



Install Cisco WAE

This section contains the following topics:

- [Install and Configure Supervisor, on page 1](#)
- [Verify WAE Image, on page 2](#)
- [Install Cisco WAE, on page 3](#)
- [Upgrade from Cisco WAE 7.x, on page 5](#)
- [Install Cisco WAE License, on page 5](#)
- [Start and Stop Cisco WAE, on page 6](#)
- [Migrate Configurations from Cisco WAE 7.x, on page 7](#)
- [Update Packages or Templates, on page 7](#)
- [Troubleshoot a Cisco WAE Installation, on page 8](#)

Install and Configure Supervisor

Install and configure supervisor before installing WAE.



Note The following configuration steps work only when supervisor is installed using yum. If supervisor is installed using any other method, it has to be configured to run **supervisorctl** as a non root user.

Step 1 Install supervisor and verify.

```
sudo yum install -y epel-release
sudo yum install -y supervisor
supervisord -version
3.4.0
```

Step 2 Create directories with write permissions for the OS user running WAE.

```
sudo mkdir -p /opt/supervisor/run
sudo mkdir -p /opt/supervisor/log
sudo chown -R [USER-NAME]:[GROUP-NAME] /opt/supervisor
```

Step 3 Update supervisor configuration to not run as a root user.

Point the pid file to `/opt/supervisor/run/supervisor.pid` and user as the OS user running WAE.

Open `/etc/supervisord.conf` as root and edit.

- In the `[unix_http_server]` section:

- Change `;file=/var/run/supervisor/supervisor.sock` to `file=/opt/supervisor/run/supervisor.sock`
- Change `;chown=nobody:nogroup` to `chown=[USER-NAME]:[GROUP-NAME]`

- In the `[supervisord]` section:

- Change `;logfile=/var/log/supervisor/supervisord.log` to `logfile=/opt/supervisor/log/supervisord.log`.
- Change `;pidfile=/var/run/supervisord.pid` to `pidfile=/opt/supervisor/run/supervisord.pid`
- Change `;minfds=1024` to `minfds=1000000`
- Change `;minprocs=200` to `minprocs=257805`

Note Do not set the user under the `[supervisord]` section.

- In the `[supervisorctl]` section:

- Change `;serverurl=unix:///var/run/supervisor/supervisor.sock` to `serverurl=unix:///opt/supervisor/run/supervisor.sock`

Step 4 Start Supervisor.

```
sudo systemctl start supervisord
sudo supervisorctl status all
```

Step 5 Enable supervisor to start during system startup.

```
sudo systemctl enable supervisord
sudo systemctl status supervisord
```

Verify WAE Image

Step 1 Download the Cisco WAE 7.4.0 software package from [Cisco Download Software](#) site.

Step 2 The certificate and digital signature are both embedded in the downloaded file - `wae-linux-v7.4.0.signed.bin`.

Step 3 Run the self-extracting signed binary. This extracts the Release Binary and validates using the signature file.

Verification of signed image

```
[admin@wae-vm-21 workspace.signed]$ ./wae-linux-v7.4.0.signed.bin
Unpacking...
Verifying signature...
Downloading CA certificate from http://www.cisco.com/security/pki/certs/crcam2.cer ...
Successfully downloaded and verified crcam2.cer.
Downloading SubCA certificate from http://www.cisco.com/security/pki/certs/innerspace.cer ...
Successfully downloaded and verified innerspace.cer.
Successfully verified root, subca and end-entity certificate chain.
Successfully fetched a public key from WAE-CCO_RELEASE.cer.
Successfully verified the signature of wae-linux-v7.4.0.bin using WAE-CCO_RELEASE.cer
```

Step 4 The generated `wae-linux-v7.4.0.bin` is the Linux installer for WAE.

Install Cisco WAE

Before you begin



Note If you want to upgrade from an older WAE 7.x release to WAE 7.4.0, see [Upgrade from Cisco WAE 7.x, on page 5](#)

- If one does not yet exist, create a UNIX user (assigned to a group). You must be this UNIX user to run installation.
 - Make sure Java 11 and Python 3.6.x are installed on the system. `JAVA_HOME` environment variable is pointing to `jdk-11.0` and `/usr/bin/python3` must point to the installed python.
 - Make sure supervisor is installed and configured. See [Install and Configure Supervisor, on page 1](#).
 - Download and verify the digitally signed Cisco WAE 7.4.0 image. See [Verify WAE Image, on page 2](#).
 - Make sure that `requests.auth` python package is installed for the BW-OPT application to function in WAE.
-

Step 1 Stop WAE if running.

Step 2 Change permission of the install file using the command:

```
chmod +x wae-linux-v7.4.0.bin
```

Step 3 Run the installer specifying the target directory.

```
./wae-linux-v7.4.0.bin <wae-dir>
```

Step 4 Navigate to installation directory to source `waerc`. Setup environment and create a runtime directory specifying the path.

```
cd <wae-dir>
source waerc
wae-setup --dest <target-runtime-dir>
```

Step 5 You are prompted to set the Cisco WAE admin password.

```
WAE admin password:
Confirm password:
```

Step 6 After installing and setting up wae (i.e. after running `wae-setup`), create a soft link to the `wae.ini` file from inside `/etc/supervisord.d/` and add WAE config to supervisor.

```
sudo ln -sf <target-runtime-dir>/wae.ini /etc/supervisord.d/
```

- Note**
- Execute this step only after supervisor is installed and configured.
 - If you want to use an external-executable-nimo based network which needs JAVA_HOME/JRE_HOME to be set, edit the section [program:waectl] inside target-runtime-dir/wae.ini file to include JAVA_HOME="valid_jdk_path" inside environment.

For example, under [program:waectl] edit to add:

```
JAVA_HOME:environment=HOME="/home/wae", NCS_JAVA_VM_OPTIONS="-Xmx32G -Xms16G -XX:+UseG1GC
-XX:+HeapDumpOnOutOfMemoryError -XX:HeapDumpPath=/home/wae/test/run/logs/
-Djava.io.tmpdir=/home/wae/test/run/work/", TMPDIR="/home/wae/test/run/work/",
JAVA_HOME="/usr/"
```

Step 7 Update supervisor configuration.

```
sudo supervisorctl update
```

Step 8 Start WAE process

```
sudo supervisorctl start wae:*
wae:zookeeper: started
wae:waectl: started
wae:kafka: started
wae:wae-monitor: started
```

- Note**
- wae:waectl is the WAE program.
 - wae:kafka and wae:zookeeper are required for traffic collection.
 - wae:wae-monitor is the monitoring service.
 - wae:logrotate is for log rotation.

Step 9 Check status of WAE process

```
sudo supervisorctl status
wae:kafka RUNNING pid 1540, uptime 28 days, 14:03:40
wae:logrotate RUNNING pid 1178, uptime 28 days, 15:10:11
wae:wae-monitor RUNNING pid 11520, uptime 0:00:12
wae:waectl RUNNING pid 1177, uptime 28 days, 15:10:11
wae:zookeeper RUNNING pid 1736, uptime 28 days, 14:03:39
```

- Note** To stop all WAE process, use the command:

```
sudo supervisorctl stop wae:*
```

Step 10 To migrate configurations from a WAE 7.x.x release to WAE 7.4.0 release, use the Cisco WAE upgrade script from [Cisco Download Software](#) site.

- Note**
- If you plan to use Cisco WAE Design from windows, generate ssh-rsa keys by running the following command from the run directory after sourcing waerc:

```
$ generate-ssh_rsa-keys
```

- If the server/VM is restarted, all the WAE services are not restarted automatically and they will be in the stopped state. They can be started using the command mentioned in Step 8.

Upgrade from Cisco WAE 7.x

Before you begin

- Download the Cisco WAE upgrade script from [Cisco Download Software](#) site.
- Download and verify the digitally signed Cisco WAE 7.4.0 image. See [Verify WAE Image, on page 2](#).
- Make sure Java 11 and Python 3.6.x are installed on the system. `JAVA_HOME` environment variable is pointing to `jdk-11.0` and `/usr/bin/python3` must point to the installed python.
- Install `pexpect` using the following command:


```
sudo pip3 install pexpect
```
- Make sure supervisor is installed and configured. See [Install and Configure Supervisor, on page 1](#).
- Disable HA before doing an upgrade. Upgrade script does not handle any configurations related to specific functional packs present in the previous WAE installation. You can:
 - Remove the configurations related to functional packs before doing the upgrade, or
 - Install WAE manually (See [Install Cisco WAE, on page 3](#)), install the functional packs in the new WAE installation and then import the configurations (see [Migrate Configurations from Cisco WAE 7.x, on page 7](#)).

Step 1 Login to the machine where 7.x is installed.

Step 2 Run the `wae_upgrade` script.

Note The installation file passed as `--wae-bin` option is the image obtained after verifying the digitally signed Cisco WAE 7.4.0 image.

```
# ./wae_upgrade --upgrade --old-install-dir <WAE_7.x_INSTALL_DIR> --old-run-dir <WAE_7.x_RUN_DIR>
--new-install-dir <WAE_7.4.0_INSTALL_DIR> --new-run-dir <WAE_7.4.0_RUN_DIR> --cfg-dir
<dir_to_save_config> --wae-bin <WAE_7.4.0_INSTALLATION_FILE>
where
--old-install-dir    indicates the directory where 7.x WAE is installed
--old- run-dir       indicates the directory where the run time for 7.x WAE resides
--new-install-dir    indicates the directory where 7.4.0 WAE must be installed
--new-run-dir        indicates the directory where the run time for 7.4.0 WAE will reside
--cfg-dir            indicates the folder where the config is to be saved. This config will be changed
to match 7.4.0 and pushed to 7.4.0
--wae-bin            indicates the path to WAE 7.4.0 installation file.
```

Install Cisco WAE License

A license is required to use all the features in Cisco WAE. If you have questions about obtaining a license, contact your Cisco support representative or system administrator.

Cisco WAE supports both Cisco Smart Licensing and traditional licensing. If you would like to convert from a traditional license to Smart Licensing, see your Cisco WAE account representative. For information on the differences between the two types of licensing, refer to the [Cisco Smart Licensing Overview](#) on Cisco.com.

For information on Cisco Smart Licensing, see "Smart Licensing" chapter in *Cisco WAE User Guide*.

Install Traditional License

To install a traditional license:

Step 1 Run `license_install` tool, and pass the name of license file (with `.lic` extension). By default, the tool merges all features that are granted by the new license with those features in an existing license.

```
license_install -file <path>/<license_name>.lic
```

Step 2 When prompted, enter the number that is associated with the directory in which you want to install the license.

- Note**
- If option 2 is selected, you need to reinstall the license when a new build is installed.
 - If option 1 is selected, reinstalling the license is not necessary unless the license is expired.
 - Once the license is installed, you can verify the installed licenses by running the `license_check` command.

Step 3 Stop and start WAE for the installed license to be picked up.

Install Smart License

To install a smart license:

Step 1 See "Smart License" section in User Guide, to configure Smart License.

Step 2 Stop and start WAE for the installed license to be picked up.

Start and Stop Cisco WAE

From the Cisco WAE run-time directory, enter the relevant Cisco WAE CLI command to start or stop Cisco WAE services:

- Start WAE

```
sudo supervisorctl start wae:*
wae:zookeeper: started
wae:waectl: started
wae:kafka: started
wae:wae-monitor: started
```

- Stop WAE

```
sudo supervisorctl stop wae:*
```

Migrate Configurations from Cisco WAE 7.x

You can use the Cisco WAE upgrade script utility to migrate configurations from WAE 7.x.

Before you begin

- Download the Cisco WAE upgrade script for migrating configurations from WAE 7.x to WAE 7.4.0 package from [Cisco Download Software](#) site.
- Install WAE 7.4.0 and start the WAE process before you proceed with migrating configurations. See [Install Cisco WAE, on page 3](#)
- Install `pexpect` using the following command:


```
sudo pip3 install pexpect
```
- Disable HA before doing an upgrade.
- Upgrade script does not handle any configurations related to specific functional packs present in the previous WAE installation. You can:
 - Remove the configurations related to functional packs before exporting them, or
 - Install the functional packs in the new WAE installation before importing the configurations.

Step 1 To take a backup of the 7.x configuration, login to the machine where 7.x is installed, and run `wae_upgrade` script with `--export` option.

```
# ./wae_upgrade --export --install-dir <WAE_7.x_INSTALL_DIR> --run-dir <WAE_7.x_RUN_DIR> --cfg-dir <dir_to_save_exported_config>
```

Where:

```
--install-dir  indicates the directory where 7.x WAE is installed
--run-dir      indicates the directory where the run time for 7.x WAE resides
--cfg-dir      indicates the folder where backup of 7.x configuration must reside
```

Step 2 To restore the 7.x configuration to 7.4.0, login to the machine where 7.4.0 is installed, and run `wae_upgrade` script with `--import` option.

```
# ./wae_upgrade --import --install-dir <WAE_7.4.0_INSTALL_DIR> --run-dir <WAE_7.4.0_RUN_DIR> --cfg-dir <dir_to_import_saved_config>
```

Where:

```
--install-dir  indicates the directory where 7.4.0 WAE is installed
--run-dir      indicates the directory where the run time for 7.4.0 WAE resides
--cfg-dir      indicates the folder where backup of 7.x configuration resides
```

Update Packages or Templates

If any packages or templates are updated or added in the `<wae_run_time_directory>/packages` directory, request a package reload using the Cisco-style WAE CLI:

```
$ packages reload
```

For example, perform a package reload when you edit the `wae.conf` file.

Troubleshoot a Cisco WAE Installation

To check the status of Cisco WAE, enter `sudo supervisorctl status`.

Cisco WAE comes with standard logging features in the YANG run time. Cisco WAE logs to multiple log files in the `<wae-run-time>/logs` directory.

The LDAP authentication logs are logged in `[wae-run-time]/logs/wae-ldap-auth.log` file. The tool located in `[wae-install-dir]/lib/exec/test-java-ssl-conn` is useful to test SSL connectivity for java applications like LDAP Authentication and EPNM notifications which provide useful information to debug certification issues.

The most useful log is `<wae-run-time>/logs/wae-java-vm.log`. Most Cisco WAE packages log to this file. Some Cisco WAE packages also log to `<wae-run-time>/logs/wae-python-vm-<package-name>.log`. The following example shows Python-VM based logs:

```
[wae@wae logs]$ pwd
/home/wae/wae-run/logs
[wae@host logs]$ ls -ltr wae-python-vm*
-rw-rw-r-- 1 wae wae 0 Feb 26 07:50 wae-python-vm-cisco-wae-opm-tte.log
-rw-rw-r-- 1 wae wae 0 Feb 26 07:50 wae-python-vm-cisco-wae-get-plan.log
-rw-rw-r-- 1 wae wae 0 Feb 26 07:50 wae-python-vm-cisco-wae-dmdmesh-creator-nimo.log
-rw-rw-r-- 1 wae wae 0 Feb 26 07:50 wae-python-vm-cisco-wae-layout-nimo.log
-rw-rw-r-- 1 wae wae 0 Feb 26 07:50 wae-python-vm-cisco-wae-opm-load-plan.log
-rw-rw-r-- 1 wae wae 0 Feb 26 07:50 wae-python-vm-cisco-wae-dmddeduct-nimo.log
-rw-rw-r-- 1 wae wae 0 Feb 26 07:50 wae-python-vm-cisco-wae-archive.log
-rw-rw-r-- 1 wae wae 2238 Feb 26 07:50 wae-python-vm.log
-rw-rw-r-- 1 wae wae 270 Feb 26 08:20 wae-python-vm-nso_wae_nodes_insert.log
```

By default, the log level is set to INFO. You can configure logging in the following ways:

- Define the log level of various logs in the run-time directory `wae.conf` file. For information about the `wae.conf` file, see the *Cisco WAE User Guide*.
- Use the Expert Mode to set logging capabilities for some network interface modules (NIMOs). For example, you can set logging capabilities such as topology NIMOs and the `lsp-snmp-nimo` module. For information about the Expert Mode, see the [Cisco WAE User Guide](#).
- Use the Cisco WAE CLI to define the log level for various NIMO components. To define the log level, enter the following command at the command line:

```
admin@wae% set java-vm java-logging logger <nimo-component> level <level-x>
```

Level types are `level-info`, `level-debug`, and `level-all`. The logs are saved to `wae-java-vm.log` and can be used for troubleshooting.

The following table lists basic NIMO components.

NIMO Component	Description
com.cisco.wae	General debugging

NIMO Component	Description
com.cisco.wae.nimo.topo	Topology-based NIMO debugging
com.cisco.wae.nimo.lspconfig	LSP configuration through NED debugging
com.cisco.wae.nimo.lsp	LSP debugging
com.cisco.wae.nimo.snmptrafficpoller	SNMP traffic poller debugging
com.cisco.wae.dare	Aggregation debugging
com.cisco.wae.nimo.optical	Optical NIMO debugging

