

CISCO SERVICE CONTROL SOLUTION GUIDE



Cisco Service Control Traffic Optimization:

Capacity Control Solution Guide, Release 3.8.x

- 1 Introduction and Toolset Overview
- 2 Configuring the Solution
- **3** Obtaining Documentation and Submitting a Service Request



This document supports all 3.8.x releases.

1 Introduction and Toolset Overview

Introduction

Delivering a quality broadband experience is increasingly difficult with the demand on the available network capacity, delay-sensitive applications, and a subscriber base that is sensitive to privacy, neutrality, and fairness. Service providers face exponential growth in the demand for network resources, which is driven by new applications built to consume as much bandwidth as possible. Adding more capacity to the network provides only temporary relief because it is quickly consumed by the applications. Moreover, it is an additional expense to the service provider. Additionally, new delay-sensitive applications such as VoIP are severely affected by the congestion events caused by the high load of the network. This affects user experience and reduces subscriber satisfaction.

The Cisco Service Control Engine (SCE) provides a toolset to deal with such challenges. The SCE network management controls the network capacity, while increasing the provider revenue. The SCE enables you to create policies that are customized to your business. You can actively prioritize specific subscribers or specific applications, and create incentives for subscribers to upgrade their plans to higher subscription plans.

SCE Capacity Control Solution

The SCE Capacity Control Solution deals with the demand for network resources. This demand is driven by the presence of applications that consume as much bandwidth as possible and the coexistence of delay-sensitive applications that are badly affected by the congestion caused by these high-bandwidth consumption applications. The goal of this solution is to divide the available network resources fairly between all active subscribers, while maximizing the overall experience of all the subscribers using the network.

Using this solution, you can configure the SCE to work in one of two ways:

- Anonymous subscriber mode—The SCE is aware of the individual subscribers using the network.
- Subscriberless mode—The SCE controls each session individually without looking at the context of the subscriber.

In anonymous subscriber mode, there is no need to integrate the SCE with the operations support systems (OSS). In anonymous subscriber mode, the SCE automatically defines each IP address as a subscriber and when the network is congested, the SCE fairly divides the resources between the subscribers. When the SCE is working in subscriberless mode, the bandwidth is fairly shared between the individual sessions, but not between the subscribers.

In the Capacity Control solution, the SCE enforces the policy only when one of the network resources, such as the physical interface of the SCE, is congested. However, you can set additional rules that create congestion. For example, you can limit the total bandwidth that is allocated for a specific application. When the total bandwidth from the specific application exceeds the predefined rule, the system enforces the policy to fairly share the resources of this application between all subscribers using the application.

To maximize the overall experience of all subscribers using the network, you can prioritize specific applications when congestion occurs instead of statically limiting the total bandwidth of specific applications. The SCE provides 10 levels of hierarchy and you can set each application to one of these levels. When there is congestion, traffic from level 1 is affected first. If the congestion continues, level 2 is affected, and so on. Traffic from level 10 is never affected, allowing you to mark specific applications as untouched by the SCE under any condition.

SCE Tiered Services Solution

The SCE Tiered Services Solution provides a toolset with which to increase revenue by applying policies that prioritize specific subscribers or services. Where the Capacity Control solution fairly allocates the bandwidth between all subscribers, the Tiered Services Solution provides an infrastructure for differentiating between subscribers to achieve your business goals.

The tiered services are used to create several profiles called packages. Each package contains multiple features that can be customized. Features include:

- Limiting the maximum bandwidth
- Minimizing the bandwidth allocated first in priority
- Assigning the relative hierarchy level that defines the portion of bandwidth that a package receives during congestion

In addition, each package includes a set of rules for specific applications, which are either allowed or blocked in the package, the sharing of the bandwidth of a subscriber between multiple applications, the priority between the services, and so on.

The Tiered Services Solution always includes integration of the SCE with your OSS so that you can identify and apply the correct policies for the subscribers.

SCE Toolset Overview

The physical link bandwidth is an absolute limit on the bandwidth that travels through the system (see Figure 1). To optimize traffic, you can limit the available bandwidth on two levels:

- Subscriber bandwidth control-Limits the available bandwidth per subscriber
- Global control—Limits the available bandwidth per service
- The Capacity Control solution consists of these configurable building blocks:
- Bandwidth Controller (BWC)—Controls the available bandwidth per service, per subscriber
- Primary Bandwidth Controllers (PBWC)—Controls the total traffic per subscriber
- Global Controllers—Controls the total bandwidth per service, per group of subscribers
- Port Controller—Controls the total bandwidth of the physical port on the SCE

Figure 1 Bandwidth Management Building Blocks



Bandwidth Control

Subscriber BWCs control the bandwidth from a specific service used by individual subscribers. Each BWC controls available bandwidth for selected services.

A BWC is specified by these parameters:

- Committed information rate (CIR)—Minimum bandwidth that is granted to the services controlled by the BWC.
- Peak information rate (PIR)—Maximum bandwidth that the services controlled by the BWC can consume.
- Assurance Level (AL)—Rate of change of available bandwidth under conditions of traffic congestion.

The AL controls how quickly the bandwidth of the service decreases from the PIR to the CIR as congestion builds, or how quickly the actual information rate (AIR) increases from the CIR to the PIR as congestion decreases.

The BWC ensures that even when the network is congested (PIR congestion), at least the CIR is granted. Similarly, the BWC ensures that even when there is little traffic associated with a BWC, the PIR is not exceeded.

Bandwidth may be thought of in terms of a virtual pipe of adjustable width. The PIR is the maximum allowed width of the virtual pipe. The CIR is the minimum width to which the pipe can contract. The actual pipe width is between the CIR and the AIR. During network congestion, the system contracts each pipe differently to differentiate between subscribers and between their services.

Primary and Service Bandwidth Control

In the Service Control Application for Broadband (SCA BB), each subscriber has an independent set of BWCs, consisting of a single Primary BWC that controls the total bandwidth available to the subscriber and several Service BWCs that control the available bandwidth of some services of that subscriber. For example, one BWC may control the streaming service; another may control the download and e-mail services together.

The PIR defines the maximum bandwidth for the associated services; the CIR defines the minimum bandwidth for the services.

External Bandwidth Control

An external bandwidth controller (EBC) controls the available bandwidth for a specific service negating the defined subscriber parameters. For example, the EBC may control VoIP to ensure that it always has sufficient bandwidth regardless of the other subscriber parameters.

Global Bandwidth Control

Global controllers provide constraints for large, global volumes of traffic, such as Total Gold Subscriber Traffic, or Total P2P Traffic. Each global controller defines the maximum bandwidth allowed for a particular type. Using a global controller, you can limit the total traffic of services in the system, such as Peer-to-Peer (P2P), to any desired bandwidth.

Port Control

The physical link bandwidth is an absolute limit on the bandwidth that can pass through the system. You can limit the total bandwidth capacity of the SCE platform to a value lower than the physical link bandwidth. For example, if another device connected to the SCE platform on the IP stream has limited bandwidth capacity, you can limit the bandwidth passing through the SCE platform to match the capacity of the other device.

2 Configuring the Solution

This chapter describes these solutions for local links as well as the steps to configure them:

- Capacity Control, page 5
- Tiered Subscriber Services, page 18
- Capacity Control and Tiered Subscriber Services, page 26

Capacity Control

The Capacity Control solution provides a means to distribute the total amount of bandwidth equally over the local links.

SCA BB supports theses two modes in which the Capacity Control solution can be configured:

- Subscriberless mode—Available bandwidth is divided equally between the flows. This means that the same amount of bandwidth is allocated per service regardless of the number of services each subscriber is currently running.
- Anonymous subscriber mode—Available bandwidth is divided equally between subscribers. The total bandwidth of each subscriber is then divided equally between their services. This means that all subscribers have an equal amount of bandwidth regardless of the number of services they are running.

Configuring the Capacity Control Solution

Step 1 From the Cisco SCA BB Console main menu, choose Help > Welcome. The Welcome window appears (see Figure 2).

FNetwork Navigator - SCA BB Console	
ile Tools Preferences <u>W</u> indow <u>H</u> elp	
🔀 Welcome 🕱	🟠 🔶 🖵
CISCO Introducing Cisco Service Control	
The Cisco Service Control Application (SCA) utilizes deep-packet inspection a subscriber-aware services. Use the wizards below to quickly setup the system, or	nd application classification allowing service providers to offer application-aware and r close this Welcome view and go to the SCA BB Console.
Tools Setup	System-wide Configuration
SCE Software Installation Wizard	Clage Analysis Wizard
This wizard lets you install and upgrade the SCE software	SCA BB can collect statistics about the applications and services used by individual subscribers. This data can be used for capacity planning and detailing the subscriber demographics. This wizard lets you quickly setup the system for usage analysis.
This wizard lets you quickly connect the SCA BB Reporter to a Collection Manager's database.	P2P Traffic Optimization Wizard
	SCA BB can prevent network congestion and reduce costs, caused by bandwidth-hungry applications such as P2P, and improve subscriber experience in using latency sensitive applications such as voice. This wizard lets you quickly setup the system for P2P traffic optimization.
	P2P Traffic Optimization for Asymmetrical Routing Wizard
	SCA BB can prevent network congestion and reduce costs, caused by bandwidth-hungry applications such as P2P, and improve subscriber experience also in environments where Asymmetrical Routing occurs (that is, the two sides of a TCP or UDP flow, or some parts of the overall subscriber's traffic traverse on different network routes). This wizard lets you quickly setup the system for P2P Traffic Optimization for Asymmetrical
	Rouning Environments.

Figure 2 Welcome Window

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Step 2 Click P2P Traffic Optimization Wizard.

The Welcome window of the P2P Traffic Optimization wizard appears (see Figure 3).

Figure 3 P2P Traffic Optimization



Note

You can also open the P2P Traffic Optimization wizard from the Network Navigator tool:

1. Select one or more devices in the Site Manager tree.

2. Right-click one of the selected devices. A popup menu appears.

3. Choose Configuration Wizards > P2P Traffic Optimization Wizard.

You can set only one Collection Manager and one Service Control Application Reporter (SCA Reporter) database in the wizard. If you select more than one Collection Manager or Cisco SCA Reporter database, only one Collection Manager and one Cisco SCA Reporter database are selected and a warning message is displayed. 5. Click **OK** to continue.

Step 3 Click Next.

The SCE IP Addresses window of the P2P Traffic Optimization wizard appears (see Figure 4).

Figure 4 SCE IP Addresses Window

P2P Traffic Optimization Wizard	×
CE IP Addresses	
One or more SCE IP addresses must be specified	-
Configuring the SCE platforms requires that they are first added to the Network Navigator.	
To add SCE platforms to the Network Navigator, type their IP <u>a</u> ddresses in the text box below (For example: 10.56.216.37, 10.56.216.38):	
2	2
	2
< Back Next > Finish Cancel	
Calcon	

Step 4 Enter the IP addresses of the SCE devices to be added to the model.

If you started from Network Navigator, the IP addresses of the SCE devices that you selected are displayed. You can add additional addresses.



You can work with up to 20 SCE devices at one time using the wizard.

Step 5 Click Next.

The SCE Usernames and Passwords window of the P2P Traffic Optimization wizard appears (see Figure 5).

Figure 5 SCE Usernames and Passwords Window

<mark>₩ P2P Tra</mark> ffi	ic Optimization Wizard	\mathbf{X}
SCE Usernam	nes and Passwords	
🚱 A password	l for the SCE 10.56.216.37 is missing	-
In order to con specified for ea	nect to the SCE platforms, a username and a password need to be ach SCE.	
💽 Use a <u>c</u> ommo	on username and a common password for all SCE platforms:	
Username: a	admin	
Password:		
OUse separate	te usernames and passwords for each SCE platform:	
SCE IP Addre	ess Username Password	
10.56.216.37 admin		
	<back next=""> Einish Cancel</back>	

Step 6 Enter the username and password for the SCE devices.

Do one of these:

- To use the same username and password for all the SCE devices that you are adding, enter the username in the Username field and the password in the Password field.
- To provide a different username and password pair for each SCE device, click the Use separate usernames and passwords for each SCE platform radio button, and, for each SCE device, enter the username and password in the appropriate cell of the SCE device table.

Step 7 Click Next.

The CM Setup window of the P2P Traffic Optimization wizard appears (see Figure 6).

Figure	6	СМ	Setun	Window
iguie	0	0.01	Jeiup	vv muovv

¥ P2P Traffic	Optimization Wizard 🛛 🛛
CM Setup	
📀 An IP address	is missing
Configuring the C CM to the Networ boxes below. The wizard will ve	M requires that it is first added to the Network Navigator. To add the k Navigator, type its IP address, username and password in the text rify the CM operational state, and configure the SCE platfroms to
send RDRs to the destination of the	CM. You may skip this step if the CM is already defined as the RDR SCE platforms.
Skip this step	
CM <u>I</u> P address:	×
CM <u>u</u> sername:	scmscm
CM <u>p</u> assword:	
	<pre></pre>

Step 8 Define the Collection Manager (CM) to use with this configuration.

Do one of these:

- Enter the IP address, username, and password of the Collection Manager device in the appropriate fields. If you started from the Network Navigator, this information is retrieved and displayed. You can modify these parameters.
- Check the Skip this step check box.

Step 9 Click Next.

The Reporter Setup window of the P2P Traffic Optimization wizard appears (see Figure 7).

Figure 7 Reporter Setup Window

¥ P2P Traffic Optimization Wizard	
Reporter Setup	I
The Reporter generates reports by executing queries on a database. Specify t database IP address and its type below. You may skip this step if the Reporter is already connected to a database. Skip this step	he
Database IP address: 10.56.201.81	~
Database type: Sybase 💌	
< Back Next > Einish Ca	ancel

Step 10 Define the database to which the SCA Reporter tool should connect.

Do one of these:

• Enter the IP address of the database and select the database type.

If you started from the Network Navigator, this information is retrieved and displayed. You can modify these parameters.

• Check the Skip this step check box.

Step 11 Click Next.

The Connectivity Test window of the P2P Traffic Optimization wizard appears (see Figure 8). The wizard tests the connectivity between the defined devices.

Figure 8 Connectivity Test Window

EP2P Tra	affic Optimiz	ation Wizard	
Connectiv	rity Test nectivity		
The wizard (that correct Please wait In case of a correct the to skip or re	will now test the IP addresses, u for the connecti n error, you ma IP addresses, u try the connecti	connectivity to the devic isernames and passwords vity test to complete. y use the 'Back' button to sernames or passwords, il vity test using the button	es that you specified, to verify ; were used. go back to previous steps and f necessary. You may also choose s below.
Туре	IP Address	Status	
SCE	10.56.216.37	Connection succeeded	
Database	10.56.201.8	Testing connectivity	
CM	10.56.201.81	Connection succeeded	
Skip conn	ectivity test [Retry connectivity test	
		Back Next >	Einish Cancel

Note

If a connection to one or more of the devices cannot be made, or if there is some problem with the connection (such as invalid version of the device), an error is displayed next to the device. You can skip these tests by clicking **Skip connectivity test**. The connections are validated when you click Finish at the end of the wizard.

Step 12 Click Next.

The Anonymous Subscribers window of the P2P Traffic Optimization wizard appears (see Figure 9).

Figure 9 Anonymous Subscribers Window



Step 13 Check the **Enable Anonymous Subscribers mode** check box, to configure the SCE to work in anonymous subscriber mode. To configure the SCE to work in subscriberless mode, uncheck the **Enable Anonymous Subscribers mode** check box.

Step 14 Click Next.

The effect of P2P traffic optimization window of the P2P Traffic Optimization wizard appears (see Figure 10), which explains why you should optimize (limit) peer-to-peer (P2P) traffic.

Figure 10 Effect of P2P Traffic Optimization Window

¥ P2P Traffic Optimization Wizard 🛛 🛛 🛛
The effect of P2P traffic optimization
This wizard configures the system to enforce strict priority between 3 levels of service: High (voice), Medium (other) and Low (P2P). The two charts below demonstrate the effect of P2P traffic optimization. The chart on the left shows how, during peak hours, uncontrolled P2P (in blue) causes congestion (total traffic crosses the red line), while browsing (yellow) and voice (green) quality deteriorates. The prioritization that is enforced by this configuration takes place when the total traffic rate crosses the configured limit. The chart on the right shows how congestion is mitigated by throttling P2P traffic, while allowing browsing and voice traffic to take its place.
< <u>Back</u> <u>Next</u> > <u>Einish</u> Cancel

Step 15 Click Next.

The Link rate limits for P2P traffic optimization window of the P2P Traffic Optimization wizard appears (see Figure 11).

Figure 11 Link Rate Limits for P2P Traffic Optimization Window

発 P2P Traffic C	ptimization Wizard 🛛 🛛 🕅
Link rate limits	for P2P traffic optimization
In the sliders below (the red line) that s sure that total rate between different a	, configure the total upstream and downstream traffic rate limits hould be enforced by the SCE platform. The SCE platform will make does not exceed this configuration, while maintaining priority applications.
These settings can	be changed later in the Global Controllers configuration dialog.
<u>U</u> pstream limit:	30% (600Mbps of 2Gbps)
<u>D</u> ownstream limit:	100% (2Gbps of 2Gbps)
	< <u>B</u> ack Next > Einish Cancel

Step 16 Configure the upstream and downstream link rate limits by using the sliders.The scale of each slider is the percentage of the aggregated bandwidth of both links.

Step 17 Click Next.

The Confirmation window of the P2P Traffic Optimization wizard appears (see Figure 12).

Figure 12 Confirmation Window



The actions that the wizard is about to take are listed in the window.

Step 18 Click Finish.

The Configuration Output window of the P2P Traffic Optimization wizard appears (see Figure 13).

Figure 13 Configuration Output Window

€ 🛛 🛛
Configuration Output
Please wait while the system is being configured.
<pre>+ 11/11/07 2:34:42 PM IST INFO Verifying that the CM is installed properly + 11/11/07 2:34:42 PM IST WARN Found anonymous group in SCE app-mng3-sce.cisco.com, + 11/11/07 2:34:42 PM IST INFO Applying configuration to SCE 10.56.216.37 (1 out of + 11/11/07 2:34:48 PM IST INFO Reading SCE platform data + 11/11/07 2:34:48 PM IST INFO Preparing configuration to SCE + 11/11/07 2:34:48 PM IST INFO Executing configuration to SCE + 11/11/07 2:35:23 PM IST INFO Updating configuration registry + 11/11/07 2:35:23 PM IST INFO Updating the CM at 10.56.201.81 with service configurati + 11/11/07 2:35:23 PM IST INFO Updating the CM at 10.56.201.81 with service configurati + 11/11/07 2:35:25 PM IST INFO Updating CM at 10.56.201.83 with service configurati + 11/11/07 2:35:25 PM IST INFO Updating the Reporter to the database + 11/11/07 2:35:25 PM IST INFO Configuration to SCE 10.56.216.37 completed + 11/11/07 2:35:25 PM IST INFO Verifying that the database is connected and configu SCA BB Templates: [PASS] A database connection is defined and available. [PASS] Policy string translations are available. [PASS] Timezone information in CM DB is available. [PASS] Timezone information in CM DB is available. [PASS] Policy String TINFO Configuration completed successfuly</pre>
< <u>Back</u> Next > Close Cancel

New devices are added to the default site of the Site Manager tree in the Network Navigator (see Figure 14).

Figure 14 Network Navigator – Site Manager Tree



The wizard attempts to connect to all devices that you defined. The operation fails if:

- The wizard cannot connect to any of the SCE devices that you listed in Step 4.
- You defined a Collection Manager in Step 8, but the wizard cannot connect to it.
- You defined a database in Step 10, but the wizard cannot connect to it.

If you defined a Collection Manager in Step 8, the SCE devices are configured so that the only category 1 Raw Data Record (RDR) destination is the Collection Manager.



Note RDR categories are the mechanism by which different types of RDRs can be sent to different collectors. For details about RDR categories, see the *Cisco Service Control Application for Broadband Reference Guide*.

A new service configuration named P2P Traffic Optimization is created, and opens in the Service Configuration Editor.

The new service configuration has these characteristics:

- The Full Functionality mode is active.
- The upstream and downstream default AGCs are set with the link limit values defined in Step 15.
- For both the default package and the Unknown Subscriber Traffic package, the following upstream and downstream BWCs are created:

Table 1 BWCs for Default and Unknown Subscriber Traffic Packages

Packages	CIR	PIR	AL
P2P	0	<value controller="" global="" in="" set=""></value>	1
VoIP	<value controller="" global="" in="" set=""></value>	<value controller="" global="" in="" set=""></value>	10
P2P	<value controller="" global="" in="" set=""></value>	<value controller="" global="" in="" set=""></value>	1

The service configuration is applied to the SCE devices.

If you defined a database in Step 10:

- 1. The SCA Reporter tool is connected to the selected database.
- 2. The first SCE platform entered in Step 4 is selected as the source of service configuration data.
- 3. The Next button is enabled.
- Step 19 (If you did not define a database in Step 10) Click Finish.

The P2P Traffic Optimization wizard closes.

Step 20 Click Next.

The Create common reports window of the P2P Traffic Optimization wizard appears (see Figure 15).





Step 21 Check the Create and display common reports once the configuration is completed check box to create reports.



Report instances are created for four predefined report types:

- Global Bandwidth per Service
- Global Active Subscribers per Service
- Top P2P Protocols
- Global Hourly Call Minutes per Service (VoIP)

Step 22 Click Close.

The wizard closes. The SCA Reporter tool opens in the Console. Report instances of each of the four report types open in the Report view of the SCA Reporter tool.

Tiered Subscriber Services

The Tiered Subscriber Services solution enables you to create different subscriber packages with class of service parameters defined for each package.

Within each package, you define the available bandwidth and allotted services, as well as the priorities for the selected services. Additionally, you can define priorities between the packages so that when the link is congested, each package receives a different, predefined share of the bandwidth.

For example, you can define these three packages:

- Gold—5 MB, three services (VoIP, P2P, browsing)
- Silver—3 MB, three services (VoIP, browsing, P2P)
- Bronze—1.5 MB, two services (browsing and P2P)

In this example, you give priority to the VoIP of the silver package so that if all services are running simultaneously, VoIP still has sufficient bandwidth for optimal performance.

Gold has top priority, followed by silver, and then bronze. When the link is congested, gold has the most available bandwidth followed by silver, and then bronze.

Configuring the Tiered Subscriber Services Solution

- **Step 1** Create a new service configuration file.
 - a. In the Service Configuration Editor tool, from the Console main menu, choose File > New Service Configuration. The New Service Configuration Settings window appears (see Figure 16).

Figure 16 New Service Configuration Settings Window

New Service Configuration Settings
System Operational Mode Select the system's operational mode for handling the network traffic: Transparent Report Only Full Functionality
Routing Classification Mode Enable Asymmetric Routing Classification Mode in topologies with high rate of unidirectional flows. In this mode, the system is better tuned for classifying traffic according to just one side of the flow, but some control capabilities are disabled.

b. In the System Operational Mode area, click the **Full Functionality** radio button.

c. Click OK.

The new service configuration is added to the Console window, open on the Policies tab, and becomes the active service configuration (see Figure 17).

Figure 17 S	Service Configuration	Editor-New	Service	Configuration
-------------	-----------------------	------------	---------	---------------

🔀 Service Configuration Editor - <new ser<="" th=""><th>vice configu</th><th>ration> - SC</th><th>A BB Console</th><th></th><th></th><th></th><th></th><th></th></new>	vice configu	ration> - SC	A BB Console					
File Tools Preferences Window Help								
i 🗅 😂 🔚 i 🏶								
🖹 🛃 Service Configuration Editor 🤭 Network N	lavigator							
S <new configuration="" service=""> 🛛</new>								
Policies : Subscriber Policies : Default Package								
🖅 Policies 🛛 💻 Classification					<u></u>	÷ 🔶 '	🌜 🗙	S 🔨
💠 🕂 🗙 📏 Configuration 🗸	Default Packa	age : Default Se	rvice					
Filtered Traffic	Rule		Action					
📲 🏺 Service Security	🚰 Defaul	lt Rule	controlled [Def	ault Upstream BWC	;) Default Downst	ream BW	⊂];	
Global Policy								
Gefault Package								
🤐 🧐 Unknown Subscriber Traffic								
							E -	
Console								
								~
								~
<u>s</u>								
Report Only				1				: 0

Step 2 Add a new package.

 a. In the Policies tab, click Subscriber policies, and click the Add Package (+) icon. The Package Settings window appears (see Figure 18).

Figure 18 Package Settings Window

Package Settings for ""	
General Quota Management Subscriber BW Controllers Advanced	
Package name:	
Package1	
Description:	
	OK Cancel

- **b**. In the **Package name** field, enter Gold.
- c. In the Description field, enter a meaningful description for the Gold package.
- d. Click OK.

- **Step 3** Add these services to the Gold package:
 - Voice and Video Calls
 - P2P
 - Browsing
 - **a**. Click the Gold package.
 - b. In the right (Rule) pane, click the add rule (+) icon.
 The Add New Rule to Package window appears (see Figure 19).

Figure 19 Add New Rule to Package Window

¥ Add New Rule to Package "Gold"	
General Control Usage Limits Breach Handling	
- Service-	
Select the Service to which the Rule will relate:	
Other	×
_ Rule State	
Define the state of this Rule:	
 Enable reporting and active actions 	
O Disable reporting and active actions	
ОК	Cancel

c. In the Service area, from the Select the Service to which the Rule will relate drop-down list, choose Voice and Video Calls.

- d. Click OK.
- e. Repeat Steps a to d, adding P2P and Browsing services.

- Step 4 For each service, create an upstream and downstream BWC and configure the BWC parameters.
 - **a**. Click the Gold package, and click the edit (\mathbf{N}) icon.
 - The Package Settings dialog box appears.
 - In the Package Settings dialog box, click the Subscriber BW Controllers tab. The Subscriber BW Controllers tab appears (see Figure 20).

Figure 20 Subscriber BW Controllers Tab

¥ Package Settings for "Default	Package"					
General Quota Management Subscribe	er BW Controlle	ers Advanced				
Subscriber BW Controllers limit the BW o for a single subscriber. They are also us	f transaction g ed for linking se	roups and prio ervices to Glob	ritize between transactions al Controllers.	of differ	ent se	rvices
Upstream						
Subscriber relative priority (upstream)	: 5 💌			•	P	×
Name	CIR (L3 K	PIR (L3 K	Global Controller		AL	
🖃 👄 Primary Upstream BWC	0	Unlimited				
🐂 💳 Default Upstream BWC	0	Unlimited	Default Global Controller	1		
Downstream Subscriber relative priority (downstrea	m): 5 💌			0	Ø	×
Name	CIR (L3 K	PIR (L3 K	Global Controller		AL	
📃 🖚 Primary Downstream BWC	0	Unlimited				
Default Downstream BWC	0	Unlimited	Default Global Controller	1		
0			ОК		Car	ncel

- **c.** Add an upstream BWC to the package. In the Upstream area, click the add sub BWC ((()) icon. A new BWC is added.
- d. In the Name field, enter Upstream Voice and Video Calls.
- e. Configure the parameters for the BWC, as required for the Voice and Video Calls service, as follows:
 - In the CIR (Kbps) field, enter 256.
 - In the PIR (Kbps) field, enter Unlimited.
 - In the AL field drop-down list, choose 9.

- f. Add a downstream BWC, and configure the parameters, as required for the Voice and Video Calls service, as follows:
 - In the Name field, enter Downstream Voice and Video Calls.
 - In the CIR (Kbps) field, enter 256.
 - In the PIR (Kbps) field, enter Unlimited.
 - In the AL field drop-down list, choose 9.
- g. Configure the remaining BWCs with the values displayed in the window in Figure 21.

Figure 21 Package Settings Example

🛠 Package Settings for "Default	Pac	kage"							
General Quota Management Subscrib	er BW	/ Control	lers	Advance	ed				
Subscriber BW Controllers limit the BW of for a single subscriber. They are also us	of tran sed fo	nsaction (r linking :	group: service	s and pr es to Glo	ioritiz bal C	e between transactions o iontrollers.	f differ	ent se	rvices
Subscriber relative priority (upstream)): 9	*					•	٩	×
Name		CIR (L	з	PIR (L	3	Global Controller		AL	
🖃 👄 Primary Upstream BWC		0		Unlimite	d			1	
Default Upstream BWC		0		Unlimite	d	Default Global Controller		1	
- Upstream Voice and Video	Calls	256		Unlimite	d	Default Global Controller		9	
Upstream P2P		256		1024		Default Global Controller		1	
		0		Unlimite	d	Default Global Controller		5	~
Downstream Subscriber relative priority (downstrea	am):	9 🗸					•	œ	×
Downstream Subscriber relative priority (downstrea	am): [CIR	9 🔽	PIR	(L3	Glol	bal Controller	() AL	Ŷ	×
Downstream Subscriber relative priority (downstreative) Name	am): [CIR 0	9 💌 t (L3	PIR	(L3	Glol	bal Controller	() AL	œ	×
Downstream Subscriber relative priority (downstream Name B	am): [CIR 0	9 💌	PIR Unlim Unlim	(L3 ited ited	Glol	bal Controller ult Global Controller	() AL	Ŷ	*
Downstream Subscriber relative priority (downstream Name Primary Downstream BWC Default Downstream BWC Downstream Voice and Vide	am): [CIR 0 6256	9 🔽	PIR Unlim Unlim Unlim	(L3 ited ited	Glol Defa Defa	bal Controller ult Global Controller ult Global Controller	() AL 1 9	Ŷ	*
Downstream Subscriber relative priority (downstream Name Primary Downstream BWC Default Downstream BWC Downstream Voice and Vid Downstream P2P	am): [CIR 0 6256 256	9 🔽	PIR Unlim Unlim Unlim 5000	(L3 ited ited ited	Glol Defa Defa	bal Controller ult Global Controller ult Global Controller ult Global Controller	 AL 1 9 1 	œ	*
Downstream Subscriber relative priority (downstreem Name Primary Downstream BWC Default Downstream BWC Downstream Voice and Vid Downstream P2P Downstream Browsing	am): [0 0 (256 256 0	9 💙	PIR Unlim Unlim Unlim 5000 Unlim	(L3 ited ited ited	Glo Defa Defa Defa Defa	bal Controller ult Global Controller ult Global Controller ult Global Controller ult Global Controller	 AL 1 9 1 5 	P	×
Downstream Subscriber relative priority (downstree Name Primary Downstream BWC Downstream Voice and Vid Downstream P2P Downstream Browsing	am): [0 (256 0	9 V	PIR Unlim Unlim 5000 Unlim	(L3 ited ited ited	Glol Defa Defa Defa	bal Controller ult Global Controller ult Global Controller ult Global Controller ult Global Controller	(a) AL 1 9 1 5	Ŷ	*

h. From the Subscriber relative priority drop-down list (for both upstream and downstream), choose 9.

- **Step 5** Associate the services with the BWCs.
 - a. Click the Voice and Video Calls rule, and click the edit (<u>)</u> icon. The Add New Rule for Service dialog box appears.
 - b. Click the Control tab.The Control tab opens (see Figure 22).

Figure 22 Control Tab

🗲 Edit Rule for Service "Voice and Video Calls"
General Control Usage Limits Breach Handling
Define the per-flow action to be performed by this Rule:
O Block the flow
• Control the flow's characteristics:
Select an upstream Bandwidth Controller Default Upstream BWC
Select a downstream Bandwidth Controller Default Downstream BWC
Limit the flow's upstream bandwidth to Kbps
Limit the flow's downstream bandwidth to Kbps
Set the flow's upstream packets ToS (DSCP) to ToS 1 [0]
Set the flow's downstream packets ToS (DSCP) to ToS 1 [0]
Limit concurrent flows of this Service to
Set CoS for flows of this Service to BE
Redirect profile for this service: Default Redirection
Mirror traffic to server group: Server Group 0
OK Cancel

- c. From the Select an upstream Bandwidth Controller drop-down list, choose Upstream Voice and Video Calls.
- d. From the Select a downstream Bandwidth Controller drop-down list, choose Downstream Voice and Video Calls.
- e. Click OK.
- f. Repeat Steps a to e for the other services.

- **Step 6** Duplicate the Gold Package and apply required changes to create a Silver package.
 - **a**. Click the Gold package, and click the duplicate package (🍁) icon.
 - A duplicate package is created with all the same attributes as the original package. The name of the new package is *Gold* (1).
 - **b.** Click the Gold (1) package and click the edit (\searrow) icon.
 - c. In the Name field, enter Silver and enter an appropriate description in the Description field.
 - **d.** Change the BWCs to reflect the Silver configurations.

Step 7 Repeat Step 6 to create a Bronze package.

Capacity Control and Tiered Subscriber Services

The Capacity Control and Tiered Subscriber Services solution is a combination of the first two solutions; where subscriber packages are defined. However, on top of the packages, the bandwidth is limited per service (subscriberless mode) or per subscriber (anonymous subscriber mode).

Configuring the Capacity Control and Tiered Subscriber Services Solution

In this solution, you add a global controller, limit the global controller bandwidth to 500 kbps, and assign the global controller to the P2P service for the Silver and Gold packages.

- **Step 1** Configure the solution as described in Configuring the Tiered Subscriber Services Solution, page 19.
- Step 2 Add a new global controller and set a single value for the maximum bandwidth limit for this global controller.
 - **a**. In the Policies tab, click **Global Policy**.

The Global Bandwidth Settings appear in the right (Rule) pane.

 b. Above the Upstream interface area, click the add (+) icon. The Select addition mode window appears (see Figure 23).

Figure 23 Select Addition Mode Window

¥	
Select addition mode	
 Add a new Global Controller Add a Global Controller and map a Rule and a BWC to it 	
Next	Cancel

- c. Click the Add a new Global Controller radio button to add a new global controller.
- d. Click Finish.

The Global Controller Settings window appears (see Figure 24).

Figure 24 Global Controller Settings Window

Upstream Global	Controller	Settings
Global Controller Se	ettings	
🔕 Global Controller mus	t have a gcN	ameText
Name:		
		L. N
The global controller can	enforce an a	iggregate rate limit across all SCE links,
as well as a separate rat	e limit per SC roller	E link.
The global controller of	an enforce a	different rate limit per time frame
The same rate limit	for all time f	rames
◯ A different rate lim	nit per time fr	ame
Single Rate Limit (Kb	ips)	
Global Controller	Rate Limit	
Aggregate	Unlimited	
← Per Link Global Control	er	
The global controller of	an enforce a	different rate limit per time frame.
• The same rate limit	for all time f	rames
◯ A different rate lim	it per time fr	ame
Single Rate Limit (Kb	ips)	
Global Controller	Rate Limit	<i>ь</i> с
For all Links	Unlimited	
		OK Cancel

- e. In the Name field, enter P2P GC.
- f. Click the The same rate limit for all time frames radio button.
- **g.** From the Rate limit for the Per Link Global Controller (in Kbps) drop-down list, choose **500 for the maximum bandwidth**.
- h. Click Finish.
- **Step 3** Repeat Step 2 to add an identical global controller for downstream.

- **Step 4** Apply the P2P global controller to the Silver package.
 - a. Click the Silver package, and click the edit (<u>)</u> icon.
 The Package Settings dialog box appears.
 - b. In the Package Settings dialog box, click the Subscriber BW Controllers tab. The Subscriber BW Controllers tab appears (see Figure 25).

Figure 25 Subscriber BW Controllers Tab

€ Package Settings for "Default	t Pacl	kage"							<u> </u>
General Quota Management Subscrib	oer BW	Control	lers	Advanc	ed				
Subscriber BW Controllers limit the BW for a single subscriber. They are also u	of tran sed for	nsaction r linking :	group servic	os and pr es to Glo	ioritiz bal C	e between transactions ol ontrollers.	f differ	ent se	rvices
Subscriber relative priority (upstream	i): 9	~					0	œ	×
Name		CIR (L	3	PIR (L	3	Global Controller		AL	
Primary Upstream BWC		0		Unlimite	d			1	
- Default Upstream BWC		0		Unlimite	d	Default Global Controller		1	-91
- Dpstream Voice and Video	Calls	256		Unlimite	d	Default Global Controller		9	
Upstream P2P		256		1024		Default Global Controller		1	
Upstream Browsing		0		Unlimite	d	Default Global Controller		5	~
Downstream Subscriber relative priority (downstre	am):	9 🗸		<u></u>			a	æ	<u> </u>
Downstream Subscriber relative priority (downstre	am): [9 🔽	PIR	(L3	Glol	bal Controller	() AL	œ	×
Downstream Subscriber relative priority (downstre Name	am): [CIR	9 🔽	PIR	(L3 hited	Glo	bal Controller	() AL	œ	×
Downstream Subscriber relative priority (downstre Name 	am): [CIR 0 0	9 💌 . (L3	PIR Unlim Unlim	(L3 nited	Glol	bal Controller ult Global Controller	() AL	Ø	×
Downstream Subscriber relative priority (downstre Name 	am): [CIR 0 : 0 4256	9 🔽	PIR Unlim Unlim	(L3 nited nited nited	Glol Defa Defa	bal Controller ult Global Controller ult Global Controller	() AL 1 9	Ŷ	*
Downstream Subscriber relative priority (downstre Name Green Primary Downstream BWC Default Downstream BWC Downstream Voice and Vic Downstream P2P	am): [CIR 0 0 256 256	9 💌	PIR Unlim Unlim Unlim 5000	(L3 nited nited nited	Glol Defa Defa Defa	bal Controller ult Global Controller ult Global Controller ult Global Controller	(3) AL 1 9 1	¢	×
Downstream Subscriber relative priority (downstre Name Green Primary Downstream BWC Creen Default Downstream BWC Creen Downstream Voice and Vice Creen Downstream P2P Creen Downstream Browsing Creen Downstream Browsing	am): [CIR 0 256 256 0	9 🔽	PIR Unlim Unlim 5000 Unlim	(L3 nited nited nited	Glol Defa Defa Defa	bal Controller ult Global Controller ult Global Controller ult Global Controller ult Global Controller	 AL 1 9 1 5 	P	
Downstream Subscriber relative priority (downstre Name Green Primary Downstream BWC Green Default Downstream BWC Green Downstream Voice and Vic Green Downstream P2P Green Downstream Browsing	am): [0 0 256 256 0	9 💌	PIR Unlin Unlin Unlin 5000 Unlin	: (L3 iited iited iited iited	Glol Defa Defa	bal Controller ult Global Controller ult Global Controller ult Global Controller ult Global Controller	(c) AL 1 9 1 5	Ø	×

- c. In the Upstream P2P row, in the Global Controller column, choose P2P GC.
- **d**. Repeat Step **c** for downstream.
- e. Click OK.
- **Step 5** Repeat Step 4 for the Bronze package.

Traffic Optimization Reports

There are several reports that can be generated to assist in traffic optimization for the local links. For details, see the *Cisco* Service Control Application Reporter User Guide.

3 Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

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