Per Host QoS

Exinda ExOS Version 6.3

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1 Introduction

Per Host QoS

Exinda Firmware Version: 6.3

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.

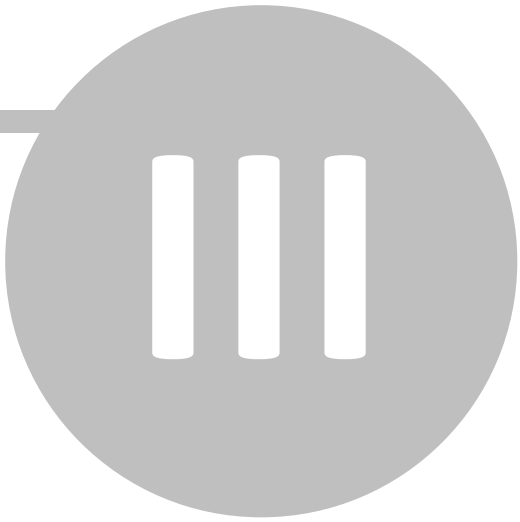
Part II

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

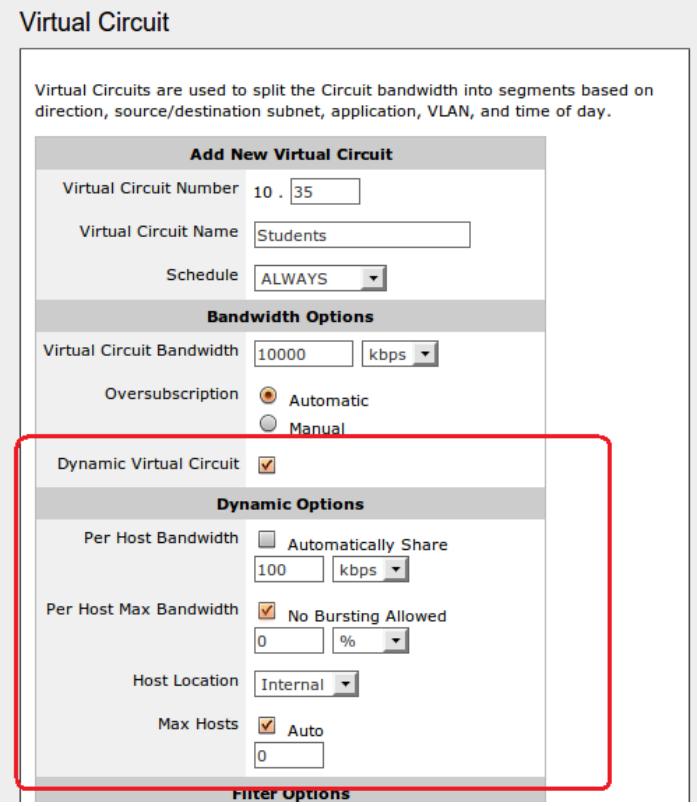


3 Enabling Per Host QoS

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.



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 IV

4 Usage Examples

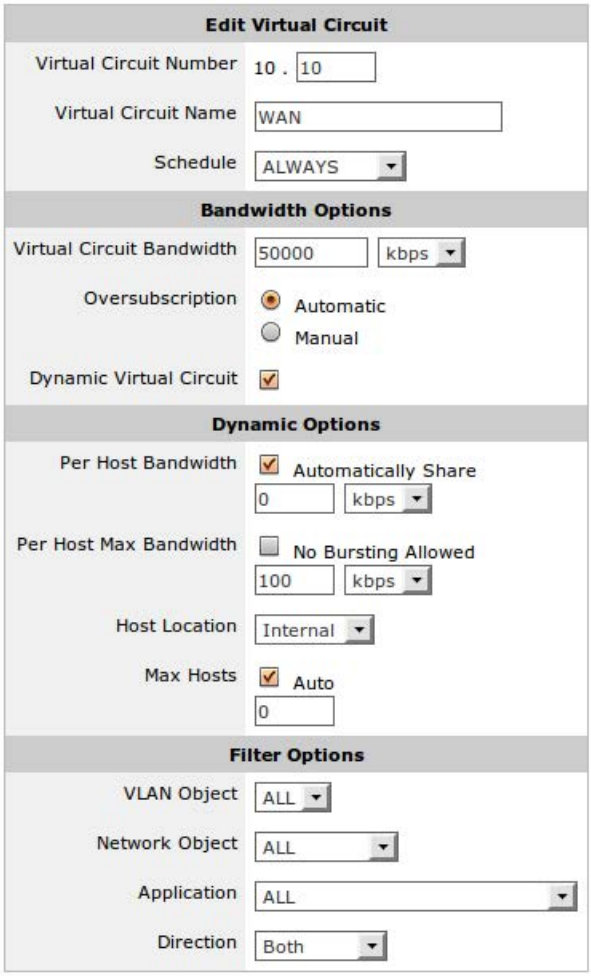
The following examples show how Per Host QoS can be used in a variety of situations.

- 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

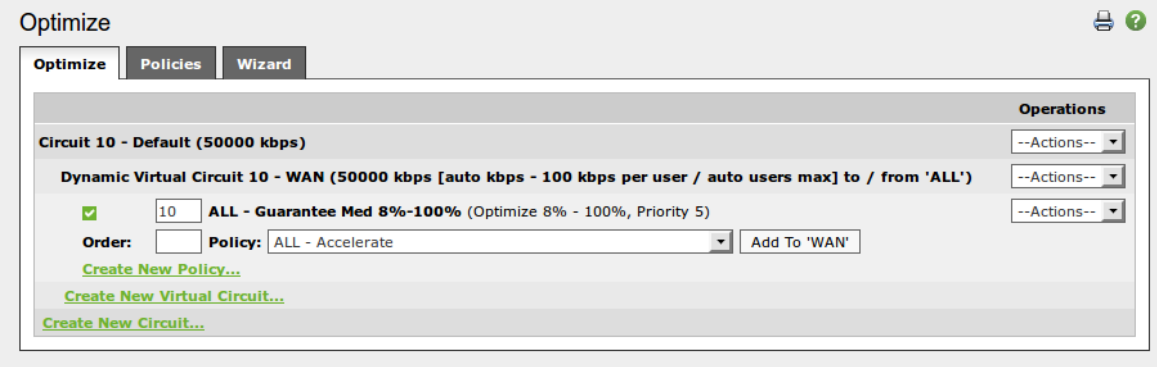
Example 1: Limit bandwidth to 100 kbps for each internal host.



Dynamic Virtual Circuit

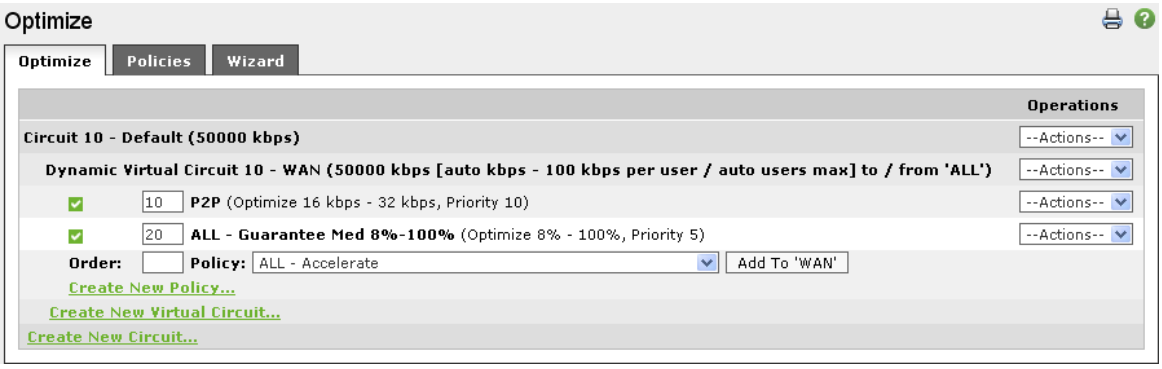
In this Dynamic Virtual Circuit, each host is limited to a maximum bandwidth of 100 kbps.

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.



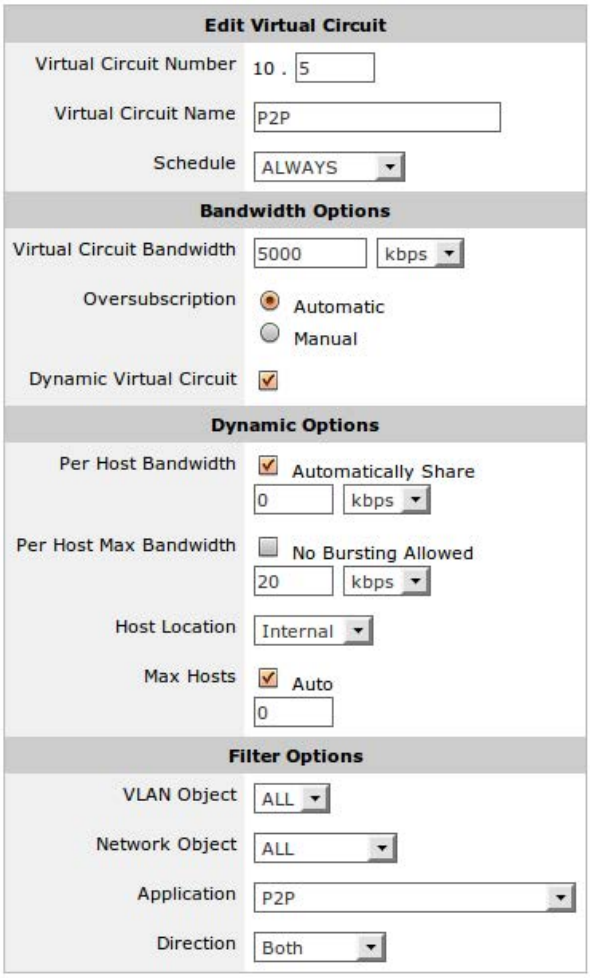
Example 2: Limit bandwidth to 100 kbps for each internal host. Further limit P2P traffic to a maximum of 32 kbps across **ALL** hosts.

In this example, each host will receive between 10 and 100 kbps. In additional, 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.



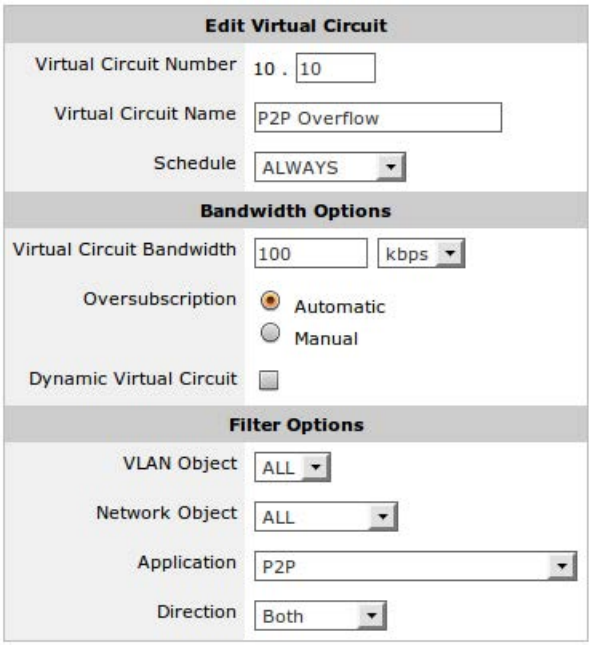
4.2 Limit Application Bandwidth

Example: Limit P2P to 20 kbps.

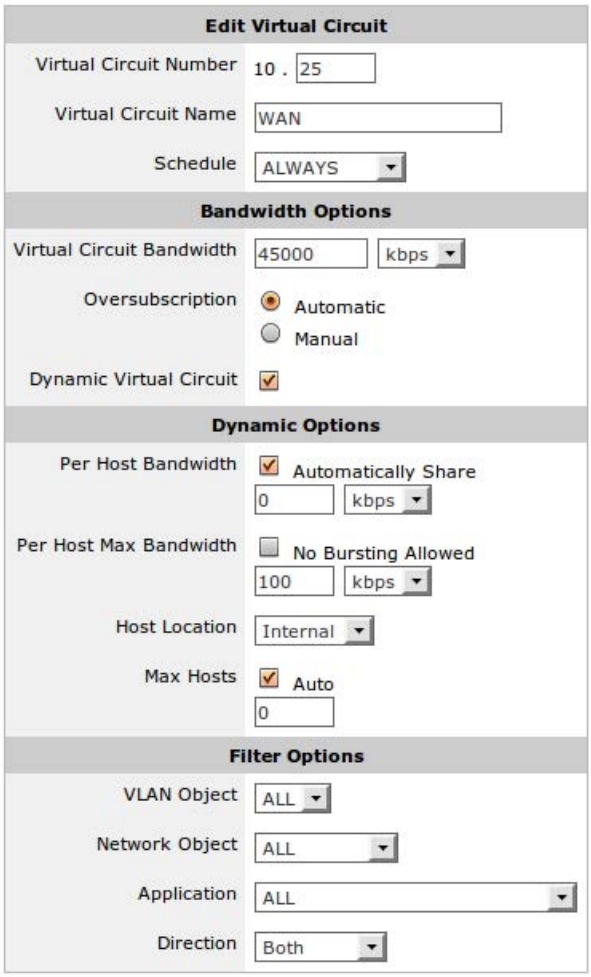


P2P Dynamic Virtual Circuit

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.

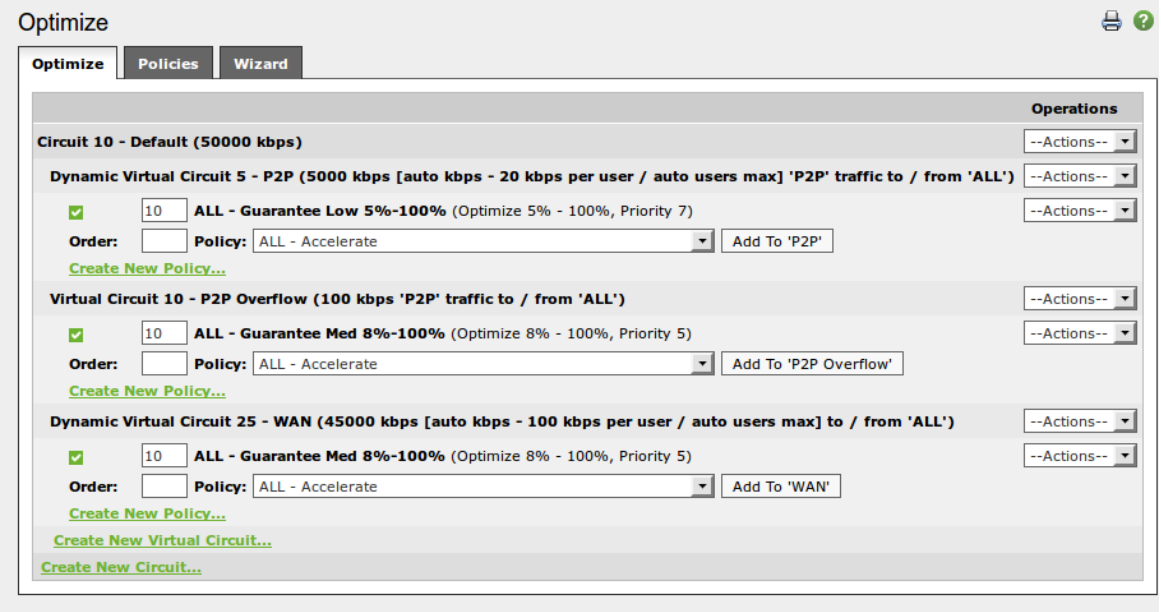


P2P Overflow Virtual Circuit



Dynamic Virtual Circuit To Share Remaining Bandwidth

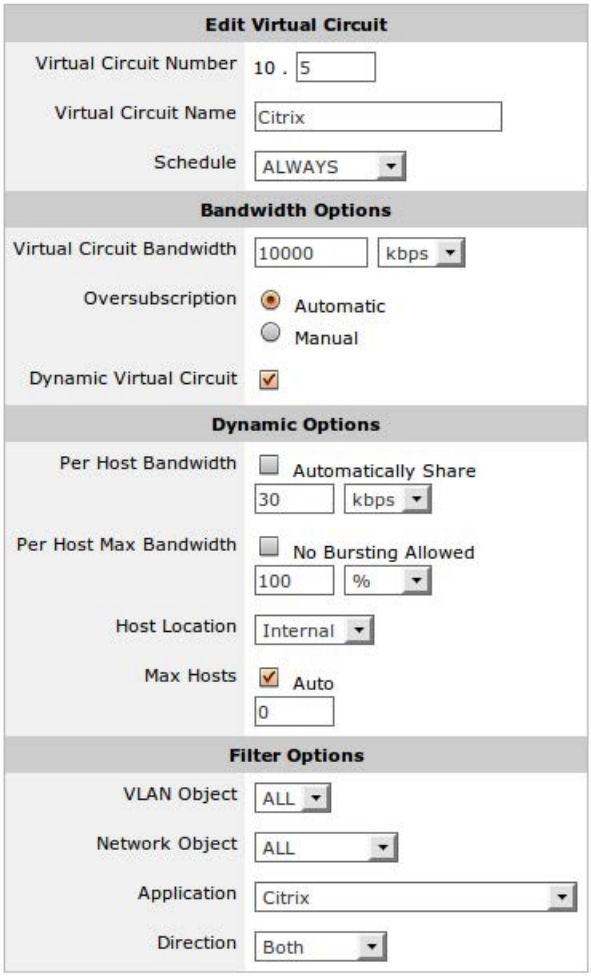
Create a Dynamic Virtual Circuit using the remaining bandwidth. Each user is limited to a maximum bandwidth of 100 kbps for all other applications.



4.3 Guarantee Application Bandwidth

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

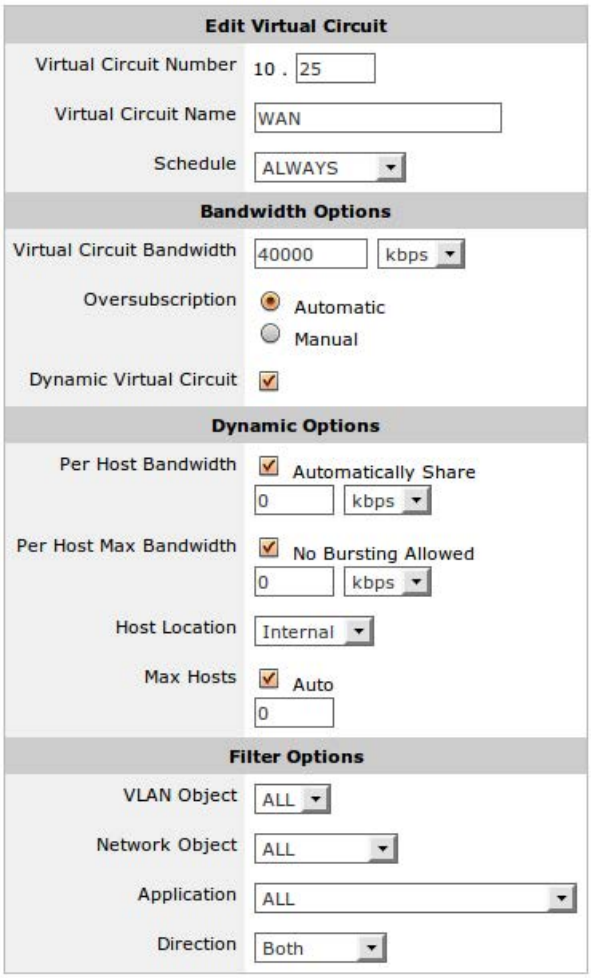
Citrix typically requires 20 to 30 kbps of bandwidth to work effectively.



Citrix Dynamic Virtual Circuit

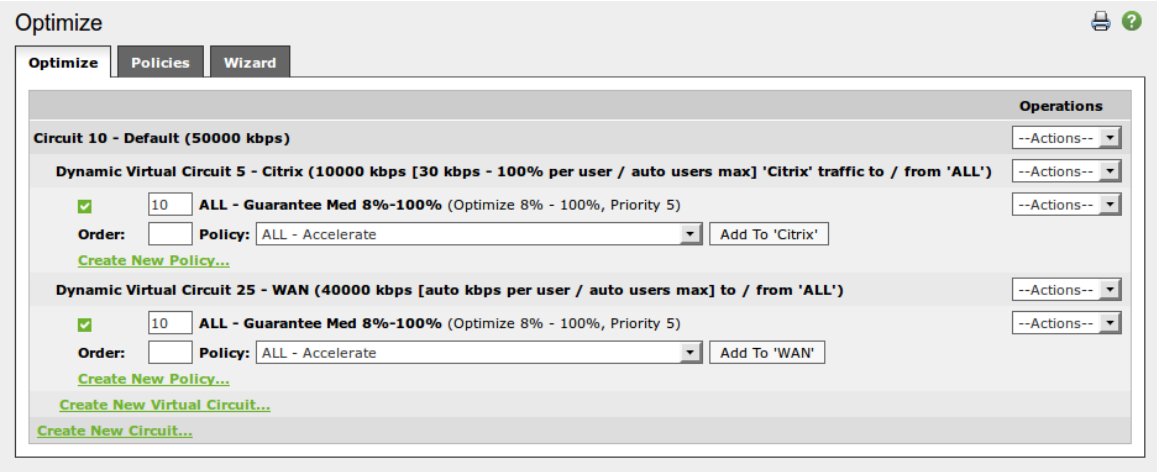
In this example, each user is guaranteed 30 kbps for Citrix. Furthermore, each user can burst up to 100% of the Dynamic Virtual Circuit bandwidth.

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.



Dynamic Virtual Circuit For Remaining Bandwidth

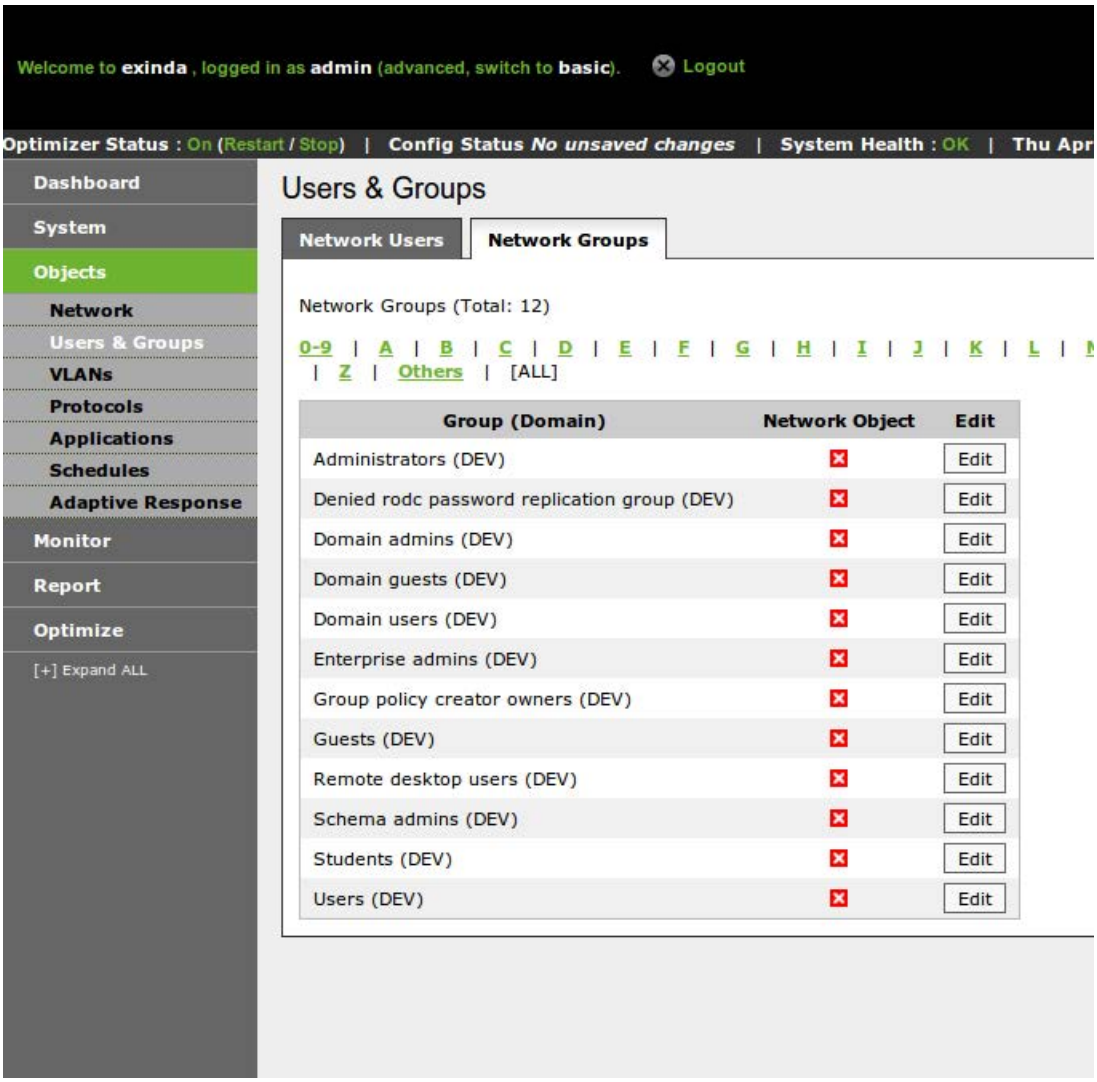
The **"WAN"** Dynamic Virtual Circuit has **Per Host Bandwidth** set to **"Automatically Share"**. Each user will be allocated a percentage of the Dynamic Virtual Circuit bandwidth. This is calculated by dividing the Dynamic Virtual Circuit bandwidth by the number of active hosts.



4.4 Active Directory

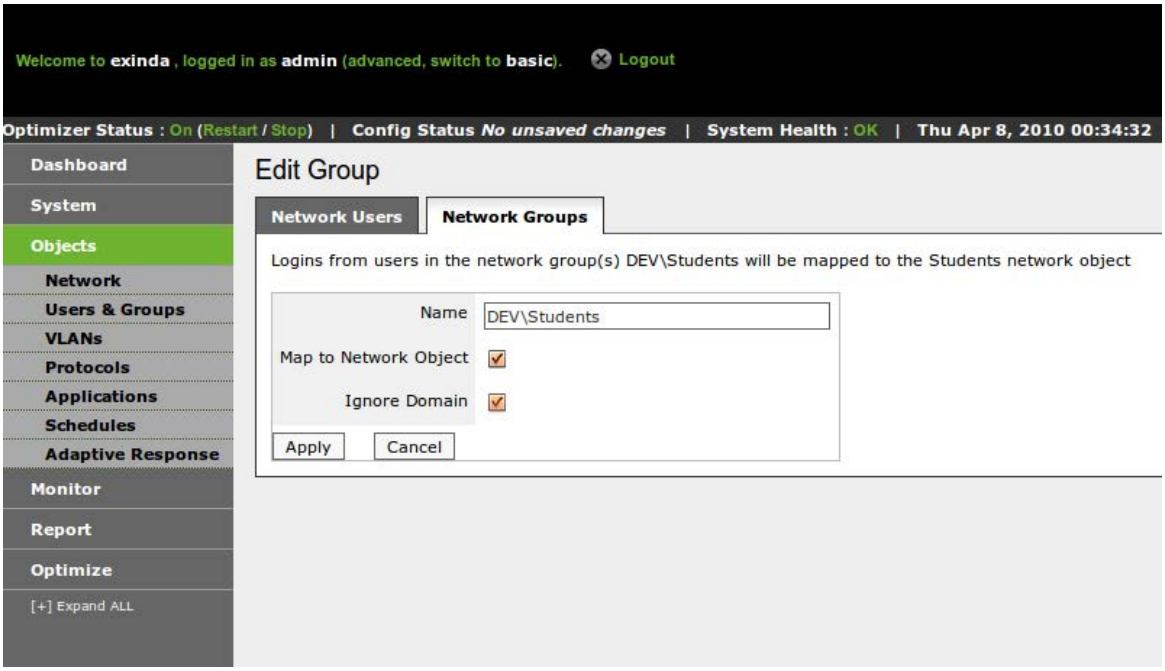
Example: Restrict users in the Active Directory 'Students' group to 100 kbps.

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



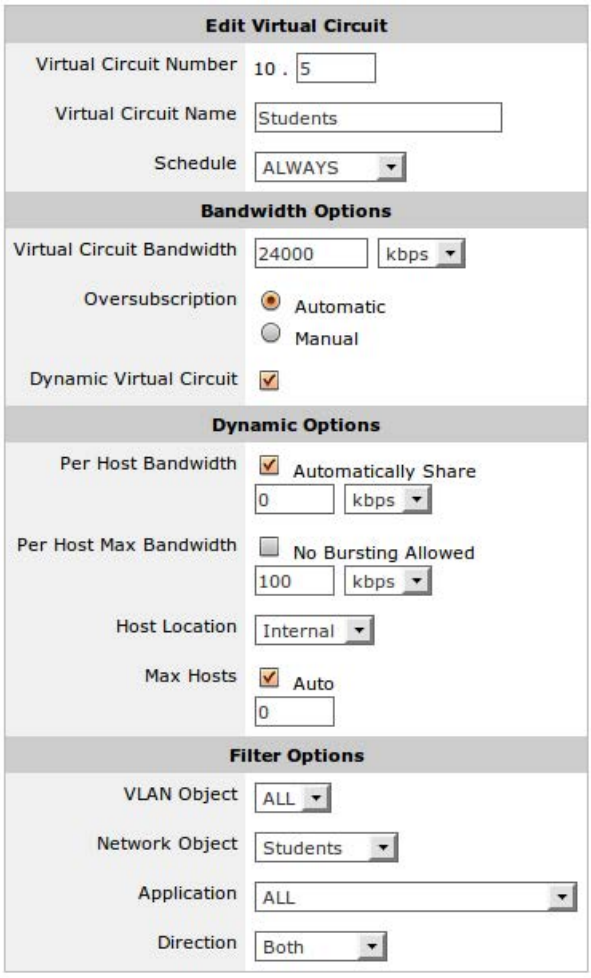
Active Directory Groups

Create a Network Object from the Active Directory group.



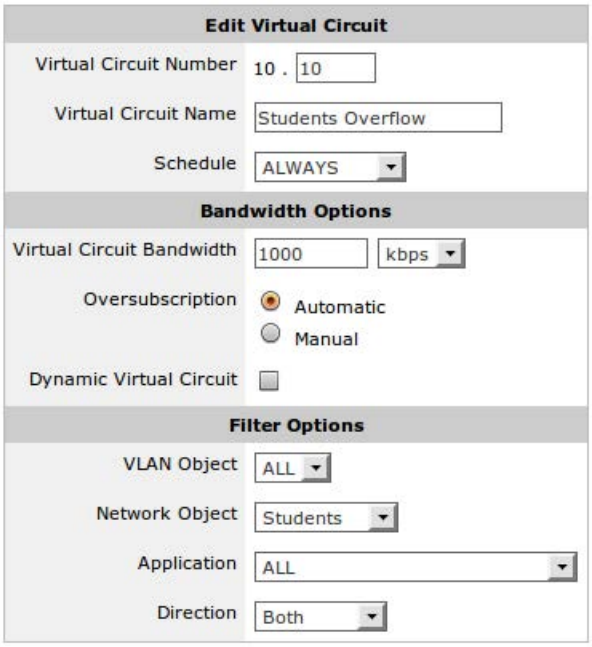
Map AD Group 'Students' To Network Object 'Students'

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

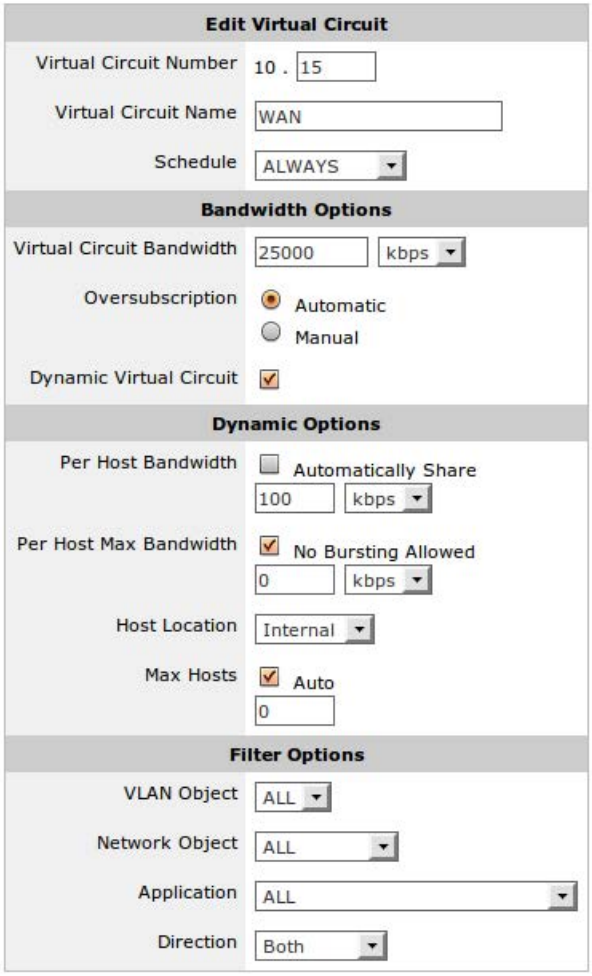


Students Dynamic Virtual Circuit

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.

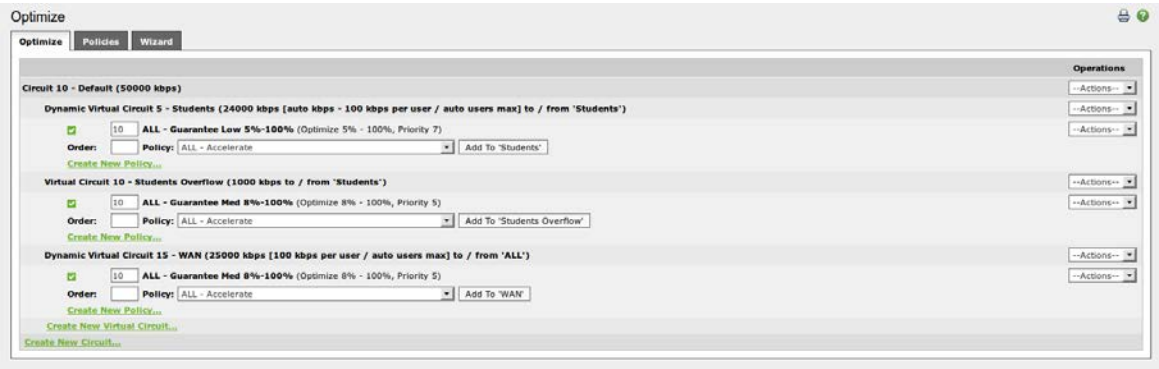


Students Overflow Virtual Circuit



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**".



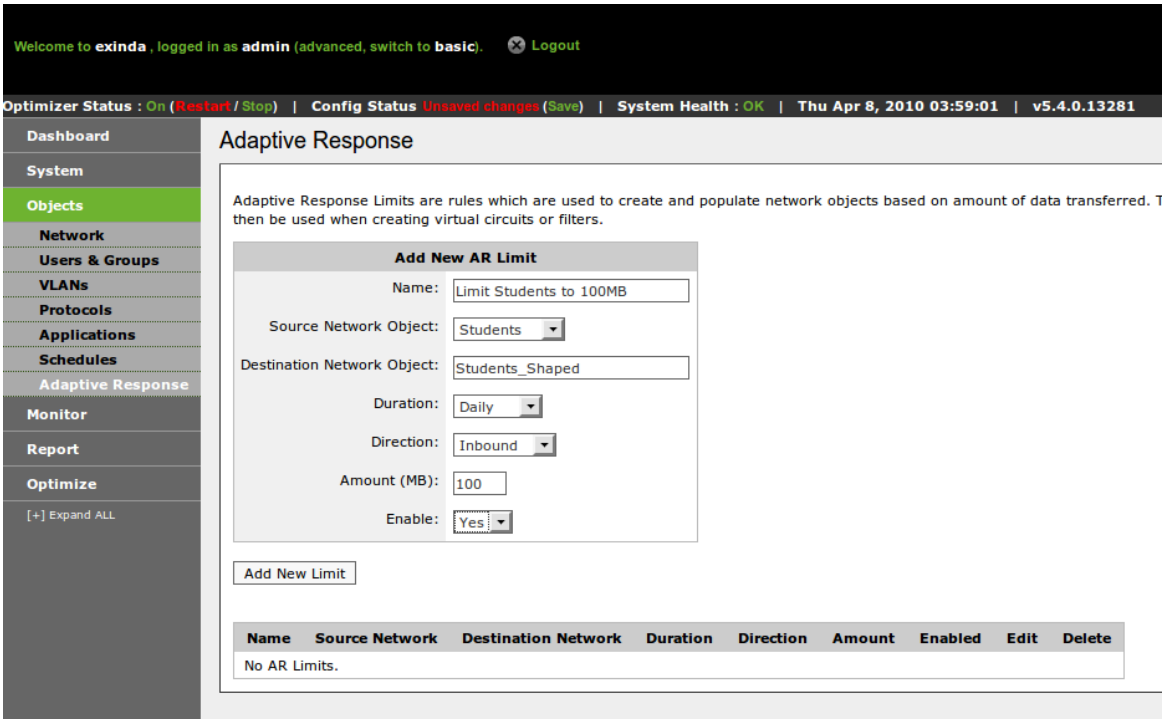
4.5 Adaptive Response

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.

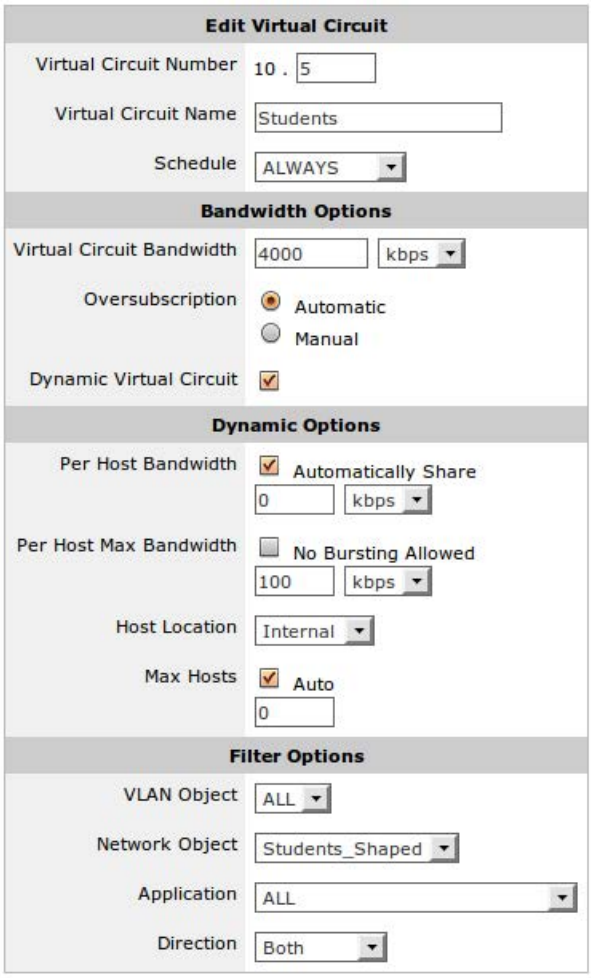
Create a new Adaptive Response rule based on the **"Students"** Network Object. Each host is allowed to download 100 MB per day before being placed into the **"Students_Shaped"** Network Object.



Create Adaptive Response Object

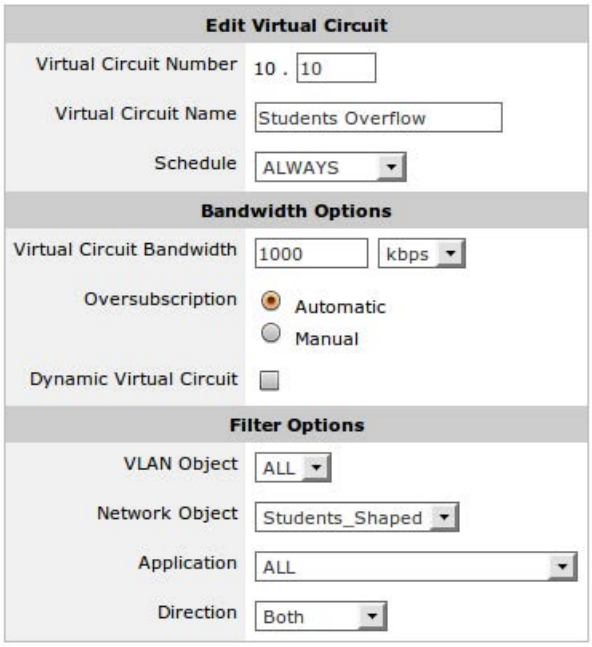
Create a Dynamic Virtual Circuit, with **Network Object** set to **"Students_Shaped"**. Hosts matching this Network Object will fall into this Dynamic Virtual Circuit.

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.

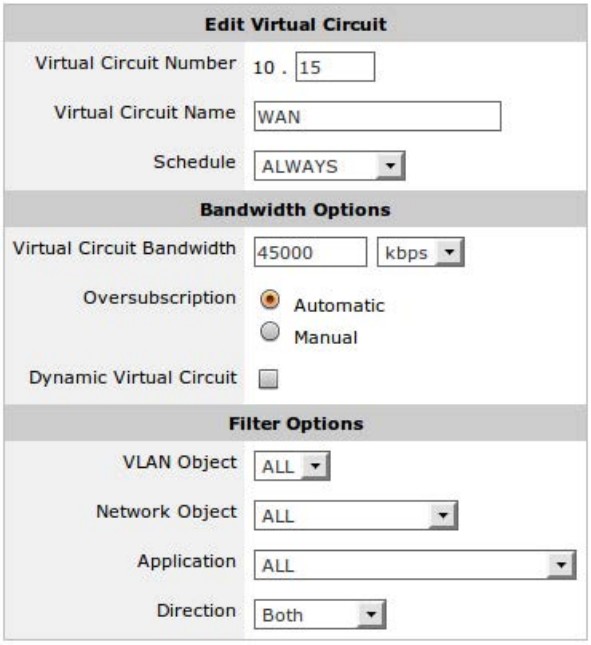


Students Dynamic Virtual Circuit

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

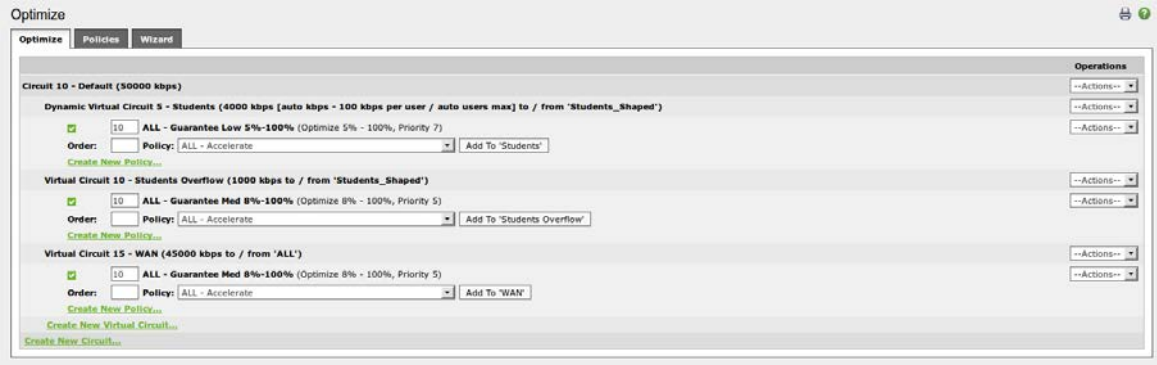


Students Overflow Virtual Circuit



Virtual Circuit To Share Remaining Bandwidth

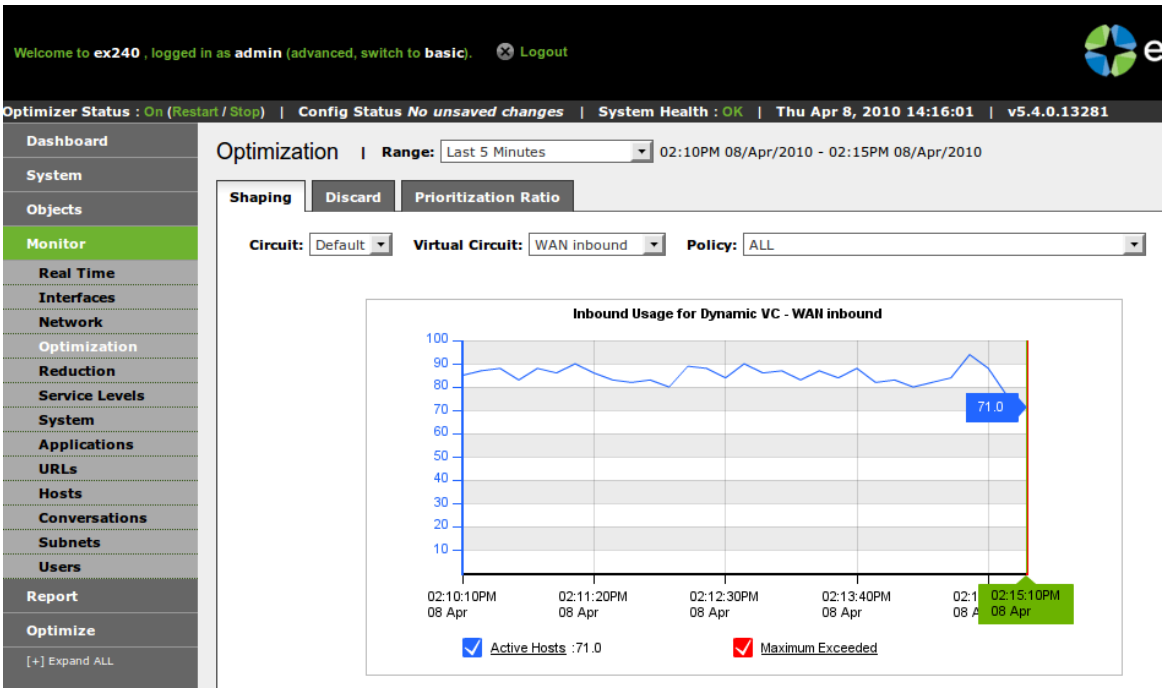
Other users and students who have not used their 100MB daily quota will share 45 Mbps of bandwidth in the WAN Virtual Circuit.



Part V

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.