HUGHES
An EchoStar Company

DATASHEET

Quality of Service and Bandwidth Management

Powerful capabilities to address the most demanding enterprise applications

A reliable communication network serves as the backbone of any successful organization. Yet when applications on a network become congested, organizational efficiency and productivity are affected. Conventional wisdom to solve the problem has always been to simply throw bandwidth at it. However, there is a far more efficient and cost-effective way to overcome network congestion: Quality of Service (QoS) and bandwidth management.

Manage Bandwidth and Save Money

Bandwidth management is critical for the new generation of Internet applications, such as Voice over IP (VoIP) and Video on Demand (i.e., YouTube). The JUPITER™ System has a rich set of QoS capabilities and bandwidth management features that enable service operators to offer an extensive range of differentiated services.

The JUPITER System continuously inspects traffic flow and allocates resources to ensure proper service levels with the following capabilities:

- Guarantee bandwidth as well as latency and jitter performance based on a given application (i.e., VoIP)
- Offer weighted service plans so that high value plans are throttled less than low value plans during times of congestion
- Carve out forward and/or return channel capacity to a set of terminals, such as for a cellular backhaul operator
- Configure a Virtual Network Operator's (VNO) traffic either to maintain Mbps rate in rain fade conditions or a constant Msps rate in rain fade

The JUPITER System's flexibility enables operators to address a diverse range of applications and markets – each with a different set of traffic handling requirements.

What is QoS?

QoS is a prioritization technique that works by setting Type of Service (ToS) bits in the IP header of packets. Values are then used to make decisions regarding traffic flow throughout the network. These values are known as the Differentiated Services Code Point (DSCP). DSCP values provide a level of control based on user and application policies. The JUPITER System supports QoS features in both the forward and return channels.

Bandwidth Management

The JUPITER System's bandwidth management features provide the ability to:

- Define minimum throughput according to Class of Service (CoS)
- Guarantee minimum throughput according to CoS
- Apply a volume usage cap (Fair Access Policy) based on varying CoS

Smart Traffic Classification

The JUPITER System supports smart traffic classification based on the following factors:

- DSCP values
- Packet size
- Source and destination IP addresses
- Protocol type
- IPv6 flow label
- Source and destination port numbers

There are four main CoS settings in the system that can be mapped to any of four traffic classes. A typical configuration is shown below:

	Latency Tolerance	Intended Applications
Conversational	Low	VoIP (Real-time traffic)
Interactive	Low	Web browsing, transactions
Streaming	Medium	Streaming video
Background	High	Bulk file transfers

Traffic classes are defined based on the following application requirement characteristics:

Class of Service	Traffic Classification
1	Conversational
2	Interactive
3	Streaming
4	Background
5*	

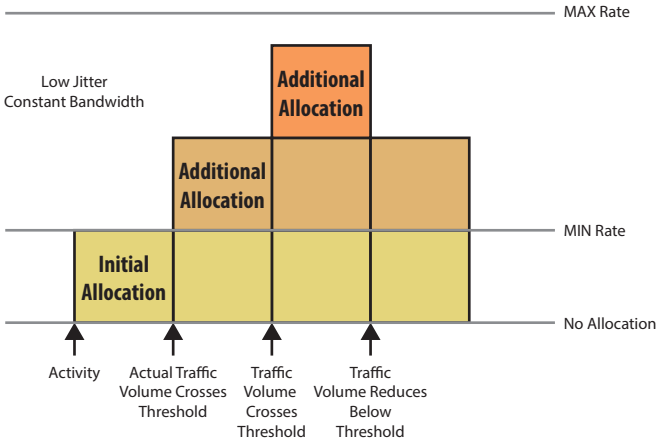
*Extra queue is used to carry traffic and is not subject to volume usage cap.

Bandwidth Allocation Techniques

Individual traffic classifications are mapped to different bandwidth allocation techniques over the satellite link. There are multiple methods for allocating bandwidth, including:

Adaptive Constant Bit Rate (CBR)

Adaptive CBR bandwidth allocation allows the user to set minimum and maximum thresholds for bandwidth and to configure the incremental step size. This ensures guaranteed bandwidth and low jitter, and enables the end user (terminal) to dynamically adjust its bandwidth on an as-needed basis.



Committed Information Rate (CIR)/Peak Information Rate (PIR)

The CIR/PIR method utilizes backlog information in the buffer to determine how much bandwidth to allocate over the CIR and up to the PIR values, utilizing bandwidth efficiently across the network. This results in medium jitter but allows bandwidth to be allocated based on demand. With CIR/PIR, the customer is always ensured CIR bandwidth, not to exceed the preconfigured PIR.

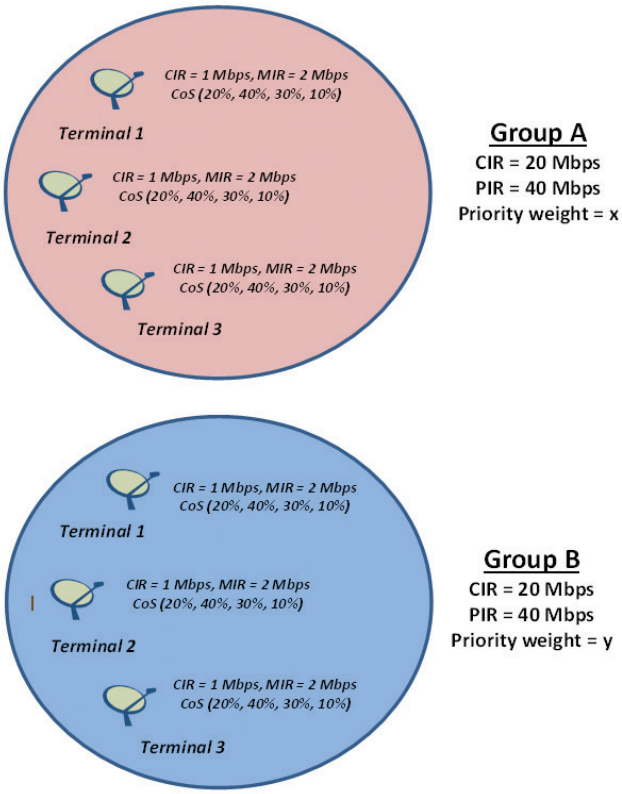
Backlog-Based

This method employs backlog-based bandwidth allocation for the terminal, utilizing space segment in a highly efficient manner to the operator. The key differentiating feature is that these techniques can be applied on a per traffic class. Within the same terminal, bulk traffic can be treated as backlog-based, whereas interactive and streaming traffic can be treated with CIR/PIR. This unique flexibility within the terminal allows the operator to ensure that important applications get the required bandwidth across the entire network. This solves the problem of an operator needing to configure all traffic from a terminal of CIR to ensure minimum bandwidth allocation regardless of the application type.

Group Level CIR

The JUPITER System also supports the ability to define a subset of terminals and apply a group level CIR. This flexibility allows a service provider to deliver differentiated services based on customer types and organizational needs, as well as by market segment.

As illustrated, there are two groups of terminals, Group A and Group B, each of which can be assigned varying traffic weights and differentiated service levels. This flexibility allows the service operator to offer differentiated service by market segment.



The JUPITER System ensures maximum efficiency in bandwidth utilization. The combination of QoS and bandwidth management techniques ensures applications are prioritized accordingly.

For more information about the JUPITER System, please visit www.hughes.com or email globalsales@hughes.com.

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