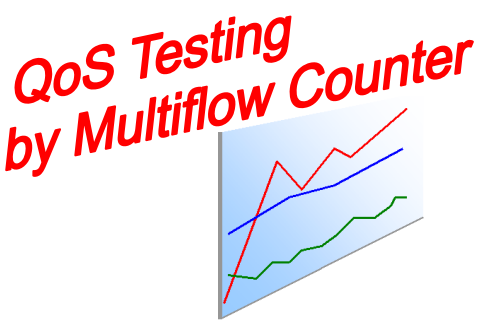
IP QoS Measurement

MU120131A/132A IP QoS Measurement

MD1230B, MP1590B

Data Quality Analyzer, Network Performance Tester



The spread of broadband networks is leading to a new era of IP-based networks. Previous best-effort type networks are inadequate for provision of rich-content services and guaranteed network service quality (QoS) is already an important requirement. The MD1230B and MP1590B are general-purpose IP testers that can also be used for QoS verification and evaluation.

1. Introduction

Provision of networks offering high-quality services requires large-scale setup work related to high-level network design and QoS management of each network device. There are frequently cases when there are no problems in normal operation but problems appear as traffic increases, and then the network configuration is re-examined and the device settings changed and strengthened. Avoiding these types of problems not only requires configuring the network in accordance with the equipment catalog specifications, but also requires pre-evaluation of the network under load.

2. Applications

Congestion is the most important reason for requiring guaranteed QoS. When traffic volumes are low, problems are unlikely to occur even without QoS management. However, networks become unstable as increasing traffic at each terminal causes congestion. Verification of networks with guaranteed QoS and network equipments with QoS management functions requires intentional emulation of high load (congestion) conditions and confirmation that the QoS system is functioning correctly.

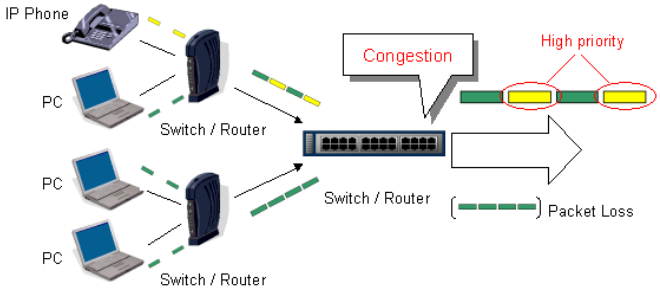


Fig. 1 QoS Management

The above setup shows an IP phone system with guaranteed QoS using priority control to assure stable throughput and low delay times. In addition to the IP phone, the network has other traffic, such as email and web browsing, from other PCs. Because the network cannot send packets exceeding the line capacity, overflow packets are discarded as congestion occurs when traffic from each PC increases. In addition, in congested network conditions, transmission delays become large because packets are waiting to be sent and transmission delay variation also increases. However, in a network with guaranteed QoS, traffic is prioritized so the IP phone packets are sent with high priority. A network with QoS management assures that IP phone packets are sent with stable throughout and low delay even under congested conditions. Traffic prioritizing systems use physical port number, MAC address, VLAN (CoS), IP address, ToS (Diffserve), port number, etc.

➢ Load Emulation & QoS Monitoring

The MD1230B and MP1590B emulate and monitor traffic under high network load conditions to allow QoS verification and evaluation before the network service is commissioned.

■ Stream Generation

It is difficult to generate designed streams in an actual network but this function permits simple generation of high traffic loads at the full wire rate. Any QoS related parameters can be set using the Stream Editing function.

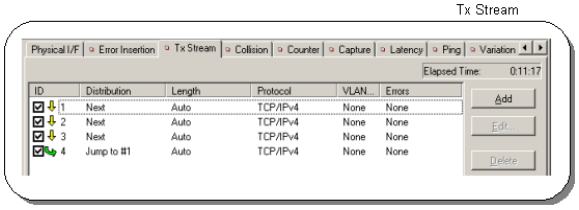


Fig. 2 Stream Generation

■ Multiflow Counter

By monitoring each traffic condition (throughput, delay, frame loss) simultaneously, the operation and performance of QoS management can be checked and measured.

A maximum of 255 traffic flows can be monitored simultaneously and templates are provided for each priority system, including MAC, VLAN, IP, TCP/UDP port number, etc.

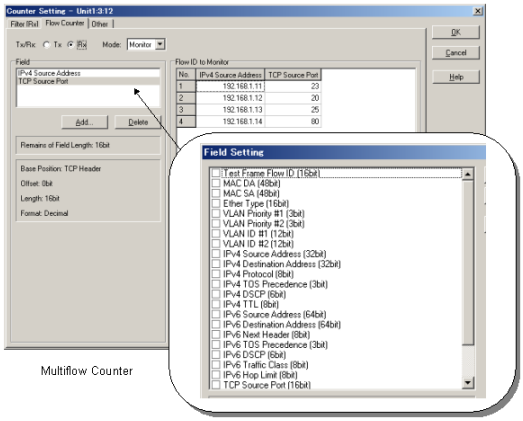


Fig. 3 Multiflow Counter

➢ Measurement Examples

The MD1230B and MP1590B can evaluate the most important QoS parameters—throughput, delay time and frame loss.

■ Throughput Test

This tests conforms whether or not the band with priority controlled traffic meets the design speed.

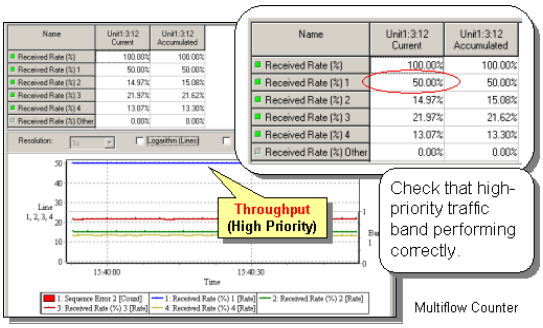


Fig. 4 Throughput Test

■ Delay Time Measurement

This tests conforms whether or not the delay of the priority controlled traffic is within the specified range.
The delay times (Max, Min, Current, Avg.) for each traffic can be monitored as a time series.

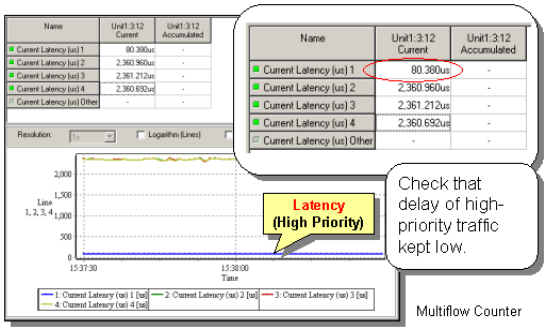


Fig. 5 Delay Time Measurement (Time Series)

In addition, due to its impact on the stability of real-time services such as IP phones, the delay variation can be monitored too.

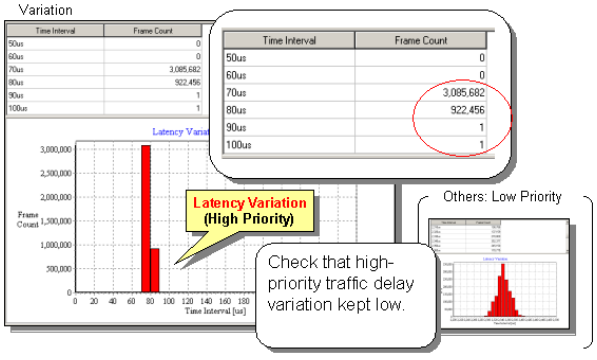


Fig. 6 Delay Variation Monitoring (Packet Jitter)

■ Frame Loss Test

This tests whether any frames in the priority controlled traffic are being lost.

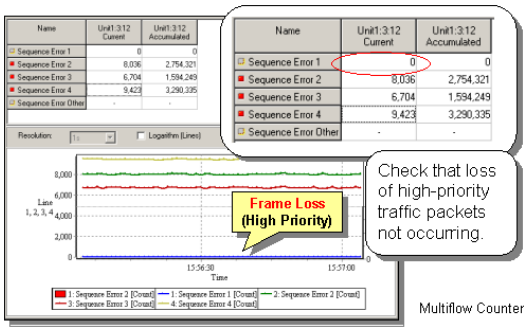


Fig. 7 Frame Loss Test

3. Product Features

- Combining load generation and QoS monitoring functions allows one tester to support QoS verification of network and network equipment
- QoS verification of multiple multiport switches and routers (max. five 12-port (electrical) MU120131A and 8-port (optical) MU120132A modules installed in MD1230B main frame)
- Templates for QoS priority parameters
- Maximum of 255 traffic flows monitored simultaneously (max. of 8 graph displays).

4. Summary

The MD1230B, and MP1590B can generate high-load conditions meeting the network design specifications, which is difficult to achieve in actual service, to support QoS pre-verification and evaluation before the network is commissioned. They provide a key solution in assuring continued improvement and expansion of high-level network QoS verification.

Composition	Mainframe: MD1230B,MP1590B Puluqin Module: MU120131Aor MU120132A Software version: Ver7.0 or later
Multiflow Counter	Flows: Max. 255 traffic flows/port (real-time display of 255 traffic flows/unit) Flow definition: Combination of 4 fields in frame (16-bits wide max.) Field Setting Templates: MAC DA, MAC SA, Ether Type, VLAN Priority #1, VLAN Priority #2, VLAN ID #1, VLAN ID #2, IPv4 Source Address, IPv4 Destination Address, IPv4 Protocol, IPv4 TOS Precedence, IPv4 DSCP, IPv4 TTL, IPv6 Source Address, IPv6 Destination Address, IPv6 Next Header, IPv6 Tos Precedence, IPv6 DSCP, IPv6 Traffic Class, IPv6 Hop Limit, TCP Source Port, TCP Destination Port, UDP Source Port, UDP Destination Port Counter Items: Transmitted Bit Rate (Mbit/s), Transmitted Rate (%), Transmitted Byte, Transmitted Frame, Transmitted Frame (fps), Received Bit Rate (Mbit/s), Received Rate (%), Received Byte, Received Frame, Received Frame (fps), Sequence Error, Max Latency (us), Min Latency (us), Current Latency (us), Avg Latency (us) Graphs: Simultaneous display of 8 graphs (7 line graphs + 1 bar graph) Resolution: 1 s, 1 minute, 15 minutes, 60 minutes
Delay Time Distribution	Resolution: 1 us, 10 us, 100 us, 1 ms, 10 ms, 100 ms, 1 s

5. Ordering Information

➢MD1230B		➢MP1590B	
MD1230B	**Data Quality Analyzer**	MP1590B	**Network Performance Tester**
MD1230B-11	**Packet BER Test**	MP1590B-11	**Packet BER Test**
MU120131A	**10/100/1000M Ethernet Module**	MU120131A	**10/100/1000M Ethernet Module**
MU120132A	**Gigabit Ethernet Module**	MU120132A	**Gigabit Ethernet Module**

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