

Per Host QoS

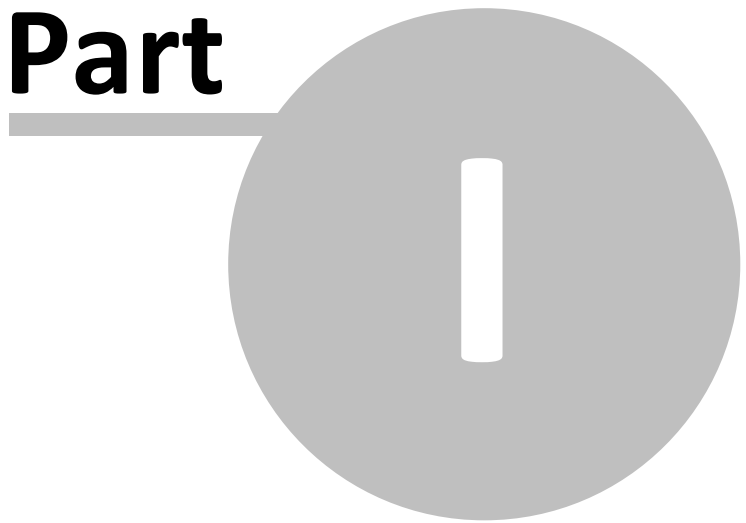
Exinda ExOS Version 6.3

© 2012 Exinda, Inc

Table of Contents

Part I Introduction	4
1 Using this Guide	4
2 Further Reading	5
Part II Overview	7
Part III Enabling Per Host QoS	9
Part IV Usage Examples	12
1 Limit Bandwidth Per Host	13
2 Limit Application Bandwidth	15
3 Guarantee Application Bandwidth	18
4 Active Directory	21
5 Adaptive Response	26
Part V Viewing Statistics	31

Part



1 Introduction

Per Host QoS

Exinda Firmware Version: 6.3

All rights reserved. No parts of this work may be reproduced in any form or by any means - graphic, electronic, or mechanical, including photocopying, recording, taping, or information storage and retrieval systems - without the written permission of the publisher.

Products that are referred to in this document may be either trademarks and/or registered trademarks of the respective owners. The publisher and the author make no claim to these trademarks.

While every precaution has been taken in the preparation of this document, the publisher and the author assume no responsibility for errors or omissions, or for damages resulting from the use of information contained in this document or from the use of programs and source code that may accompany it. In no event shall the publisher and the author be liable for any loss of profit or any other commercial damage caused or alleged to have been caused directly or indirectly by this document.

1.1 Using this Guide

Throughout the manual the following text styles are used to highlight important points:

- Useful features, hints and important issues are called "notes" and they are identified in a light blue background.

Note: This is a note.

- Practical examples are presented throughout the manual for deeper understanding of specific concepts. These are called "examples" and are identified with a light green background.

This is an example.

- Warnings that can cause damage to the device are included when necessary. These are indicated by the word "caution" and are highlighted in yellow.

Caution: This is a caution.

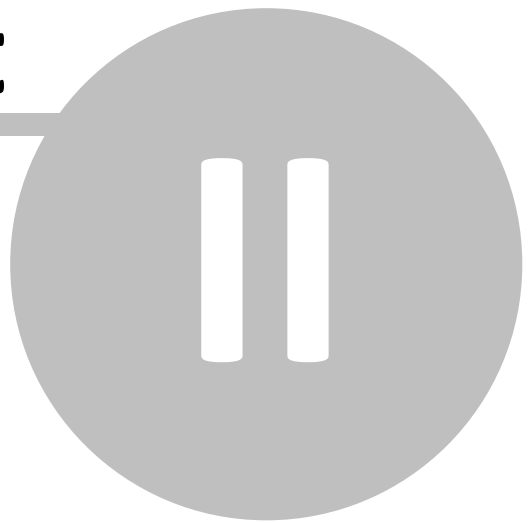
1.2 Further Reading

In addition to this How to Guide, the following relevant user documentation is available and should be read in conjunction with this guide:

- Exinda User Manual

Please visit <http://www.exinda.com> for more information.

Part

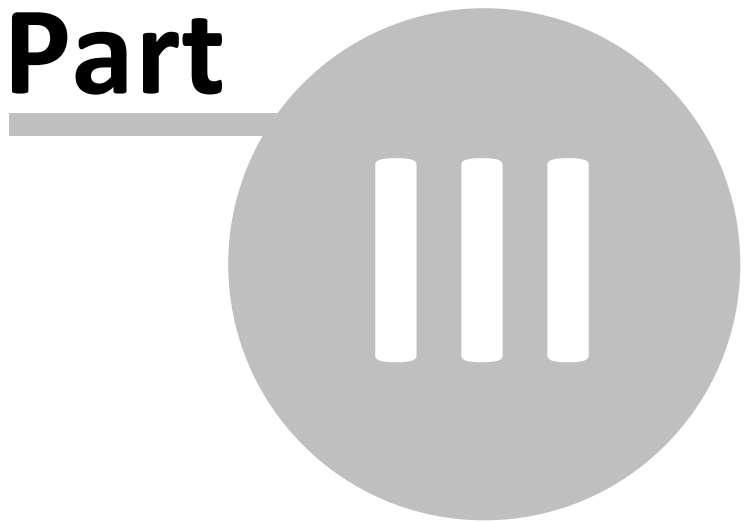


2 Overview

Per Host QoS allows you to manage traffic congestion by policing bandwidth available to each host in your network. You can allocate a minimum amount of bandwidth for critical applications, such as VoIP and Citrix, for every host in your network. You can also restrict the bandwidth that each host can utilize for recreational purposes.

Per Host QoS can be integrated with Active Directory so bandwidth management can be tailored to users or groups.

Part



3 Enabling Per Host QoS

Per Host QoS is applied at the Virtual Circuit level. It is disabled by default. A Virtual Circuit with Per Host QoS enabled is called a Dynamic Virtual Circuit (DVC).

Note: To create a Virtual Circuit or edit an existing one, navigate to the Optimizer page on the Web UI - advanced mode.

To enable Per Host QoS, tick the 'Dynamic Virtual Circuit' checkbox.

Virtual Circuit

Virtual Circuits are used to split the Circuit bandwidth into segments based on direction, source/destination subnet, application, VLAN, and time of day.

Add New Virtual Circuit

Virtual Circuit Number: 10 .

Virtual Circuit Name:

Schedule:

Bandwidth Options

Virtual Circuit Bandwidth:

Oversubscription: Automatic Manual

Dynamic Virtual Circuit:

Dynamic Options

Per Host Bandwidth: Automatically Share

Per Host Max Bandwidth: No Bursting Allowed

Host Location:

Max Hosts: Auto

Filter Options

When Dynamic Virtual Circuit is enabled, the following options become available.

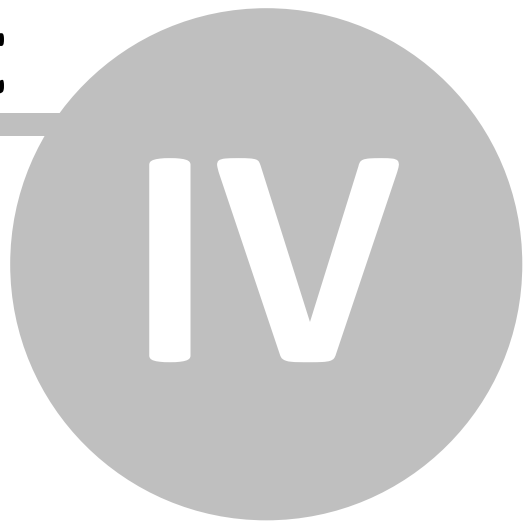
Per Host Bandwidth	Sets the amount of bandwidth that each host will receive. This bandwidth is guaranteed, so it will be available to each host, if required. If Automatically Share is selected, the amount of bandwidth each host receives is calculated by dividing the Virtual Circuit guaranteed bandwidth by the number of active hosts.
Per Host Max Bandwidth	Sets the maximum amount of bandwidth that each host can burst to. If No Bursting Allowed is selected, each host will get only the bandwidth that they have been guaranteed.

Host Location	Sets the location of the hosts to allocate bandwidth to. Internal Hosts are those that are on the Internal (or LAN) side of the appliance. External Hosts are those that are on the External (or WAN) side of the appliance.
Max Hosts	Sets the maximum number of hosts that can fall into this Dynamic Virtual Circuit. If 'Auto' is selected, the maximum number of hosts is calculated by assuming each host gets its guaranteed bandwidth. If the Automatically Share option is selected, the maximum number of hosts is calculated by assuming each host is entitled to minimum bandwidth, which is 10kbps. Any host that becomes active after the maximum number of hosts is exceeded will not fall into this Virtual Circuit.

Note: There is a system limit of 325,00 hosts that can fall into each Dynamic Virtual Circuit. This may occur if the Virtual Circuit has more than 300 Mbps of bandwidth. When this limit is exceeded, hosts will fall into the next applicable Virtual Circuit.

Note: When Per Host QoS is enabled, a further level of traffic shaping is introduced. Traffic is first shaped at the Host level, then at the Policy level. The bandwidth allocated will be the minimum of the two levels.

Part



4 Usage Examples

The following examples show how Per Host QoS can be used in a variety of situations.

- [Limit Bandwidth per Host](#)
- [Limit Application Bandwidth](#)
- [Guarantee Application Bandwidth](#)
- [Per Host QoS with Active Directory](#)
- [Per Host QoS with Adaptive Response](#)

Note: All examples are based on a 50 Mbps symmetrical link.

4.1 Limit Bandwidth Per Host

Example 1: Limit bandwidth to 100 kbps for each internal host.

Edit Virtual Circuit	
Virtual Circuit Number	10 . 10
Virtual Circuit Name	WAN
Schedule	ALWAYS
Bandwidth Options	
Virtual Circuit Bandwidth	50000 kbps
Oversubscription	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Dynamic Virtual Circuit	<input checked="" type="checkbox"/>
Dynamic Options	
Per Host Bandwidth	<input checked="" type="checkbox"/> Automatically Share 0 kbps
Per Host Max Bandwidth	<input type="checkbox"/> No Bursting Allowed 100 kbps
Host Location	Internal
Max Hosts	<input checked="" type="checkbox"/> Auto 0
Filter Options	
VLAN Object	ALL
Network Object	ALL
Application	ALL
Direction	Both

Dynamic Virtual Circuit

In this Dynamic Virtual Circuit, each host is limited to a maximum bandwidth of 100 kbps.

With **Max Hosts** set to **"Auto"**, a maximum of 5000 hosts can fall into this Dynamic Virtual Circuit. This is calculated by assuming each host is entitled to a minimum bandwidth of 10 kbps as **"Automatically Share"** is selected.

The screenshot shows the 'Optimize' window with the 'Policies' tab selected. It displays a table of policies for 'Circuit 10 - Default (50000 kbps)'. The table has columns for 'Operations' and 'Policy'. The policy shown is 'ALL - Guarantee Med 8%-100%' (Optimize 8% - 100%, Priority 5) with a bandwidth of 10 kbps. The 'Order' is 1 and the 'Policy' is 'ALL - Accelerate'. There is an 'Add To 'WAN'' button. Below the table are links for 'Create New Policy...', 'Create New Virtual Circuit...', and 'Create New Circuit...'.

Operations	Policy
--Actions--	ALL - Guarantee Med 8%-100% (Optimize 8% - 100%, Priority 5)

Example 2: Limit bandwidth to 100 kbps for each internal host. Further limit P2P traffic to a maximum of 32 kbps across ALL hosts.

In this example, each host will receive between 10 and 100 kbps. In addition, P2P traffic summed across all hosts is capped at 32 kbps, with a guaranteed rate of 16 kbps. To further illustrate this example, suppose there are 100 active users, all using P2P applications on the WAN. The per host bandwidth is 100 kbps, but the P2P policy caps bandwidth at 32 kbps which will be fairly shared between each user. So we would expect to see P2P traffic per user at approx 320 bps.

The screenshot shows the 'Optimize' window with the 'Policies' tab selected. It displays a table of policies for 'Circuit 10 - Default (50000 kbps)'. The table has columns for 'Operations' and 'Policy'. The policies shown are 'P2P' (Optimize 16 kbps - 32 kbps, Priority 10) and 'ALL - Guarantee Med 8%-100%' (Optimize 8% - 100%, Priority 5). The 'Order' is 1 and the 'Policy' is 'ALL - Accelerate'. There is an 'Add To 'WAN'' button. Below the table are links for 'Create New Policy...', 'Create New Virtual Circuit...', and 'Create New Circuit...'.

Operations	Policy
--Actions--	P2P (Optimize 16 kbps - 32 kbps, Priority 10)
--Actions--	ALL - Guarantee Med 8%-100% (Optimize 8% - 100%, Priority 5)

4.2 Limit Application Bandwidth

Example: Limit P2P to 20 kbps.

Edit Virtual Circuit	
Virtual Circuit Number	10 . 5
Virtual Circuit Name	P2P
Schedule	ALWAYS
Bandwidth Options	
Virtual Circuit Bandwidth	5000 kbps
Oversubscription	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Dynamic Virtual Circuit	<input checked="" type="checkbox"/>
Dynamic Options	
Per Host Bandwidth	<input checked="" type="checkbox"/> Automatically Share 0 kbps
Per Host Max Bandwidth	<input type="checkbox"/> No Bursting Allowed 20 kbps
Host Location	Internal
Max Hosts	<input checked="" type="checkbox"/> Auto 0
Filter Options	
VLAN Object	ALL
Network Object	ALL
Application	P2P
Direction	Both

P2P Dynamic Virtual Circuit

In the P2P Dynamic Virtual Circuit, each host is limited to 20 kbps of P2P traffic. With **Max Hosts** set to "**Auto**", a maximum of 500 hosts can fall into this Dynamic Virtual Circuit. Additional hosts will share bandwidth allocated in the P2P Overflow Virtual Circuit.

Edit Virtual Circuit	
Virtual Circuit Number	10 . 10
Virtual Circuit Name	P2P Overflow
Schedule	ALWAYS
Bandwidth Options	
Virtual Circuit Bandwidth	100 kbps
Oversubscription	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Dynamic Virtual Circuit	<input type="checkbox"/>
Filter Options	
VLAN Object	ALL
Network Object	ALL
Application	P2P
Direction	Both

P2P Overflow Virtual Circuit

Edit Virtual Circuit	
Virtual Circuit Number	10 . 25
Virtual Circuit Name	WAN
Schedule	ALWAYS
Bandwidth Options	
Virtual Circuit Bandwidth	45000 kbps
Oversubscription	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Dynamic Virtual Circuit	<input checked="" type="checkbox"/>
Dynamic Options	
Per Host Bandwidth	<input checked="" type="checkbox"/> Automatically Share 0 kbps
Per Host Max Bandwidth	<input type="checkbox"/> No Bursting Allowed 100 kbps
Host Location	Internal
Max Hosts	<input checked="" type="checkbox"/> Auto 0
Filter Options	
VLAN Object	ALL
Network Object	ALL
Application	ALL
Direction	Both

Dynamic Virtual Circuit To Share Remaining Bandwidth

Create a Dynamic Virtual Circuit using the remaining bandwidth. Each user is limited to a maximum bandwidth of 100 kbps for all other applications.

Optimize

Optimize Policies Wizard

Operations

Circuit 10 - Default (50000 kbps) --Actions--

Dynamic Virtual Circuit 5 - P2P (5000 kbps [auto kbps - 20 kbps per user / auto users max] 'P2P' traffic to / from 'ALL') --Actions--

10 ALL - Guarantee Low 5%-100% (Optimize 5% - 100%, Priority 7) --Actions--

Order: Policy: ALL - Accelerate Add To 'P2P'

Create New Policy...

Virtual Circuit 10 - P2P Overflow (100 kbps 'P2P' traffic to / from 'ALL') --Actions--

10 ALL - Guarantee Med 8%-100% (Optimize 8% - 100%, Priority 5) --Actions--

Order: Policy: ALL - Accelerate Add To 'P2P Overflow'

Create New Policy...

Dynamic Virtual Circuit 25 - WAN (45000 kbps [auto kbps - 100 kbps per user / auto users max] to / from 'ALL') --Actions--

10 ALL - Guarantee Med 8%-100% (Optimize 8% - 100%, Priority 5) --Actions--

Order: Policy: ALL - Accelerate Add To 'WAN'

Create New Policy...

Create New Virtual Circuit...

Create New Circuit...

4.3 Guarantee Application Bandwidth

Example: Guarantee 30 kbps per host, for the Citrix application.

Citrix typically requires 20 to 30 kbps of bandwidth to work effectively.

Edit Virtual Circuit	
Virtual Circuit Number	10 . 5
Virtual Circuit Name	Citrix
Schedule	ALWAYS
Bandwidth Options	
Virtual Circuit Bandwidth	10000 kbps
Oversubscription	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Dynamic Virtual Circuit	<input checked="" type="checkbox"/>
Dynamic Options	
Per Host Bandwidth	<input type="checkbox"/> Automatically Share 30 kbps
Per Host Max Bandwidth	<input type="checkbox"/> No Bursting Allowed 100 %
Host Location	Internal
Max Hosts	<input checked="" type="checkbox"/> Auto 0
Filter Options	
VLAN Object	ALL
Network Object	ALL
Application	Citrix
Direction	Both

Citrix Dynamic Virtual Circuit

In this example, each user is guaranteed 30 kbps for Citrix. Furthermore, each user can burst up to 100% of the Dynamic Virtual Circuit bandwidth.

With **Max Hosts** set to "Auto", a maximum of 333 hosts can fall into this Dynamic Virtual Circuit. Additional hosts will share bandwidth allocated in the second Dynamic Virtual Circuit.

Edit Virtual Circuit	
Virtual Circuit Number	10 . 25
Virtual Circuit Name	WAN
Schedule	ALWAYS
Bandwidth Options	
Virtual Circuit Bandwidth	40000 kbps
Oversubscription	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Dynamic Virtual Circuit	<input checked="" type="checkbox"/>
Dynamic Options	
Per Host Bandwidth	<input checked="" type="checkbox"/> Automatically Share 0 kbps
Per Host Max Bandwidth	<input checked="" type="checkbox"/> No Bursting Allowed 0 kbps
Host Location	Internal
Max Hosts	<input checked="" type="checkbox"/> Auto 0
Filter Options	
VLAN Object	ALL
Network Object	ALL
Application	ALL
Direction	Both

Dynamic Virtual Circuit For Remaining Bandwidth

The "WAN" Dynamic Virtual Circuit has **Per Host Bandwidth** set to "Automatically Share". Each user will be allocated a percentage of the Dynamic Virtual Circuit bandwidth. This is calculated by dividing the Dynamic Virtual Circuit bandwidth by the number of active hosts.

Optimize 🖨️ ?

Optimize Policies Wizard

		Operations
Circuit 10 - Default (50000 kbps)		--Actions--
Dynamic Virtual Circuit 5 - Citrix (10000 kbps [30 kbps - 100% per user / auto users max] 'Citrix' traffic to / from 'ALL')		--Actions--
<input checked="" type="checkbox"/>	10 ALL - Guarantee Med 8%-100% (Optimize 8% - 100%, Priority 5)	--Actions--
Order:	Policy: ALL - Accelerate Add To 'Citrix'	
Create New Policy...		
Dynamic Virtual Circuit 25 - WAN (40000 kbps [auto kbps per user / auto users max] to / from 'ALL')		--Actions--
<input checked="" type="checkbox"/>	10 ALL - Guarantee Med 8%-100% (Optimize 8% - 100%, Priority 5)	--Actions--
Order:	Policy: ALL - Accelerate Add To 'WAN'	
Create New Policy...		
Create New Virtual Circuit...		
Create New Circuit...		

4.4 Active Directory

Example: Restrict users in the Active Directory 'Students' group to 100 kbps.

Using the Web UI - Advanced Mode, navigate to Objects | Users & Groups. Edit the "Students (DEV)" group.

Welcome to **exinda**, logged in as **admin** (advanced, switch to basic). [Logout](#)

Optimizer Status : On (Restart / Stop) | Config Status No unsaved changes | System Health : OK | Thu Apr

Users & Groups

Network Users | **Network Groups**

Network Groups (Total: 12)

0-9 | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | Others | [ALL]

Group (Domain)	Network Object	Edit
Administrators (DEV)	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/>
Denied rodc password replication group (DEV)	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/>
Domain admins (DEV)	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/>
Domain guests (DEV)	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/>
Domain users (DEV)	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/>
Enterprise admins (DEV)	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/>
Group policy creator owners (DEV)	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/>
Guests (DEV)	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/>
Remote desktop users (DEV)	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/>
Schema admins (DEV)	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/>
Students (DEV)	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/>
Users (DEV)	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/>

Active Directory Groups

Create a Network Object from the Active Directory group.

Welcome to **exinda**, logged in as **admin** (advanced, switch to **basic**). [Logout](#)

Optimizer Status : **On** (Restart / Stop) | Config Status **No unsaved changes** | System Health : **OK** | Thu Apr 8, 2010 00:34:32

Dashboard
System
Objects
Network
Users & Groups
VLANs
Protocols
Applications
Schedules
Adaptive Response
Monitor
Report
Optimize
[+] Expand ALL

Edit Group

Network Users | **Network Groups**

Logins from users in the network group(s) DEV\Students will be mapped to the Students network object

Name:

Map to Network Object

Ignore Domain

Map AD Group 'Students' To Network Object 'Students'

The Network Object "**Students**" can now be used in a Dynamic Virtual Circuit.

Edit Virtual Circuit	
Virtual Circuit Number	10 . 5
Virtual Circuit Name	Students
Schedule	ALWAYS
Bandwidth Options	
Virtual Circuit Bandwidth	24000 kbps
Oversubscription	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Dynamic Virtual Circuit	<input checked="" type="checkbox"/>
Dynamic Options	
Per Host Bandwidth	<input checked="" type="checkbox"/> Automatically Share 0 kbps
Per Host Max Bandwidth	<input type="checkbox"/> No Bursting Allowed 100 kbps
Host Location	Internal
Max Hosts	<input checked="" type="checkbox"/> Auto 0
Filter Options	
VLAN Object	ALL
Network Object	Students
Application	ALL
Direction	Both

Students Dynamic Virtual Circuit

Each host in the "Students" Network Object is limited to 100 kbps. With **Max Hosts** set to "Auto", a maximum of 2400 hosts can fall into this Dynamic Virtual Circuit. Additional hosts will share bandwidth allocated in the "Students Overflow" Virtual Circuit.

Edit Virtual Circuit	
Virtual Circuit Number	10 . 10
Virtual Circuit Name	Students Overflow
Schedule	ALWAYS
Bandwidth Options	
Virtual Circuit Bandwidth	1000 kbps
Oversubscription	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Dynamic Virtual Circuit	<input type="checkbox"/>
Filter Options	
VLAN Object	ALL
Network Object	Students
Application	ALL
Direction	Both

Students Overflow Virtual Circuit

Edit Virtual Circuit	
Virtual Circuit Number	10 . 15
Virtual Circuit Name	WAN
Schedule	ALWAYS
Bandwidth Options	
Virtual Circuit Bandwidth	25000 kbps
Oversubscription	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Dynamic Virtual Circuit	<input checked="" type="checkbox"/>
Dynamic Options	
Per Host Bandwidth	<input type="checkbox"/> Automatically Share 100 kbps
Per Host Max Bandwidth	<input checked="" type="checkbox"/> No Bursting Allowed 0 kbps
Host Location	Internal
Max Hosts	<input checked="" type="checkbox"/> Auto 0
Filter Options	
VLAN Object	ALL
Network Object	ALL
Application	ALL
Direction	Both

Dynamic Virtual Circuit For Remaining Bandwidth

Another Dynamic Virtual Circuit can be created to share the remaining bandwidth for other hosts. In this example, each host is guaranteed 100 kbps with "No Bursting Allowed".

The screenshot shows the 'Optimize' configuration window with three dynamic virtual circuits defined:

- Circuit 10 - Default (50000 kbps)**
 - Dynamic Virtual Circuit 5 - Students (24000 kbps [auto kbps - 100 kbps per user / auto users max] to / from 'Students')
 - Policy: ALL - Guarantee Low 5%-100% (Optimize 5% - 100%, Priority 7)
 - Order: 10
 - Action: Add To 'Students'
- Virtual Circuit 10 - Students Overflow (1000 kbps to / from 'Students')**
 - Policy: ALL - Guarantee Med 8%-100% (Optimize 8% - 100%, Priority 5)
 - Order: 10
 - Action: Add To 'Students Overflow'
- Dynamic Virtual Circuit 15 - WAN (25000 kbps [100 kbps per user / auto users max] to / from 'ALL')**
 - Policy: ALL - Guarantee Med 8%-100% (Optimize 8% - 100%, Priority 5)
 - Order: 10
 - Action: Add To 'WAN'

4.5 Adaptive Response

Example: Restrict users in the Active Directory 'Students' group to 100 kbps, once the user has downloaded 100 MB per day.

Create the Network Object "**Students**" based on the Active Directory "**Students**" group as shown in the previous chapter.

Using the Web UI - Advanced Mode, navigate to Objects | Adaptive Response.

Create a new Adaptive Response rule based on the "**Students**" Network Object. Each host is allowed to download 100 MB per day before being placed into the "**Students_Shaped**" Network Object.

Welcome to exinda , logged in as admin (advanced, switch to basic). [Logout](#)

Optimizer Status : On (Restart / Stop) | Config Status Unsaved changes (Save) | System Health : OK | Thu Apr 8, 2010 03:59:01 | v5.4.0.13281

Adaptive Response

Adaptive Response Limits are rules which are used to create and populate network objects based on amount of data transferred. They then be used when creating virtual circuits or filters.

Add New AR Limit

Name:

Source Network Object:

Destination Network Object:

Duration:

Direction:

Amount (MB):

Enable:

Name	Source Network	Destination Network	Duration	Direction	Amount	Enabled	Edit	Delete
No AR Limits.								

Create Adaptive Response Object

Create a Dynamic Virtual Circuit, with **Network Object** set to "**Students_Shaped**". Hosts matching this Network Object will fall into this Dynamic Virtual Circuit.

Each host is limited to a maximum bandwidth of 100 kbps. With **Per Host Bandwidth** set to "**Automatically Share**", a maximum of 400 hosts can fall into this Dynamic Virtual Circuit.

Edit Virtual Circuit	
Virtual Circuit Number	10 . 5
Virtual Circuit Name	Students
Schedule	ALWAYS
Bandwidth Options	
Virtual Circuit Bandwidth	4000 kbps
Oversubscription	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Dynamic Virtual Circuit	<input checked="" type="checkbox"/>
Dynamic Options	
Per Host Bandwidth	<input checked="" type="checkbox"/> Automatically Share 0 kbps
Per Host Max Bandwidth	<input type="checkbox"/> No Bursting Allowed 100 kbps
Host Location	Internal
Max Hosts	<input checked="" type="checkbox"/> Auto 0
Filter Options	
VLAN Object	ALL
Network Object	Students_Shaped
Application	ALL
Direction	Both

Students Dynamic Virtual Circuit

Additional hosts will share bandwidth allocated in the Students Overflow Virtual Circuit.

Edit Virtual Circuit	
Virtual Circuit Number	10 . 10
Virtual Circuit Name	Students Overflow
Schedule	ALWAYS
Bandwidth Options	
Virtual Circuit Bandwidth	1000 kbps
Oversubscription	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Dynamic Virtual Circuit	<input type="checkbox"/>
Filter Options	
VLAN Object	ALL
Network Object	Students_Shaped
Application	ALL
Direction	Both

Students Overflow Virtual Circuit

Edit Virtual Circuit	
Virtual Circuit Number	10 . 15
Virtual Circuit Name	WAN
Schedule	ALWAYS
Bandwidth Options	
Virtual Circuit Bandwidth	45000 kbps
Oversubscription	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Dynamic Virtual Circuit	<input type="checkbox"/>
Filter Options	
VLAN Object	ALL
Network Object	ALL
Application	ALL
Direction	Both

Virtual Circuit To Share Remaining Bandwidth

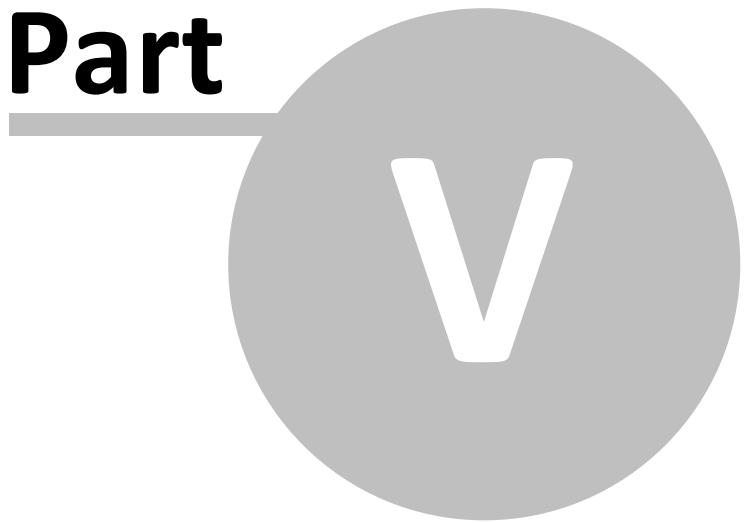
Other users and students who have not used their 100MB daily quota will share 45 Mbps of bandwidth in the WAN Virtual Circuit.

The screenshot shows the 'Optimize' configuration window with three tabs: 'Optimize', 'Policies', and 'Wizard'. The 'Optimize' tab is active, displaying a list of circuits with their respective configurations and actions.

Circuit Name	Configuration	Operations
Circuit 10 - Default (30000 kbps)		--Actions--
Dynamic Virtual Circuit 5 - Students (4000 kbps [auto kbps - 100 kbps per user / auto users max] to / from 'Students_Shaped')		--Actions--
<input checked="" type="checkbox"/> 10 ALL - Guarantee Low 5%-100% (Optimize 5% - 100%, Priority 7)	Order: <input type="text"/> Policy: ALL - Accelerate Add To 'Students'	--Actions--
Virtual Circuit 10 - Students Overflow (1000 kbps to / from 'Students_Shaped')		--Actions--
<input checked="" type="checkbox"/> 10 ALL - Guarantee Med 8%-100% (Optimize 8% - 100%, Priority 5)	Order: <input type="text"/> Policy: ALL - Accelerate Add To 'Students Overflow'	--Actions--
Virtual Circuit 15 - WAN (45000 kbps to / from 'ALL')		--Actions--
<input checked="" type="checkbox"/> 10 ALL - Guarantee Med 8%-100% (Optimize 8% - 100%, Priority 5)	Order: <input type="text"/> Policy: ALL - Accelerate Add To 'WAN'	--Actions--

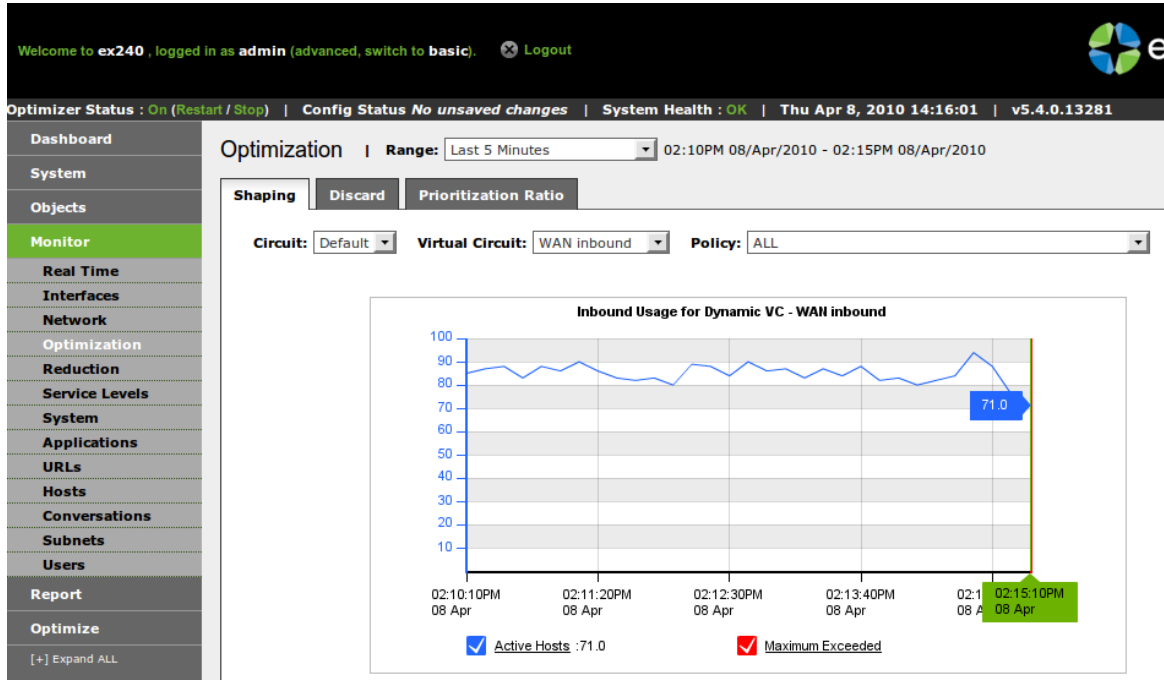
At the bottom of the window, there are links for 'Create New Policy...', 'Create New Virtual Circuit...', and 'Create New Circuit...'.

Part



5 Viewing Statistics

To see the number of active hosts in a Dynamic Virtual Circuit, navigate to Monitor | Optimization | Shaping and select the required Dynamic Virtual Circuit.



Active Hosts and Exceeded Hosts

This graph also shows the number of exceeded hosts (if any) that did not fall into the Dynamic Virtual Circuit because its capacity was exceeded.