VideoStream

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Media stream

A Media Stream feature is a multicast delivery solution that

- converts IP multicast traffic into unicast frames for transmission over the air
- enables each wireless client to acknowledge receipt of video multicast data, and
- increases the reliability and quality of the media stream delivery in wireless networks.

The IEEE 802.11 wireless multicast delivery mechanism does not provide a reliable way to acknowledge lost or corrupted packets. As a result, if a multicast packet is lost during transmission, the system does not resend it, which may prevent you from viewing the IP multicast stream.

Cisco IOS XE Gibraltar 16.12.1 and later support IPv6 multicast addresses with the Media Stream feature. To configure media stream on IPv6 networks, specify IPv6 multicast addresses instead of IPv4 multicast addresses.

Prerequisites for media stream

These prerequisites must be satisfied before you configure media stream:

- Enable the multicast feature. Configure IP multicast on the controller in multicast-multicast mode.
- Check the IP address on the client machine. Verify that the client machine's IP address belongs to the appropriate VLAN.
- Verify that the access points have joined the controllers .

How to configure media stream

-

Configure the general parameters for a media stream (GUI)

Specify the parameters required to enable and manage multicast media streams for your network.

Procedure

Step 1 Choose **Configuration** > **Wireless** > **Media Stream**.

Step 2 In the **General** tab, check the **Multicast Direct Enable** check box.

Step 3 In the **Session Message Config** section, check the **Session Announcement State** check box to enable the session announcement mechanism. The wireless controller applies the new general parameters for media streaming, and and notifies clients.

Step 4 In the **Session Announcement URL** field, enter the URL where the client can find more information when an error occurs during the multicast media stream transmission.

Step 5 In the **Session Announcement Email** field, enter the email address that users can contact for assistance.

Step 6 In the **Session Announcement Phone** field, enter a phone number that users can call for assistance.

Step 7 In the **Session Announcement Note** field, enter the reason why a client cannot be served with a multicast media.

Step 8 Click **Apply**.

The wireless controller applies the new general parameters for media streaming, and clients are notified accordingly.

Configure multicast-direct globally for media stream (CLI)

Enable and configure multicast-direct globally for all media streams on the wireless controller using CLI commands.

Procedure

Step 1 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Enable multicast for wireless forwarding.

Example:

```
Device(config)# wireless multicast
```

Step 3 Enable IGMP snooping for each VLAN. If the global setting is disabled, all VLANs are considered disabled, regardless of their individual settings.

Example:

```
Device(config)# ip igmp snooping
```

Step 4 Enable a snooping querier on an interface when there is no multicast router in the VLAN to generate queries.

Example:

```
Device(config)#ip igmp snooping querier
```

Step 5 Configure the global multicast-direct on the controller.

Example:

```
Device(config)# wireless media-stream multicast-direct
```

Step 6 Configure the message configuration parameters, such as phone number, URL, email address, and notes.

Example:

```
Device(config)# wireless media-stream message
```

When a media stream is refused due to bandwidth constraints, a message can be sent to the affected user. These parameters define the IT support email address, explanatory notes to be displayed for the user, the redirect URL, and the phone number that users can contact regarding the refused stream.

Step 7 Configure each media stream and its parameters, such as expected multicast destination addresses, stream bandwidth consumption, and stream priority parameters.

Example:

```
Device(config)# wireless media-stream group grp-name startIp endIp
```

Step 8 Return to privileged EXEC mode. Alternatively, you can also press **Ctrl-Z** to exit global configuration mode.

Example:

```
Device(config)# end
```

The controller is now configured for multicast-direct for media streams as specified.

```
Device# configure terminal
Device(config)# wireless multicast
Device(config)# ip igmp snooping
Device(config)#ip igmp snooping querier
Device(config)# wireless media-stream multicast-direct
Device(config)# wireless media-stream message
 Email  Configure Session Announcement Email
 Notes  Configure Session Announcement notes
 URL    Configure Session Announcement URL
 phone  Configure Session Announcement Phone number
 <cr>
Device(config)# wireless media-stream group grp1 231.1.1.1 239.1.1.3
 avg-packet-size Configure average packet size
 default Set a command to its defaults
 exit Exit sub-mode
 max-bandwidth Configure maximum expected stream bandwidth in Kbps
 no Negate a command or set its defaults
 policy Configure media stream admission policy
 priority Configure media stream priority, <1:Lowest - 8:Highest>
 qos Configure over the air QoS class, <'video'> ONLY
 rrc-evaluation Configure RRC re-evaluation admission
 violation Configure stream violation policy on periodic re-evaluation
Device(config)# end
```

Configure media stream for 802.11 bands (CLI)

Enable and optimize media stream handling for 802.11 wireless bands by configuring relevant settings and parameters using CLI commands.

Procedure

Step 1 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Configure whether media stream (multicast to unicast) is allowed for the 802.11 band.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} media-stream multicast-direct
```

You must disable the 802.11 network to enable media stream.

Step 3 (Optional) Configure the redirection of unicast video traffic to the best-effort queue.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} media-stream video-redirect
```

Step 4 Configure the media stream to be sent through the best-effort queue if that media stream cannot be prioritized due to bandwidth-availability limitations.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} media-stream multicast-direct admission-besteffort
```

Run the **no** form of the command to drop the stream if the media stream cannot be prioritized due to bandwidth-availability limitations.

Step 5 Configure the maximum number of media streams allowed per client.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} media-stream multicast-direct client-max value
```

The maximum is 15 and the default is 0. The value of 0 denotes unlimited streams.

Step 6 Configure the maximum number of radio streams.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} media-stream multicast-direct radio-maximum value
```

The valid range is from 1 to 20. The default is 0. The value of 0 denotes unlimited streams.

Step 7 Configure maximum media (voice and video) bandwidth as a percentage.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} cac multimedia max-bandwidth bandwidth
```

The range is from 5 percent to 85 percent.

Step 8 Configure the minimum PHY rate needed for a client to send a media stream as unicast. If a client communicates below this rate, it will not receive the media stream as a unicast flow.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} cac media-stream multicast-direct min_client_rate
dot11_rate
```

Typically, this PHY rate is equal to or higher than the rate at which multicast frames are sent.

Step 9 Configure Call Admission Control (CAC) parameters for the media stream access category.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} cac media-stream
```

Step 10 Configure CAC parameters for media access category used for voice and video.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} cac multimedia
```

Step 11 Configure CAC parameters for voice access category.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} cac voice
```

Step 12 Return to privileged EXEC mode. Alternatively, you can also press **Ctrl-Z** to exit global configuration mode.

Example:

```
Device(config)# end
```

The 802.11 bands are configured to handle media streams according to your specified parameters, enabling efficient multicast-to-unicast conversion and optimized bandwidth management for media traffic.

```
Device# configure terminal
Device(config)# ap dot11 24ghz media-stream multicast-direct
Device(config)# ap dot11 24ghz media-stream video-redirect
Device(config)# ap dot11 24ghz media-stream multicast-direct admission-besteffort
Device(config)# ap dot11 24ghz media-stream multicast-direct client-max 15
Device(config)# ap dot11 24ghz media-stream multicast-direct radio-maximum 20
Device(config)# ap dot11 24ghz cac multimedia max-bandwidth 60
Device(config)# ap dot11 24ghz cac media-stream multicast-direct min_client_rate
Device(config)# ap dot11 5ghz cac media-stream
Device(config)# ap dot11 5ghz cac multimedia
Device(config)# ap dot11 5ghz cac voice
Device(config)# end
```

Configure a WLAN to stream video (GUI)

Procedure

Step 1 Choose **Configuration** > **Wireless** > **WLANs** > **Wireless Networks**.

Step 2 Select a **WLAN** to view the **Edit WLAN** window.

Step 3 Click the **Advanced** tab.

Step 4 Check the **Media Stream Multicast-Direct** check box to enable the feature.

Step 5 Click **Update & Apply to Device**.

The selected WLAN now supports multicast-direct video streaming, allowing wireless clients to receive optimized video streams.

Configure WLAN to stream video (CLI)

Enable video streaming functionality on a WLAN by configuring multicast-direct media streaming.

Procedure

Step 1 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Enter WLAN configuration mode.

Example:

```
Device(config)# wlan wlan_name
```

Step 3 Disable WLAN for configuring its parameters.

Example:

```
Device(config-wlan)# shutdown
```

Step 4 Configure the multicast-direct media stream for the WLAN.

Example:

```
Device(config)# media-stream multicast-direct
```

Step 5 Enable the WLAN.

Example:

```
Device(config-wlan)# no shutdown
```

Step 6 Return to privileged EXEC mode. Alternatively, you can also press **Ctrl-Z** to exit global configuration mode.

Example:

```
Device(config)# end
```

The WLAN is configured to support optimized video streaming via multicast-direct media streams.

```
Device# configure terminal
Device(config)# wlan wlan50
Device(config-wlan)# shutdown
Device(config)# media-stream multicast-direct
Device(config-wlan)# no shutdown
Device(config)# end
```

Enable a media stream per WLAN (GUI)

You can prioritize media streams over each WLAN to improve video and audio transmission quality.

Perform this task when you need to ensure media streaming is supported and optimized on specific WLANs.

Procedure

Step 1 Choose **Configuration** > **Tags & Profiles** > **WLANs**.

Step 2 On the **WLANs** page, click the name of the **WLAN** or click **Add** to create a new one.

Step 3 In the **Add/Edit WLAN** window that is displayed, click the **Advanced** tab.

Step 4 Check the **Enabling a Media Stream for each WLAN** check box to enable the media stream on the WLAN.

Step 5 Save the configuration.

You have enabled media streaming for the selected WLAN. Streaming traffic is now optimized.

Enable a media stream per WLAN (CLI)

Enable multicast media streaming functionality for a specified WLAN.

Perform this procedure when you need to configure multicast media streaming on individual WLANs in your wireless network environment.

Procedure

Step 1 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Enter WLAN configuration mode.

Example:

```
Device(config)# wlan wlan-name
```

Step 3 Disable the WLAN for configuring its parameters.

Example:

```
Device(config-wlan)# shutdown
```

Step 4 Configure multicast-direct for the WLAN.

Example:

```
Device(config-wlan)# media-stream multicast-direct
```

Step 5 Enable the WLAN.

Example:

```
Device(config-wlan)# no shutdown
```

The WLAN is now enabled with multicast-direct media streaming.

```
Device# configure terminal
Device(config)# wlan wlan5
Device(config-wlan)# shutdown
Device(config-wlan)# media-stream multicast-direct
Device(config-wlan)# no shutdown
```

Configure the general parameters for a media stream (GUI)

Configure the general parameters for a media stream to enable wireless multicast functionality and session announcement options. This helps you ensure the media stream operates correctly in your wireless network environment.

Procedure

Step 1 Choose **Configuration** > **Wireless** > **Media Stream**.

Step 2 Check the **Multicast Direct Enable** check box to enable multicast direct globally on the local mode.

Step 3 In the **Session Message Config** section, enter values for these parameters:

- Session Announcement URL
- Session Announcement Email
- Session Announcement Phone
- Session Announcement Note

Step 4 Save the configuration.

The system saves and applies the general parameters for the media stream.

Configure the general parameters for a media stream (CLI)

Configure phone, URL, email, and notes for a media stream and enable multicast direct globally in a local wireless environment.

Perform this procedure when you want to apply or change general configuration parameters for a media stream through the CLI.

Procedure

Step 1 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Configure various message configuration parameters, such as phone, URL, email, and notes.

Example:

```
Device(config)# wireless media-stream message {url url | email email-address | phone
phone-number | notes notes}
```

Step 3 Enable multicast direct globally for local mode.

Example:

```
Device(config)# wireless media-stream multicast-direct
```

Note
This configuration will not impact flex and fabric media-stream configurations.

Step 4 Return to privileged EXEC mode.

Example:

```
Device(config)# exit
```

The general parameters for the media stream are now configured, and multicast direct is enabled for local mode.

```
Device# configure terminal
Device(config)# wireless media-stream message url www.xyz.com
Device(config)# wireless media-stream multicast-direct
Device(config)# exit
```

Add media stream (CLI)

Configure media streams to manage multicast traffic efficiently on the device.

Media streams help you improve multicast traffic performance for applications such as streaming video or audio over wireless networks. Use media streams to reserve resources and prioritize bandwidth.

Procedure

Step 1 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Configure each media stream and set parameters such as multicast destination addresses, bandwidth consumption, and priority.

Example:

```
Device(config)# wireless media-stream group groupName startIpAddr endIpAddr
```

Step 3 Configure the average packet size.

Example:

```
Device(media-stream)# avg-packet-size packetsize
```

Step 4 Configure the maximum expected stream bandwidth, in Kbps.

Example:

```
Device(media-stream)# max-bandwidth bandwidth
```

Step 5 Configure the media stream admission policy.

Example:

```
Device(media-stream)# policy {admit | deny}
```

Step 6 Configure the over-the-air QoS class as "video".

Example:

```
Device(media-stream)# qos video
```

Step 7 Configure the violation mode.

Example:

```
Device(media-stream)# violation {drop | fallback}
```

Step 8 Configure Resource Reservation Control (RRC) re-evaluation admission to provide initial or periodic admission evaluation. This process occurs at intervals of 2, 4, 8, or more seconds.

Example:

```
Device(media-stream)# rrc-evaluation {initial | periodic}
```

Step 9 Set the priority value. The valid range is 1 to 8, where 1 is the lowest.

Example:

```
Device(media-stream)# priority priority-value
```

The system configures the media stream using your parameters and activates it for use.

```
Device# configure terminal
Device(config)# wireless media-stream group group1 224.0.0.0 224.0.0.223
Device(media-stream)# avg-packet-size 100
Device(media-stream)# max-bandwidth 80
Device(media-stream)# policy admit
Device(media-stream)# qos video
Device(media-stream)# violation drop
Device(media-stream)# rrc-evaluation initial
Device(media-stream)# priority 6
```

Delete a media stream (GUI)

Remove an existing media stream to keep only necessary and relevant streams in the system.

Procedure

Step 1 Choose **Configuration** > **Wireless** > **Media Stream**.

Step 2 Click the **Streams** tab.

Step 3 Check the check box next to the stream name you want to delete.

To delete multiple streams, select the checkboxes next to each stream name.

Step 4 Click **Delete**.

Step 5 Click **Yes** in the confirmation window to delete the media stream.

The selected media stream is permanently deleted from the system. It is no longer available for use or configuration.

Delete a media stream (CLI)

Remove a configured media stream from the device using CLI commands when the media stream is no longer required or needs to be reconfigured.

Before you begin

Before you delete a media stream, make sure it is enabled and configured.

Procedure

Step 1 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Delete the media stream identified by the command.

Example:

```
Device(config)# no wireless media-stream group media_stream_name
```

Step 3 Return to privileged EXEC mode.

Example:

```
Device(config)# end
```

Alternatively, you can also press **Ctrl-Z** to exit global configuration mode.

The specified media stream is removed from the device configuration and is no longer active.

```
Device# configure terminal
Device(config)# no wireless media-stream group grp1
Device(config)# end
```

Configure multicast direct admission control (GUI)

This task explains how to enable and configure multicast direct admission control using the GUI.

Procedure

Step 1 Choose **Configuration** > **Wireless** > **Media Stream**.

Step 2 Check the **Media Stream Admission Control (ACM)** check box to enable multicast direct admission control.

Step 3 In the **Maximum Media Stream RF bandwidth (%)** field, enter the percentage of maximum bandwidth for media applications on this radio band. The valid range is 5 to 85. If your client reaches the specified value, new calls on this radio band are rejected.

Step 4 In the **Maximum Media Bandwidth (%)** field, enter the bandwidth. The valid range is 5 percent to 85 percent.

Step 5 From the **Client Minimum Phy Rate** drop-down list, select the minimum transmission data rate in kilobits per second that the client can use. If the transmission data rate is below the physical rate, video does not start or your client is classified as a bad client. The system then demotes the video for better effort quality of service (QoS) or denies it.

Step 6 In the **Maximum Retry Percent (%)** field, enter the percentage of maximum retries that are allowed. The default value is 80. If the value exceeds 80, video does not start or your client might be classified as a bad client. The system can demote the video for better effort QoS or deny it.

Step 7 Click **Apply**.

You have activated multicast direct admission control.

Configure multicast direct admission control (CLI)

Configure multicast direct admission control to:

- ensure that media streams are efficiently delivered to wireless clients
- maintain optimal bandwidth allocation for multicast video and audio traffic, and
- enforce admission control policies that prevent network congestion and protect media quality.

To configure multicast direct admission control, perform these steps:

Procedure

Step 1 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Disable the 802.11 network.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz } shutdown
```

Step 3 Configure the redirection of the unicast video traffic to the best effort queue.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} media-stream video-redirect
```

Step 4 Enable admission control on the media-stream access category.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} cac media-stream acm
```

Step 5 Configure the maximum media bandwidth, in percent.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} cac media-stream max-bandwidth bandwidth
```

The range is from 5 percent to 85 percent.

Step 6 Configure the maximum bandwidth allocated for media to Wi-Fi Multimedia (WMM) clients.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} cac multimedia max-bandwidth bandwidth
```

The range is from 5 percent to 85 percent.

Step 7 Configure the minimum PHY rate needed for a client to receive media stream as unicast.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} cac media-stream multicast-direct min-client-rate
dot11Rate
```

If your client communicates below this rate, it will not receive the media stream as a unicast flow. Usually, this PHY rate is equal to or higher than the rate multicast frames are sent.

Step 8 Configure the maximum retry percent CAC parameter for multicast-direct streams.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} cac media-stream multicast-direct max-retry-percent
 retryPercent
```

Step 9 Configure the maximum number of radio streams.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} media-stream multicast-direct radio-maximum value
```

The valid range is 1 to 20. Default is 0. Value 0 denotes unlimited streams.

Step 10 Configure the maximum number of allowed media streams for each client.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} media-stream multicast-direct client-maximum value
```

The maximum value is 15, and the default is 0. A value of 0 denotes unlimited streams.

Step 11 Configure the media stream so that it is sent through the best effort queue if it cannot be prioritized due to limited bandwidth.

Example:

```
Device(config)# ap dot11 {24ghz | 5ghz} media-stream multicast-direct admission-besteffort
```

Add **no** in the command to drop the stream when the media stream cannot be prioritized because bandwidth is unavailable.

Step 12 Enable the 802.11 network.

Example:

```
Device(config)# no ap dot11 {24ghz | 5ghz} shutdown
```

You have successfully configured multicast direct admission control on the specified wireless network interface.

```
Device# configure terminal
Device(config)# ap dot11 24ghz shutdown
```

```
Device(config)# ap dot11 24ghz media-stream video-redirect
Device(config)# ap dot11 24ghz cac media-stream acm
Device(config)# ap dot11 24ghz cac media-stream max-bandwidth 65
Device(config)# ap dot11 24ghz cac multimedia max-bandwidth 65
Device(config)# ap dot11 24ghz cac media-stream multicast-direct min-client-rate 800
Device(config)# ap dot11 24ghz cac media-stream multicast-direct max-retry-percent 50
Device(config)# ap dot11 24ghz media-stream multicast-direct radio-maximum 10
Device(config)# ap dot11 24ghz media-stream multicast-direct client-maximum 12
Device(config)# ap dot11 24ghz media-stream multicast-direct admission-besteffort
Device(config)# no ap dot11 24ghz shutdown
```

Create and attach policy-based QoS profile

The high-level steps to create and attach policy-based QoS profile are as follows:

1. Create a QoS profile
2. Create a service template
3. Map the service template to thepPolicy map
4. Map the policy map to the policy profile

Create a QoS profile (GUI)

Define and apply policies that optimize network resource allocation for various types of traffic.

Procedure

Step 1 Click **Configuration** > **Services** > **QoS**.
Step 2 Click **Add** to create a new QoS Policy.
Step 3 Enter a **Policy Name**.
Step 4 Enter a **Description** for the policy.
Step 5 In the **Class Default** section, choose a value in the **Mark** drop-down list.
Step 6 Enter the **Police (kbps)** value.
Step 7 Click **Apply to Device**.

The new QoS profile is deployed to the selected devices. It enforces your traffic priorities immediately.

Create a QoS profile (CLI)

Use this procedure to configure a custom Quality of Service (QoS) profile on your device by using the CLI. This configuration lets you manage network traffic according to your needs.

Procedure

Step 1 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Create a policy map.

Example:

```
Device(config)# policy-map policy-map-name
```

Step 3 Add a description to the policy map.

Example:

```
Device(config-pmap)# description description
```

Step 4 Create policy criteria.

Example:

```
Device(config-pmap)# class class-map-name
```

Step 5 Set the committed information rate for policing.

Example:

```
Device(config-pmap-c)# police cir committed-information-rate
```

Step 6 Configure what action occurs when the rate is less than the conform burst value.

Example:

```
Device(config-pmap-c-police)# conform-action drop
```

Step 7 Configure what action occurs when the rate is between the conform burst and the sum of conform burst and exceed burst values.

Example:

```
Device(config-pmap-c-police)# exceed-action drop
```

Step 8 Return to privileged EXEC mode.

Example:

```
Device(config-pmap-c-police)# end
```

The device creates and stores the QoS profile. Display the policy map and class map with the appropriate CLI commands to verify your configuration.

```
Device# configure terminal
Device(config)# policy-map QoS_Drop_Youtube
Device(config-pmap)# description QoS_Drop_Youtube
Device(config-pmap)# class QoS_Drop_Youtube1_AVC_UI_CLASS
Device(config-pmap-c)# police cir 8000
Device(config-pmap-c-police)# conform-action drop
Device(config-pmap-c-police)# exceed-action drop
Device(config-pmap-c-police)# end
```

Create a service template (GUI)

Create a reusable configuration profile that defines network service attributes—such as VLAN, session timeout, access controls, and Quality of Service (QoS) policies—for consistent and efficient assignment to one or more devices.

Procedure

Step 1 Choose **Configuration** > **Security** > **Local Policy**.

Step 2 On the **Local Policy** page, **Service Template** tab, click **Add**.

Step 3 In the **Create Service Template** window, configure these parameters:

- **Service Template Name**: Enter a name for the template.
- **VLAN ID**: Enter the VLAN ID for the template. The valid range is 1 to 4,094.
- **Session Timeout (secs)**: Set the timeout duration for the template. The valid range is 1 to 65,535.
- **Access Control List**: Select the Access Control List from the drop-down list.
- **Ingress QOS**: Select the input QoS policy for the client from the drop-down list.
- **Egress QOS**: Select the output QoS policy for the client from the drop-down list.

Step 4 Click **Apply to Device**.

The new service template is created and available for assignment to network devices.

Map the service template to the policy map (CLI)

Map a service template to a policy map using CLI commands to enable attribute-driven service control.

Procedure

Step 1 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Specify the parameter map type and name.

Example:

```
Device(config)# parameter-map type subscriber attribute-to-service parameter-map-name
```

Step 3 Specify the parameter map attribute filter criteria. Multiple filters are used in the example provided here.

Example:

```
Device(config-parameter-map-filter)# map-index map device-type eq filter-name user-role eq
 user-name
```

Step 4 Specify the service template.

Example:

```
Device(config-parameter-map-filter-submode)# map-index service-template service-template-name
 precedence precedence-num
```

Step 5 Return to privileged EXEC mode.

Example:

```
Device(config-parameter-map-filter-submode)# end
```

Step 6 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 7 Specify the policy map type.

Example:

```
Device(config)# policy-map type control subscriber policy-map-name
```

Step 8 Specify the match criteria to the policy map.

Example:

```
Device(config-event-control-policymap)# event identity-update match-all
```

Step 9 Apply a class map using a service template.

Example:

```
Device(config-event-control-policymap)# class-num class always do-until-failure
```

Step 10 Apply the parameter map.

Example:

```
Device(config-event-control-policymap)# action-index map attribute-to-service table
parameter-map-name
```

The service template is successfully mapped to the specified policy map.

```
Device# configure terminal
Device(config)# parameter-map type subscriber attribute-to-service QoS-Policy_Map-param
Device(config-parameter-map-filter)# 1 map device-type eq "Android" user-role eq "student"
Device(config-parameter-map-filter)# 1 service-template Qos_template
Device(config-parameter-map-filter-submode)# end
Device# configure terminal
Device(config)# policy-map type control subscriber QoS-Policy_Map
Device(config-event-control-policymap)# event identity-update match-all
Device(config-event-control-policymap)# 1 class always do-until-failure
Device(config-event-control-policymap)# 1 map attribute-to-service table QoS-Policy_Map-param
```

Map service template to the policy map (GUI)

Map a service template to an existing policy map. This enables deployment of predefined configurations.

Procedure

Step 1 Choose **Configuration** > **Tags & Profiles** > **Policy**.

Step 2 On the **Policy Profile** page, select the **Policy Profile** to be mapped.

Step 3 In the **Edit Policy Profile** window, click the **Access Policies** tab.

Step 4 Use the **Local Subscriber Policy Name** drop-down list to select the policy name.

Step 5 Click **Update & Apply to Device**.

The selected service template is now mapped to the policy map and applied to the device.

Map the service template to policy map (CLI)

Map a service template to a policy map so the policy map automatically applies the desired service configurations to targeted network traffic.

Procedure

Step 1 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Specify the parameter map type and name.

Example:

```
Device(config)# parameter-map type subscriber attribute-to-service parameter-map-name
```

Step 3 Specify the parameter map attribute filter criteria. You can use multiple filters.

Example:

```
Device(config-parameter-map-filter)# map-index map device-type eq filter-name user-role eq
 user-name
```

Step 4 Specify the service template.

Example:

```
Device(config-parameter-map-filter-submode)# map-index service-template service-template-name
 [precedence precedence-num]
```

Step 5 Return to privileged EXEC mode.

Example:

```
Device(config-parameter-map-filter-submode)# end
```

Step 6 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 7 Specify the type of policy map.

Example:

```
Device(config)# policy-map type control subscriber policy-map-name
```

Step 8 Specify the match criteria to the policy map.

Example:

```
Device(config-event-control-policymap)# event identity-update match-all
```

Step 9 Apply a class map with a service template.

Example:

```
Device(config-event-control-policymap)# class-num class always do-until-failure
```

Step 10 Apply a parameter map.

Example:

```
Device(config-event-control-policymap)# action-index map attribute-to-service table
parameter-map-name
```

The policy map is associated with the service template. It enforces the defined service configurations on specified network traffic."

```
Device# configure terminal
Device(config)# parameter-map type subscriber attribute-to-service QoS-Policy_Map-param
Device(config-parameter-map-filter)# 1 map device-type eq "Android" user-role eq "student"
Device(config-parameter-map-filter-submode)# 1 service-template Qos_template
Device(config-parameter-map-filter-submode)# end
Device# configure terminal
Device(config)# policy-map type control subscriber QoS-Policy_Map
Device(config-event-control-policymap)# event identity-update match-all
Device(config-event-control-policymap)# 1 class always do-until-failure
Device(config-event-control-policymap)# 1 map attribute-to-service table QoS-Policy_Map-param
```

Map the policy map (GUI)

Map a new policy map so that you can enforce local security and service templates based on device and user attributes.

Procedure

Step 1 Choose **Configuration** > **Security** > **Local Policy** > **Policy Map** tab.

Step 2 Click **Add**.

Step 3 Enter a name in the **Policy Map Name** text field.

Step 4 Click **Add** to add the matching criteria information.

Step 5 Select the service template from the **Service Template** drop-down list.

Step 6 Select the filters from **Device Type**, **User Role**, **User Name**, **OUI**, and **MAC Address** drop-down lists.

Step 7 Click **Add Criteria**.

Step 8 Click **Apply to Device**.

The new policy map is created and applied according to the specified criteria.

Map the policy map (CLI)

Map a policy map to a wireless policy profile using CLI commands to apply specific subscriber policies.

Procedure

Step 1 Enter global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Configure a wireless policy profile.

Example:

```
Device(config)# wireless profile policy wlan-policy-profile-name
```

Step 3 Add a description for the policy profile.

Example:

```
Device(config-wireless-policy)# description profile-policy-description
```

Step 4 Configure the subscriber policy name.

Example:

```
Device(config-wireless-policy)# subscriber-policy-name policy-name
```

After you complete these steps, the policy map is mapped to the wireless policy profile, and the configuration becomes active on the device.

```
Device# configure terminal
Device(config)# wireless profile policy wireless-policy-profile
Device(config-wireless-policy)# description "wireless policy profile"
Device(config-wireless-policy)# subscriber-policy-name QoS-Policy_Map
```

Monitor media streams

To provide reference information about the available commands used to monitor media streams on wireless devices, including a description of each command to assist users in understanding and using these monitoring tools effectively.

Table 1: Commands for monitoring media streams

Commands	Description
show wireless media-stream client detail *group name*	Displays media stream client details of the particular group.

Commands	Description
show wireless media-stream client summary	Displays the media stream information of all the clients.
show wireless media-stream group detail *group name*	Displays the media stream configuration details of the particular group.
show wireless media-stream group summary	Displays the media stream configuration details of all the groups.
show wireless media-stream message details	Displays the session announcement message details.
show wireless multicast	Displays the multicast-direct configuration state.
show ap dot11 {24ghz | 5ghz} media-stream rrc	Displays 802.11 media resource reservation control configurations.

Verify media stream information

Use these **show** commands to view the media stream information.

To view general media stream information and status, use these commands:

```
Device# show wireless media-stream multicast-direct state

Multicast-direct State..........................  : enabled
Allowed WLANs:
WLAN-Name                                          WLAN-ID
-----------------------------------------------------------
zsetup_mc                                          1
vwlc-mc_mo                                         3
mcuc_test1                                         4
mcuc_test2                                         5

Device# show wireless media-stream group summary


Number of Groups: 4

Stream Name          Start IP                End IP            Status
------------------------------------------------------------------------------
new2                 231.2.2.3               231.2.4.4         Enabled
my234                234.0.0.0               234.10.10.10      Enabled
uttest2              235.1.1.20              235.1.1.25        Enabled
uttest3              235.1.1.40              235.1.1.200       Enabled
```

To view the details of a particular media stream, use the **show wireless media-stream client detail** *media_stream_name* command:

```
Device# show wireless media-stream group detail uttest2


Media Stream Name         : uttest2
Start IP Address          : 235.1.1.20
End IP Address            : 235.1.1.25
RRC Parameters:
 Avg Packet Size(Bytes)   : 1200
 Expected Bandwidth(Kbps) : 1000
```

```
 Policy                   : Admitted
 RRC re-evaluation        : Initial
 QoS                      : video
 Status                   : Multicast-direct
 Usage Priority           : 4
 Violation                : Drop
```

To view RRC information for a dot11 band, use the **show ap dot11** {**24ghz** | **5ghz** } **mediastream rrc** command:

```
Device# show  ap dot11 5ghz media-stream rrc

Multicast-direct                : Enabled
Best Effort                     : Disabled
Video Re-Direct                 : Disabled
Max Allowed Streams Per Radio   : Auto
Max Allowed Streams Per Client  : 5
Max Media-Stream Bandwidth      : 5
Max Voice Bandwidth             : 50
Max Media Bandwidth             : 43
Min PHY Rate (Kbps)             : 6000
Max Retry Percentage            : 5
```

To view session announcement message details, use the **show wireless media-stream message details** command:

```
Device# show wireless media-stream message details
URL          :
Email        : abc@cisc
Phone        :
Note         :
State        : Disabled
```

To view the list of clients in the blocked list database, use the **show ip igmp snooping igmpv2-tracking** command:

```
Device# show ip igmp snooping igmpv2-tracking

Client to SGV mappings
----------------------
Client: 10.10.10.215 Port: Ca1
 Group: 239.255.255.250 Vlan: 10 Source: 0.0.0.0 blacklisted: no
 Group: 234.5.6.7 Vlan: 10 Source: 0.0.0.0 blacklisted: no
 Group: 234.5.6.8 Vlan: 10 Source: 0.0.0.0 blacklisted: no
 Group: 234.5.6.9 Vlan: 10 Source: 0.0.0.0 blacklisted: no

Client: 10.10.101.177 Port: Ca2
 Group: 235.1.1.14 Vlan: 10 Source: 0.0.0.0 blacklisted: no
 Group: 235.1.1.16 Vlan: 10 Source: 0.0.0.0 blacklisted: no
 Group: 235.1.1.18 Vlan: 10 Source: 0.0.0.0 blacklisted: no

SGV to Client mappings
----------------------
Group: 234.5.6.7 Source: 0.0.0.0 Vlan: 10
 Client: 10.10.10.215 Port: Ca1 Blacklisted: no
```

To view wireless client summary, use the **show wireless media-stream client summary** command:

```
Device# show wireless media-stream client summary
```

To view details of a specific wireless media stream, use the **show wireless media-stream client detail** command:

```
Device# show wireless media-stream client detail uttest2

Media Stream Name         : uttest2
Start IP Address          : 235.1.1.20
End IP Address            : 235.1.1.25
RRC Parameters:
 Avg Packet Size(Bytes)   : 1200
 Expected Bandwidth(Kbps) : 1000
 Policy                   : Admitted
 RRC re-evaluation        : Initial
 QoS                      : video
 Status                   : Multicast-direct
 Usage Priority           : 4
 Violation                : Drop
```