



Network Model Configuration—Expert Mode

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Expert Mode Overview

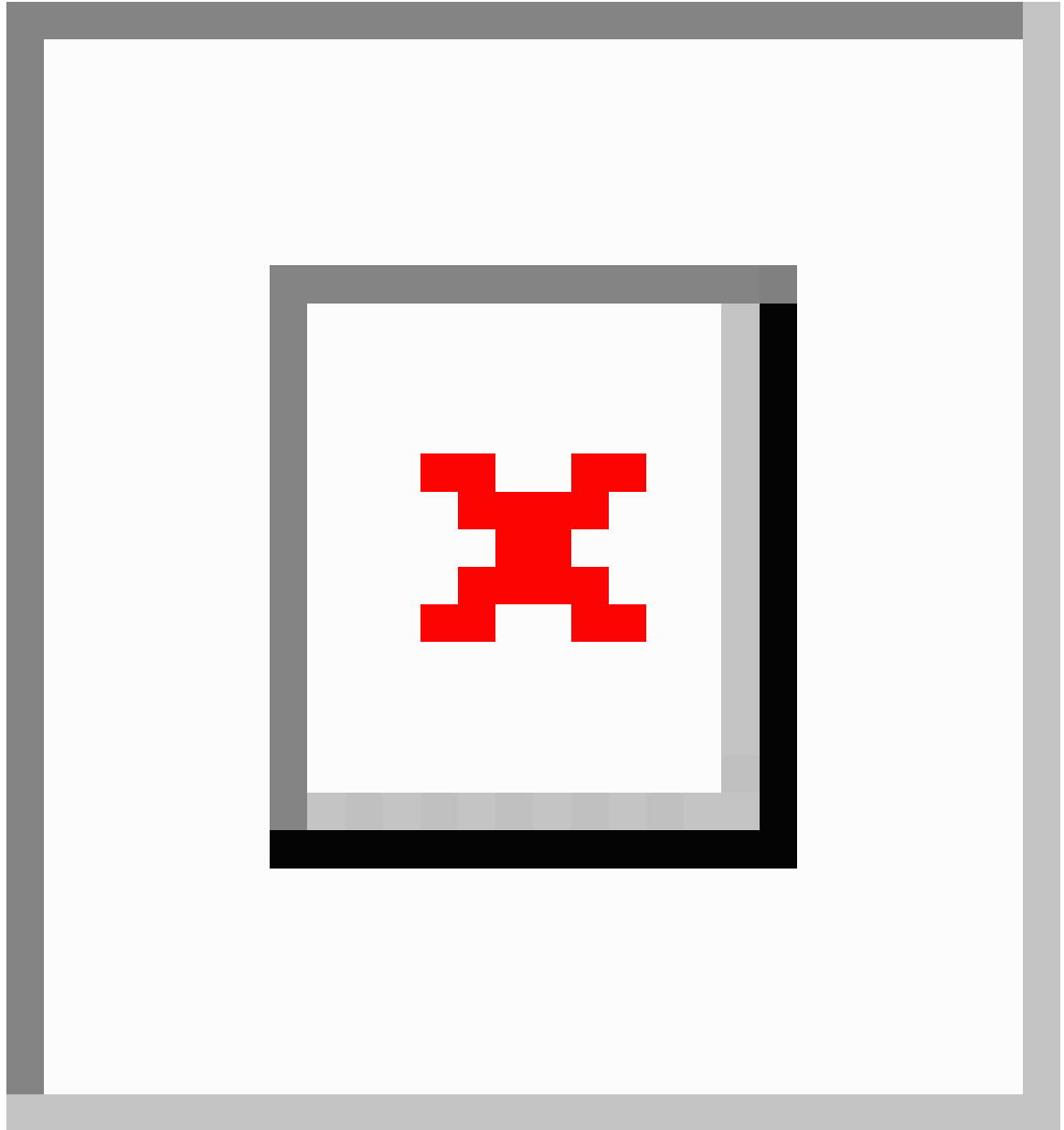
The Expert Mode is a YANG model browser with additional device and service functionality that might not be available in the WAE UI. You might also prefer to use the Expert Mode over the WAE CLI because all options for each operation are visible on the Expert Mode.

The Expert Mode is a mix of custom-built widgets and auto-rendering from the underlying device, service, and network models. The Expert Mode is immediately updated when new devices, NIMOs, or network models are added to the system.

In the top-right corner of the Cisco WAE UI (<https://server-ip:8443>), click the icon to access the Expert Mode:

The purpose of this section is to illustrate the Expert Mode and go over procedures to get you up and running. This section does not go into advanced configurations. It is assumed that once you understand the basic procedures, you can configure more complex operations.

Figure 1: Expert Mode Interface



Callout No.	Name	Description
1	wae:wae	Navigate to this path to configure global settings and agents.
2	wae:networks	Navigate to this path to configure network settings and NIMOs.
3	Root directory	Click this icon to access the wae:networks and wae:wae paths.
4	Breadcrumb	Indicates where in the directory structure you are.
5	Commit button	Click this button to commit any configuration changes.

Navigation and Commit

When an object type (for example, a network instance) is selected, a list of all related object instances is shown. When performing network configuration operations, click the **Commit** button to save the changes. For more information on Commit functionality, see [Commit Flags](#).

Configure a Network Model Using the Expert Mode

This workflow describes the high-level configuration steps on how to create a network model using the Expert Mode.

Step	For more information, see...
1. Configure device authgroups and SNMP groups.	Configure Device Access Using the Expert Mode, on page 3
2. Configure a network access profile.	Configure Network Access, on page 4
3. Configure agents. Note This step is only required for collecting XTC or multi-layer information.	<ul style="list-style-type: none"> • Configuring XTC Agents Using the Expert Mode, on page 5 • Configure the Configuration Parsing Agent Using the Expert Mode, on page 7
4. Create a network and collect basic topology data. Note If you plan to consolidate network models and collect more than basic topology (for example, merge topo-bgppls-xtc-nimo and lsp-pcep-xtc-nimo information into one final network model), configure DARE and create networks where collections have not yet been executed. For more information, see NIMO Collection Consolidation .	Create a Network Model, on page 8
5. Configure additional data collections.	Configure Additional NIMOs, on page 9
6. (Optional) Configure the Scheduler.	Scheduler Configuration
7. Configure and view plan archives.	Configure the Archive and View Plan Files Using the WAE Expert Mode, on page 10

Configure Device Access Using the Expert Mode

Cisco WAE uses authgroups for login and SNMP access to the devices. The following procedure describes how to use the Expert Mode to configure authgroups and network access.

- Step 1** From the Expert Mode, set up authgroups.
- Navigate to `/ncs:devices` and click the **authgroups** tab.

- b) Click **group**.
- c) Click the plus (+) sign, enter an authgroup name, and click **Add**.
- d) Click **default-map** and enter the default authentication parameters. For example, choose **remote-name** from the drop-down list, check the **default-map** check box, and enter the remote name string credentials.

Note If not visible, scroll down to view and enter the remote secondary password.

Step 2 Set up SNMP groups.

- a) Navigate back to **/ncs:devices/authgroups** and click the **snmp-group** tab.
- b) Click the plus (+) sign and enter an SNMP group name.
- c) Check **default-map** and enter the default SNMP credentials. For example, choose **community-name** from the drop-down list, check the **default-map** check box, and enter the community string credentials.
- d) If configuring SNMPv3, click the **usm** tab and enter in the applicable User-based Security Model (USM) values (remote user, security level, authentication, and privacy protocols). For more information on USM values, see the SNMPv3 options explained in the following WAE UI procedural topic: [Configure Network Access Using the Cisco WAE UI](#).
- e) Click the **Commit** button.

What to do next

Create a network access profile. See [Configure Network Access, on page 4](#).

Configure Network Access

Step 1 Navigate to **/wae:wae** and click the **nimos** tab.

Step 2 Click **network-access**.

Step 3 Click the plus (+) sign and enter a network access name.

Step 4 Select and enter the appropriate network access details.

The default authgroups and SNMP groups you configured earlier are available in the drop-down lists. For more information, see [Configure Device Access Using the Expert Mode, on page 3](#).

Step 5 Click the **node-access** tab to enter the management IP address of the router.

- a) Click the plus (+) sign, enter the IP address, and click **Add**.
- b) Enter the associated management IP.

Repeat these steps as necessary for all management IPs.

Step 6 Click the **Commit** button.

What to do next

After completion of this task, you can create a network and run basic data collection.

Configure Agents Using the Expert Mode

Agents perform information-gathering tasks and must be configured before certain network collection operations. This section describes how to configure these agents using the Expert Mode.

Configuring XTC Agents Using the Expert Mode

The XR Transport Controller (XTC) agent periodically collects information from XTC and keeps it as raw and normalized data. The agent is used to connect to the REST interface of XTC and retrieve the PCE topology. This data is consumed by different applications (Bandwidth on Demand) and NIMOs (topo-bgpls-xtc-nimo and lsp-pcep-xtc-nimo) to extract topology, LSPs, and so on. An agent must be configured for every XTC node in the network. XTC agents must be configured for any networks that use XTC before you can perform a network collection.

Step 1 From the Expert Mode, navigate to **wae:wae** and click the **agents** tab.

Step 2 Click **xtc**.

Step 3 Click the plus (+) icon to add agents.

Step 4 Enter the following information:

- XTC agent name.
- **xtc-host-ip**—Host IP address of the XTC router.
- **xtc-rest-port**—Port number to use for REST calls to the XTC host. The default is 8080.
- **use-auth**—To use HTTP basic authentication with defined credentials, choose **true** from the drop-down list.
- **auth-group**—XTC credentials that were defined in [Configure Device Access Using the Expert Mode, on page 3](#).
- **batch-size**—Number of nodes to send in each message. Default is 1000.
- **keep-alive**—Interval in seconds to send keep-alive messages. Default is 10.
- **max-lsp-history**—Number of LSP entries to send. Default is 0.
- **enabled**—Enables the XTC agent. Default is true.

As long as the **enabled** option is set to true, the XTC agent starts right away after configuration or when WAE starts. In the same respect, the XTC agent stops when the configuration is removed, if WAE has stopped, or the enabled option is set to false.

Step 5 Click **Commit**.

Step 6 Repeat these steps for all XTC nodes.

Step 7 To view the raw data, navigate back to **/wae:wae/agents/xtc-agent:xtc/xtc/<agent-name>** and click the **pce** tab.

Step 8 Click the appropriate data containers (topology-nodes, tunnel-detail-infos, and xtc-topology-objects) to view the raw data.

To confirm data was collected successfully, navigate to **/wae:wae/agents/xtc-agent:xtc/xtc/<agent-name>** and click the **status** tab. You can view the time stamp of the last successful collection.

Note The WAE XTC agent keeps updating in the back end even after a restart is successful. The status of XTC agent update can be seen from data received and data reports flags from XTC agent status. The value of more than 0, means that agent update is completed.

What to do next

Configure collections for networks that use XTC. For more information, see [NIMO Descriptions](#).

Configuring Netflow Agents Using the Expert Mode

The netflow agent collects and aggregates exported NetFlow and related flow measurements. These measurements can be used to construct accurate demand traffic data for WAE Design.

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- Step 1** From the Expert Mode, in **Configuration editor**, navigate to **wae:wae** and click the **agents** tab.
- Step 2** Click **netflow**.
- Step 3** Select the operation mode from **mode** drop down list. Choose between **single** or **controller and processor**. Select single mode for CNF collection.
- Step 4** In the **config** tab, enter all the details for **controller**, **processor**, **jms** and **common**.
- The controller node, processor node, jms and common folders are displayed based on the operation mode selected.
- Note** For CNF, though the mode is Single, it is mandatory to configure the controller node, processor node. Give valid json file for `cluster-config-file-path` under Controller tab, and valid `service-instance-id` under Processor tab matching the entry inside json file.
- Step 5** Click **Commit**.
- Step 6** In the **netflow** tab, click **start** > **Invoke start** to start collecting.
- Step 7** Click **stop** > **Invoke stop** to stop collecting.
- Step 8** Run the **status** > **Invoke status** to request agent status using CLI:

```
wae agents netflow status
status true
message
CLUSTER STATUS - BEGIN

AGENT NODE - BEGIN
cluster ID:                wae-netflow-agent
instance ID:               agent-single
```

- Note**
- Open standard OS terminal.
 - Ensure `waerc` file is sourced.
 - Run following command:

```
sudo /home/wae/test/run/packages/cisco-wae-netflow-agent/priv/bin/flow_cluster_manage
-action prepare-os-for-netflow
```

- Stop wae and restart your system.

You need to do this only once before the first run of netflow collection.

Example

Following is a sample agent config:

```
admin@wae# show running-config wae agents netflow
wae agents netflow mode single
wae agents netflow config controller cluster-config-file-path
/opt/wae-netflow/flow-config-single.json
wae agents netflow config processor service-instance-id agent-single
wae agents netflow config common log-level debug
```

What to do next

Configure collections for networks that use Netflow. For more information, see [NIMO Descriptions](#).

Configure the Configuration Parsing Agent Using the Expert Mode

The Configuration Parse agent can collect (run-config-get) and parse data (run-config-parse) from Cisco, Juniper, and Huawei router configuration files. The agent can retrieve the configuration by determining the router type/vendor and parsing the configuration. After parsing this information, the tool matches corresponding interfaces in the IGP mesh to create the network topology. For information on what types of router configurations the agent can read, see [Router Configuration Information, on page 8](#). This agent can be used to parse LSP, VPN, port, and Shared Risk Link Groups (SRLG) data. The agent is used in the following NIMOs:

- SRLG Configuration Parse (srlg-cfg-parse-nimo)
- VPN Configuration Parse (vpn-cfg-parse-nimo)
- Port Configuration Parse (port-cfg-parse-nimo)
- LSP Configuration Parse (lsp-cfg-parse-nimo)
- Topology Configuration Parse (topo-cfg-parse-nimo)

The agent can retrieve the configuration by determining the router type/vendor and parsing the configuration. After parsing this information, the tool matches corresponding interfaces in the IGP mesh to create the network topology. For information on what types of router configurations the agent can read, see [Router Configuration Information, on page 8](#).

The following procedure describes how to configure the agent using the Expert Mode. You can also use the Cisco WAE UI to configure this agent ([Cisco WAE UI Overview](#)).

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- Step 1** From the Expert Mode, navigate to **wae:wae** and click the **agents** tab.
 - Step 2** Click **cfg-parse**.
 - Step 3** Click the plus (+) icon to add agents and enter a Configuration Parsing agent name. This can be any arbitrary name.
 - Step 4** If configurations are already being saved for your network, enter a directory where the configurations are stored; for example, `/home/user1/wae/etc/configs/gc_out`. Alternatively, enter the path where configurations are saved if you are using the agent to get configurations.
 - Step 5** If you want to retrieve configurations, click the **get** tab and choose the network access. If you only want to parse existing configurations, skip to Step 8.
 - Step 6** Click **Commit**.
 - Step 7** Navigate back to the **cfg-parse** tab and click **run-config** > **Invoke run-config-parse**.
 - Step 8** Click the **parse** tab.

- Step 9** Enter configuration parse values. To view field descriptions, hover the mouse pointer over the field name. More information on some of the fields are described below :
- **igp-protocol**—Choose which interfaces are part of the topology: IS-IS and/or OSPF-enabled interfaces. The default is IS-IS.
 - **ospf-area**—The agent can read information for single or multiple areas. The -ospf-area option specifies the area ID or all. The default is area 0.
 - **isis level**—The agent can read IS-IS Level 1, Level 2, or both Level 1 and Level 2 metrics. If both are selected, the agent combines both levels into a single network. Level 2 metrics take precedence.
 - **asn**—ASN is ignored by default. However, for networks that span multiple BGP ASNs, use this option to read information from more than one IGP process ID or instance ID in an ASN.
 - Click **include-object** to add collection types: base, lag, srlg, rsvp, vpn, frt, sr_lsps, lmp, and sr_policies.
- Step 10** Click the plus (+) icon and choose a collection type from the drop-down list.
- Step 11** Click **Commit**.
- Step 12** Navigate back to the **cfg-parse** tab and click **run-config-parse > Invoke run-config-parse**.
- Step 13** To verify that the agent is running successfully, click the **model** tab > **nodes**. The list of nodes appears.

Example

If using the WAE CLI (in config mode):

```
wae@wae(config)# wae agents cfg-parse cfg-parse <cfg_parse_agent_name>
wae@wae(config-cfg-parse-<agent>)# directory <path_to_config_dir>
wae@wae(config-cfg-parse-<agent>)# get source-network <13_network_name>
wae@wae(config-cfg-parse-<agent>)# get network-access <network-access>
wae@wae(config-cfg-parse-<agent>)# parse igp-protocol <ospf/isis>
wae@wae(config-cfg-parse-<agent>)# parse include-object base
wae@wae(config-cfg-parse-<agent>)# parse include-object lmp
wae@wae(config-cfg-parse-<agent>)# exit
```

Router Configuration Information

The following router configuration information can be read by the Configuration Parse agent:

<ul style="list-style-type: none"> • Router name • Router IP address (loopback) • Interface names (inside IGP topology) • Interface IP addresses • Interface capacities (if available) 	<ul style="list-style-type: none"> • IGP type and metrics (IS-IS or OSPF) • RSVP reservable bandwidth (MPLS) • LAG ports (for Ethernet) and bundle ports (for different link types)
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Create a Network Model

When creating a network you must also configure basic topology collection using the topo-igp-nimo or the topo-bgpls-xtc-nimo. The following procedure describes the first configuration step using the Expert Mode.

Before you begin

- Confirm that device access and network access are configured. For more information, see [Configure Device Access Using the Expert Mode, on page 3](#) and [Configure Network Access, on page 4](#).
- If creating a network running XTC, confirm that XTC agents have been configured. For more information, see [Configuring XTC Agents Using the Expert Mode, on page 5](#).

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- Step 1** From the Expert Mode, navigate to `/wae:networks`.
- Step 2** Click the plus (+) sign and enter a network model name.
- Step 3** Click **Add**.
- Step 4** Click the **nimo** tab.
- Step 5** From the **Choice - nimo-type** drop-down list, choose one of the following:
- **topo-igp-nimo**—Collect topology information using the IGP database. For more information on options, see [Topology Collection Using the IGP Database](#).
 - **topo-bgpls-xtc-nimo**—Collect topology information from a network running XTC. This NIMO requires a configured agent. For more information, see [Topology Collection Using XTC](#) and [Configuring XTC Agents Using the Expert Mode, on page 5](#).
- Step 6** Click the corresponding link. For example, if you chose `topo-igp-nimo`, click the **topo-igp-nimo** link and enter the applicable parameters.
- Step 7** Click the **Commit** button. This network model can now be used as the source network for additional network collections.
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What to do next

Configure additional network collections using this network model as the source network. For more information, see [NIMO Descriptions](#).

Configure Additional NIMOs

This topic only describes the general steps on configuring different types of advanced network data collection. NIMOs are used to collect different types of data. Some NIMOs require the configuration of agents. For more information, see [NIMO Descriptions](#).

Before you begin

You must have a network model with basic collection to be used as a source network. For more information, see [Create a Network Model, on page 8](#).

-
- Step 1** From the Expert Mode, navigate to `/wae:networks/network/network_name`.
- Step 2** Click the **nimo** tab.
- Step 3** From the **Choice - nimo-type** drop-down list, select a NIMO to configure.
- Step 4** Enter the appropriate parameters for the selected NIMO.
- Step 5** Click the **Commit** button.

Step 6 Click **run-collection** > **Invoke run-collection**.

Configure the Archive and View Plan Files Using the WAE Expert Mode

After creating a network model and running collection, you have the option to retrieve and view plan files. Plan files capture all relevant information about a network at a given time, and can include topology, traffic, routing, and related information.

The Archive is a repository for plan files. See also [Configure the Archive Using the WAE CLI](#), which describes how to configure the Archive using the WAE CLI.

- Step 1** Navigate to `/wae:networks/network/<network_model_name>` and click the **plan-archive** tab.
- Step 2** Enter the archive directory.
- Step 3** From the source drop-down list, select **cdb** (configuration database) or **file**.
- Step 4** Click **commit**.
- Step 5** To save the current network model to a plan file into the archive directory you specified, click **run**.
- Step 6** To retrieve a plan file:
- Click **get**.
 - Enter timestamp and plan format.
Hover over the fields to view what format is expected.
 - Click **Invoke get**.
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What to do next

From the WAE Design GUI, you can open plan files residing on WAE Archive.