Configure Flexible DSCP Marking and Video Promotion

Flexible DSCP Marking and Video Promotion Overview

Devices and applications use Differentiated Services Code Point (DSCP) markings to indicate the Quality of Service (QoS) treatment of IP communications. For example, desktop video endpoints may use multimedia conferencing AF41 marking for video media streams, while high-definition video room systems may use real-time interactive CS4 marking. When an application sends and receives IP communications to and from the same type of application, the DSCP markings are symmetric, and the QoS treatments of the IP communications that each application sends and receives are the same. However, when an application sends and receives media to and from a different type of application, the DSCP markings may be asymmetric, and the QoS treatments of the IP communications that each application sends and receives may be inconsistent. For example, the QoS treatment of the video media stream that a video room system receives from a desktop video endpoint may be inadequate to support the expected quality of the video room system.

Devices and applications are subjected to Call Admission Control (CAC) to ensure that adequate bandwidth is available for the duration of established sessions. The bandwidth that is utilized by established sessions is updated as the sessions begin and end. Attempts to establish new sessions that would exceed the available bandwidth are blocked. The amount of bandwidth available may be tracked independently for devices and applications of different types. For example, independent tracking of bandwidth may be available for desktop video endpoints and high-definition video room systems to send and receive video media streams.

When devices and applications of the same type send and receive communications, the same type of bandwidth deductions are made in each direction. However, when devices and applications of different types send and receive communications, different types of bandwidth deductions must be made in each direction. Moreover, the bandwidth deductions are usually symmetric in amount, by design, to reflect the usual behavior of an IP network. As a result, when devices and applications of different types send and receive communications, the total bandwidth deductions may be up to double the amount of network bandwidth that is actually utilized.

This inconsistency in bandwidth accounting may cause attempts to establish new sessions to be blocked unnecessarily.

The Flexible DSCP Marking and Video Promotion feature allows you to configure a Video Promotion policy that reconciles the inconsistency in bandwidth accounting in favor of the application that receives more favorable CAC and QoS treatment. For example, if a session between a desktop video endpoint and a high-definition video room system is reconciled in favor of the video room system, then the reconciliation is deemed a promotion for the desktop video endpoint.

When reconciliation is in effect between devices and applications of different types, bandwidth is deducted only for the type of application that is favored by reconciliation. If sufficient bandwidth is available for a session of this type to be admitted, the device or application of the type that is not favored by reconciliation is instructed to change the DSCP markings that it uses to those that are used by the device or application of the type that is favored by reconciliation. For example, if a desktop video endpoint is promoted in a session with a high-definition video room system, bandwidth accounting takes place as if the desktop video endpoint were an application of the same type as the video room system. The desktop video endpoint is instructed to change its DSCP markings to those that are used by the video room system. The QoS treatment is consistent in both directions, bandwidth is deducted for a session between devices and applications of the same type as the video room system, and bandwidth is not deducted for a session between devices and applications of the same type as the desktop video endpoint.

When you activate the Flexible DSCP Marking and Video Promotion feature, Unified Communications Manager dynamically signals desktop video devices a Traffic Class Label that is indicative of the DSCP marking for each negotiated media stream.

Custom QoS Settings for Users

You can customize Quality of Service (QoS) settings within a SIP profile and apply those settings to your users. The **SIP Profile Configuration** window has been enhanced with the following types of QoS settings:

- Custom DSCP values for audio and video streams
- Custom UDP port ranges for audio and video streams

Custom DSCP Values for Audio and Video

You can configure DSCP values for audio and video calls within a SIP profile and apply them to the SIP phones that use that profile. The **SIP Profile Configuration** window includes custom DSCP settings for the following types of calls:

- Audio calls
- Video calls
- Audio portion of a video call
- TelePresence calls
- Audio portion of a TelePresence call

If your company has a set of employees, such as a sales force, or a CEO, who require higher QoS priority settings than the majority of your employees, you can use the SIP profile configurations to configure custom DSCP values for those users. The settings within the SIP profile override the corresponding clusterwide service parameter settings.

Custom UDP Port Ranges for Audio and Video

You can configure separate UDP port ranges for the audio stream and video stream of a SIP call. Because video typically requires considerably more bandwidth than audio, creating dedicated port ranges for each media type simplifies network bandwidth management. It also protects against audio stream degradation by guaranteeing that the audio stream will have a dedicated channel that is separate from the higher-bandwidth video stream.

You can apply this configuration by setting the **Media Port Ranges** field in the SIP profile to **Separate Port Ranges for Audio and Video**. You can then apply the configuration to a phone by associating the SIP profile to a phone.

Traffic Class Label

The Flexible DSCP and Video Promotion feature uses the Traffic Class Label (TCL) to instruct the SIP endpoint dynamically to mark its DSCP on a per call basis, based on the Video Promotion policy that you configure. Because TCL is a SIP Session Description Protocol (SDP) attribute that is defined per media line, the TCL and its associated DSCP markings can be different for the audio media line and the video media line of a video call. You can choose different DSCP markings for the audio stream and the video stream of the video call.

DSCP Settings Configuration Task Flow

Perform the following tasks to configure DSCP values and a video promotion policy for your network.

Procedure

	Command or Action	Purpose
Step 1	Configure Flexible DSCP Marking and Video Promotion Policy, on page 3	Configure a video promotion policy to handle the different types of video.
Step 2	Configure Custom QoS Policy for Users, on page 5	If your company has users that require higher priority than other users in your company, configure a SIP Profile that includes custom DSCP values for audio and video streams. For example, if your company has a telephone sales force or CEO whom require higher priority, you can apply the customized SIP profile to those users' phones.

Configure Flexible DSCP Marking and Video Promotion Policy

Follow these steps to configure a video promotion policy to handle the different types of video.

Procedure

Step 1 From Cisco Unified CM Administration, choose **System** > **Service Parameters**.

Step 2 From the **Server** drop-down list, choose the server where you want to configure the parameters.

Step 3 From the **Service** drop-down list, choose the **Cisco CallManager (Active)** service.

If the service does not display as active, ensure that the service is activated in Cisco Unified Serviceability.

Step 4 To configure a Video Promotion policy that promotes desktop video endpoints to immersive video endpoints, set the **Use Video BandwidthPool for Immersive Video Calls** parameter to **False** and set the **Video Call QoS Marking Policy** parameter to **Promote to Immersive**.

Step 5 To configure other parameters, scroll to the appropriate area of the **Service Parameter Configuration** window and update the parameter values. See Flexible DSCP Marking and Video Promotion Service Parameters, on page 4 for information about the service parameters and their configuration options.

Step 6 Click **Save**.

Flexible DSCP Marking and Video Promotion Service Parameters

Note For more information about the service parameters, click the parameter name or click the question mark (?) icon that displays in the **Service Parameter Configuration** window.

Table 1: Flexible DSCP Marking and Video Promotion Service Parameters

Parameter	Description
Clusterwide Parameters (System - QoS)	This section of service parameters includes clusterwide DSCP values for a wide range of audio and video call types, including DSCP for audio calls, video calls, the audio portion of a video call, TelePresence calls, and the audio portion of a TelePresence call. It is highly recommended that you keep these parameters set to the default value unless a Cisco support engineer instructs otherwise.
Clusterwide Parameters (Call Admission Control)	
Video Call QoS Marking Policy	This parameter allows you to configure a Promote to Immersive policy that reconciles bandwidth allocation inconsistencies between a desktop video endpoint and a Cisco TelePresence immersive video endpoint in favor of the immersive endpoint. When promotion is performed, the audio and video bandwidth are reserved from the immersive bandwidth pool allocation. The policy of Promote to Immersive takes effect only for calls between an immersive video device and a desktop video device that supports flexible DSCP marking.
Clusterwide Parameters (System - Location and Region)	
Default Intraregion Max Immersive Video Call Bit Rate (Includes Audio)	This parameter specifies the default maximum total bit rate for each immersive video call within a particular region, when the **Use System Default** option is selected as the **Max Immersive Video Call Bit Rate** in the **Region Configuration** window for the relationship of the region with itself.

Parameter	Description
Default Interregion Max Immersive Video Call Bit Rate (Includes Audio)	This parameter specifies the default maximum total bit rate for each immersive video call between a particular region and another region, when the **Use System Default** option is selected as the **Max Immersive Video Call Bit Rate** in the **Region Configuration** window for the relationship of the region with the other region.
Use Video BandwidthPool for Immersive Video Calls	This parameter specifies whether Unified Communications Manager reserves bandwidth from the desktop video bandwidth pool for immersive video calls.

Configure Custom QoS Policy for Users

Perform the following tasks to set up a custom Quality of Service (QoS) policy for users. You may want to apply a custom policy if a set of users within your company has different QoS requirements from the rest of the company such as telephone sales force or a CEO.

Procedure

	Command or Action	Purpose
Step 1	Configure Custom QoS Settings in SIP Profile, on page 5	Configure a SIP Profile with customized DSCP values and a UDP port range for audio and video streams.
Step 2	Apply Custom QoS Policy to a Phone, on page 6	Apply the SIP Profile to a phone. The DSCP settings in the SIP Profile override the DSCP clusterwide service parameter settings..

Configure Custom QoS Settings in SIP Profile

Configure custom DSCP values and UDP port ranges for the phones that use this SIP Profile. You can use these settings to configure a customized QoS policy that you can apply to specific phones and users within your network. You may want to do this if you want to apply specific QoS settings to specific users within your enterprise, such as a sales force, or a CEO.

Procedure

Step 1 From Cisco Unified CM Administration, choose **Device** > **Device Settings** > **SIP Profile**.

Step 2 Perform either of the following steps:

- Click **Find** and select an existing SIP Profile.
- Click **Add New** to create a new SIP Profile.

Step 3 From the **Media Port Ranges** field, select whether you want to assign a single UDP port range that handles both audio and video media, or separate port ranges for audio and video streams.

- If you want to configure a single port range for audio and video media, enter the range of ports in the **Start Media Port** and **Stop Media Port** fields. The possible port values are between 2048 and 65535.

• If you want separate port ranges for audio and video streams, enter the range of audio ports using the **Start Audio Port** and **Stop Audio Port** fields. Enter the range of video ports using the **Start Video Port** and **Stop Video Port** fields. The possible port values for each are between 2048 and 65535.The two port ranges must not overlap.

Step 4 In the following fields, configure customized DSCP values for audio and video streams.

- DSCP for Audio Calls
- DSCP for Video Calls
- DSCP for Audio Portion of Video Calls
- DSCP for TelePresence Calls
- DSCP for Audio Portion of TelePresence Calls

Note By default, each of the above fields is configured to use the value from a corresponding service parameter. If you assign new values, the new value overrides the service parameter setting.

Step 5 Complete the remaining fields in the **SIP Profile Configuration** window. For help with the fields and their settings, refer to the online help.

Step 6 Click **Save**.

Apply Custom QoS Policy to a Phone

Use this procedure to apply a SIP Profile that contains customized QoS settings, including DSCP values and a UDP port range for audio and video media. When you apply this SIP profile to a phone, the phone uses the custom settings from the SIP Profile.

Procedure

Step 1 From Cisco Unified CM Administration, choose **Device** > **Phone**.

Step 2 Perform any one of the following steps:

- Click **Find** and select an existing phone.
- Click **Add New** to create a new phone.

Step 3 From the **SIP Profile** drop-down list, select the SIP profile that you set up with the custom DSCP values and UDP port range values.

Step 4 Complete the remaining fields in the **Phone Configuration** window. For more information on the fields and their configuration options, see the system Online Help.

Step 5 Click **Save**.

Flexible DSCP Marking and Video Promotion Interactions

Table 2: Flexible DSCP Marking and Video Promotion Interactions

Device	Interaction
SIP Intercluster Trunks	The Flexible DSCP Marking and Video Promotion feature is supported over SIP intercluster trunks.
Skinny Client Control Protocol (SCCP) Devices	The Flexible DSCP Marking and Video Promotion feature is supported for SCCP devices.
Pass-Through MTPs	If pass-through MTPs are inserted in a call, Unified Communications Manager signals the MTP to mark the packets with the DSCP marking that is expected from the endpoint device that originally emitted the packet for the video stream. If the two endpoints on a call use different DSCP markings (for example, a Cisco TelePresence immersive video endpoint and a desktop video endpoint without Video Promotion), the MTPs preserve the DSCP marking in each stream direction.

Flexible DSCP Marking and Video Promotion Restrictions

Table 3: Flexible DSCP Marking and Video Promotion Restrictions

Restriction	Description
Trunks and gateways	The Flexible DSCP Marking and Video Promotion feature is not supported over H.323 trunks and Media Gateway Control Protocol (MGCP) gateways.
Multilevel Precedence and Preemption	Cisco recommends that you do not use the Flexible DSCP Marking and Video Promotion feature with Multilevel Precedence and Preemption (MLPP) service calls. When you need MLPP service functionality, Cisco recommends that you set the Video Call QoS Marking Policy and Use Video BandwidthPool for Immersive Video Calls service parameters to their default values. With default values for the Video Call QoS Marking Policy and Use Video BandwidthPool for Immersive Video Calls service parameters, Unified Communications Manager and endpoints use MLPP DSCP markings for the media packets.
SIP video endpoints	The Flexible DSCP Marking and Video Promotion feature is dependent on desktop SIP video endpoint support. Currently, only Cisco DX650 series SIP phones provide the required endpoint support.