Configuring Application Visibility and Control

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Information About Application Visibility and Control

Application Visibility and Control (AVC) classifies applications using deep packet inspection techniques with the Network-Based Application Recognition (NBAR) engine, and provides application-level visibility and control (QoS) in wireless networks. After the applications are recognized, the AVC feature enables you to either drop, mark, or police the data traffic.

Using AVC, we can detect more than 1000 applications. AVC enables you to perform real-time analysis and create policies to reduce network congestion, costly network link usage, and infrastructure upgrades.

Note
You can view list of 30 applications in Top Applications in Monitor Summary section of the UI.

AVC DSCP marks only the DSCP of the original packet in the controller in both directions (upstream and downstream). It does not affect the outer CAPWAP DCSP. AVC DSCP is applicable only when the application is classified. For example, based on the AVC profile configuration, if an application is classified as ftp or http, the corresponding DSCP marking is applied irrespective of the WLAN QoS. For downstream, the DSCP value of outer CAPWAP header and inner packet’s DSCP are taken from AVC DSCP. WLAN QoS is only applicable for all traffic from WLC to AP through CAPWAP. It does not change the DSCP of the original packet.

Using AVC rule, you can limit the bandwidth of a particular application for all the clients joined on the WLAN. These bandwidth contracts coexist with per-client downstream rate limiting with per client downstream rate limits that takes precedence over the per-application rate limits.
When you downgrade the controller from 8.0 to any earlier version, the AVC rate limit rules display the action as drop. This action is expected since the AVC rate limit rule is introduced in the controller version 8.0.

Note

AVC is supported in central switching mode on the following controller platforms: Cisco 2500 Series Wireless Controllers, Cisco 5500 Series Wireless Controllers, Cisco Flex 7500 Series Wireless Controllers, Cisco 8500 Series Wireless Controllers, and Cisco Wireless Services Module 2 (WiSM2).

The number of concurrent flows supported for AVC classification on different controller platforms for 8.0 release are noted in the following table. The absolute maximum number of flows supported on one platform cannot exceed more than 110% of the numbers shown in the following table and this 10% extra flows support will happen based on availability of the free memory in the system.

<table>
<thead>
<tr>
<th>Cisco WLC Platform</th>
<th>Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco 2504 WLC</td>
<td>26,250</td>
</tr>
<tr>
<td>Cisco 5508 WLC</td>
<td>183,750</td>
</tr>
<tr>
<td>Cisco WiSM2</td>
<td>393,750</td>
</tr>
<tr>
<td>Cisco 8510 WLC</td>
<td>336,000</td>
</tr>
<tr>
<td>Cisco 5520 WLC</td>
<td>336,000</td>
</tr>
<tr>
<td>Cisco 8540 WLC</td>
<td>336,000</td>
</tr>
</tbody>
</table>

Restrictions for Application Visibility and Control

- IPv6 packet classification is not supported.
- Layer 2 roaming is not supported across controllers.
- Multicast traffic is not supported.
- The number of applications that you can apply rate limit is 3.
- Only one rule can be configured per application. An application cannot have both a rate limit as well as a Mark rule.
- AVC rate limiting is not supported on Cisco 2504 WLC.

Configuring Application Visibility and Control (GUI)

Step 1
Create and configure an AVC profile by following these steps:

a) Choose Wireless > Application Visibility and Control > AVC Profiles.
b) Click New.
c) Enter the AVC profile name.
d) Click **Apply**.
e) On the **AVC Profile Name** page, click the corresponding AVC profile name. The **AVC Profile > Edit** page is displayed.
f) Click **Add New Rule**.
g) Choose the application group and the application name from the respective drop-down lists.
   View the list of default AVC applications available by choosing **Wireless > Application Visibility and Control > AVC Applications**.
h) From the **Action** drop-down list, choose either of the following:
   • **Drop**—Drops the upstream and downstream packets that correspond to the chosen application.
   • **Mark**—Marks the upstream and downstream packets that correspond to the chosen application with the Differentiated Services Code Point (DSCP) value that you specify in the **DSCP (0 to 63)** drop-down list. The DSCP value helps you provide differentiated services based on the QoS levels.
      **Note** The default action is to give permission to all applications.
   i) If you choose **Mark** from the **Action** drop-down list, choose a DSCP value from the **DSCP (0 to 63)** drop-down list. The DSCP value is a packet header code that is used to define QoS across the Internet. The DSCP values are mapped to the following QoS levels:
      • **Platinum (Voice)**—Assures a high QoS for Voice over Wireless.
      • **Gold (Video)**—Supports high-quality video applications.
      • **Silver (Best Effort)**—Supports normal bandwidth for clients.
      • **Bronze (Background)**—Provides the lowest bandwidth for guest services.
      You can also choose **Custom** and specify the DSCP value. The valid range is from 0 to 63.
j) Click **Apply**.
k) Click **Save Configuration**.

**Step 2**

Associate an AVC profile to a WLAN by following these steps:
a) Choose **WLANs** and click the corresponding WLAN ID. The **WLANs > Edit** page is displayed.
b) Click the **QoS** tab.
c) Choose the AVC profile from the **AVC Profile** drop-down list.
d) Click **Apply**.
e) Click **Save Configuration**.

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**Configuring Application Visibility and Control (CLI)**

- Create or delete an AVC profile by entering this command:
config avc profile avc-profile-name {create | delete}

• Add a rule for an AVC profile by entering this command:
  config avc profile avc-profile-name rule add application application-name {drop | mark dscp-value | ratelimit Average Ratelimit value  Burst Ratelimit value}

• Remove a rule for an AVC profile by entering this command:
  config avc profile avc-profile-name rule remove application application-name

• Configure an AVC profile to a WLAN by entering this command:
  config wlan avc wlan-id profile avc-profile-name {enable | disable}

• Configure application visibility for a WLAN by entering this command:
  config wlan avc wlan-id visibility {enable | disable}

  Note Application visibility is the subset of an AVC profile. Therefore, visibility is automatically enabled when you configure an AVC profile on the WLAN.

• View information about all AVC profile or a particular AVC profile by entering this command:
  show avc profile {summary | detailed avc-profile-name}

• View information about AVC applications by entering these commands:
  * show avc applications [application-group]—Displays all the supported AVC applications for the application group.
  * show avc statistics application application_name top-users [downstream wlan | upstream wlan | wlan] [wlan_id] ] —Displays AVC statistics for the top users of an application.
  * show avc statistics top-apps [upstream | downstream]—Displays the AVC statistics for the most used application.
  * show avc statistics wlan wlan_id [application application_name | top-app-groups [upstream | downstream] | top-apps [upstream | downstream]]—Displays the AVC statistics of a WLAN per application or top applications or top application groups.
  * show avc statistics client client_MAC [application application_name | top-apps [upstream | downstream]]—Displays the client AVC statistics per application or top applications.

  Note You can view list of 30 applications using the show avc applications and show avc statistics commands.

• Configure troubleshooting for AVC events by entering this command:
  debug avc events {enable | disable}

• Configure troubleshooting for AVC errors by entering this command:
  debug avc error {enable | disable}
Configuring NetFlow

Information About NetFlow

NetFlow is an embedded instrumentation within the Cisco Wireless Controller (WLC) software to characterize wireless network flows. NetFlow monitors each IP flow and exports the aggregated flow data to the external NetFlow collectors.

The NetFlow architecture consists of the following components:

- Collector—Entity that collects all the IP traffic information from various NetFlow exporters.
- Exporter—Network entity that exports the template with the IP traffic information. The Cisco WLC acts as an exporter.

Note: Cisco WLC does not support IPv6 address format when acting as an exporter for NetFlow.

Configuring NetFlow (GUI)

Step 1 Configure the Exporter by performing these steps:
   a) Choose **Wireless > Netflow > Exporter**.
   b) Click **New**.
   c) Enter the Exporter name, IP address, and the port number. The valid range for the port number is from 1 to 65535.
   d) Click **Apply**.
   e) Click **Save Configuration**.

Step 2 Configure the NetFlow Monitor by performing these steps:
   a) Choose **Wireless > Netflow > Monitor**.
   b) Click **New** and enter a Monitor name.
   c) On the Monitor List window, click the Monitor name to open the **Netflow Monitor > Edit** window.
   d) Choose the exporter name and the record name from the respective drop-down lists.
      • Client App Record—Better Performance
   e) Click **Apply**.
   f) Click **Save Configuration**.

Step 3 Associate a NetFlow Monitor to a WLAN by performing these steps:
   a) Choose **WLANs** and click a WLAN ID to open the **WLANs > Edit page**.
   b) In the QoS tab, choose a NetFlow monitor from the **Netflow Monitor** drop-down list.
   c) Click **Apply**.
d) Click Save Configuration.

Configuring NetFlow (CLI)

- Create an Exporter by entering this command:
  ```
  config flow create exporter exporter-name ip-addr port-number
  ```
- Create a NetFlow Monitor by entering this command:
  ```
  config flow create monitor monitor-name
  ```
- Associate or dissociate a NetFlow monitor with an exporter by entering this command:
  ```
  config flow {add | delete} monitor monitor-name exporter exporter-name
  ```
- Associate or dissociate a NetFlow monitor with a record by entering this command:
  ```
  config flow {add | delete} monitor monitor-name record ipv4_client_app_flow_record
  ```
- Associate or dissociate a NetFlow monitor with a WLAN by entering this command:
  ```
  config wlan flow wlan-id monitor monitor-name {enable | disable}
  ```
- View a summary of NetFlow monitors by entering this command:
  ```
  show flow monitor summary
  ```
- View information about the Exporter by entering this command:
  ```
  show flow exporter {summary | statistics}
  ```
- Configure NetFlow debug by entering this command:
  ```
  debug flow {detail | error | info} {enable | disable}
  ```