System Metrics Collection on Cisco Expressway

Maintain and Operate Guide

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Introducing System Metrics Collection

What is System Metrics Collection, and how does it work on Expressway?

System Metrics Collection is a feature on Expressway that publishes system performance statistics, enabling remote monitoring of performance.

The Expressway collects statistics about the performance of the hardware, OS, and the application, and publishes these statistics to a remote host (typically a data analytics server) that aggregates the data.

Where do I configure System Metrics Collection?

You can configure this feature on Expressway via the web interface or the command line. The configuration from one peer applies throughout the cluster, so we recommend that you configure it on the master peer if you are monitoring a cluster.

There is also some configuration required on the remote server; the collectd daemon should be running on the server, and should have the collectd network plugin configured to listen on an address that can be seen by the clients. Further details depend on your monitoring environment and are beyond the scope of this information.

How can I use this data?

You can use the data to generate graphs, aggregate statistics, and analyze performance, using tools such as Circonus and Graphite.

Configure System Metrics Collection on Expressway

In the following procedure you'll use the web interface to configure the Expressway to collect statistics and publish them to a specified server. For more detailed descriptions of the options, see System Metrics Reference, page 4.

1. Log on to the Expressway and go to **Maintenance > Logging**
2. Toggle **System Metrics Collection** to *On*
3. Enter the **Collection server address**

   You can use IP address, hostname or FQDN to identify the remote server
4. Change the **Collection Interval** and **Collection server port** if necessary

   You may need to change the port if the collection server is listening on a different port to the default (*25826*). You may need to change the collection interval if your policy requires finer metrics than the default interval (*60*s)
5. Click **Save**

Configure System Metrics on Remote Server

Selection and configuration of the server you choose for data analytics in your environment is beyond the scope of this document. Circonus and Graphite are applications that can handle collectd information.

Your analytics tool must support receiving data from the collectd daemon. This daemon is running on the Expressway and pushes the metrics to your analytics server, using the collectd network plugin.

The network plugin implements the collectd binary protocol for data encapsulation. The analytics server must be able to parse and present this data. Your analytics server will probably have its own UI for configuring how it collects and shows the data, which could be based on collectd or an alternative software.

If you are using collectd on the analytics server, you need to modify *collectd.conf* file so that the server:

- listens for data from the collectd clients (eg. Expressway); you need to enable the network plugin and configure the listen block with the server's IP address. For example:

```
<Plugin "network">
       Listen "198.51.100.15"
</Plugin>
```

- stores the data it receives in a human readable form (eg. to CSV files); you need to enable the csv plugin tell it where to write the files. For example:

```
<Plugin "csv">
       DataDir "/var/lib/collectd/csv"
       StoreRates true
</Plugin>
```

See also

- https://collectd.org/wiki/index.php/Networking_introduction
- https://collectd.org/documentation/manpages/collectd.conf.5.shtml#plugin_network
- https://collectd.org/wiki/index.php/Binary_protocol
- https://collectd.org/wiki/index.php/Plugin:CSV
- https://collectd.org/documentation/manpages/collectd.conf.5.shtml#plugin_csv

Troubleshooting System Metrics

Is the Expressway sending data?

Take a TCP dump from the Expressway and check for packets sent to the address of your data analytics server:

Go to **Maintenance > Diagnostics > Diagnostics logging**, check the box labeled **Take tcpdump while logging**, and then start logging.

System Metrics Reference

What are the configuration options on the Expressway?

Table 1 Configuration commands for collectd on Expressway

What the command does	Web UI location	Example CLI command
Toggle Metrics Collection on/off	**Maintenance > Logging > System Metrics Collection**	`xconfig log SystemMetrics mode: on`
Specify the server address	**Maintenance > Logging > Collection server address**	`xconfig log SystemMetrics network address: address`
Specify the listening port	**Maintenance > Logging > Collection server port**	`xconfig log SystemMetrics network port: 25826`
Specify the collection interval	**Maintenance > Logging > Collection Interval**	`xconfig log SystemMetrics interval: 60`
Read System Metrics configuration	**Maintenance > Logging**	`xstatus SystemMetrics`

What metrics are collected from the Expressway?

The following hardware statistics are monitored:

- aggregation-cpu-sum
- aggregation-cpu-average
- df
- disk
- load
- protocols-Tcp
- protocols-Udp
- swap
- Users
- memory
- Uptime
- Process

The following application data are monitored by the custom **exec-app** plugin for collectd:

- **gauge-active_alarms** is the count of active alarms on this Expressway
- **gauge-active_calls** is the count of calls being handled by this Expressway
- **gauge-<*service name*>** is the status of each system service.
- **gauge-<*zone name*>_ActiveCalls** counts the active calls in the named zone
- **gauge-<*zone name*>_BandwidthAllocated** measures the total bandwidth allocated to the named zone
- **gauge-<*zone name*>_BandwidthLimit**

Each of these metrics uses the collectd GAUGE data source type, which allows free-form data. On the collection server, the full collectd value name will be shown, for example **collectd*Hostname*collectd.exec-app.gauge-active_calls**.

Note that zone names are user-configurable and may thus be in conflict with the naming schema for collectd metrics. If your collection server is enforcing the schema, there is a chance that metrics from some zones will not be accepted.

What data is sent to the collection server?

The network plugin uses the collectd binary protocol to encapsulate numeric, string, and value data representing the monitored hardware resources and software processes.

The network plugin pushes the metrics data packets to the analytics server once every interval, using UDP 25826 by default. The analytics server parses and presents the data in human readable form.

If the analytics server is using the collectd network plugin and csv plugin, then the metrics are stored as small CSV files, using the metric name and timestamp to create the filename, for example **gauge-H323-2015-05-21**.

Which collectd plugins are implemented on Expressway?

Table 2 collectd plugins implemented in the Expressway application

Plugin name	Description / more information
Aggregation	Aggregates CPU values into the counters **aggregation_cpu_sum** and **aggregation_cpu_average**.

Table 2 collectd plugins implemented in the Expressway application (continued)

Plugin name	Description / more information
CPU	Processor information. The raw information is aggregated into `aggregation_cpu_average` and `aggregation_cpu_sum`
DF	File system information; see DF description on collectd Wiki
Disk	Hard disk performance; see Disk description on collectd Wiki
Exec-app	Customized version of `exec` that returns specific Expressway information on calls, alarms, zones, and services
Load	System load based on task queue
Memory	Memory statistics
Network	Enables publishing to a remote address. The plugin implements the collectd binary protocol for data encapsulation. The remote server must have the appropriate parsing tool
Protocols	Configurable subset of the protocols used by the Expressway
Process	Counts the system processes and groups them by state (e. g. running, sleeping, zombies) It also collects detailed statistics about specific processes. The plugin monitors the following processes in detail: ■ app ■ bramble ■ credentialmanagerservermain ■ cvs_main ■ erlang-beam ■ erlang-epmd ■ httpd ■ httpserver ■ ivy ■ licensemanagerservermain ■ managementconnectormain ■ managementframework ■ openssl2nss ■ policyservermain ■ syslog-ng ■ XCP
Swap	The amount of system memory written to disk
Uptime	Tracks system uptime, providing counters like average running time or maximum uptime for a particular period; see Uptime description on collectd Wiki
Users	Count of currently logged in users

Document Revision History

Table 3 Summary of changes to this document

Date	Description
July 2015	First published with System Metrics feature for X8.6

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