



VSS MONITORING'S SESSION-BASED/FLOW AWARE LOAD BALANCING FEATURE

Application Note

Quick Specs

- Up to 8 Monitor Ports in a single load balanced group
- Up to 32 total load balanced Monitor Port groups per device (unfiltered, filter-match, or non-match)
- Unlimited number of non-load balanced monitor groups
- Selectable actions for when load balanced ports/tools go down

Benefits

- Prevents packet loss (especially useful for monitoring 10 GigE traffic with Gigabit tools)
- Reduces monitoring deployment costs by leveraging legacy Gigabit monitoring tools across new 10 GigE network infrastructure
- Reduces load/processing requirement on any one monitoring tool by balancing the traffic across multiple tools
- Enables full tool and load balancing group redundancy

VSS Monitoring's Load Balancing feature distributes traffic across multiple monitor ports, effectively summing the bandwidth of the load balanced ports. Up to eight monitor ports can be configured to output traffic as a single logical pipe, with their output approximately evenly distributed throughout the load balanced group.

Output from the load balanced group is designed to maintain packet order within any given conversation (any single data stream between point A and point B), as well as to guarantee a consistent output port for any single conversation. This ensures that a packet sniffer or other monitoring tool will see every packet of a given conversation.

Session-based/Flow-aware Load balancing is performed using 'flow association'. The system maintains the association of packets with each flow or conversation between any two network endpoints (for example, a PC and web server), such that all traffic from a given flow will be output from a consistent monitor port within a load balanced group. Different flows are distributed to different ports within the group, effectively balancing the traffic across all ports of the load balanced group.

Flow association is done by examining selected fields within each packet and performing a mathematical algorithm to consistently separate and distribute traffic to specific ports within a load balanced group. Users can configure a load balanced port group to use any of the following combinations of packet fields for flow association.

Ten Base Load Balancing criteria:

- MAC destination address, Ethernet Type (EType) and network port number*
- MAC source address, Ethernet Type and network port number*
- MAC destination and source address, Ethernet Type and network port number*
- IP destination address
- IP source address
- IP destination and source addresses

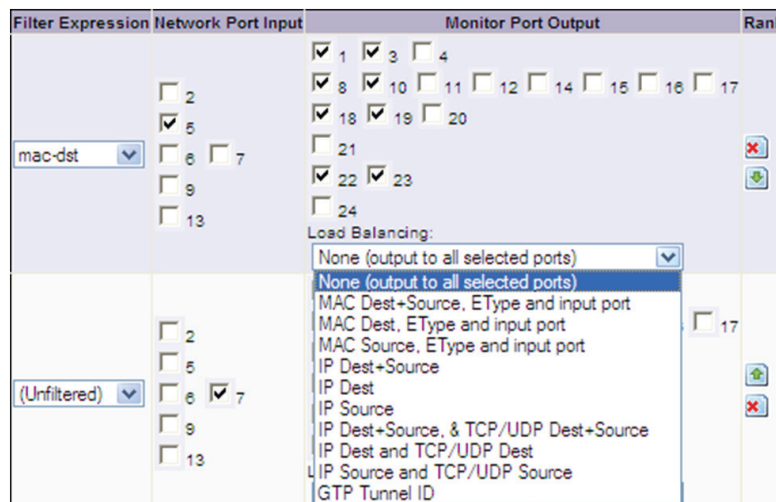


Figure 1. GUI screen capture displaying load balancing within the Filter and Monitoring Output Settings
 (1) VSS distinguishes between load balancing & filtering as separate yet complementary processes that can be applied independently or together as needed by the user depending on the monitoring application.

- IP destination address, and TCP/UDP destination port number
- IP source address, and TCP/UDP source port number
- IP destination and source addresses, and TCP/UDP destination and source port numbers
- GTP Tunnel Endpoint ID (TEID)

** MAC-based load balancing can also take into account the input port that the packet entered the tap at. This is user-selectable.*

Twelve Extended Load Balancing criteria:

- GTP inner IP destination
- GTP inner IP destination and source
- GTP inner IP source
- GTP inner IP and TCP/UDP/SCTP destination
- GTP inner IP and TCP/UDP/SCTP destination and source
- GTP inner IP and TCP/UDP/SCTP source
- MPLS inner IP destination
- MPLS inner IP destination and source
- MPLS inner IP source
- MPLS inner IP and TCP/UDP/SCTP destination
- MPLS inner IP and TCP/UDP/SCTP destination and source
- MPLS inner IP and TCP/UDP/SCTP source

Groups

Load balancing groups provide a structured method for defining one or more load balancing groups of ports and how these load balance groups behave when one or more tools or ports go down/ become unavailable. A load balancing group may be any size from 1 to 8 ports.

The available actions that can be selected are:

A: Re-balance the load equally among the remaining online ports, where the sessions on all ports might move, but the most even session-based balance will be achieved.

B: Distribute the offline ports' sessions among the remaining online ports, where the online ports' sessions will remain directed to the same ports and only the sessions from the offline ports will be rebalanced across the remaining online ports.

C: Do not re-balance or re-distribute, where the offline ports' sessions are dropped and the online ports' sessions remain directed to the same ports.

D: Move all traffic / all sessions to an alternate Load Balancing group. The alternative group is user defined and selectable. If the same number of ports exist in the alternative load balancing group as the original, the balancing will maintain the same spread of sessions.

E: Move each offline port's sessions only to a fail-over port from an alternative Load balancing group. The alternative group is user defined and selectable. The balancing of sessions will be maintained across the group.

F: Move only the offline ports' sessions to direct pass-through *

G: Move all sessions/traffic to direct pass-through *

H: Move all sessions/all traffic to block/drop *

** F, G, and H selections are only available on Protector series products.*

Application

When applying Load Balancing (see Figure 2), it is important to understand that:

- Copied network traffic can be spread in real time across multiple monitor ports (e.g. 10 GigE to 1 GigE)
- Network traffic sessions are preserved for proper data correlation and analysis
- Traffic is evenly distributed from selected filtered criteria (or unfiltered or unmatched)

For most applications, it is recommended that load balanced groups be configured to the IP destination and source address, and TCP/UDP destination and source port number option, as it provides the greatest probability of even distribution across all load balanced ports. The other options are suitable for unusual applications or for advanced users who understand flow identification and how it applies to their network.

Considerations

Whilst Load Balancing provides a more controlled and even distribution of traffic across monitor ports, there are some items that should be considered when planning and dimensioning your monitoring access network:

- Load is distributed based on dividing the filtered or unfiltered traffic into eight buckets, regardless of how many monitor ports are in the monitor group. This means that to obtain as close to even distribution of traffic as possible, the number of ports in a monitor group must be either 2, 4, or 8.
- There is no certainty that traffic from different source addresses or sessions will have the same or equivalent volumes. Therefore, in situations where the volume of traffic is not even across sources or sessions, then the load distribution is unlikely to be even across the monitor ports.

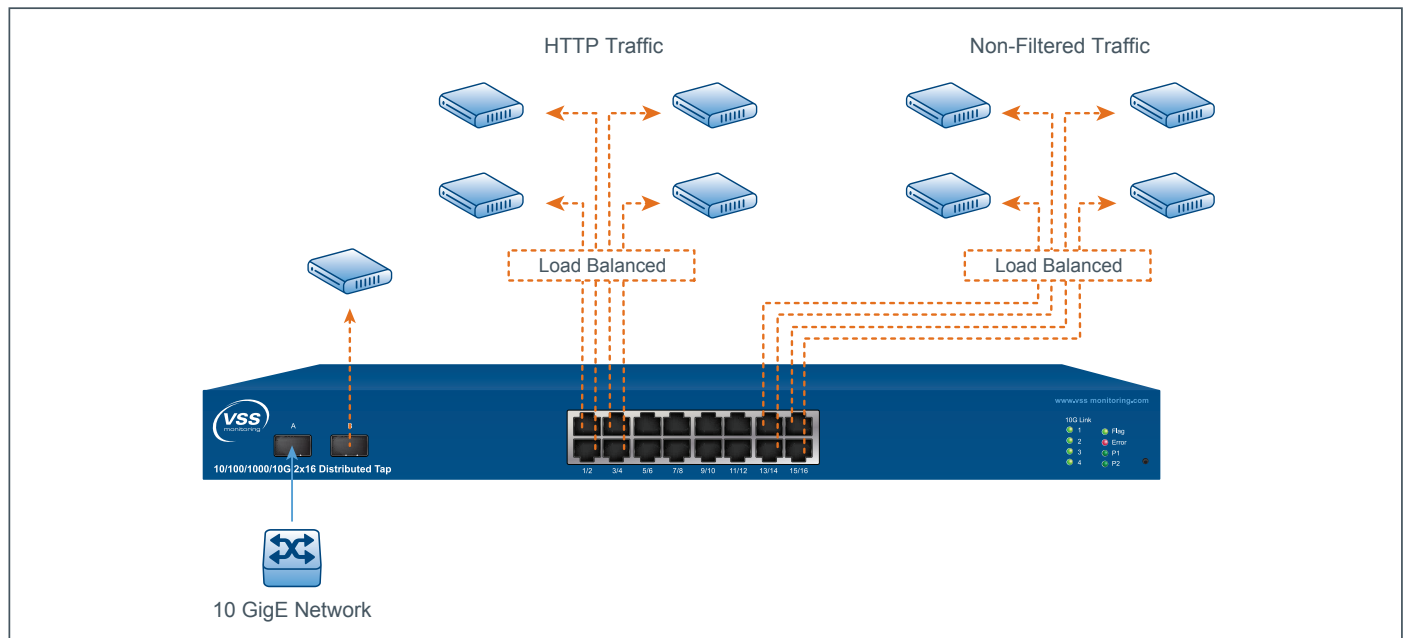


Figure 2. Diagram depicts a sample of session-based/flow-aware load balancing application for monitor groups



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