

FatPipe Quality of Service (QoS)

Introduction

FatPipe Quality of Service (QoS) can help you optimize the efficiency of your Internet connection by providing tools to control congestion and prioritize data flow up to ten levels.

FatPipe QoS gives you granular control over how IP traffic is transmitted over your network, and as a result, helps you control WAN costs. You can reduce bandwidth requirements and alleviate bottleneck issues when you allocate bandwidth to specific business applications and control recreational traffic via FatPipe QoS.

FatPipe QoS combined with link load balancing will make sure that rules are applied to additional or secondary lines when a failure occurs to your primary WAN line, providing redundancy for your WAN infrastructure data transmissions.

The QoS technology guarantees prioritization of real-time voice/video traffic and allows administrators to pre-allocate bandwidth for mission critical data. QoS will also throttle traffic to prevent congestion

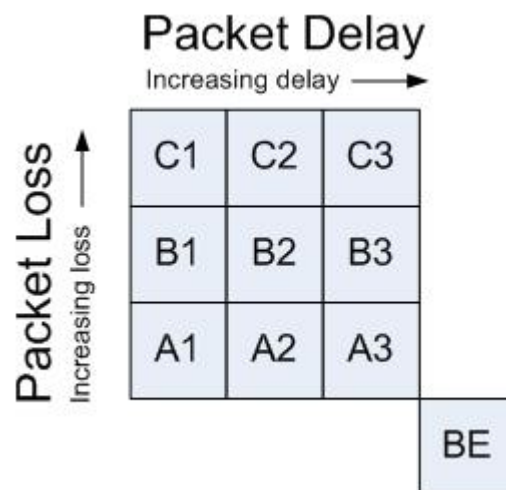
QoS Basics

The primary purpose of QoS is to assure that packets are transported from a source to a destination with certain characteristics, corresponding to the requirements of the service that the packet flow supports. This becomes a challenge in a situation where multiple streams compete for limited available resources. One of these resources is link transmission capacity, which gets divided into **throughputs** of individual streams. Another important resource is buffer memory, which affects **packet loss**. A third resource for which network packets compete is service, which determines priority of each packet and thus amount of **delay** they will experience.

These three components of QoS are interdependent and FatPipe QoS is designed to take that into account. The result is a system with two degrees of freedom. For example, it is possible to configure a network to reduce loss for

certain streams, but only at the cost of increased delay for those streams.

Outgoing network traffic is managed by assigning a **QoS quality class** to each type of traffic. This quality class determines the treatment of that traffic type in terms of how many packets are preserved and how urgently they are transmitted, relative to one another. Unlike the one-dimensional view of quality that is usually understood as priority, QoS respects the fact that different streams have different priorities: some streams are more delay-sensitive, while others may be more loss-sensitive. This is the 2D-DiffServ model, where quality classes are mapped on to a matrix.



A1 is the highest classification and **Best Effort** traffic is the lowest classification. The Best Effort class does not guarantee any particular level of service and represents the unused capacity of the link at any given moment.

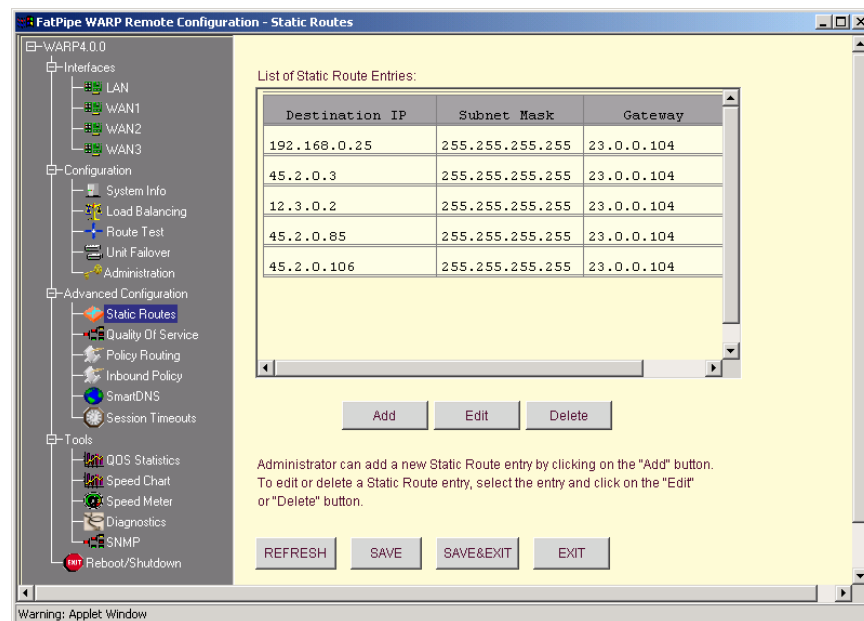
In addition to QoS quality class, certain amount of bandwidth is also assigned by the user to each type of traffic, and it is defined by **committed access rate (CAR)** and **Burst Rate**.

The CAR of a traffic type defines the amount of bandwidth that is guaranteed to be available to that type with packet loss and delay within limits defined by the associated quality class, at any time the associated link is up. The amount of traffic forwarded under these conditions is called **primary rate**.

The Burst Rate defines the upper limit for bandwidth that can be made available to the traffic type. The amount of bandwidth between CAR and Burst Rate is made available only if it is not in use by other quality groups. Traffic above CAR is **downgraded** to Best Effort, without guarantees on delay and loss. All traffic above its declared Burst Rate is **discarded**, even if there is unused link bandwidth.

Configuration

In order to define QoS characteristic for a traffic type, you must first create a QoS Rule. Go to Quality of Service page and click Add.



Enter name for the rule. It can consist only of letters and digits. Define CAR and Burst Rate for each link that you want this type of traffic to use. Note that Link Bandwidth has to be defined for each link that you want to apply QoS rules to. The minimum value for CAR is 8Kbps and the maximum value is defined by Link Bandwidth, but it also depends on other quality groups defined on that link. The sum of all CARs on a particular link can not be greater than 90% of the Link Bandwidth. The remaining 10% is always reserved for Best Effort traffic. The

Burst Rate can not be smaller than the associated CAR, nor can it be greater than the Link Bandwidth. In addition to that, select one of nine quality classes for link you intend to use for this kind of traffic and click OK.

The QoS Rules table provides a convenient view of CARs and Burst Rates for all quality groups, as well as Link Bandwidths and total bandwidth already reserved by CARs for each link.

Add/Edit Quality of Service Rule

Name:

Quality Class

C1	C2	C3
B1	B2	B3
A1	A2	A3

Packet Lost ↑

→ Packet Delay

	Committed Rate(Kbps)	Burst Rate(Kbps)	Quality Class
WAN1	<input type="text" value="68"/>	<input type="text" value="1000"/>	<input type="text" value="A2"/>
WAN2	<input type="text"/>	<input type="text"/>	<input type="text" value="None"/>
WAN3	<input type="text"/>	<input type="text"/>	<input type="text" value="None"/>

OK Cancel

Warning: Applet Window

A QoS rule by itself is useless, because there is no association with any particular kind of traffic. In order to create this association, go to either Outbound or Inbound Policy Routing page. Here, you can either edit an existing Policy Routing rule or create a new one and select a QoS rule which will be applied to the traffic defined by the Policy Routing rule.

Name: OutBound Select Protocol: TCP Quality Of Service: Qos1

Source IP/Mask: 24.0.0.10/24 Source Port: * Destination IP/Mask: 10.2.0.171/24 Destination Port: *

Traffic mode:
 Interface Priority Interface Specific

WAN Interface List

Interface	NAT	Port NAT	NAT IP/Mask	NAT Port
WAN1	Yes	Yes	0.0.0.0-0.0.0.0	0

Buttons: Add, Edit, Delete, Up, Down, OK, Cancel

Warning: Applet Window

Benefits of FatPipe QoS

- Guarantees prioritization of real-time voice/video traffic
 - VoIP and video traffic will always get higher priority than other types of traffic to ensure quality
- Guarantees pre-allocated bandwidth for mission critical data
 - Customers can allocate fixed amount of bandwidth for different types of traffic – 25%Video, 15% VoIP, 20% database, etc.
- Preventing “over provisioning of network” by solving QoS problems on the customer side
 - Bandwidth allocation adding to 100% allows for efficient utilization of WAN
- Maximum utilization of network link
 - Per application and per user policies provide fairness between users and prevent one application or user from congesting a link
- Throttle traffic to prevent congestion

- Improve bandwidth utilization by controlling recreational and malicious traffic
- Enhances quality of VPN traffic
 - Point-to-point traffic can be given higher priority than internet traffic to improve inter-office communication
- Monitor the SLA with your ISP to ensure quality service
 - Latency and bandwidth utilization reports allow for better monitoring of line

Advantages of Using FatPipe QoS

- Ten levels of traffic priorities
 - Gives granular control over application and associated bandwidth. Applications can be classified up to ten levels of priorities. The remaining traffic will default to best effort.
- Optimize real time and standard traffic
 - Control all traffic regardless of application.
- Always guarantees the minimum quality and bandwidth you require
 - Guarantee performance of applications like CRM and thin client by optimizing response times
- Combined with link load balancing the QoS rules can be enforced across the multiple links
 - Works across multiple links to add reliability to the WAN and efficiently use the links
- FatPipe's QoS scales the quality rules to remaining lines in case of line failure
 - Add redundancy to the WAN infrastructure while maintaining performance for critical applications
- Controls WAN costs by reducing bandwidth requirements
 - Allocate bandwidth to business applications and control recreational traffic
- FatPipe's QoS adds stability, consistency, reliability, quality and control to WAN links.
- Simple and easy to configure

- Intuitive GUI based interface

FatPipe's QoS is infinitely scalable and completely protocol independent

- Works transparently with all IP networks
- Guarantees quality for applications like VoIP, video and other mission critical applications.
- Can predict delay, loss and bandwidth requirements BEFORE they occur in the network.
- Increases VPN utilization within VPN tunnel.
- Complete and total control of bandwidth plus quality parameters
- Maximizes utilization of network link.
- Stops packet flooding and DoS floods for mission critical applications

Conclusion

FatPipe's easy to set-up and manage QoS feature can help you have better control of how traffic flows over your WAN, providing quality performance for applications like VoIP, video and other mission critical applications. It can also lend to greater stability, reliability and better utilization of your WAN links. Please visit www.fatpipeinc.com for more information about FatPipe QoS or any of FatPipe's products.