



Consolidated Release Notes for Cisco WAE 7.2.1 and Patches

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Introduction

This document provides information regarding Cisco WAN Automation Engine (Cisco WAE) Release 7.2.1 and related patches.

Cisco WAN Automation Engine (WAE) provides the tools to create and maintain a model of the current network through the continual monitoring and analysis of the network and the traffic demands that are placed on it. This network model contains all relevant information about a network at a given time, including topology, configuration, and traffic information. You can use this information as a basis for analyzing the impact on the network due to changes in traffic demands, paths, node and link failures, network optimizations, or other changes.

The Cisco WAE platform is an open, programmable framework that interconnects software modules, communicates with the network, and provides APIs to interface with external applications.

This document contains the following topics:

- [Release Information for Cisco WAE 7.2.1 Patch 1, on page 1](#)
- [Release Information for Cisco WAE 7.2.1, on page 3](#)
- [Documentation, on page 11](#)
- [Filing a Cisco WAE Bug, on page 11](#)
- [Using the Cisco Bug Search Tool, on page 12](#)
- [Accessibility Features, on page 12](#)

Release Information for Cisco WAE 7.2.1 Patch 1

This section provides information related to Cisco WAE Release 7.2.1 Patch 1 and contains the following topics:

- [Install Cisco WAE 7.2.1 Patch 1, on page 1](#)
- [Resolved Bugs, on page 2](#)

Install Cisco WAE 7.2.1 Patch 1

This procedure outlines the steps necessary to upgrade to Cisco WAE 7.2.1 Patch 1:

Before you begin

Download and verify the digitally signed Cisco WAE 7.2.1 Patch 1 image. See [Verify WAE Image, on page 7](#)

Procedure

Step 1 Stop WAE services using supervisor.

```
supervisorctl stop wae:*
```

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

```
chmod 755 wae-linux-v7.2.1-patch1.bin
```

Step 3 Install Cisco WAE 7.2.1 Patch 1 using the following command:

```
# ./wae-linux-v7.2.1-patch1.bin [-i WAE_INSTALL_DIR] [-r WAE_RUN_DIR] [-b BACKUP_DIR]
```

where

WAE_INSTALL_DIR is the WAE install directory path.

WAE_RUN_DIR is the run directory path.

BACKUP_DIR is the backup directory to use when creating the patch.

Note During the backup phase of WAE installation, you may see a few messages on the terminal like:

```
cp: cannot stat ...
```

This is expected and does not cause any problems with the patch install.

Step 4 Start WAE services using supervisor:

```
supervisorctl start wae:*
```

Step 5 Confirm that all WAE services are running:

```
supervisorctl status
```

Step 6 On the WAE CLI, run:

```
admin@wae# packages reload
```

Note After installation of the patch, use the new version of Cisco WAE Design (WAE-Design-k9-7.2.1-patch1-Linux-x86_64.signed.bin) that is available for download for all platforms. Verify the signed image before installing. See *Cisco WAE Design 7.2.1 GUI Installation Guide*.

After applying Cisco WAE 7.2.1 Patch 1, a few error messages are captured in the java log files. These error messages can be safely ignored and no WAE functionality is affected.

Step 7 (Optional) If license_install tool was run previously from within the WAE install directory <WAE_INSTALL_DIR>, then run the license_install tool once again after installing this patch.

Resolved Bugs

The following are descriptions of the resolved bugs in Cisco WAE Release 7.2.1 Patch 1:

Table 1: Resolved Bugs

Bug ID	Description
CSCvs18201	Unable to collect Inventory for Huawei VRP 5 and CPU/MEM for VRP 8
CSCvs52155	VPN traffic measured not populated
CSCvs70239	Aggregation of network demand hangs preventing any further aggregation from running
CSCvs95132	DNF Netflow NIMO throws "java.lang.NullPointerException" error during nimo execution
CSCvt19325	In WAE 7.2.1, IP address information is lost from Interfaces table after DARE aggregation
CSCvs50959	In WAE 7.2.1, Optical NIMO creates too many files in /tmp
CSCvs58735	login-find-multicast-nimo fails with "Python cb_action" error
CSCvs59422	Unable to change enabled field from config UI
CSCvs68767	Intermittent DARE aggregation error and failure
CSCvs70134	Virtual nodes shown as type physical
CSCvs70161	In WAE 7.2.1, cisco-wae-archive fills the wae-python-vm.log
CSCvs70758	WAE 7.1.2 to WAE 7.2.1 upgrade migraton script fails
CSCvs77750	In WAE 7.1.3 Patch 3, lsp-snmp-nimo is shown as as Unrouted
CSCvs93391	WAE does not resolve interface name on IPv6 ALU devices
CSCvs95445	In WAE 7.1.3 Patch 3, cfg_parse timeout occurs when traffic-poller begins/is running
CSCvs44588	Update/Return license reservation APIs throw "classcast exception" error after agent restart
CSCvs29335	Layout NIMO does not copy SRLGs from the template

Release Information for Cisco WAE 7.2.1

This section provides information related to Cisco WAE Release 7.2.1 and contains the following topics:

- [What's New in Cisco WAE 7.2.1, on page 4](#)
- [Upgrade to Cisco WAE 7.2.1, on page 6](#)
 - [Install and Configure Supervisor, on page 6](#)
 - [Verify WAE Image, on page 7](#)
 - [Install Cisco WAE, on page 7](#)
- [Supported Node Versions, on page 9](#)
- [Resolved Bugs, on page 9](#)

What's New in Cisco WAE 7.2.1

The following features are new in Cisco WAE 7.2.1

Feature	Description
Smart Licensing	<p>Cisco WAE now supports both Cisco Smart Licensing and traditional licensing. Cisco Smart Licensing is a standardized licensing platform that enables you to automate time consuming manual licensing tasks, track the status of your license and software usage trends.</p> <p>Some of the benefits that Cisco Smart Licensing offers are:</p> <ul style="list-style-type: none"> • Visibility to devices and software purchased and deployed • Ability to monitor and manage devices, licenses, and usage in real time • Automatic license activation • Product simplicity with standard software offers, licensing platform, and policies • Decreased operational costs <p>WAE UI → Smart Licensing is added to enable you to configure and manage all details related to smart licenses.</p> <p>For more information, see "Cisco Smart Licensing" chapter in the <i>Cisco WAE 7.2.1 User Guide</i>.</p>
HA with automatic failover	<p>Cisco WAE now supports High Availability (HA) with automatic failover. If a primary node fails, the secondary node takes over as Master node.</p> <p>WAE UI → HA configuration page is updated to enable you to configure master and slave nodes.</p> <p>For more information, see "Administration" chapter ("Configure High Availability" topic) in the <i>Cisco WAE 7.2.1 User Guide</i>.</p>
Online Help	<p>Cisco WAE now comes with embedded online help. Use the Help button on WAE UI to access the related help topics.</p> <p>Note Documents are sometimes updated after original publication. Refer to the <i>Cisco WAE 7.2.1 User Guide</i> document on Cisco.com for latest updates.</p>
Changeover tool enhancements	<p>The Changeover tool is enhanced to allow you to group Interface Metric changes together into steps. You can:</p> <ul style="list-style-type: none"> • Group parallel interfaces metric changes together. • Group interface metric changes from the same source if there is no impact to maximum utilization. <p>For more information, see "Changeover" chapter ("Running the Changeover Tool" topic) in the <i>Cisco WAE Design 7.2.1 User Guide</i>.</p>

Feature	Description
Enhancement to SR policy modelling to support multiple candidate path	<p>SR policy is enhanced to support multiple candidate path along with preference.</p> <p>If an SR LSP contains multiple SR Candidate paths, the demand is routed on the LSP path with the highest preference option for which the demand can be routed from source to destination.</p> <p>For more information, see "Segment Routing Simulation" chapter ("SR LSP Routing" topic) in the <i>Cisco WAE Design 7.2.1 User Guide</i>.</p>
RSVP-TE Optimization Tool enhancements	<p>In Cisco WAE Design, the RSVP-TE Optimization Tool is enhanced to allow you to set avoidance constraints.</p> <p>Navigate to Tools → RSVP LSP Optimization → RSVP-TE Opt. Avoid Objects section in the Advanced tab lets you to select Nodes, Interfaces, L1 Links, L1 Nodes, SRLGs to be avoided when optimizing LSPs.</p> <p>For more information, see "RSVP-TE Optimization" chapter ("Optimization Input" topic) in the <i>Cisco WAE Design 7.2.1 User Guide</i>.</p>
WAE Live Database management	<p>Cisco WAE Live database management now provides you with the following options:</p> <ul style="list-style-type: none"> • Manage database space by the age of the record. • Manage database space by the % of the disk capacity. <p>The dependency on Oracle Java is also removed.</p> <p>For more information, see "Performing Administrative Tasks" chapter ("Database Management" topic) in the <i>Cisco WAE Live 7.2.1 User Guide</i>.</p>
Inventory data collection timestamp	<p>On WAE Live → Inventory page, the Table view is updated to include Last Collected field at the bottom of the page which displays the date and time of last collected data.</p> <p>For more information, see "Viewing Inventory" chapter ("Viewing the Inventory Table" topic) in the <i>Cisco WAE Live 7.2.1 User Guide</i>.</p>
Digital Signing	<p>Cisco WAE software (including WAE Design and WAE Live) now come with digital signatures. The verifiable digital signatures ensure that the Cisco WAE software running on your systems is secure and has not been tampered with, and that the software originated from a trusted source.</p> <p>For more information, see <i>Cisco WAE 7.2.1 Installation Guide</i> and <i>Cisco WAE Design 7.2.1 GUI Installation Guide</i>.</p>
Enhancement to SR policy modelling to support multiple SID type	<p>Cisco WAE is now updated to support additional SID types - Interfaces, Nodes, Node Groups, LSPs.</p>
Cisco WAE scaling	<p>WAE is now enhanced to support 3000 nodes for modeling, simulation and optimization.</p>
EPNM 3.0 support for optical collection	<p>WAE now supports EPNM 3.0 with NCS2K (11.0/11.1).</p>
WAE performance improvements	<p>NIMOs are now enhanced to support native format.</p>
Inter AS BGP enhancement	<p>AS-merge is enhanced to handle dropped demands.</p>

Feature	Description
WMD - Increase in robustness	Performance of WMD interacting with SAGE is improved.

Upgrade to Cisco WAE 7.2.1

Follow the below workflow to install or upgrade to Cisco WAE 7.2.1:

- [Install and Configure Supervisor, on page 6](#)
- [Verify WAE Image, on page 7](#)
- [Install Cisco WAE, on page 7](#)

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.

Procedure

Step 1 Install supervisor and verify.

```
sudo yum install -y epel-release
sudo yum install -y supervisor
supervisord -version
3.1.4
```

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

Procedure

Step 1 Download the Cisco WAE 7.2.1 software package from [Cisco Download Software](#) site.

Step 2 The certificate and digital signature are both embedded in the downloaded file `-wae-linux-v7.2.1.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-v7.2.1.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-v7.2.1.bin using WAE-CCO_RELEASE.cer
```

Step 4 The generated `wae-linux-v7.2.1.bin` is the Linux installer for WAE.

Install Cisco WAE

Before you begin

- 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 supervisor is installed and configured. See [Install and Configure Supervisor, on page 6](#).

- Download and verify the digitally signed Cisco WAE 7.2.1 image. See [Verify WAE Image, on page 7](#).
- Make sure Java-8 is installed on the system and `JAVA_HOME` environment variable is pointing to `jdk-1.8`.
- Make sure that `requests.auth` python package is installed for the BW-OPT application to function in WAE.
- For migrating the existing 7.1.x configurations to 7.2.1 please go through the README file provided with “*Cisco WAE upgrade script for migrating configurations from WAE 7.1.x to WAE 7.2.1*” package from CCO.

Procedure

Step 1 Stop WAE if running.

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

```
chmod +x wae-linux-v7.2.1.bin
```

Step 3 Run the installer specifying the target directory.

```
./wae-linux-v7.2.1.bin <wae-dir>
```

Step 4 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.

Step 7 Update supervisor configuration.

```
supervisorctl update
```

Step 8 Start WAE process

```
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

```

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:

```
supervisorctl stop wae:*
```

Supported Node Versions

The following table lists the supported node versions for Cisco WAE 7.2.1

Table 2: Supported Node Versions for Cisco WAE 7.2.1

Feature	Product	Tested with version	Notes
SRTM	IOS-XR	6.6.2 + SMU, 6.5.3 + SMU	
Netconf LSP	IOS-XR	6.5.1	NED Version: ncs-4.7.4-cisco-iosxr-7.11.1
	IOS-XR	15.3	NED Version: ncs-4.7.4-cisco-ios-6.22.1
	Juniper Junos Mx960	18.1R1.9	NED Version: ncs-4.7.1-juniper-junos-4.1
RT Apps, Multi XTC, Reactive polling.	IOS-XR	6.6.2 + SMU, 6.5.3 + SMU	
Multilayer	NCS2K	10.9, 11.0	
	EPNM	3.0.3	

Resolved Bugs

The following are descriptions of the resolved bugs in Cisco WAE Release 7.2.1:

Table 3: Resolved Bugs

Bug ID	Description
CSCvn17584	Running <code>topo-vpn-nimo</code> to discover L3 and L2 VPNs in a network results in error.
CSCvp60520	Unable to keep active connection with XTC.
CSCvp62803	WMD does not get traffic from <code>traffic-poll-nimo</code> .

Bug ID	Description
CSCvq34672	rpc-error occurs on downloading .pln file from WMD using WAE-Design.
CSCvq36413	'Traffic fitting failed error' message displayed during Demand Deduction.
CSCvq54725	Interfaces with Util Sim higher than 100% due to demands coming from netflow.
CSCvq59755	'Bad file descriptor' error message is displayed when external-executable-nimo is executed.
CSCvq70190	zookeeperctl.out file is filled up with a lot of messages.
CSCvq74682	WAE High Availability does not work as expected.
CSCvq79488	Java Exception in topo-igp - Out Of Memory.
CSCvq86258	WAE XTC agent keeps multiple connections with XTC and is not consuming the information sent by XTC, increasing XTC memory usage.
CSCvq87842	topo-bgp-nimo collection is unable to complete the upload to CDB due to "Invalid Value" error for peer-id.
CSCvr09357	traffic-demands-nimo is not executed at regular intervals and at times it is not executed correctly.
CSCvr12252	The final network model does not have the layout coming from layout-nimo. It gets corrupted.
CSCvr85317	The DARE aggregation fails after few hours.
CSCvr86225	wae.log captures many CRIT errors showing instabilities in the processes and results in WAE restarting. /tmp folder get filled upto 100% when topo-vpn-nimo is executed.
CSCvm34065	DARE does not process changes, displays 'Queue full' error message.
CSCvm57253	Packages reload when simultaneous collections are scheduled.
CSCvn49160	Following error is seen while loading plan file with L1 and L3 information: wae@wae# wae components load-plan run plan-file /home/wae/bonn-agg_v30.pln network-name bonn-archive Error: Python cb_action error. external error (19): Error on line 588: unknown element: dispaly-name
CSCvo78480	DARE rebuild creates another DARE network when one network gets sourced to multiple DARE network.
CSCvq01121	The traffic balance of external endpoint member is rounded off when a plan file is imported.
CSCvq26753	WAE DARE does not consolidate NIMOs when node-filter configuration is changed
CSCvq38200	inter-as-nimo deletes ASes previously merged from newly merged plan files that are not related to the other merges.
CSCvq39102	login_test and snmp_test tools are not packaged with WAE collector.
CSCvq53205	Supervisorctl file limits need to be increased at Install time.
CSCvq54298	WAE is unable to discover Huawei CX600 boxes and hardware inventory
CSCvq56906	Intermittent Failures while writing plan files to Archives.

Bug ID	Description
CSCvr51385	Maximum opened files option in netflow agent or flow collector tools is always set to 4096 when WAE is started using <code>supervisorctl</code> .
CSCvr84760	Kafka issue impacting multiple components.
CSCvp44310	WAE Design application is slow to recompute simulated traffic numbers when the Multicast tables are included.
CSCvq57634	On WAE Design, Save to -> Template option must be enhanced to allow the operator to update <code>layout-nimo</code> template file directly to WAE Server.
CSCvq84759	Introduce <code>NetIntHistory</code> details in the output plan file.
CSCvr24303	On WAE Design, introduce Save option to WAE server to improve performance.
CSCvr38394	When trying to execute <code>run-config-parse</code> , WAE fails with illegal reference error for <code>p2mp-lsp-name</code> .

Documentation

To find descriptions of all related Cisco WAE documentation, see [Documentation Roadmap](#).



Note We sometimes update the documentation after original publication. Therefore, you should always review the documentation on Cisco.com for any updates.

Filing a Cisco WAE Bug

While filing CDETS for Cisco WAE, make sure the following information is captured:

- WAE configuration: supervisor configuration, aggregator configuration and the nimo configuration of concerned network and its source-network, if any.
- `<run-dir>/logs/` directory
- Plan file(s) for the network(s) of concern
- `<run-dir>/data/stats/` for system stability and resource usage related issues
- `<run-dir>/work/dare/` for aggregation related issues.
- `<run-dir>/data/networks/*.db` for issues related to networks configured as 'native' and the corresponding aggregator (final-network).
- CDB dump of the networks of concern for networks of 'yang' format ('yang' is the default storage-format).
- Configuration corresponding to the component of concern. Eg: WMD, archive etc.
- For collection issues, record file(s) if the nimo supports record-playback.
- `~/cariden/logs/` for designapid related issues.

Using the Cisco Bug Search Tool

You can use the Cisco Bug Search Tool to search for a specific bug or to search for all bugs in a release.

Procedure

Step 1 Go to the <http://tools.cisco.com/bugsearch>.

Step 2 Enter your registered Cisco.com username and password, and click **Log In**.

The Bug Search page opens.

Note If you do not have a Cisco.com username and password, you can <http://tools.cisco.com/RPF/register/register.do>.

Step 3 Use any of these options to search for bugs, and then press Enter (Return) to initiate the search:

- To search for a specific bug, enter the bug ID in the Search For field.
- To search for bugs based on specific criteria, enter search criteria, such as a problem description, a feature, or a product name, in the Search For field.
- To search for bugs based on products, enter or select a product from the Product list. For example, if you enter “WAE,” you get several options from which to choose.
- To search for bugs based on releases, in the Releases list select whether to search for bugs affecting a specific release, bugs that were fixed in a specific release, or both. Then enter one or more release numbers in the Releases field.

Step 4 When the search results are displayed, use the filter tools to narrow the results. You can filter the bugs by status, severity, and so on.

To export the results to a spreadsheet, click **Export Results to Excel**.

Accessibility Features

For a list of accessibility features in Cisco WAE, visit <https://www.cisco.com/c/en/us/about/accessibility/voluntary-product-accessibility-templates.html> (VPAT) website, or contact accessibility@cisco.com.

All product documents except for images, graphics, and some charts are accessible. If you would like to receive the product documentation in audio format, braille, or large print, contact accessibility@cisco.com.

