



Services and Statistics

Access: Web home page, click WAE Statistics.

The Statistics pages enable you to configure, monitor and troubleshoot all services and servers.



Note

The WAE Statistics page does not appear in some web browsers if you do not have the correct SSL certificates. To work around this, install the correct SSL certificates (see the [“Installing an SSL Web Certificate” section on page 10-2](#)) or do the following:

1. Click the WAE Statistics link. The URL format is `https:// <server_IP> :8443`. For example, `https://192.0.2.14:8443`
 2. Copy the URL of this page to another browser window.
 3. In the new browser, change the URL port from 8443 to 8843. For example, `https://192.0.2.14::8843 Ex`
 4. Follow the browser messages to accept the connection and add it as an exception.
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The following terms are used on these UI pages and in this documentation.

- **Service**—An instance of a program that is being executed. Depending on the process, it may have multiple threads of concurrent execution.

Note that the terms *service*, *process*, and *function* are used interchangeably. For example, the Processes page lists services. The Platform Diagnostics page, Functions tab shows services per component.

- **Component**—A server or host that is running services. It can be either a device or a virtual machine. A component can reside as a stand-alone system or it can be one of the servers in a distributed (high-availability) environment.

Note that the terms *component*, *server*, and *host* are used interchangeably.



Note

If you do not see the Statistics UI, make sure the System services are running. If they are not, turn on the System services through the CLI. For information, see [Events](#).

Services

Service Types

Service	Description
Automation Services	
wae-appenginecore	Service API that manages and routes requests to load the network model to the appropriate wae-designapiserver.
wae-core	Service that enables the WAE Core server to use WAE Core REST and Thrift APIs.
wae-db	Service for the WAE Core database server.
wae-designapiserver	Service that enables wae-appenginecore to use the Design APIs. This wraps the Design APIs and controls Design API instances.
wae-messaging	WAE messaging service that uses JMS (Java Message Service).
wae-osc	Service that enables the OSC (Open SDN Controller) server.
WAE Services	
All of the above Automation services, plus the following.	
wae-mlb	Service that enables the WAE Live datastore server.
wae-ni	Service that enables the northbound WAE Network Interface (NI) APIs. WAE NI is used for continuous polling and for continuous PCEP LSP collection.
wae-web-server	Service that enables the web server used by the Collector server, all web applications, web System UI, and web Statistics UI.
System Services	
wae-svcs-dashui	Service that controls the UI dashboard used for displaying logs and diagnostics in the Statistics UI.
wae-svcs-db	Service that enables the datastore that stores statistic information.
wae-svcs-logagent	Service that forwards log entries from client applications to wae-svcs-db.
wae-svcs-metricsbkr	Service that receives the collected diagnostic entries from client applications to wae-svcs-db.
wae-svcs-metricsd	Service that collects diagnostic entries from client applications.
wae-svcs-mon	Service that monitors all services and automatically restarts them in the event of ungraceful terminations (such as with a kill command).
wae-svcs-ui	Service used to enable the Statistics UI.
wae-svcs-log	Service that forwards client application log entries to syslog.

Monitor Services

The wae-svcs-mon service automatically monitors all wae-svcs*, wae-ni, and wae-web-server upon installation completing. It also monitors the Automation services once they are started. If the system is rebooted or if you “ungracefully” stop a process, such as with a kill command, wae-svcs-mon automatically restarts the service. Therefore, the only way to shut down a service is as follows:

```
service <service_name> stop
```

**Note**

The `wae-mld` service is not monitored.

Service Location

The scripts for starting and stopping Automation and WAE services are located in `/etc/init.d` and `/usr/local/bin`. Whether these scripts are executed on startup is handled by symbolic links created in `/etc/rc#.d` directories, where # is a number 0 through 6.

You can use `chkconfig` to disable, enable, and view startup settings. Note that you must have root permission to execute `chkconfig` commands.

For more information on `service` and `chkconfig` utilities, use their `man` pages.

```
man service
man chkconfig
```

The System services are located in `/etc/init.d`.

Ports

The ports that servers are listening to are listed in the *System Requirements* document posted on cisco.com. Following is an example of how to verify that the WAE Core service started and is listening to the correct port, which by default is 7777.

```
netstat -anp | grep 7777
```

Viewing Service Status Details

Access: WAE Statistics > Processes.

The Process Status page shows the status of all services except `wae-mld`. The column headings list the hostname and IP address for each server (host). For each service that is running on a host, an icon appears on the service row under the appropriate host column. The icon color indicates the status of the service under the related host.

- Green—The service is operational and running.
- Red—The service is not reachable.
- Gray—The service is either initializing or is not being monitored. To enable monitoring, see

If a service is not available, a dash appears in the cell for that host.

Click the circular icon to view service status details, such as the service uptime, data collection timestamp, and the memory and CPU usage on that server.

There are two types of services monitored: WAE services and System services.

- WAE services—These services operate WAE. Monitoring these services enables you to determine if the products are properly communicating. For instance, if `wae-ni` displays red, then you know the WAE Network Interface (NI) server might have stopped running. You could also determine network issues, such as if a port were blocked by a firewall or if a WAE server could not communicate with the network.

- System services—These services enable you to gather and view the statistics. Checking these services is a good way to stay informed of whether you are properly gathering the data needed to monitor and troubleshoot WAE.

The status is updated every 15 seconds. You can also refresh the status by clicking the upper right Refresh icon.

Managing and Configuring Services

If you have an admin role, you can perform the following tasks using the WAE UI:

- Start, stop, and restart a service.
- Enable or disable monitoring of a service.
- Enable or disable a service from automatically starting at system boot.



Note

System services and `wae-web-server` cannot be disabled at boot. You can only start, end, and restart `wae-web-server` using the CLI. For more information, see [Starting and Stopping Services Using the CLI](#).

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- Step 1** From the WAE UI, select **WAE Statistics > Processes**. The Process Status lists all running services.
- Step 2** Click the circular icon that belongs to the WAE service that you want to configure.
- Step 3** Click the appropriate button to perform the desired action. If there are no buttons available, then that service cannot be configured.
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Events

Access: WAE Statistics > Events.

Viewing Event Log Details

The Log Events Detail section shows detailed log information for each service except `wae-mls` and thus, can be used for troubleshooting the system or simply better understanding it. You could use this information for investigating a wide range of issues. For example, you could find logs that identify why a collection failed or find warnings applicable to PCEP LSP deployments.

The most recent 100 logs appear, and log data is kept up to 30 days.

All columns are sortable.

- Time—Time the message was logged.
- ServiceType—Service on which the message is logged.
- ClientId—IP address of the host (component) running the service.
- LogLevel—Type of Log4j log message from Failure to Trace. Each row is color-coded to show its log level. For example, Debug is light green and Info is light blue.

- **Logger**—Method within the service that generated the message.
- **Thread**—Process thread that generated the message.
- **Bundle**—Karaf software component (not the same as a WAE component).
- **Message**—Log message.

You can search for any word in the Log Events Detail section. This search feature uses the query string syntax produced by Elasticsearch. For information on these capabilities, see the Query String Syntax information in the Elasticsearch documentation.

<https://www.elastic.co/guide/en/elasticsearch/reference/current/query-dsl-query-string-query.html#query-string-syntax>

Filter Log Events by Severity

To filter what type of log events are displayed, do the following:

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- Step 1** From the WAE UI, select **WAE Statistics > Events**.
 - Step 2** From the Select Log Level drop-down list, select the minimum log level severity.

The Log Events Detail immediately displays events with the minimum severity level you selected. For example, if you select WARN, all severity levels set to WARN or higher will be displayed. The log level severities are listed in the following order (from highest to lowest): FATAL, ERROR, WARN, INFO, and DEBUG.

Viewing Event Log Graphs

Graph	Description
Log Events Source	Shows the percentage of total logs by service. Each color represents a different service. This enables you to see which of the services is returning the most log messages.
Log Level Counts	Shows the number (count) of messages for the most frequently appearing message type. This enables you to compare the number of log levels that are appearing most frequently.
Log Events Timeline	Shows how events are coming in over time in a stacked graph manner. Each color represents a different log level. A sudden spike in the more serious logs, such as errors, would be indicative of problems that need attention.

Platform Diagnostics

Access: WAE Statistics > Diagnostics.

The Platform Diagnostics page is particularly useful for analyzing trends over time and for being alerted to sudden changes in those trends, which could indicate either problems with one of the servers or a problem in the network. Diagnostics data is kept up to 7 days.

**Note**

You can switch between the system status or utilization graphs by clicking the toggle icon underneath the Refresh icon. For more information on system status, see [Chapter 8, “Local Server Status.”](#)

The default view is Summary of Components in distributed deployments or Components in single-system deployments.

- **Summary of Components and Components**—Summary of Components shows trends of diagnostics for all components. The Components tab show trends for the component in a single-system deployment, or for a selected component in a distributed deployment.

These trends enable you to clearly see changes and potentially correlate these changes with events. If a component is sluggish or not performing as expected based on the past, you would see this as a trend change. For example, if a CPU is running generally at 25% usage and suddenly jumps to 90%, that spike would appear in the graph, and you could then check the Event Logs for errors or warnings that indicate why the CPU percentage drastically increased. If the memory usage trend changed from 5 GB to 25 GB, this change would appear in the graph, and you could check the network to see if a problem had occurred to cause such an increase.

Component diagnostics include CPU percentage usage, memory usage, network usage, and free disk space. For distributed deployments, this is also selectable as “Summary of all Components” from the top, right selection menu. The following options are also available in the top left.

- **Functions**—Shows diagnostics per service running on the selected component. Diagnostics include heap size, thread count, and CPU percentage used. This option is useful when you need more information than available in the Components view.
- **WAE-NI**—Shows interface and LSP diagnostics from WAE NI.

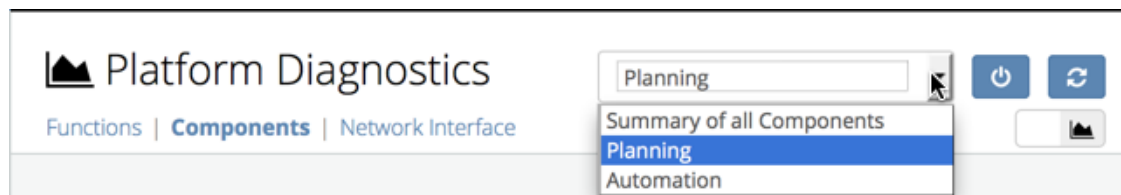
Note that whether the page displays services and whether the page displays information for a distributed deployment differs depending on the option selected.

Option	Shows Single-System Deployment?	Shows Distributed Deployment?
Summary of Components	NA (does not appear as an option)	Yes, all components
Component	Yes	Yes, selected component
Functions	Yes, shows status of component-related services	Yes, shows status of component-related services

**Note**

The `wae-mlld` service is not available from the Platform Diagnostics page.

Figure 7-1 Platform Diagnostics Selections



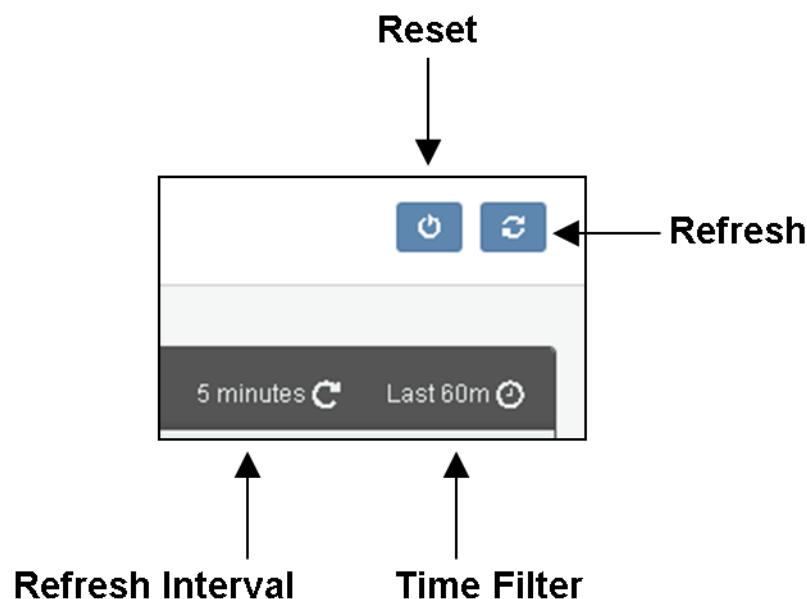
Using the Events and Diagnostic UIs

Time Filters and Refresh Intervals

The time filter and refresh interval in the top right are toggles for showing and hiding the selections to change them (Figure 7-2). The two act in conjunction with each other. The time filter is the amount of time for which the events or diagnostics are displayed. The refresh interval is how often the data is refreshed. For example, on the Platform Diagnostics page, if the time filter is the last 30 minutes and the refresh interval is 5 minutes, this means that every 5 minutes the diagnostics are updated to show the last 30 minutes from that point in time.

The default time filter is 60 minutes, and by default, the information on the pages is not automatically refreshed.

Figure 7-2 Event and Diagnostic Time Features



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Change Time Filter

To change the time filter, click it. A set of choices appear. Once you set the time filter, click **Go**.

- **Quick**—Enables you to select from a set of preset time filters, ranging from the last 15 minutes up to the last 5 years.
- **Relative**—Enables you to specify a time that is relative to the current time. For instance, you could set it to show the data for 2 hours ago. The time extends down to the milliseconds. To round this number, select “round to the *<increment>*” button, where increment changes, depending on your selection.
- **Absolute**—Enables you to a specific date range. Selecting a future time is not applicable.

Change Refresh Interval

To change the time interval, click the time filter or the refresh interval, select Refresh Interval, and then make your selection. You can also turn off the viewing of this interval.



Note

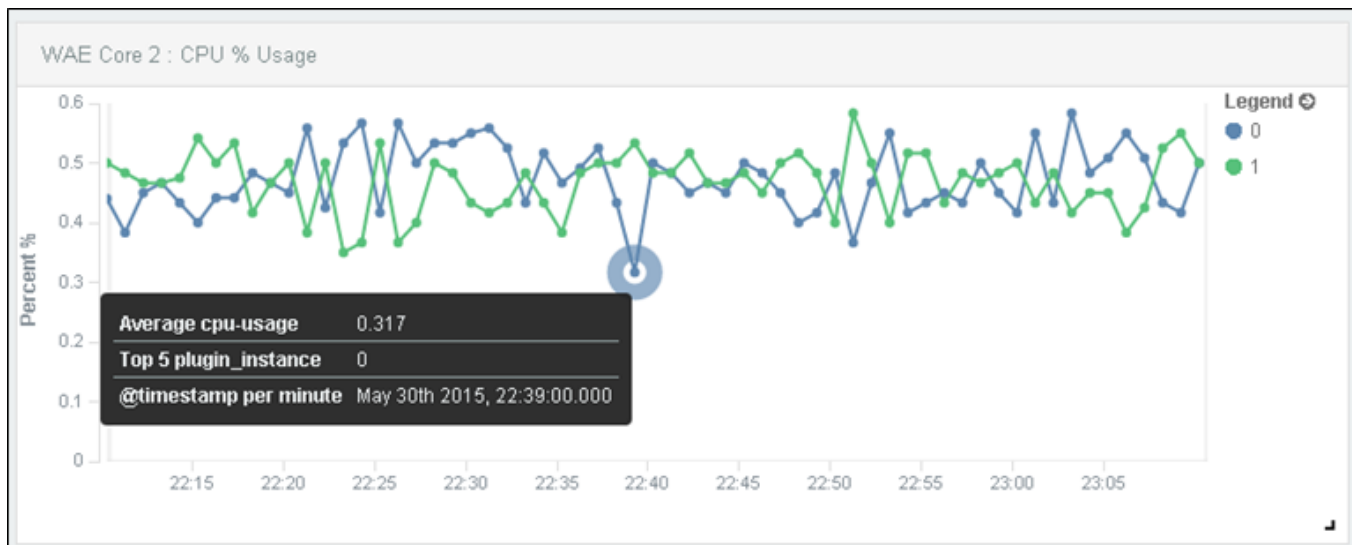
If you leave the page, the refresh setting reverts to the default of not refreshing (off).

UI Tips

- Click the arrow to expand or close the legend that defines what each color represents.
- To highlight information represented by any color, move the cursor over it in the legend or in the graph.
- To reset the time filter, refresh interval, and graph positions to their defaults, click the **Reset** button.
- To move a graph, drag it to the desired location.
- To get more detail about a datapoint in the graph, hover over it.
- To expand or shrink a graph, click and drag the bottom, right corner.

Figure 7-3 shows an example of the CPU% Usage for the WAE Core 2 component. The expanded legend defines the trend lines for CPU cores 0 (blue) and 1 (green). Hovering over the lowest CPU utilization shows more details for it. Notice the icon in the bottom right for expanding and contracting the graph.

Figure 7-3 Example Expanded View with Legend and Tooltip



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