Anritsu

MD1230/MP1590 Family

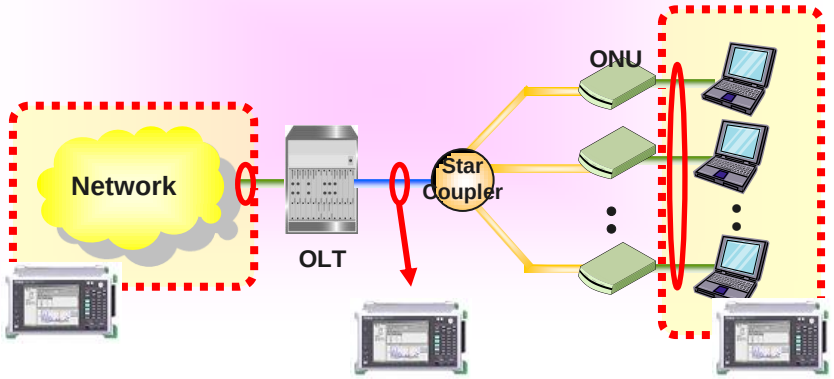
Version 7.1

MD1230/MP1590 Version7.1 Product Introduction

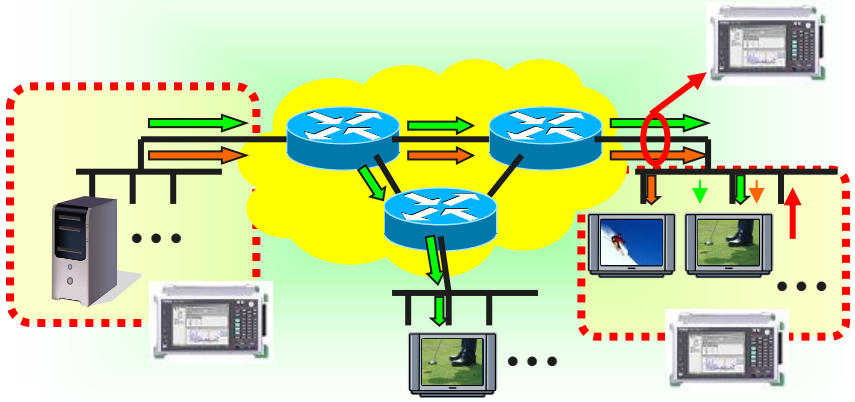
Anritsu Corporation

Overview

PON Solution



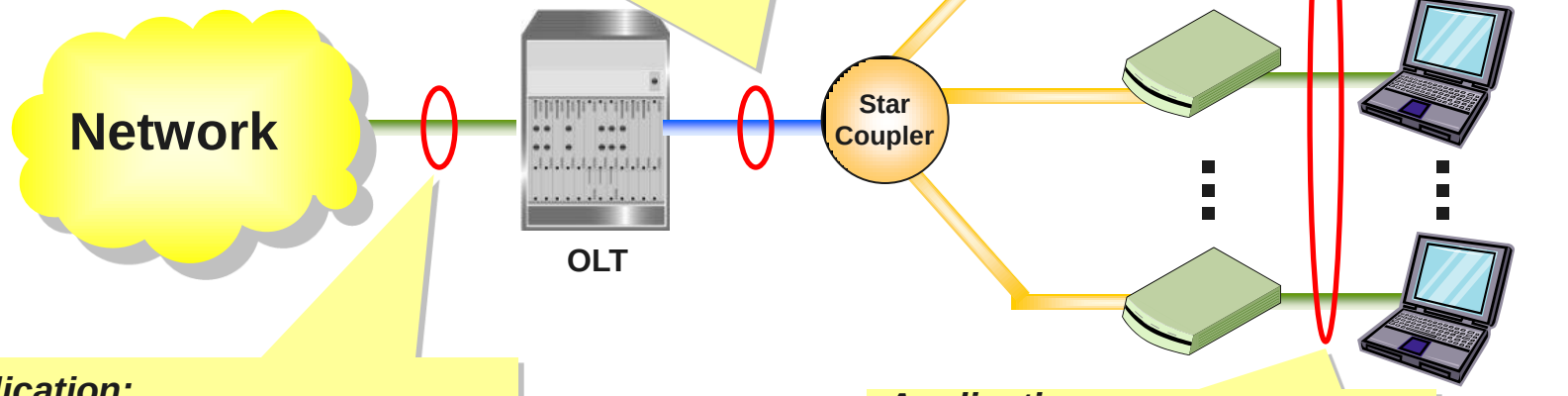
IPTV Solution



PON Solution

Application:
E-PON System Analysis/Performance measurement

E-PON OAM Analysis
LLID Flow Counter



Application:
Verify QoS of each ONU in Upstream, and measure general transmission performance.

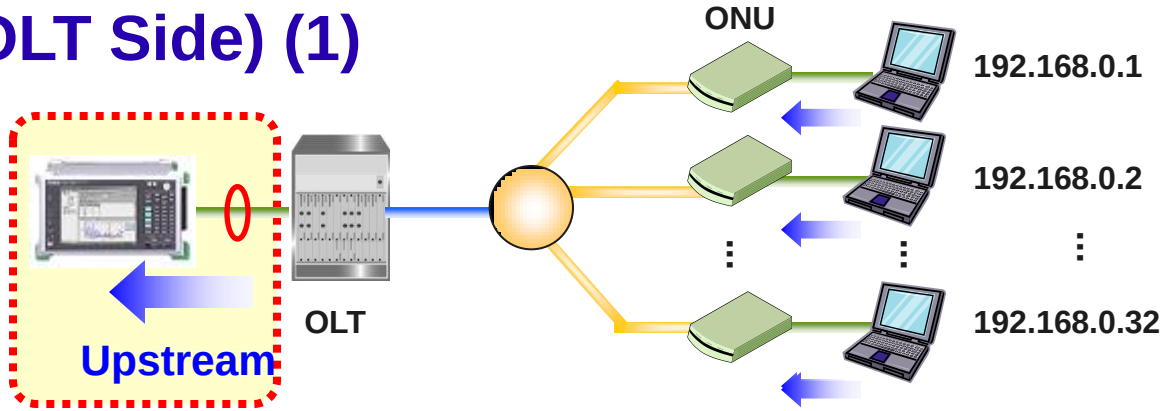
Multi Flow Counter
Multi Stream Generation

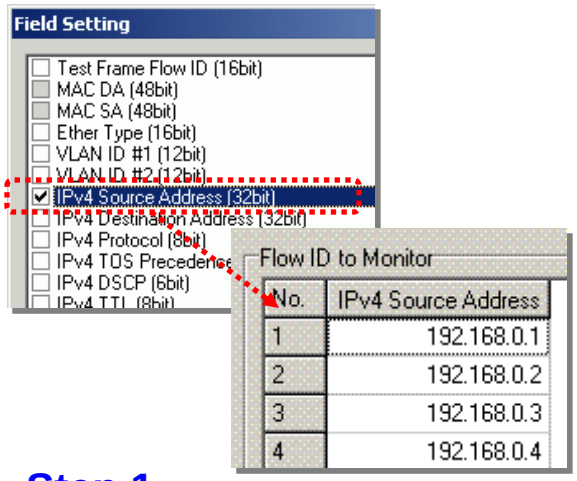
Application:
Measure some ONUs performance and QoS simultaneously.

Group Measurement
Low-cost-per-port Measurement

PON Measurement (OLT Side) (1)

Verify QoS of each ONU signal from upstream signal sent from OLT.



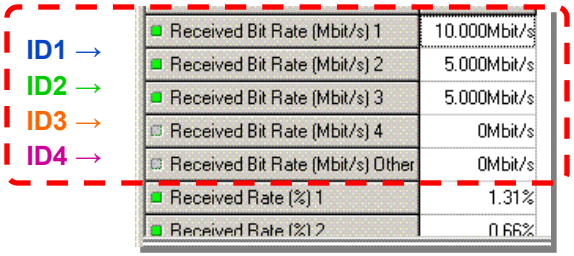


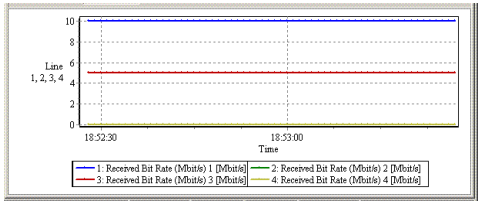
Step 1

Extract each ONU signal from received upstream signal using IP address as ID.

Step 2

Check QoS of each ONU for signal from ONU. ***Multi Flow Counter***





Check Throughput for each ID as graph.

Measure

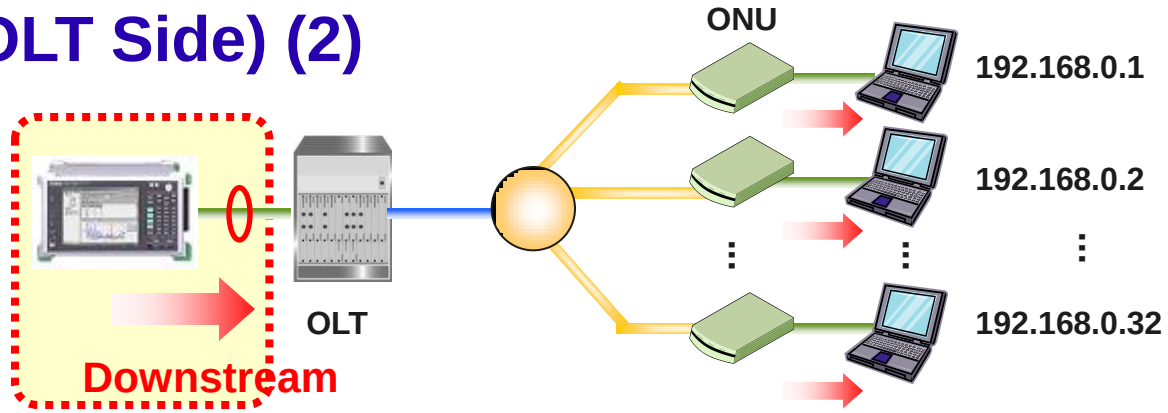
- **Throughout**
- **Latency**
- **Frame Loss**

for each ID (IP Address in this example) and verify QoS for each ID.

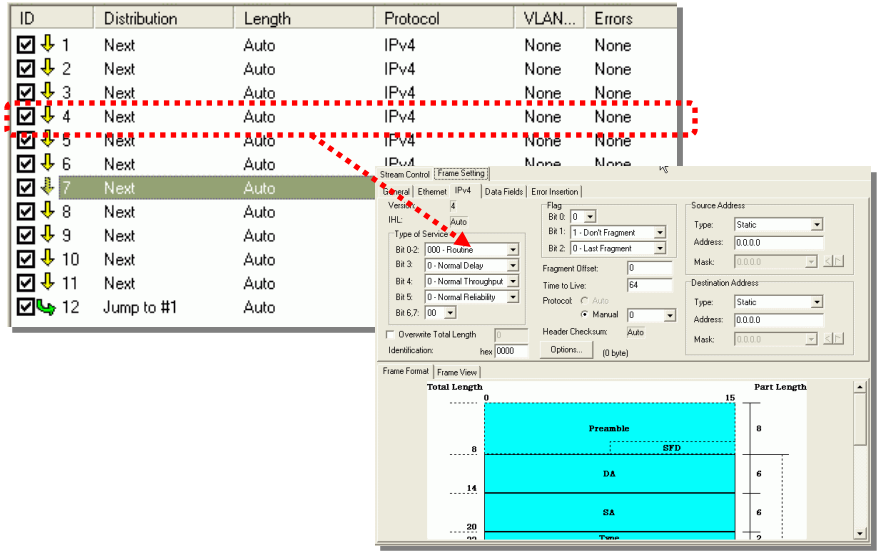
Check delay for each ID.

PON Measurement (OLT Side) (2)

Generate signal sent to each ONU from MD1230 to verify throughput of entire network.



Multi Tx Stream



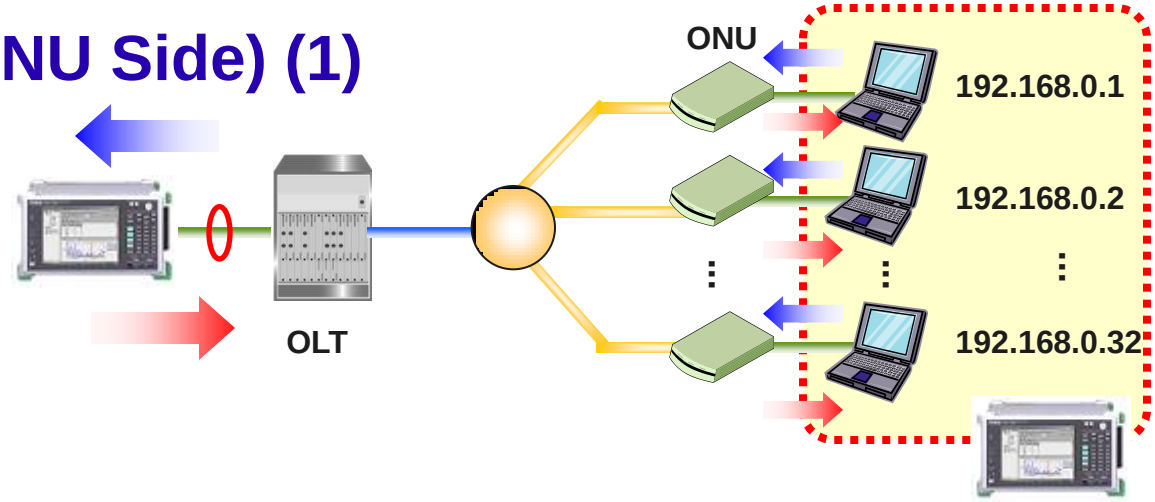
Set any of the following parameters independently for each ONU using Multi Tx Stream method with downstream data flowing to OLT from MD1230.

- **Address: MAC, IP**
- **Client Data Format: TCP, UDP, IPv6, User-defined, etc.**
- **VLAN: Supports Q-in-Q**
- **Frame Length: 48 to 10,000 Bytes**
- **And others**

PON Solution

PON Measurement (ONU Side) (1)

Configure low-cost test environment for multiple ONUs (clients) connected to PON.



MU120131A 10M/100M/1000M Ethernet Module

- 10/100/1000 BASE-T
- RJ-45 Auto MDI-X
- 12 ports

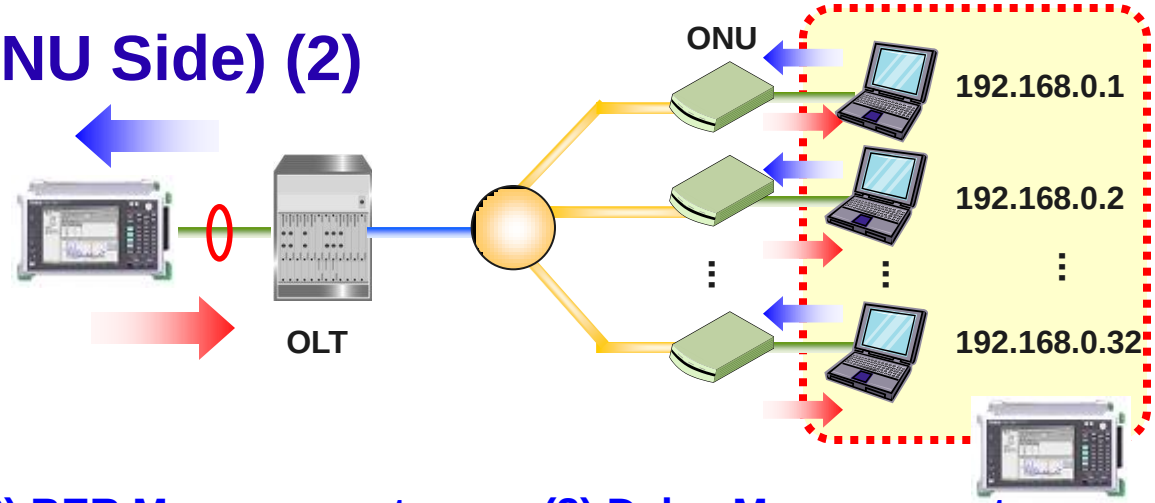
MU120132A Gigabit Ethernet Module

- 1000 BASE-SX/LX/LE/LR
- SFP Transceiver (LC connector)
- 8 ports

Full range of multi-port modules for measuring multiple ONU (clients), supporting measurement of all ports in a 32-branch PON system using one MD1230B.

PON Measurement (ONU Side) (2)

Verify QoS of multiple ONUs using throughput, delay, BER, etc.



(1) Throughput Measurement

Name	Unit1:3:1 Current	Unit1:3:2 Current	Unit1:3:3 Current	Unit1:3:5 Current
Transmitted Bit Rate (bit/s)	11,650bit/s	20,609bit/s	8,394bit/s	16,598bit/s
Transmitted Bit Rate (%)	13.00%	69.00%	4.00%	40.00%
Transmitted Byte	31,788	10,607	9,048	8,957
Transmitted Frame	15,132	10,047	1,173	25,402
Received Bit Rate (bit/s)	13,716bit/s	27,928bit/s	2,643bit/s	30,448bit/s
Received Bit Rate (%)	42.00%	93.00%	61.00%	48.00%
Received Byte	30,744	3,278	5,932	31,807
Received Frame	32,358	8,505	3,843	25,411

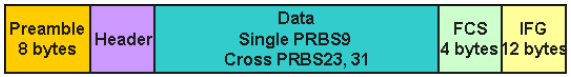
Display measured throughput of multiple ports on one screen.

(2) BER Measurement

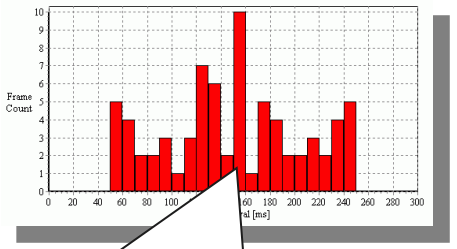
PRBS Frame Error Count	28,703	28,703
PRBS Frame Error Rate	2.7E-03	0
PRBS Bit Error Count	9,894	9,894
PRBS Bit Error Rate	2.7E-03	0

Verify Tx QoS of each ONU at 1-bit resolution using BER measurement.

Pattern for BER Measurement



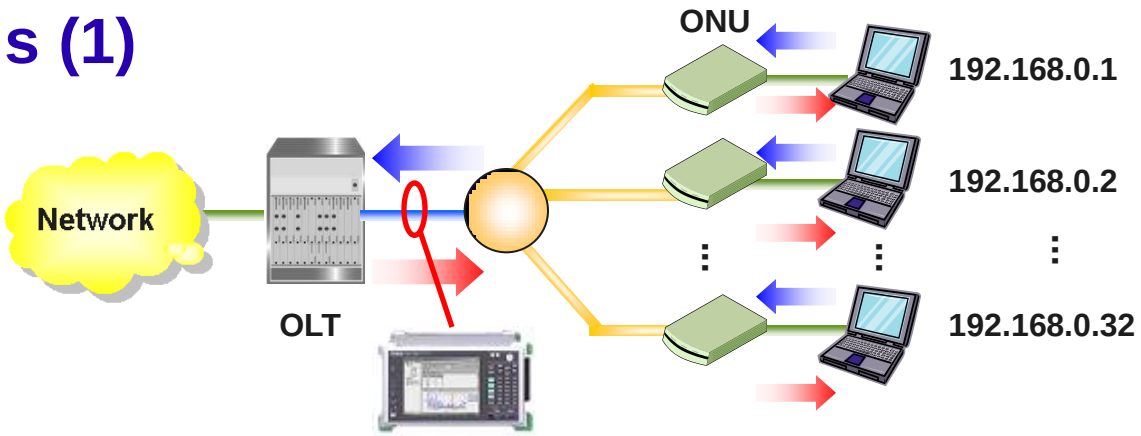
(3) Delay Measurement



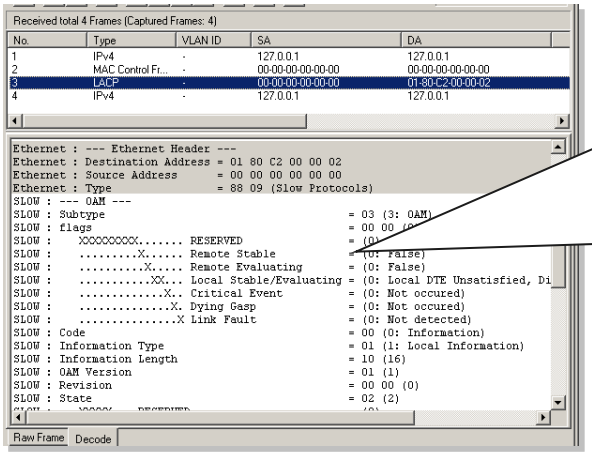
In addition to normal Delay measurement, measurement of Delay distribution is also built-in for statistical verification of network randomness.

EPON System Analysis (1)

Monitor signals between E-PON OLT and ONU to analyze OAM exchange.



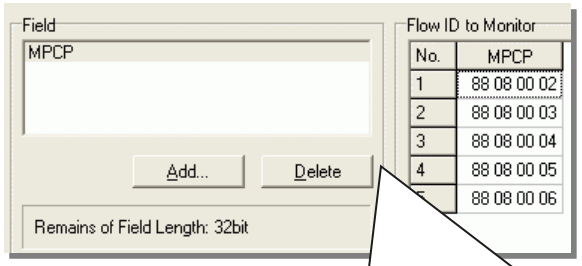
(1) EPON OAM Analysis



Use Capture/Decode function to analyze EPON OAM exchanges.

Supported Analyses
MPCP Frames
IEEE802.3ah Frames

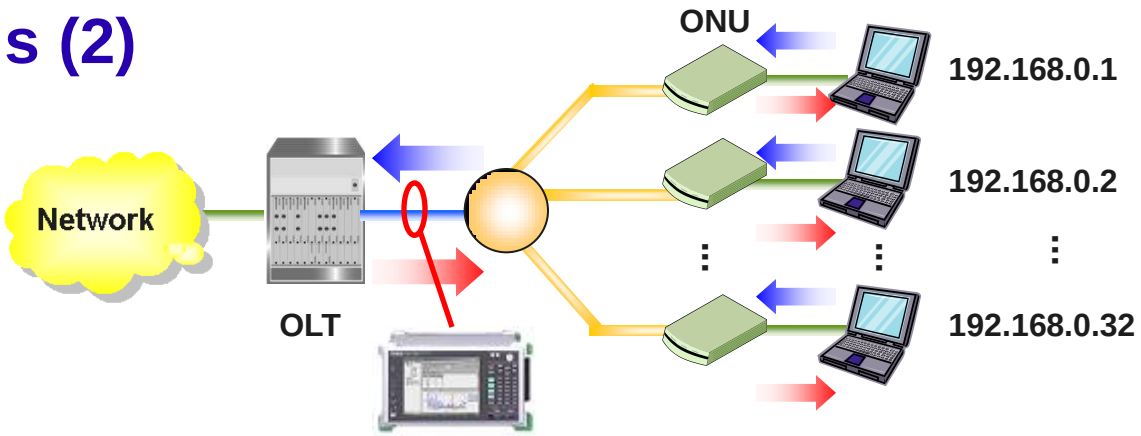
(2) EPON OAM Statistics

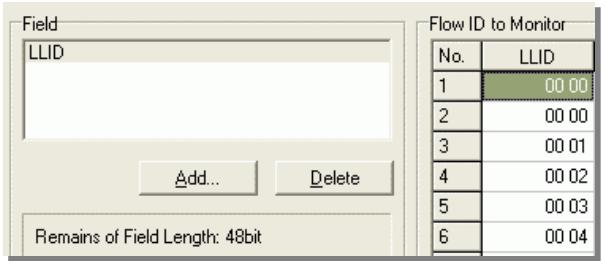


Measure MPCP exchanges with Multi Flow Counter to verify OAM statistics.

EPON System Analysis (2)

Verify QoS of signal in E-PON for each LLID using Multi Flow Counter.



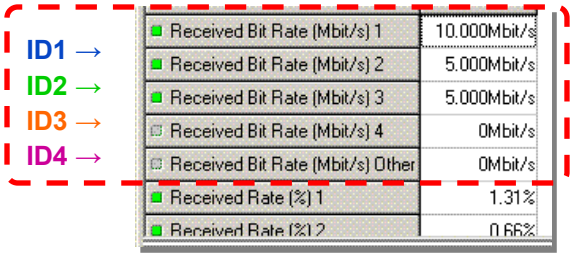


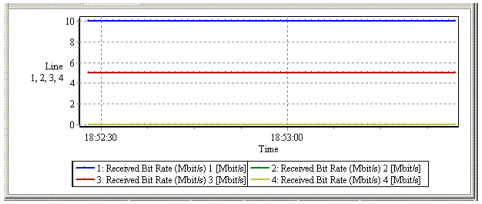
Step 1

Extract each ONU signal from received signal in EPON using LLID as ID.

Step 2

Check QoS of each ONU for signal from ONU. ***Multi Flow Counter***





Check Throughput for each ID as graph.

Measure

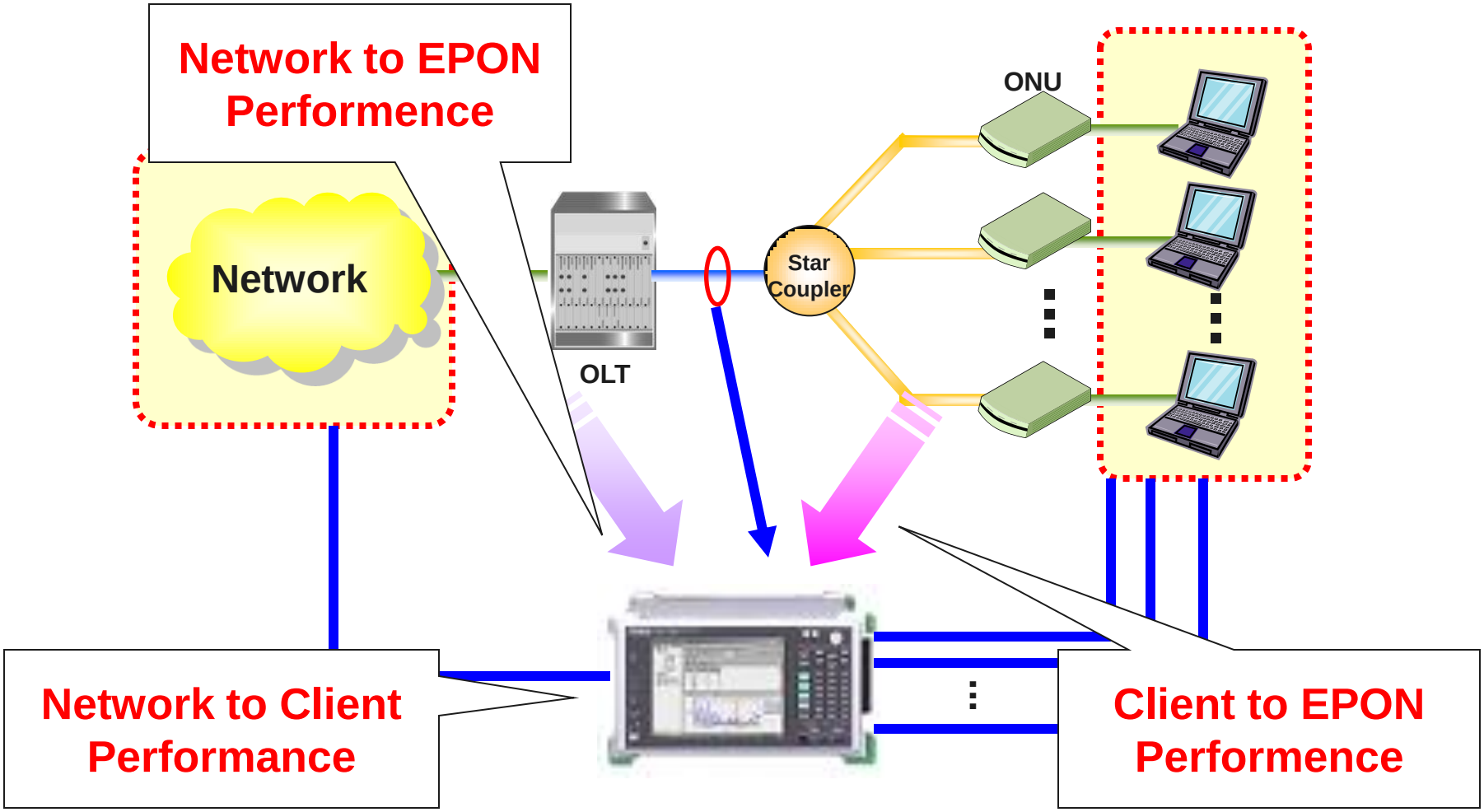
- **Throughout**
- **Latency**
- **Frame Loss**

for each ID (LLID Address in this example) and verify QoS for each ID.

Check delay for each ID.

PON Solution

PON Measurement (Total Performance)



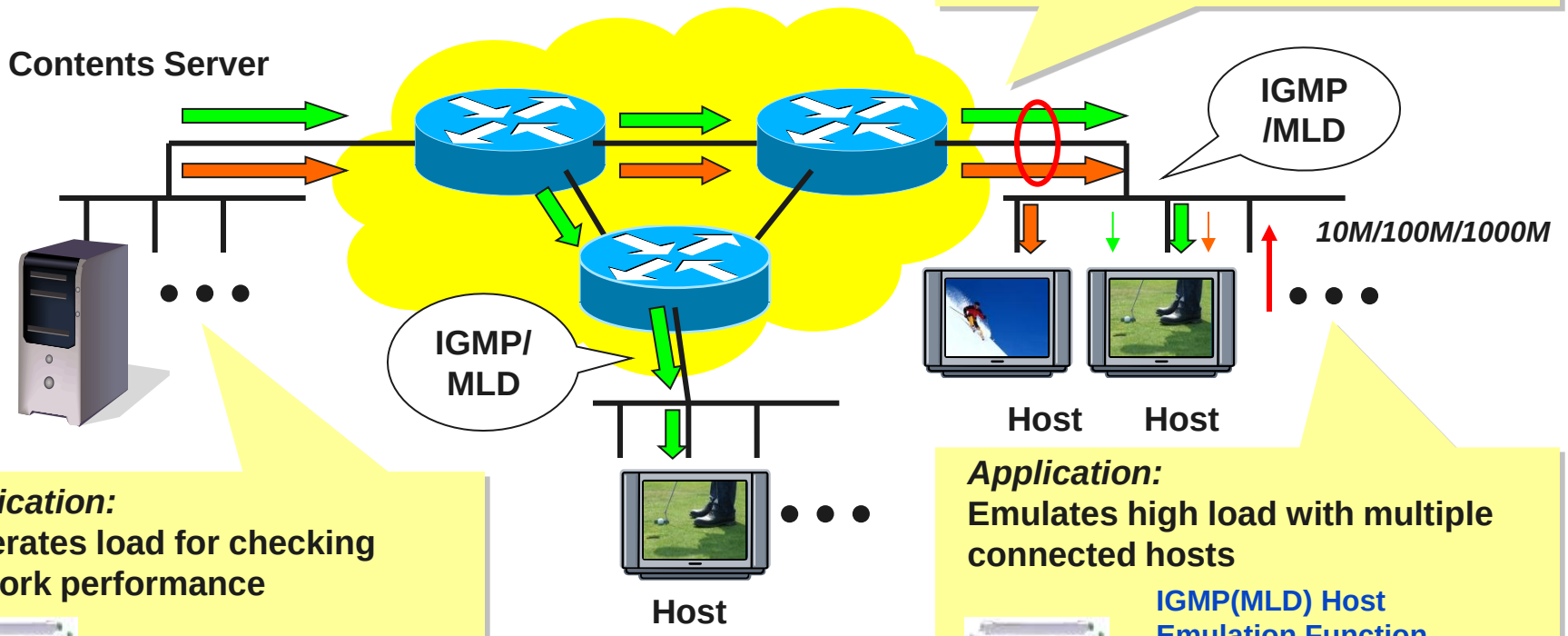
IPTV Solution

Supports IGMPv2/v3, and MLDv1/v2

Application:
Check multicast network QoS

Multiflow Counter Function

Capture Decode Function



Application:
Generates load for checking network performance

Generates multicast stream

Generated fragment data

Application:
Emulates high load with multiple connected hosts

IGMP(MLD) Host Emulation Function

- Join/Leave
- Channel Zapping

Discover What's Possible™

Multicast stream A

Multicast stream B

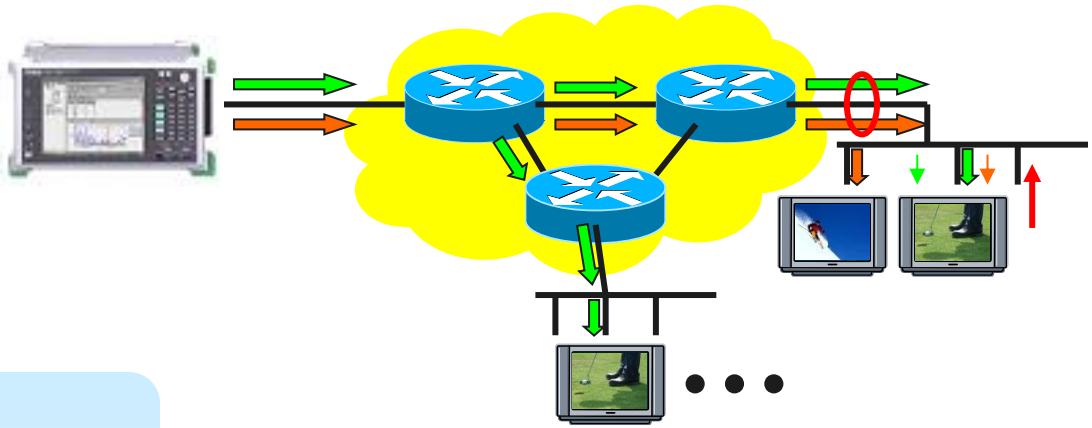
IPv4: IGMP
IPv6: MLD

Anritsu

IPTV Solution

Stream Generation

Generate load for checking network performance.



Fragment Test Stream

ID	Distribution	Length	Protocol	VLAN...	Errors
1	Cont	Fixed 9000	IPv4	None	None

ID	Distribution	Length	Protocol	VLAN...	Errors
1	Next	Fixed 1014	IPv4	None	None
2	Next	Fixed 1014	IPv4	None	None
3	Next	Fixed 1014	IPv4	None	None
4	Next	Fixed 1014	IPv4	None	None
5	Next	Fixed 1014	IPv4	None	None
6	Next	Fixed 1014	IPv4	None	None
7	Next	Fixed 1014	IPv4	None	None
8	Next	Fixed 1014	IPv4	None	None
9	Next	Fixed 1014	IPv4	None	None
10	Jump to #1	Fixed 216	IPv4	None	None

Automatically create fragmented test data from any test data.

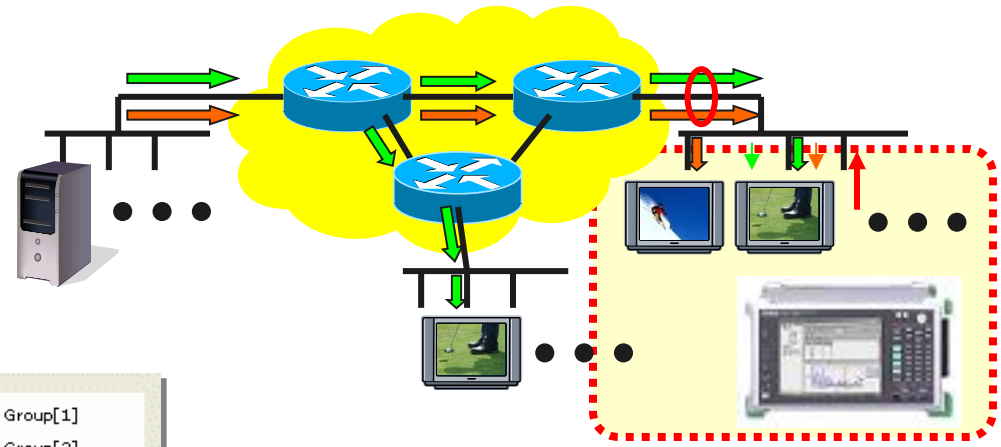
Multichannel Stream

ID	Distribution	Length	Protocol	VLAN...	Errors
1	Next	Fixed 1518	IPv4	None	None
2	Next	Fixed 1518	IPv4	None	None
3	Next	Fixed 1518	IPv4	None	None
4	Next	Fixed 1518	IPv4	None	None
5	Next	Fixed 1518	IPv4	None	None
6	Next	Fixed 1518	IPv4	None	None
7	Next		IPv4	None	None
8	Next		IPv4	None	None
9	Next			None	None
10	Next				
11	Jump to				

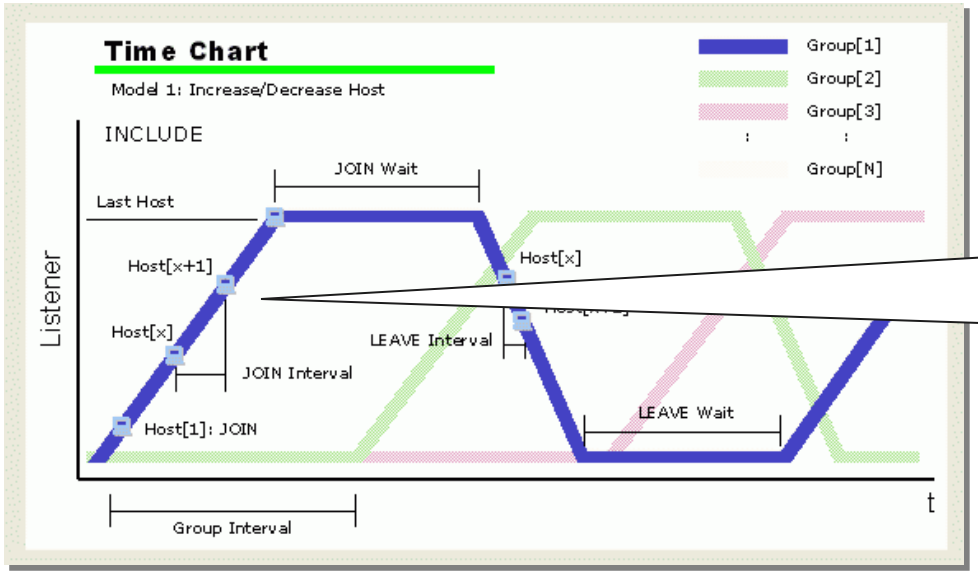
Create stream for multiple channels (multiple multicast addresses).
Address, Tx rate, etc., are set separately for each channel.

Multicast Host Emulation – Leave/Join

Reproduce conditions as each host repeatedly performs Leave/Join requests to server to generate high server load.



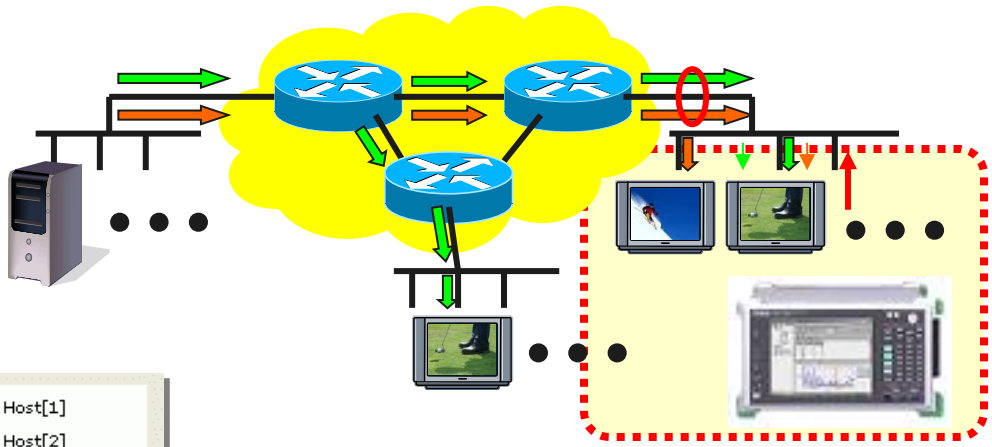
IGMPv2/v3, MLDv1/v2 Emulation



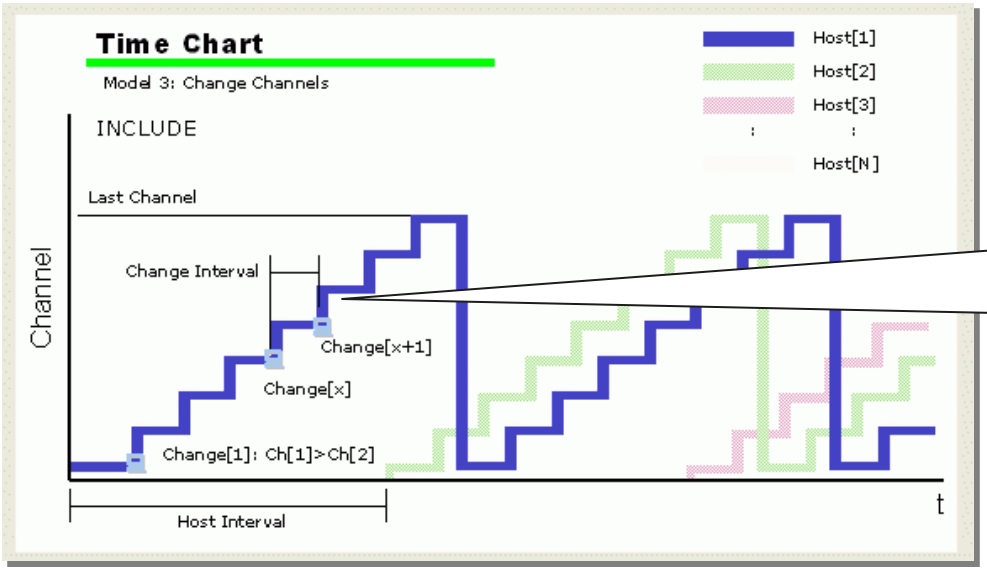
To emulate a number of groups, hosts perform repeated Join operations at fixed intervals. After the specified number of hosts has joined, Leave operations are performed repeatedly.

Multicast Host Emulation – Channel Zapping

Multiple groups make continuous channel switching requests to server (Channel Zapping) to create high network load.



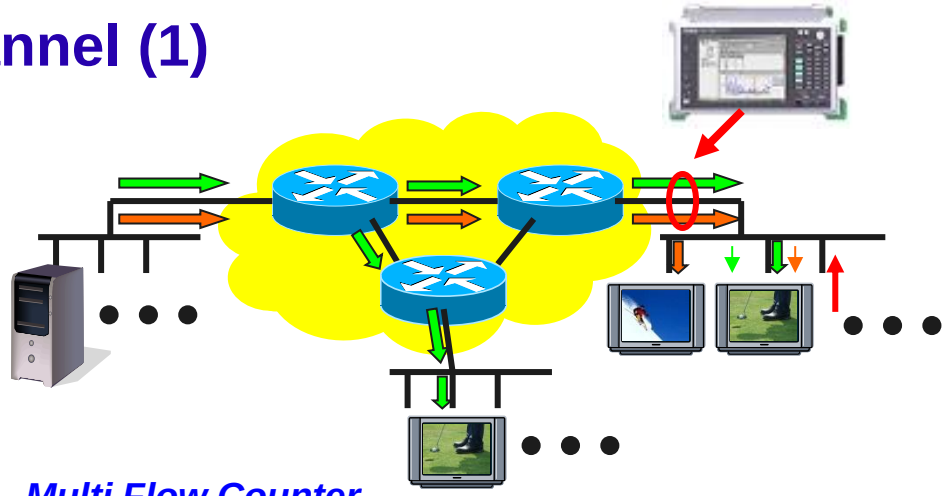
IGMPv2/v3, MLDv1/v2 Emulation



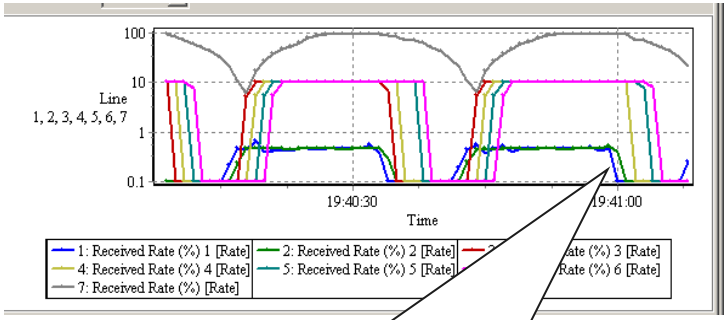
To emulate a number of groups, viewing-channel switching requests are made at fixed intervals to create a continuous Channel Zapping condition.

QoS Measurement of Each Channel (1)

Verify QoS of each channel or each host.

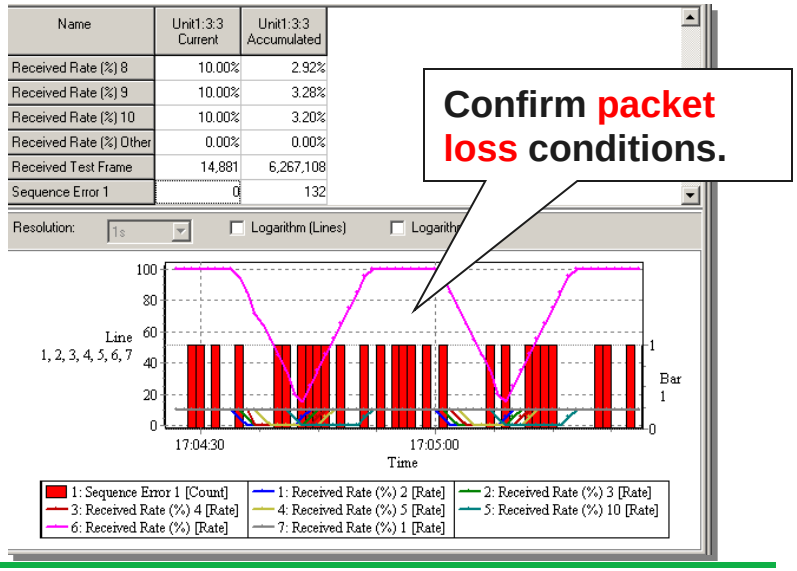


Multi Flow Counter



Multi Flow Counter
Measure throughput (traffic) of each channel (each multicast address).

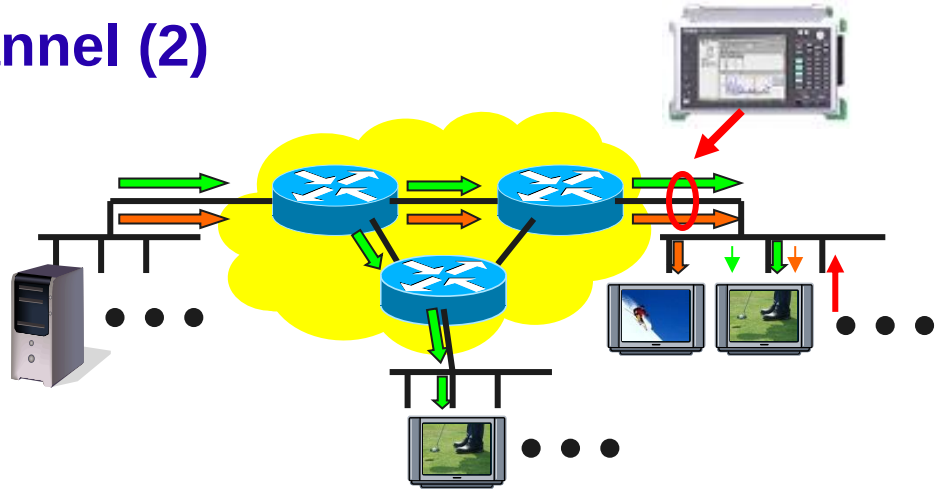
Multi Flow Counter



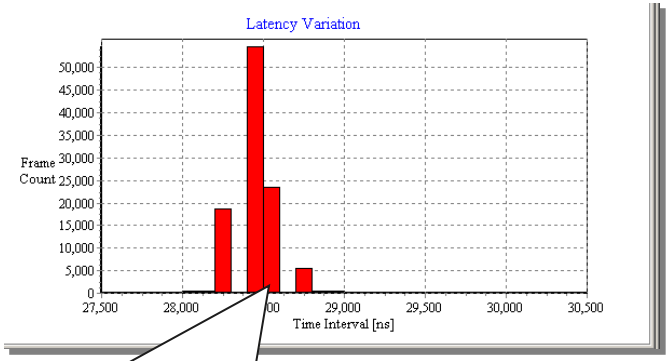
Confirm packet loss conditions.

QoS Measurement of Each Channel (2)

Verify network delay by emulating multiple hosts simultaneously and creating high-load Channel Zapping conditions.



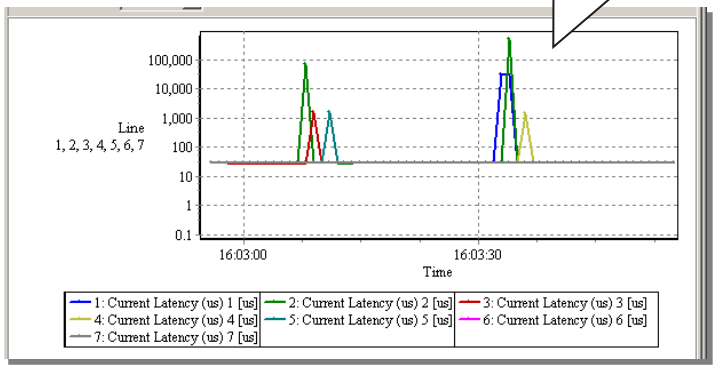
Variation



By measuring time-delay distribution, confirm the network degree of delay (variation) under high-load conditions.

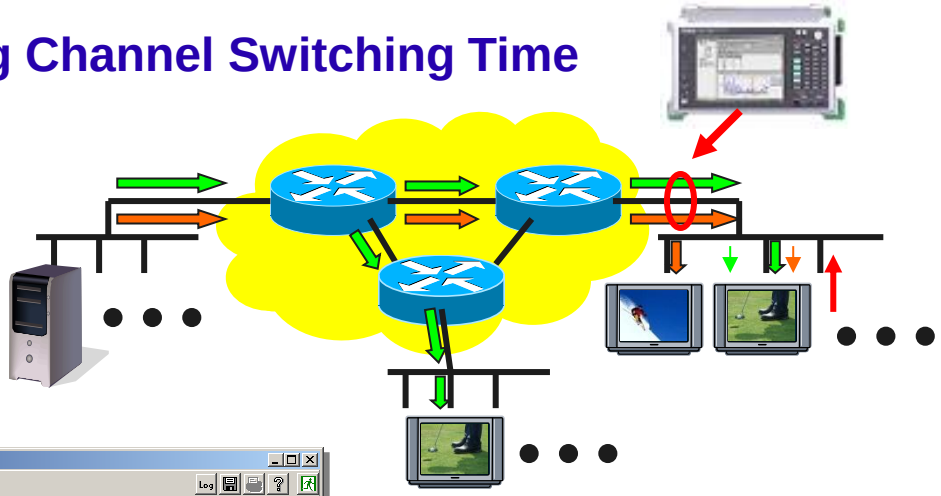
Verify amount of delay of each channel and host in chronological sequence.

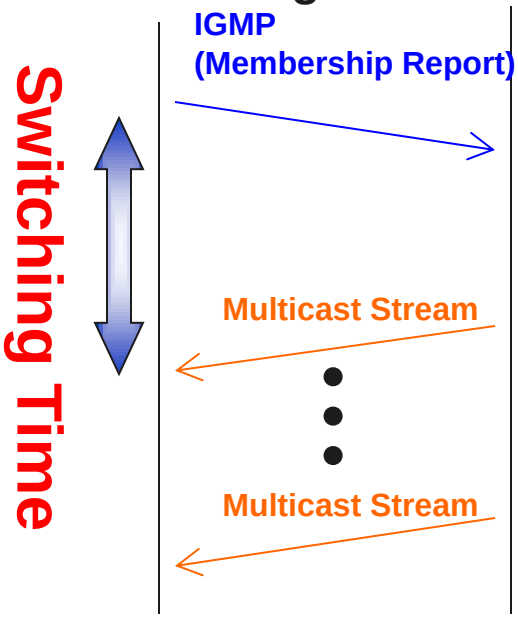
Multi Flow Counter

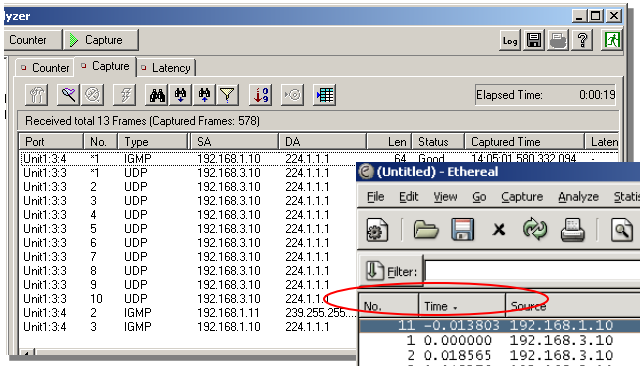


QoS Measurement – Confirming Channel Switching Time

Capturing and analyzing the exchanges between the host and supports verification of channel switching time.

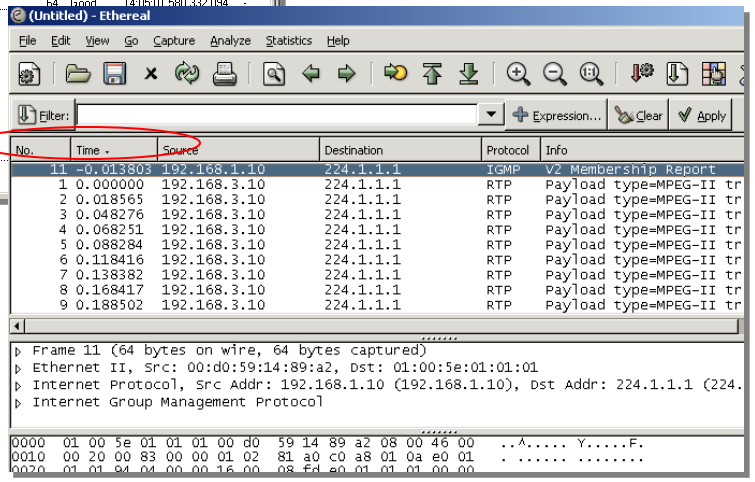






Capture

Ethereal/ Wireshark



Note

Anritsu

Specifications are subject to change without notice.

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