect to the IBM Z Workload Scheduler Agent. It is used together with the -tdwbport tdwbport\_number parameter. It adds the capability to run dynamic workload to the IBM Z Workload Scheduler Agent. If not specified, the default value is **localhost**. This value is registered in the ResourceAdvisorUrl property in the JobManager.ini file.

**-tdwbport**tdwbport\_number

The dynamic domain manager of backup dynamic domain manager HTTP or HTTPS port number used to connect to the IBM Z Workload Scheduler Agent. It is used together with the -tdwbhostname host\_name parameter to add the capability to run dynamic workload to the IBM Z Workload Scheduler Agent. This number is registered in the ResourceAdvisorUrl property in the JobManager.ini file. The default value is **0**, meaning that the capability to run dynamic workload to the agent is not added. The valid range is from 0 to 65535.

**-u**

Displays command usage information and exits.

**-uname**user\_name

The name of the user for which the IBM Z Workload Scheduler Agent is installed. This user name is not to be confused with the user performing the installation logged on as **root** on UNIX and Linux and as **administrator** on Windows operating systems.

On UNIX and Linux, this user account must be created manually before running the installation. Create a user with a home directory. By default, IBM Z Workload Scheduler Agent is installed in the home directory of the specified user.

**-work\_dir**working\_directory

The temporary directory used for theIBM Workload Scheduler installation process files deployment.

**On Windows operating systems**

If you specify a path that contains blanks, enclose it in double quotes. If you do not manually specify a path, the path is set to %temp%\TWA\tws95, where %temp% is the temporary directory of the operating system.

**On UNIX and Linux operating systems**

The path cannot contain blanks. If you do not manually specify a path, the path is set to /tmp/TWA/tws95.

**-v**

Displays the command version and exits.

**-zhostname**zconn\_hostname

The fully qualified host name of the Z connector (this is coincident with the Dynamic Workload Console host name). It is used together with the -zport zconn\_port parameter. It adds the capability to download the plug-ins from the Z connector.

This value is registered in the ResourceAdvisorAgent property of the JobManager.ini file.

**-zport**zconn\_portnumber

The HTTP or HTTPS port number of the Z connector (this is coincident with the Dynamic Workload Console port number). It is used together with the -zhostname zconn\_hostname parameter to add the capability to download the plug-ins from the Z connector. The valid range is from 1 to 65535.

This value is registered in the ResourceAdvisorAgent property in the JobManager.ini file.

Examples

This example describes how to install the IBM Z Workload Scheduler Agent for the user ZWS\_user and accept the default value to add the runtime environment for Java. The runtime environment is used to run jobs supplied with the product or implemented through the custom plug-ins, it also enables the capability to remotely run, from the agent, the dynamic workload broker resource command on the server.

**On Windows operating systems**

twsinst.vbs -new

-uname *ZWS*\_user

-password qaz12qaz

-jmportssl false

-jmport 31114

-inst\_dir "c:\Program Files\IBM\TWA\TWS\_user"

**On UNIX and Linux operating systems**

./twsinst -new

-uname *ZWS*\_user

-jmportssl false

-jmport 31114

-inst\_dir /home/ZWS\_user/TWA

* + 1. **The twsinst log files**

The **twsinst** log file name is:

**On Windows operating systems:**

<*TWS\_INST\_DIR*>\logs\twsinst\_*operating\_system*\_*TWS\_user*^*version\_number*.log

Where:

***TWS\_INST\_DIR***

The IBM Workload Scheduler installation directory. The default installation directory is C:\Program Files\IBM\TWA\_*TWS\_user*.

***operating\_system***

The operating system.

***TWS\_user***

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

**On UNIX operating systems:**

<*TWS\_INST\_DIR*>/TWSDATA/installation/logs/twsinst\_*operating\_system*\_*TWS\_user*^*product\_version\_number*.log

Where:

***TWS\_INST\_DIR***

The IBM Workload Scheduler installation directory. The default installation directory is /opt/IBM/TWA\_*TWS\_user*.

***operating\_system***

The operating system.

***TWS\_user***

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

* 1. **Enabling dynamic capabilities after installation or upgrade**

This section describes the procedure that you must perform to enable dynamic scheduling capabilities after you installed or upgraded the IBM Z Workload Scheduler Agent, without enabling them:

1. Update the JobManager.ini configuration file located in:

**Windows™ operating systems:**

*tws\_home*\TWS\ITA\cpa\config\JobManager.ini

**UNIX™ and Linux™ operating systems:**

*tws\_home*/TWS/ITA/cpa/config/JobManager.ini

by assigning to the *tdwb\_hostname* and *mdm\_httpsport* variables contained in the ResourceAdvisorUrl property, the following values:

***tdwb\_hostname***

The fully qualified host name of the workload broker server.

***mdm\_httpsport***

The value that the **httpsPort** has on the master domain manager, as shown by the **showHostPorperties** wastool. The default is 31116, which is the dynamic workload broker port number. The port is currently set to zero because at installation time you specified that you would not use the dynamic workload broker.

The **ResourceAdvisorUrl** property has the following syntax:

ResourceAdvisorUrl = https://*tdwb\_hostname*:*mdm\_httpsport*

/JobManagerRESTWeb/JobScheduler/resource

1. Start the IBM Z Workload Scheduler Agent by running the following command from *TWS\_home*:

**Windows operating systems:**

StartUpLwa.cmd

**UNIX and Linux operating systems:**

StartUpLwa

* 1. **Deploying with Docker**
     1. **Getting started with Docker**

This topic gives you an overview of the high-level procedure to deploy IBM Workload Automation components using Docker.

To deploy IBM Workload Automation using a Docker container, proceed as follows:

1. Access and then download the Docker image from the entitled registry. For further information, see the complete procedure in [Deploying containers with Docker](https://www.ibm.com/docs/en/SSGSPN_9.5.0/zos/src_inst/eqqi1installingwithDocker.html).
2. You can choose to deploy all product containers with a single command, or you can deploy each product component container individually. Start and configure the IBM Workload Automation containers. The complete procedure is described in [Deploying containers with Docker](https://www.ibm.com/docs/en/SSGSPN_9.5.0/zos/src_inst/eqqi1installingwithDocker.html).

More detailed technical information for each component can be found in the sample readme files:

* + [IBM Workload Automation Console](https://www.ibm.com/links?url=https%3A%2F%2Fgithub.com%2FWorkloadAutomation%2Fibm-workload-automation-docker-compose%2Fblob%2Fmaster%2Freadmes%2Freadme_CONSOLE.md)
  + [IBM Workload Automation dynamic agent](https://www.ibm.com/links?url=https%3A%2F%2Fgithub.com%2FWorkloadAutomation%2Fibm-workload-automation-docker-compose%2Fblob%2Fmaster%2Freadmes%2Freadme_DYNAMIC_AGENT.md)
  + [IBM Workload Automation z-centric agent](https://www.ibm.com/links?url=https%3A%2F%2Fgithub.com%2FWorkloadAutomation%2Fibm-workload-automation-docker-compose%2Fblob%2Fmaster%2Freadmes%2Freadme_ZCENTRIC_AGENT.md)

1. Access the container to verify the status and run IBM Workload Automation commands. For further details, see [Accessing the Docker containers](https://www.ibm.com/docs/en/SSGSPN_9.5.0/distr/src_pi/awspiaccessDocker.html" \o "This topic shows you how to access the container shell and run IBM Workload Automation commands.).
   * 1. **Prerequisites**

Prerequisite information when deploying with containers.

When deploying the product using containers, ensure you have fulfilled the following prerequisites:

Check the [Prerequisites](https://www.ibm.com/docs/en/SSGSPN_9.5.0/distr/src_pi/awspitwsprereq.html#awspitwsprereq) of the command line installation method.

If you want to calculate the necessary resources that the agent container needs to run, use the following formula:

Evaluate the volume\_size variable:

Volume size(MB)=

120 + [ 30 x *jobs\_per\_day* x (*average\_joblog\_size\_MB* / 3 + 0.008) ]

For example, considering "average\_joblog\_size\_MB = 0.001 MB (1KB)", you obtain:

1.000

jobs\_per\_day: 370 MB --> volume\_size = 370Mi

10.000

jobs\_per\_day: 2.6 GB --> volume\_size = 2600Mi

100.000

jobs\_per\_day: 25 GB --> volume\_size = 25Gi

* + 1. **Deploying Docker compose on Linux on Z**

Before you deploy IBM Workload Automation components on Linux on Z, ensure that you have deployed Docker compose, as explained in the following procedure.

To deploy the containers, **docker-compose** is required on the local workstation. Perform the following steps:

1. Browse to /usr/local/bin and create a file with name docker-compose with the following contents:
2. #
3. # This script will attempt to mirror the host paths by using volumes for the
4. # following paths:
5. # \* $(pwd)
6. # \* $(dirname $COMPOSE\_FILE) if it's set
7. # \* $HOME if it's set
8. #
9. # You can add additional volumes (or any docker run options) using
10. # the $COMPOSE\_OPTIONS environment variable.
11. #
12. set -e
13. VERSION="1.27.4"
14. IMAGE="ibmcom/dockercompose-s390x:$VERSION"
15. # Setup options for connecting to docker host
16. if [ -z "$DOCKER\_HOST" ]; then
17. DOCKER\_HOST='unix:///var/run/docker.sock'
18. fi
19. if [ -S "${DOCKER\_HOST#unix://}" ]; then
20. DOCKER\_ADDR="-v ${DOCKER\_HOST#unix://}:${DOCKER\_HOST#unix://} -e DOCKER\_HOST"
21. else
22. DOCKER\_ADDR="-e DOCKER\_HOST -e DOCKER\_TLS\_VERIFY -e DOCKER\_CERT\_PATH"
23. fi
24. # Setup volume mounts for compose config and context
25. if [ "$(pwd)" != '/' ]; then
26. VOLUMES="-v $(pwd):$(pwd)"
27. fi
28. if [ -n "$COMPOSE\_FILE" ]; then
29. COMPOSE\_OPTIONS="$COMPOSE\_OPTIONS -e COMPOSE\_FILE=$COMPOSE\_FILE"
30. compose\_dir="$(dirname "$COMPOSE\_FILE")"
31. # canonicalize dir, do not use realpath or readlink -f
32. # since they are not available in some systems (e.g. macOS).
33. compose\_dir="$(cd "$compose\_dir" && pwd)"
34. fi
35. if [ -n "$COMPOSE\_PROJECT\_NAME" ]; then
36. COMPOSE\_OPTIONS="-e COMPOSE\_PROJECT\_NAME $COMPOSE\_OPTIONS"
37. fi
38. if [ -n "$compose\_dir" ]; then
39. VOLUMES="$VOLUMES -v $compose\_dir:$compose\_dir"
40. fi
41. if [ -n "$HOME" ]; then
42. VOLUMES="$VOLUMES -v $HOME:$HOME -e HOME" # Pass in HOME to share docker.config and allow ~/-relative paths to work.
43. fi
44. i=$#
45. while [ $i -gt 0 ]; do
46. arg=$1
47. i=$((i - 1))
48. shift
49. case "$arg" in
50. -f|--file)
51. value=$1
52. i=$((i - 1))
53. shift
54. set -- "$@" "$arg" "$value"
55. file\_dir=$(realpath "$(dirname "$value")")
56. VOLUMES="$VOLUMES -v $file\_dir:$file\_dir"
57. ;;
58. \*) set -- "$@" "$arg" ;;
59. esac
60. done
61. # Setup environment variables for compose config and context
62. ENV\_OPTIONS=$(printenv | sed -E "/^PATH=.\*/d; s/^/-e /g; s/=.\*//g; s/\n/ /g")
63. # Only allocate tty if we detect one
64. if [ -t 0 ] && [ -t 1 ]; then
65. DOCKER\_RUN\_OPTIONS="$DOCKER\_RUN\_OPTIONS -t"
66. fi
67. # Always set -i to support piped and terminal input in run/exec
68. DOCKER\_RUN\_OPTIONS="$DOCKER\_RUN\_OPTIONS -i"
69. # Handle userns security
70. if docker info --format '{{json .SecurityOptions}}' 2>/dev/null | grep -q 'name=userns'; then
71. DOCKER\_RUN\_OPTIONS="$DOCKER\_RUN\_OPTIONS --userns=host"
72. fi
73. # shellcheck disable=SC2086
74. exec docker run --rm $DOCKER\_RUN\_OPTIONS $DOCKER\_ADDR $COMPOSE\_OPTIONS $ENV\_OPTIONS $VOLUMES -w "$(pwd)" $IMAGE "$@"
75. Run the following command to make the docker-compose file an executable file:

sudo chmod +x /usr/local/bin/docker-compose

1. More detailed technical information for each component are available in the sample readme files:
   * [IBM Workload Automation Console](https://www.ibm.com/links?url=https%3A%2F%2Fgithub.com%2FWorkloadAutomation%2Fibm-workload-automation-docker-compose%2Fblob%2Fmaster%2Freadmes%2Freadme_CONSOLE.md)
   * [IBM Workload Automation dynamic agent](https://www.ibm.com/links?url=https%3A%2F%2Fgithub.com%2FWorkloadAutomation%2Fibm-workload-automation-docker-compose%2Fblob%2Fmaster%2Freadmes%2Freadme_DYNAMIC_AGENT.md)
   * [IBM Workload Automation z-centric agent](https://www.ibm.com/links?url=https%3A%2F%2Fgithub.com%2FWorkloadAutomation%2Fibm-workload-automation-docker-compose%2Fblob%2Fmaster%2Freadmes%2Freadme_ZCENTRIC_AGENT.md)
     1. **Deploying containers with Docker**

How to deploy the current version of IBM Workload Automation using Docker containers.

This chapter describes how to deploy the current version of IBM Workload Automation using Docker containers.

The available Docker containers are:

* IBM Workload Automation Console, containing the Dynamic Workload Console image for UNIX, Windows, Linux on Z operating systems, and the IBM z/OS Container Extensions (zCX) feature.
* IBM Workload Automation dynamic agent and the image of the agent with the machine learning engine, containing the Agent image for UNIX, Windows, Linux on Z operating systems. and the IBM z/OS Container Extensions (zCX) feature.
* IBM Workload Automation z-centric agent, containing the Agent image for UNIX, Windows, Linux on Z operating systems. and the IBM z/OS Container Extensions (zCX) feature.

Each container package includes also a docker-compose.yml file to configure your installation.

You can choose to deploy all product containers with a single command, or you can deploy each product component container individually.

**Deploying all product component containers with a single command**

The following readme file contains all the steps required to deploy all product components at the same time: [IBM Workload Automation](https://www.ibm.com/links?url=https%3A%2F%2Fgithub.com%2FWorkloadAutomation%2Fibm-workload-automation-docker-compose)

**Deploying each product component container individually**

If you want to install server, console and agent containers individually, see the related readme files :

* [IBM Workload Automation Console](https://www.ibm.com/links?url=https%3A%2F%2Fgithub.com%2FWorkloadAutomation%2Fibm-workload-automation-docker-compose%2Fblob%2Fmaster%2Freadmes%2Freadme_CONSOLE.md)
* [IBM Workload Automation dynamic agent](https://www.ibm.com/links?url=https%3A%2F%2Fgithub.com%2FWorkloadAutomation%2Fibm-workload-automation-docker-compose%2Fblob%2Fmaster%2Freadmes%2Freadme_DYNAMIC_AGENT.md)
* [IBM Workload Automation z-centric agent](https://www.ibm.com/links?url=https%3A%2F%2Fgithub.com%2FWorkloadAutomation%2Fibm-workload-automation-docker-compose%2Fblob%2Fmaster%2Freadmes%2Freadme_ZCENTRIC_AGENT.md)

Note: The database is always external to the Docker engine and is not available as a container

Note: When deploying the server (master domain manager) container, the database schema is automatically created at the container start. If you are planning to install both the IBM Workload Automation server master domain manager and backup master domain manager, ensure that you run the command for one component at a time. To avoid database conflicts, start the second component only when the first component has completed successfully.

* + 1. **Accessing the Docker containers**

This topic shows you how to access the container shell and run IBM Workload Automation commands.

To check the container status and run IBM Workload Automation commands, you need to access the containers as described below:

1. Obtain the container ID by running the following command: **docker ps**

An output similar to the following one is returned:

CONTAINER ID IMAGE NAMES ........ .......

b02459af2b9c ...... wa-console ........ .......

1. Access the Docker container by running the following command: **docker exec -it <container\_id> /bin/bash**

Where

***container\_id***

Is the ID of the container obtained with the command explained in the first step, for example **b02459af2b9c**.

* + 1. **Creating a Docker image to run IBM Z Workload Scheduler Agents**

Quickly create a Docker image to run IBM Z Workload Scheduler Agents.

You can run IBM Z Workload Scheduler Agents in a Docker container that you use to run jobs remotely, for example to call REST APIs or database stored procedures, or to run jobs within the container itself.

To create a Docker container, you are provided with step-by-step instructions and the latest versions of the required samples on GitHub [here](https://www.ibm.com/links?url=https%3A%2F%2Fgithub.com%2FWorkloadAutomation%2Fagent-docker-kit). Follow the instructions to create a Docker container to run jobs remotely, or use it as base image to add the applications to be run with the agent to other images, or customize the samples to best meet your requirements.

1. **Upgrading the IBM Z Workload Scheduler Agent**

Upgrading IBM Z Workload Scheduler Agent (also known as z-centric agent) from older versions to the current version.

* 1. **Coexistence with previous versions**

The current version of the IBM Z Workload Scheduler Agent (z-centric) can be installed on any workstation containing a prior version, provided that the *TWS\_user*, **JobManager** port, and installation path are different from those of the previous versions.

* 1. **User authorization requirements**

Check the authorization roles before beginning the upgrade procedure. For detailed information, see [User authorization requirements](https://www.ibm.com/docs/en/SSGSPN_9.5.0/zos/src_inst/eqqi1checkauthorins.html#checkauthorins).

* 1. **Upgrading notes**

Before upgrading the IBM Z Workload Scheduler Agent, ensure that there are no jobs running on the agent.

If you are upgrading IBM Z Workload Scheduler Agent from an installation where you did not install the dynamic capabilities, you cannot add them during the upgrade process. To add them, perform the procedure described in the following section:

* [Enabling dynamic capabilities after installation or upgrade](https://www.ibm.com/docs/en/SSGSPN_9.5.0/zos/src_inst/eqqi1enabledyncap.html#enabledyncap)

When the upgrade procedure is successful, it is not possible to roll back to the previous version. Rollback is possible only for upgrades that fail.

* 1. **Upgrading using twsinst**

Use **twsinst** to upgrade IBM Z Workload Scheduler Agent by satisfying the following objectives:

**Save time, disk space, and RAM when upgrading the product**

It saves disk space and RAM because it is not Java-based.

**Use a very simple command**

It consists of a single line command.

**Manage both UNIX™ and Windows™ operating system workstations**

It runs both on UNIX and Windows agents.

For a list of the supported operating systems and requirements, see [IBM Workload Scheduler Detailed System Requirements](http://www.ibm.com/support/docview.wss?uid=ibm10742497).

* + 1. **Upgrading process**

According to your operating system, to upgrade the IBM Z Workload Scheduler Agent with **twsinst** perform the following steps:

**Windows™ operating systems**

1. Insert the DVD related to your operating system.
2. Log in as administrator on the workstation where you want to upgrade the agent.
3. From the *DVD\_root*/TWS/*operating\_system* directory of the DVD, run the **twsinst** script using the synopsis described in this section.

Note: **twsinst** for Windows is a Visual Basic Script (VBS) that you can run in CScript and WScript mode, for example:

cscript twsinst -update -uname *username*

-acceptlicense yes

**UNIX™ and Linux™ operating systems**

1. Insert the installation DVD related to your operating system.
2. From *DVD\_root*/TWS/*operating\_system*, run the **twsinst** script using the synopsis described in this section.

A successful upgrade using the **twsinst** script issues the return code RC = 0. If the installation fails to understand the cause of the error, see [Analyzing return codes for agent installation, upgrade, restore, and uninstallation](https://www.ibm.com/docs/en/SSGSPN_9.5.0/distr/src_pi/awspiagentrct.html).

**Synopsis**:

**On Windows operating systems:**

**Show command usage and version**

**twsinst -u | -v**

**Upgrade an instance**

**twsinst -update -uname** *user\_name*

[**-addjruntime** *true*]

[**-domain** *user\_domain*]

[**-inst\_dir** *install\_directory*]

[**-lang** *lang\_id*]

[**-recovInstReg** *true*]

[**-skip\_usercheck**]

[**-wait** *minutes*]

[**-work\_dir** *working\_directory*]

**UNIX and Linux operating systems:**

**Show command usage and version**

**twsinst -u | -v**

**Upgrade an instance**

**twsinst -update -uname** *user\_name*

[**-addjruntime** *true*]

[**-inst\_dir** *install\_directory*]

[**-lang** *lang-id*]

[**-recovInstReg** *true*]

[**-reset\_perm**]

[**-skip\_usercheck**]

[**-wait** *minutes*]

[**-work\_dir** *working\_directory*]

**-addjruntime *true***

Adds the Java™ run time to run job types with advanced options, both those supplied with the product and the additional types implemented through the custom plug-ins. With the -update option, the only valid value for this parameter is **true**.

If you decided not to install Java run time when upgrading, you can still add this feature at a later time as it is described in [Adding a feature](https://www.ibm.com/docs/en/SSGSPN_9.5.0/distr/src_pi/awspiaddnewfeatu.html#addnewfeatu).

**-recovInstReg *true***

To re-create the registry files. Specify it if you have tried to upgrade a stand-alone, fault-tolerant agent (an agent that is not shared with other components or does not have the connector feature) and you received an error message that states that an instance of IBM Workload Scheduler cannot be found, this can be caused by a corrupt registry file. See [Upgrading when there are corrupt registry files](https://www.ibm.com/docs/en/SSGSPN_9.5.0/distr/src_pi/awspirecovcluster.html) in *IBM Workload Scheduler: Planning and Installation*.

**-reset\_perm**

UNIX and Linux only. Reset the permissions of the **libatrc** library.

**-skip\_usercheck**

Enable this option if the authentication process within your organization is not standard, thereby disabling the default authentication option. On UNIX and Linux operating systems if you specify this parameter, the program skips the check of the user in the /etc/passwd file or the check you perform using the **su** command. On Windows operating systems if you specify this parameter, the program does not create the user you specified in the -uname *username* parameter. If you specify this parameter you must create the user manually before running the script.

**-wait *minutes***

The number of minutes that the product waits for jobs that are running to complete before starting the upgrade. If the jobs do not complete during this interval the upgrade does not proceed and an error message is displayed. Valid values are integers or **-1** for the product to wait indefinitely. The default is **60** minutes.

**-work\_dir *working\_directory***

The temporary directory used by the installation process to store the files to deploy.

**On Windows operating systems:**

If you specify a path that contains blanks, enclose it in a double quotation marks. If you do not manually specify a path, the path is set to %temp%\TWA\tws93, where %temp% is the temporary directory of the operating system.

**On UNIX and Linux operating systems:**

The path cannot contain blanks. If you do not manually specify a path, the path is set to /tmp/TWA/tws93.

* + 1. **Examples**

To upgrade the agent installed for the user TWS\_user in the user home directory that does not have the dynamic scheduling capabilities and the Java™ runtime to run job types with advanced options, run the following command:

./twsinst -update -uname *TWS\_user*

* + 1. **The twsinst log files**

The **twsinst** log file name is:

**On Windows operating systems:**

<*TWS\_INST\_DIR*>\logs\twsinst\_*operating\_system*\_*TWS\_user*^*version\_number*.log

Where:

***TWS\_INST\_DIR***

The IBM Workload Scheduler installation directory. The default installation directory is C:\Program Files\IBM\TWA\_*TWS\_user*.

***operating\_system***

The operating system.

***TWS\_user***

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

**On UNIX operating systems:**

<*TWS\_INST\_DIR*>/TWSDATA/installation/logs/twsinst\_*operating\_system*\_*TWS\_user*^*product\_version\_number*.log

Where:

***TWS\_INST\_DIR***

The IBM Workload Scheduler installation directory. The default installation directory is /opt/IBM/TWA\_*TWS\_user*.

***operating\_system***

The operating system.

***TWS\_user***

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

* 1. **Enabling dynamic capabilities after upgrade**

To enable dynamic scheduling after you upgraded the IBM Z Workload Scheduler Agent without enabling it, see [Enabling dynamic capabilities after installation or upgrade](https://www.ibm.com/docs/en/SSGSPN_9.5.0/zos/src_inst/eqqi1enabledyncap.html#enabledyncap).

* 1. **Uninstalling the IBM Z Workload Scheduler Agent**

Uninstalling the agent does not remove files created after the agent was installed, nor files that are open at the time of uninstallation. If you do not need these files, you must remove them manually. If you intend to reinstall and therefore need the files, make a backup before starting the installation process.

* + 1. **User authorization requirements**

Before beginning the uninstallation procedure, check the authorization roles described in [User authorization requirements](https://www.ibm.com/docs/en/SSGSPN_9.5.0/zos/src_inst/eqqi1checkauthorins.html#checkauthorins).

* + 1. **Uninstalling the IBM Z Workload Scheduler Agent using the twsinst script**

Perform the following steps to uninstall the IBM Z Workload Scheduler Agent by using the **twsinst** script. Depending on the operating system, proceed as follows:

* Windows™ operating systems:
  1. Ensure that all IBM Workload Scheduler processes and services are stopped, and that there are no active or pending jobs.
  2. Log on as administrator on the workstation where you want to uninstall the product.
  3. **twsinst** for Windows operating systems is a Visual Basic Script (VBS) that you can run in CScript and WScript mode, from the *installation\_dir*\TWS directory, run the **twsinst** script as follows:
  4. **cscript twsinst -uninst -uname** *user\_name* [**-wait** *minutes*]
  5. [**-domain** *domain\_name*] [**-lang** *lang\_id*]

[**-work\_dir** *working\_dir*]

* The uninstallation is performed in the language of the locale and not the language set during the installation phase. If you want to uninstall agents in a language other than the locale of the computer, run the **twsinst** script from the /*installation\_dir*/TWS (for example, /home/user1/TWS) as follows:
* cscript twsinst -uninst -uname *user\_name* -lang *language*
* where *language* is the language set during the uninstallation.
* UNIX™ and Linux™ operating systems:
  1. Ensure that all processes and services are stopped, and that there are no active or pending jobs. For information about stopping the processes and services, see *Administration Guide*.
  2. Log on as root and change your directory to /*installation\_dir*/TWS (for example: /home/user1/TWS where user1 is the name of IBM Workload Scheduler user.)
  3. From the TWS directory, run the **twsinst** script as follows:
  4. **twsinst -uninst -uname** *user\_name* [**-wait** *minutes*]

[**-lang** *lang\_id*] [**-work\_dir** *working\_dir*]

* The uninstallation is performed in the language of the locale and not the language set during the installation phase. If you want to uninstall agents in a language other than the locale of the computer, run the **twsinst** script from the /*installation\_dir*/TWS (for example, /home/user1/TWS) as follows:
* ./twsinst -uninst -uname *user\_name* -lang *language*
* where *language* is the language set during the uninstallation.

**-uninst**

Uninstalls the agent

**-uname *user\_name***

The name of the user for which the agent is uninstalled. This user name is not to be confused with the user performing the installation logged on as **root** on UNIX and Linux, and as **administrator** on Windows operating systems.

**-wait *minutes***

The number of minutes that the product waits for jobs that are running to complete before starting the uninstallation. If the jobs do not complete during this interval the uninstallation stops and an error message is displayed. Valid values are integers or **-1** for the product to wait indefinitely. The default is **60** minutes.

**-domain *domain\_name***

Windows operating systems only. The domain name of the IBM Workload Scheduler user. The default is the name of the workstation on which you are uninstalling the product.

**-lang *lang\_id***

The language in which the twsinst messages are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used.

Note: The **-lang** option is not to be confused with the IBM Workload Scheduler supported language packs.

**-work\_dir *working\_dir***

The temporary directory used for the installation process files deployment.

**On Windows operating systems:**

If you specify a path that contains blanks, enclose it in double quotation marks. If you do not manually specify a path, the path is set to %temp%\TWA\tws93, where %temp% is the temporary directory of the operating system.

**On UNIX and Linux operating systems:**

The path cannot contain blanks. If you do not manually specify a path, the path is set to /tmp/TWA/tws93.

The following is an example of a **twsinst** script that uninstalls the IBM Workload Scheduler agent, originally installed for user named **TWS\_user**:

**On Windows operating systems:**

twsinst -uninst -uname *TWS\_user*

**On UNIX and Linux operating systems:**

./twsinst -uninst -uname *TWS\_user*

* + 1. **The twsinst log files**

The **twsinst** log file name is:

**On Windows operating systems:**

<*TWS\_INST\_DIR*>\logs\twsinst\_*operating\_system*\_*TWS\_user*^*version\_number*.log

Where:

***TWS\_INST\_DIR***

The IBM Workload Scheduler installation directory. The default installation directory is C:\Program Files\IBM\TWA\_*TWS\_user*.

***operating\_system***

The operating system.

***TWS\_user***

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

**On UNIX operating systems:**

<*TWS\_INST\_DIR*>/TWSDATA/installation/logs/twsinst\_*operating\_system*\_*TWS\_user*^*product\_version\_number*.log

Where:

***TWS\_INST\_DIR***

The IBM Workload Scheduler installation directory. The default installation directory is /opt/IBM/TWA\_*TWS\_user*.

***operating\_system***

The operating system.

***TWS\_user***

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

* 1. **Troubleshooting and maintaining installation, upgrade, and uninstallation**

This chapter describes how to troubleshoot and maintain the installation, the upgrade, and the uninstallation of the agent.

* + 1. **Analyzing return codes for agent installation, upgrade, restore, and uninstallation**

Check how your operation completed by analyzing the return codes that are issued by twsinst.

Return codes that you can receive when you are installing, upgrading, restoring, or uninstalling agents. To analyze them and take corrective actions, run the following steps:

**On Windows operating systems**

1. Display the operation completion return code, by using the following command:

echo %ERRORLEVEL%

1. Analyze the following table to verify how the operation completed:

| **Error Code** | **Description** | **User action** |
| --- | --- | --- |
| 0 | Success: The operation completed successfully without any warnings or errors. | None. |
| 1 | Generic failure | Check the messages that are displayed on the screen by the script. Correct the error and rerun the operation.  If the error persists, search the <https://www.ibm.com/support/home/> database for a solution. |
| 2 | The installation cannot create the IBM Workload Scheduler user or assign the correct permission to it. | Verify the operating system policies and configuration. Verify the input values. If necessary, create the user manually before you run the installation. |
| 3 | The password is not correct or the installation cannot verify it. | Verify the operating system policies and configuration. Verify the input values. |
| 4 | The IBM Workload Scheduler installation directory is not empty. You specified as installation folder a directory that exists. | Empty it or specify a different directory. |
| 5 | An error occurred checking the IBM Workload Scheduler prerequisites on the workstation. | See the System Requirements Document at [IBM Workload Scheduler Detailed System Requirements](http://www.ibm.com/support/docview.wss?uid=ibm10742497). |
| 6 | The IBM Workload Scheduler registry is corrupted. | Use the recovInstReg option to recover the registry. Then, rerun the operation. |
| 7 | The upgrade or restore operation cannot retrieve the information from the configuration files. | Check that the previous installation and the localopts, the globalopts, the ita.ini, and the JobManager.ini files are not corrupted. Correct the errors and try again the operation. |
| 8 | The upgrade, restore, or uninstallation cannot proceed because there are jobs that are running. | Stop the jobs that are running or wait for these jobs to complete. Restart the operation. |
| 9 | The upgrade, restore, or uninstallation cannot proceed because there are files that are locked. | Stop all the processes that are running and close all the activities that can block the installation path. Restart the operation. |
| 10 | The upgrade, restore, or uninstallation cannot proceed because there are command lines opened. | Close the command lines. Restart the operation. |
| Table 1. Windows operating system agent return codes | | |

**On UNIX and Linux operating systems:**

1. Display the installation completion return code, by using the following command:

echo $?

1. Analyze the following table to verify how the installation completed:

| **Error Code** | **Description** | **User action** |
| --- | --- | --- |
| 0 | Success: The installation completed successfully without any warnings or errors. | None. |
| 1 | Generic failure. | Check the messages that are displayed on the video by the script. Correct the error and rerun the operation.  If the error persists, search the <https://www.ibm.com/support/home/> database for a solution. |
| 2 | The installation did not find the IBM Workload Scheduler user or its home directory. The IBM Workload Scheduler user that you specified either does not exist or does not have an associated home directory. | Verify the operating system definition of the IBM Workload Scheduler user. |
| 3 | Not applicable |  |
| 4 | The IBM Workload Scheduler installation directory is not empty. You specified as installation folder a directory that exists. | Empty it or specify a different directory. |
| 5 | An error occurred checking the IBM Workload Scheduler prerequisites on the workstation. | See the System Requirements Document at [IBM Workload Scheduler Detailed System Requirements](http://www.ibm.com/support/docview.wss?uid=ibm10742497). |
| 6 | The IBM Workload Scheduler registry is corrupted. | Use the recovInstReg option to recover the registry. Then, rerun the operation. |
| 7 | The upgrade or restore operation cannot retrieve the information from the configuration files. | Check that the previous installation and the localopts, the globalopts, the ita.ini, and the JobManager.ini files are not corrupted. Correct the errors and try again the operation. |
| 8 | The upgrade, restore, or uninstallation cannot proceed because there are jobs that are running. | Stop the jobs that are running or wait for these jobs to complete. Restart the operation. |
| 9 | The upgrade, restore, or uninstallation cannot proceed because there are files that are locked. | Stop all the processes that are running and close all the activities that can block the installation path. Restart the operation. |
| 10 | The upgrade, restore, or uninstallation cannot proceed because there are command lines opened. | Close the command lines. Restart the operation. |
| Table 2. UNIX or Linux operating system agent return codes | | |

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