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Troubleshooting Live Ethernet Traffic

- Finding root causes of network issues -

Network Master Pro MT1000A
Network Master Flex MT1100A

Introduction

An Ethernet network carries traffic to and from many different users. The behavior of one user can affect the network performance and the perceived Quality of Service (QoS) experienced by other users. Typical root causes of network issues include:

- Top talker
  - A top talker generates much more traffic than other users, occupying a major part of the available bandwidth and slowing down the network.
  - A top talker could also be within a subgroup (i.e. VLAN) of the network affecting only that group; these top talkers might not be top talkers for the total link but can be responsible for affecting the subgroup.

- Network attack
 - One node is accessed from many sites, occupying the network and slowing it down.

- Error frames and short frames
  - Error frames cause re-transmissions and wasted network capacity.
  - Short frames are very inefficient because they include overhead (address information) required to route the frame, but very little room for information. If a user sends many short frames, the network is used inefficiently.
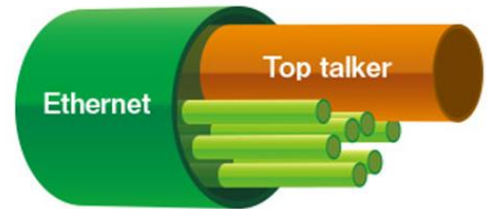
Solution: MT1000A/MT1100A with Channel Statistics and Frame Capture

The Channel Statistics application in the MT1000A and MT1100A helps network service technicians quickly analyze network performance issues and identify problems like top talker, network attack, and error frames to decrease network downtime and improve performance just by selecting and activating filters. Using this application, field technicians can easily analyze live traffic on the network without needing extra training.

The Channel Statistics application displays information on live Ethernet traffic at up to 10 Gbps grouped in up to 230 "channels" defined by one or more of the following parameters: IPv4, IPv6 or MAC address, VLAN ID or MPLS label, IP next header (protocol) or TCP/UDP ports. The displayed information includes: Frame counts/rate, Throughput, Error frames, Size distribution, IPv4/IPv6 statistics, and TCP/UDP statistics.
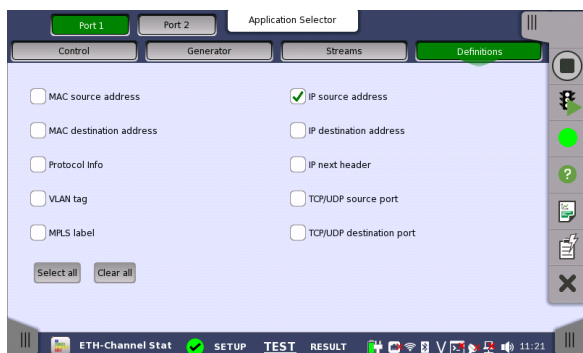
The user can freely set which parameters define channels using the Channel Statistics application.
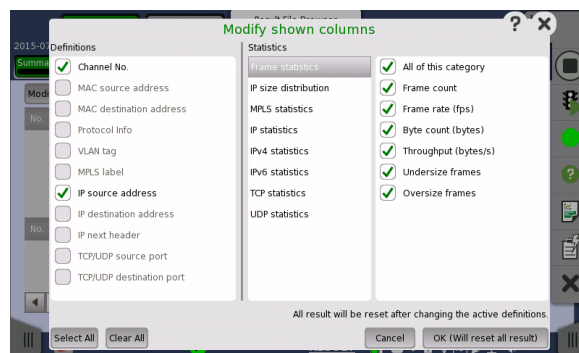

The user can easily define which results are presented by the Channel Statistics application.

Analysis	IP Channel Statistics Filter
Top talker	Source IP address
Top talker subgroup	Source IP address and VLAN tag sorted by VLAN
Network attack	Destination IP address
Error frames	(any parameter OK)
Short frames	Source IP address

Channel Statistics filter settings for analysis of network issues

Once an issue has been identified to relate to for instance a specific IP address, the filter function in the MT1000A and MT1100A can extract traffic related to this address. The extracted traffic can then be captured for further analysis with analyzed using Wireshark built into the MT1000A and MT1100A.

Application: Short Frame analysis using Channel Statistics and Frame Capture
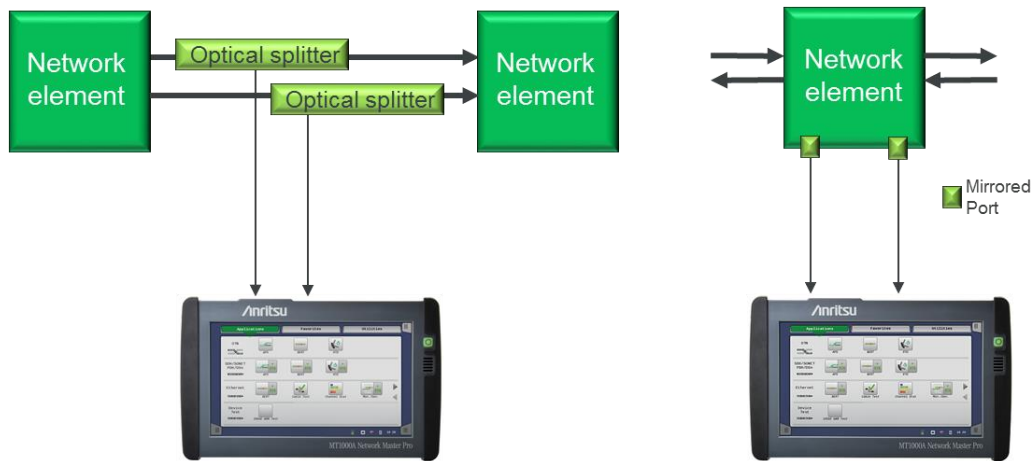

MT1000A connected to live traffic for analysis of network performance

When a user connects the MT1000A or MT1100A to an Ethernet line, starts the Channel Statistics application and then configures it to identify channels based on IP source addresses, the instrument displays results similar to those shown below. In this example, IP source address 172.29.11.5 is sending about 180 times more traffic with short frames than other IP addresses. To fully analyze this traffic, the user can capture frames from IP source address 172.29.11.5 and decode them with Wireshark built into the instruments.
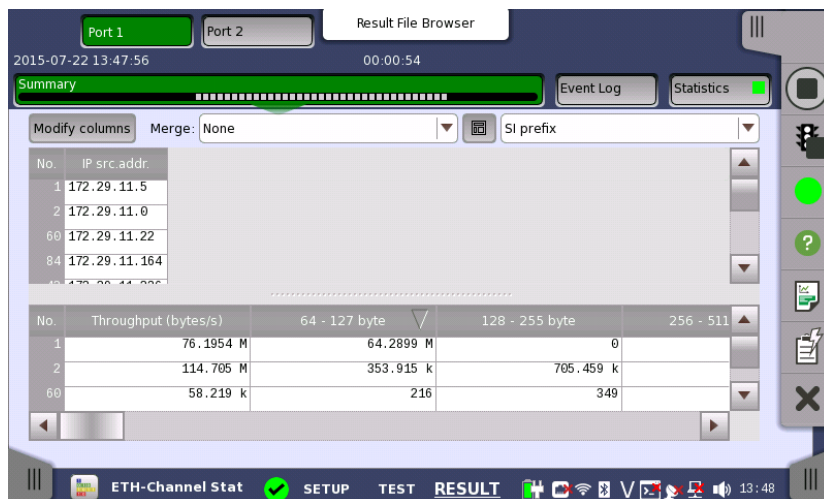

After stopping Channel Statistics measurement, the user sets a filter to extract traffic frames only from Src IPv4 172.29.11.5.

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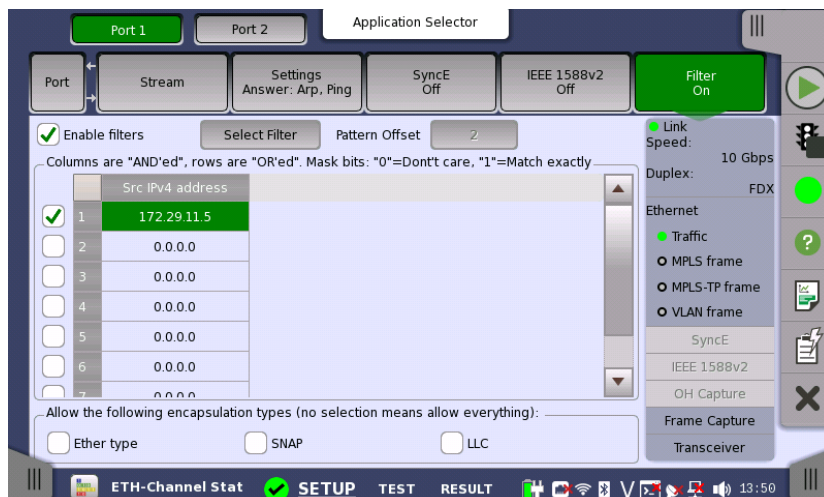
Then, the user starts the Frame Capture function with the filter activated.
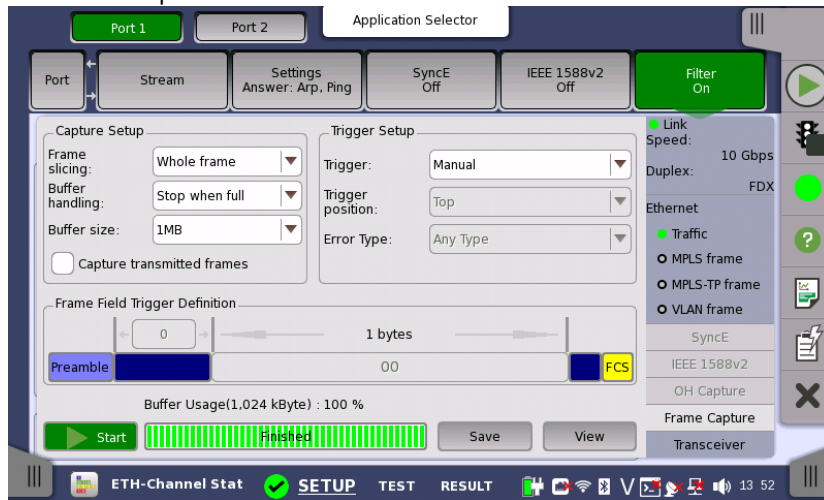
On opening Wireshark to analyze the captured data, only frames with IPv4 source address 172.29.11.5 are shown, making it easier to look inside the many short frames and identify the potential problem.
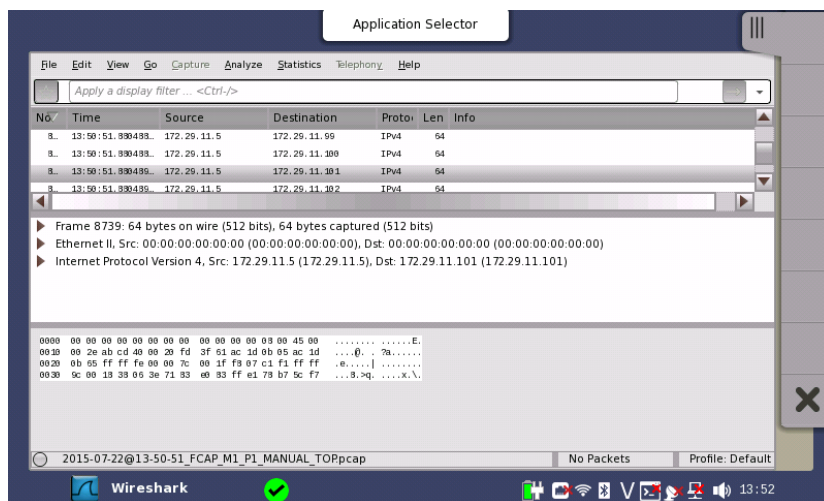
Hints when using Frame Capture

- You can optimize the use of the memory available for Frame Capture by filtering as shown above.
- You can also use the MT1000A/MT1100A Frame Slicing function to capture only the first 64 (or 128) bytes of a frame. In many cases, the most interesting information to examine for troubleshooting is at the beginning or header section of Ethernet frames.
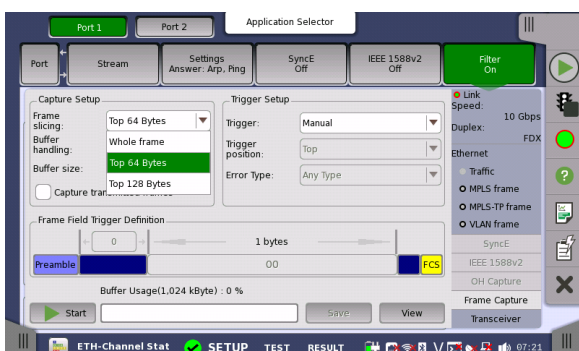
To use the Frame Slicing function, start Frame Capture with "Top 64 Bytes" selected.
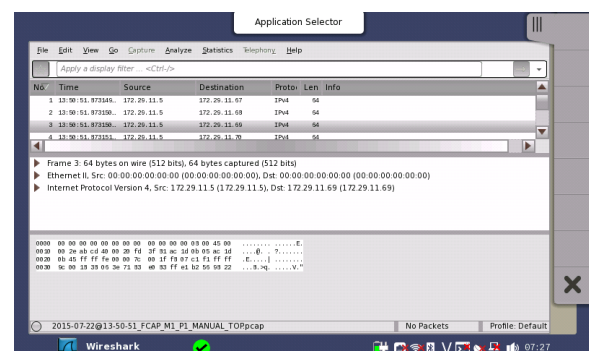
Then, open Wireshark; you will see that only the first 64 bytes of each frame are shown.

Application: VLAN Scan using Channel Statistics

Virtual Local Area Networks (VLANs)—as defined in IEEE 802.1Q—are an Ethernet technology to segment a LAN on an organizational basis, e.g. by departments, project teams, functions, or applications. Each VLAN has an identifier (ID) in the protocol stack and the user can analyze throughput per monitored VLAN ID by selecting VLAN ID as a filter in the Channel Statistics application to see all active VLANs and how much network bandwidth each VLAN is using.
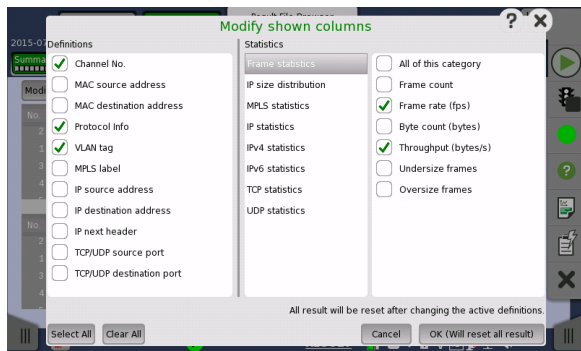
Setting filters and result fields for VLAN scan
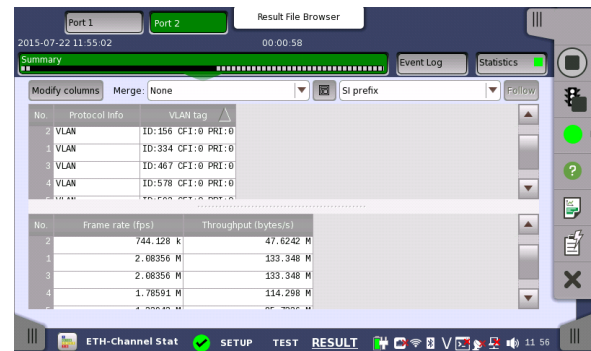
VLAN scan result with Channel Statistics application

Product strengths

- Analysis of live Ethernet traffic up to 10 Gbps grouped in up to 230 "channels"
  - Defined by one or more of following parameters:
    IPv4, IPv6 or MAC address, VLAN ID or MPLS label, IP next header (protocol) or TCP/UDP ports
  - Displayed information includes: Frame counts/rate, Throughput, Error frames, Size distribution, IPv4/IPv6 statistics, and TCP/UDP statistics
- Powerful filter functions to extract live Ethernet traffic for further analysis
- Line-rate capture of Ethernet traffic
- Built-in Wireshark for detailed, packet-level analysis and troubleshooting

Summary

The Channel Statistics application in the MT1000A/MT1100A combined with filter functions and built-in Wireshark make the MT1000A/MT1100A ideal tools for analyzing and troubleshooting live Ethernet traffic issues.

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