Real-Time Access Points Statistics

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Information About Access Point Real-Time Statistics

From Cisco IOS XE Bengaluru 17.5.1 onwards, you can track the CPU utilization and memory usage of an AP, and monitor the health of an AP, by generating real-time statistics for an AP.

SNMP traps are defined for CPU and memory utilization of APs and the controller. An SNMP trap is sent out when the threshold is crossed. The sampling period and statistics interval can be configured using SNMP, YANG, and CLI.

Statistics interval is used to process the data coming from an AP, and the average CPU utilization and memory utilization is computed over time. You can also configure an upper threshold for these statistics. When a statistic value surpasses the upper threshold, an alarm is enabled, and an SNMP trap is triggered.

From Cisco IOS XE Cupertino 17.7.1 release onwards, for radio monitoring, you can reset the radios based on the statistics sent by the AP for a sampling period. When you configure the radios in the controller, if there is no increment in the Tx or Rx statistics when the radio is up, then the radio reset is triggered.

Feature History for Real Time Access Point Statistics

This table provides release and related information for the feature explained in this module.

Table 1: Feature History for Real Time Access Point Statistics

Release	Feature	Feature Information
Cisco IOS XE Cupertino 17.7.1	Real Time Access Point Statistics	This feature is enhanced with the implementation of AP threshold values between 0 and 50 to trigger an alarm.

Restrictions for AP Radio Monitoring Statistics

You cannot reset the radio firmware from the controller. The controller will shut and unshut the radio if the Rx or Tx count is not incremented for a radio slot in a specified period.

Configuring Access Point Real Time Statistics (GUI)

Procedure

Step 1 Choose **Configuration > Tags & Profiles > AP Join**.

Step 2 Click **Add**. The **Add AP Join Profile** page is displayed.

Step 3 Under the **AP** tab, click the **AP Statistics** tab.

Step 4 In the **System Monitoring** section:

    a) Enable **Monitor Real Time Statistics** to get calculated statistics and alarms of the AP.

    b) To receive an alarm when the upper threshold is surpassed for parameters such as CPU utilization and memory, enable **Trigger Alarm for AP**.

    c) Enter the threshold percentage for CPU and memory usage in the **CPU Threshold to Trigger Alarm** field and **Memory Threshold to Trigger Alarm** fields, respectively. The valid range is between 0 to 50. An SNMP trap is sent out when this threshold is crossed.

    d) In the **Interval to Hold Alarm** field, enter the time for which the alarm is held before it gets triggered. The valid range is between 0 and 3600 seconds.

    e) In the **Trap Retransmission Time** field, enter the time between retransmissions of the alarm. The valid range is between 0 and 65535 seconds.

    f) To define how often data should be collected from the AP, enter a value in the **Sampling Interval** field. The valid range is between 720 and 3600 seconds.

    g) To define the interval at which AP statistics are to be calculated, enter a value in the **Statistics Interval** field. The valid range is between 2 and 900 seconds.

    h) To automatically reload the AP when there is high CPU and memory usage in the defined sampling interval, select the **Reload the AP** check box.

Step 5 Under the **Radio Monitoring** section:

    a) Select the **Monitoring of AP Radio stuck** check box to verify that the Tx and Rx statistics of the AP are updated each time the payloads are coming in from the AP to the controller.

    b) To generate an alarm for the radio of the AP when there is no increment in the Tx and RX statistics for the payloads, select the **Alarms for AP Radio stuck** check box.

c) Select the **Reset the stuck AP Radio** check box to recover the radio from the bad state. A radio admin state payload will be sent from the controller to toggle the radio and the radio will be shut when there is no increment in the Tx and Rx statistics.

d) To define how often data should be collected from the radio, enter a value in the **Sampling Interval** field. The valid range is between 720 and 3600 seconds.

Step 6 Click **Apply to Device** to save the configuration.

Configuring Real-Time Access Point Statistics (CLI)

Procedure

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 2	**ap profile** *ap-profile-name* **Example:** `Device(config)# ap profile doc-test`	Configures the AP profile. The default AP join profile name is *default-ap-profile*.
Step 3	**stats-timer** *frequency* **Example:** `Device(config-ap-profile)# stats-timer 60`	(Optional) Configures the statistics timer. This command is used to change the frequency of the statistics reports coming from the AP. The valid values range between 0 and 65535 seconds.
Step 4	**statistics ap-system-monitoring enable** **Example:** `Device(config-ap-profile)# statistics ap-system-monitoring enable`	(Optional) Enables monitoring of AP real-time statistics (CPU and memory).
Step 5	**statistics ap-system-monitoring alarm-enable** **Example:** `Device(config-ap-profile)# statistics ap-system-monitoring alarm-enable`	Enables alarms for AP real-time statistics (CPU and memory).
Step 6	**statistics ap-system-monitoring alarm-hold-time** *duration* **Example:** `Device(config-ap-profile)# statistics ap-system-monitoring alarm-hold-time 400`	Defines the alarms for AP real-time statistics (CPU and Memory). The valid values range between 0 and 3600 seconds.

	Command or Action	Purpose
Step 7	**ap-system-monitoring alarm-retransmit-time** *duration* **Example:** `Device(config-ap-profile)# ap-system-monitoring alarm-retransmit-time 100`	Defines the interval between retransmissions of the trap alarm. The valid values range between 0 and 65535 seconds.
Step 8	**statistics ap-system-monitoring cpu-threshold** *percentage* **Example:** `Device(config-ap-profile)# statistics ap-system-monitoring cpu-threshold 30`	Defines the threshold for CPU usage on the AP (percentage) to trigger alarms. **Note** From Cisco IOS XE Cupertino 17.7.1 release onwards, the valid threshold value for CPU on the AP to trigger the alarms is between 0 and 50.
Step 9	**ap-system-monitoring mem-threshold** *percentage* **Example:** `Device(config-ap-profile)# ap-system-monitoring mem-threshold 40`	Defines the threshold for memory usage on AP to trigger alarms. The percentage of threshold for memory usage on the AP to trigger is between 0 and 100. **Note** From Cisco IOS XE Cupertino 17.7.1 release onwards, the valid threshold value for memory usage on the AP to trigger the alarms is between 0 and 50.
Step 10	**ap-system-monitoring sampling-interval** *duration* **Example:** `Device(config-ap-profile)# statistics ap-system-monitoring sampling-interval 600`	(Optional) Defines the sampling interval. The valid values range between 2 and 900 seconds.
Step 11	**exit** **Example:** `Device(config-ap-profile)# exit`	Exits from AP profile configuration mode and returns to global configuration mode.
Step 12	**trapflags ap ap-stats** **Example:** `Device(config)# trapflags ap ap-stats`	Enables sending AP-related traps. Traps are sent when statistics exceed the configured threshold.

Example

```
Device(config)# ap profile default-policy-profile
Device(config-ap-profile)# statistics ap-system-monitoring enable
Device(config-ap-profile)#statistics ap-system-monitoring sampling-interval 90
Device(config-ap-profile)#statistics ap-system-monitoring stats-interval 120
Device(config-ap-profile)#statistics ap-system-monitoring alarm-enable
Device(config-ap-profile)#statistics ap-system-monitoring alarm-hold-time 3
```

```
Device(config-ap-profile)#statistics ap-system-monitoring alarm-retransmit-time 10
Device(config-ap-profile)#statistics ap-system-monitoring cpu-threshold 90
Device(config-ap-profile)#statistics ap-system-monitoring mem-threshold 90
Device(config)# trapflags ap ap-stats
```

Configuring AP Radio Monitoring Statistics

Procedure

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 2	**ap profile** *profile-name* **Example:** `Device(config)# ap profile test1`	Configures an AP profile and enters the AP profile configuration mode.
Step 3	**statistic ap-radio-monitoring enable** **Example:** `(config-ap-profile)#statistic ap-radio-monitoring enable`	Enables the monitoring of AP radio stuck statistics.
Step 4	**statistic ap-radio-monitoring alarm-enable** **Example:** `(config-ap-profile)#statistic ap-radio-monitoring alarm-enable`	(Optional) Enables the alarm for AP radio stuck statistics.
Step 5	**statistic ap-system-monitoring action reload-ap interval** *duration* **Example:** `(config-ap-profile)# statistic ap-radio-monitoring action reload-ap interval850`	(Optional) Specifies the sampling interval in seconds. The valid values range between 720 and 3600 seconds.
Step 6	**statistic ap-radio-monitoring action radio-reset** **Example:** `(config-ap-profile)# statistic ap-radio-monitoring action radio-reset`	(Optional) Generates an alarm and resets the radio if the radio is stuck.
Step 7	**statistic ap-system-monitoring action reload-ap** **Example:** `(config-ap-profile)# statistic ap-system-monitoring action reload-ap`	Reloads the AP.

Example

```
Device(config)# ap profile test1
Device(config-ap-profile)# statistics ap-radio-monitoring enable
Device(config-ap-profile)#statistic ap-radio-monitoring alarm-enable
Device(config-ap-profile)#statistic ap-radio-monitoring sampling-interval 750
Device(config-ap-profile)# statistic ap-radio-monitoring action radio-reset
Device(config-ap-profile)#statistic ap-system-monitoring action reload-ap
```

Monitoring Access Point Real-Time Statistics (GUI)

Procedure

Step 1 Choose **Monitoring** > **Wireless** > **AP Statistics**.

Step 2 Click the **General** tab.

Step 3 Click an AP name. The **General** window is displayed.

Step 4 To view the AP Statistics data, click the **AP Statistics** tab.

The following information is displayed:

- **Memory alarm last send time**: Displays the time of the last memory trap sent.

- **Memory Alarm Status**: Displays the state of the memory alarm. An alarm can be **ACTIVE**, **INACTIVE**, **INACTIVE_SOAKING**, **ACTIVE_SOAKING**. An alarm is soaked until the configured hold time has passed.

- **Memory alarm raise time**: Displays the last time the memory alarm was active.

- **Memory alarm clear time**: Displays the last time the memory alarm was inactive.

- **Last statistics received**: Displays the time of the last statistics report received from the AP.

- **Current CPU Usage**: Displays the latest percentage of CPU usage reported.

- **Average CPU Usage**: Displays the average CPU usage calculated.

- **Current Memory Usage**: Displays the latest percentage of memory usage reported.

- **Average Memory Usage**: Displays the average memory usage calculated.

- **Current window size**: Displays the window size. The window size is calculated by dividing the statistics interval by the sampling interval. The average CPU and memory usage is calculated by the window size.

- **CPU alarm last send time**: Displays the time of the last CPU trap sent.

- **CPU Alarm Status**: Displays the state of the CPU alarm. An alarm can be **ACTIVE**, **INACTIVE**, **INACTIVE_SOAKING**, **ACTIVE_SOAKING**. An alarm is soaked until the configured hold time has passed.

- **CPU alarm raise time**: Displays the last time the CPU alarm was active.

• **CPU alarm clear time**: Displays the last time the CPU alarm was inactive.

Step 5   Click **OK**.

Verifying Access Point Real-Time Statistics

To verify AP real-time statistics, run the **show ap config general | section AP statistics** command:

```
Device# show ap config general | section AP statistics
!Last Statistics
AP statistics : Enabled
Current CPU usage : 4
Average CPU usage : 49
Current memory usage : 35
Average memory usage : 35
Last statistics received : 03/09/2021 15:25:08
!Statistics Configuration
Current window size : 1
Sampling interval : 30
Statistics interval : 300
AP statistics alarms : Enabled
!Alarm State - Active, Inactive, Inactive_Soaking, Inactive_Soaking
Memory alarm status : Active
Memory alarm raise time : 03/09/2021 15:24:29
Memory alarm clear time : NA
Memory alarm last send time : 03/09/2021 15:24:59
CPU alarm status : Inactive
CPU alarm raise time : 03/09/2021 15:24:25
CPU alarm clear time : 03/09/2021 15:25:05
CPU alarm last send time : 03/09/2021 15:25:05
!Alarm Configuration
Alarm hold time : 6
Alarm retransmission time : 30
Alarm threshold cpu : 30
Alarm threshold memory : 32
```

To verify the statistics reporting period, run the **show ap config general | i Stats Reporting Period** command:

```
Device# show ap config general | i Stats Reporting Period
Stats Reporting Period : 10
```