APPLICATION NOTE

NetStack

Robust filtering, aggregation, replication, and more – the gold standard baseline for visibility

KEYSIGHT

A Robust Foundation

We offer a robust set of standard features with its industry leading network packet brokers. We provide three stages of filtering to optimize port usage and physical design; next, we added a dynamic filter compiler that sorts complex logic and we do it all through our known, easy-to-use web interface to save administrators time and prevent error. Then we added core traffic filtering features: aggregation, replication and tagging. To top it off, we layer on features others charge for or don't even offer – load balancing and the ability to double your ports. All this as the foundational set of capabilities.

Easy to use Interface

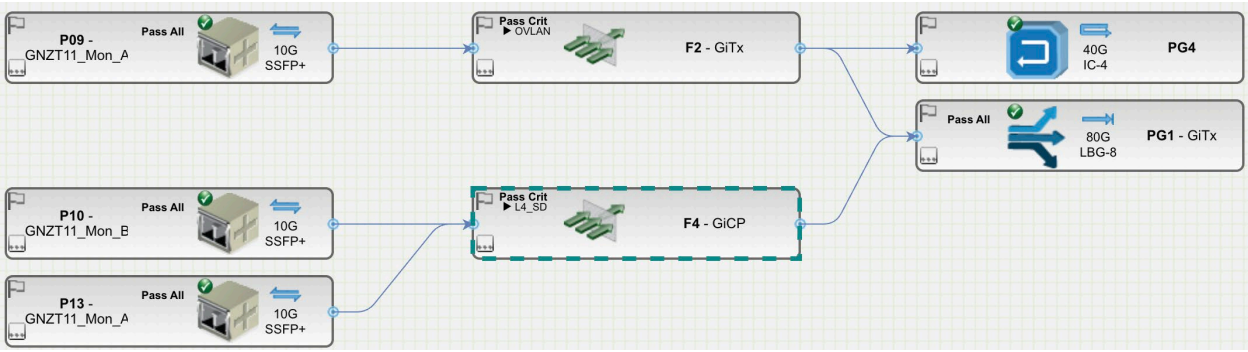
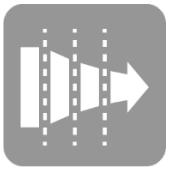
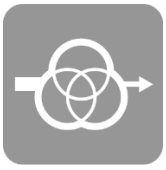
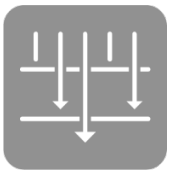
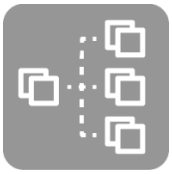


Figure 1. Network Packet Broker User Interface

NetStack Features Overview

Feature	Function
Three Stages of Filtering 	Network packet brokers allow traffic management through filtering traffic based on select criteria and forwarding only traffic of interest to meet tool needs. We offer three stages of filtering for more effective, efficient filtering, with less error. Three stages of filtering allow the building of complex rules, without nested statements, or loss of ports through looping traffic back.
Intersection Mode Filtering 	Intersection Mode is based on our patented Dynamic Filter Compiler technology which allows overlap rules to be resolved seamlessly behind the scenes. This makes configuration easy when tools, rules, or both are changing on the fly. Intersection mode is ideal for out-of-band monitoring where portions of traffic may need to be monitored by multiple tools, ensuring that no blind spots develop, and visibility is complete.
Priority Based Filtering (PBF) 	PBF allocates a priority to each rule in the filter list. Traffic is matched strictly based on the condition and priority of each rule, like access control list (ACL) rule matching. PBF is ideal for inline traffic filtering where duplicates are harmful. With PBF, complex inline filtering requirements are made simple, and duplication is guaranteed not to occur.
Dynamic Filter Compiler 	Allowing the simplest configuration for complex filtering logic, our patented dynamic filter compiler resolves rule overlaps seamlessly behind the scenes, so tools receive the right traffic even with complex logic and heavy overlaps. Blind spots are easily created with traditional packet brokers that are strictly based on priority to perform traffic filtering. With the dynamic filter compiler capability, our packet brokers are extremely agile and allow changes on the fly. Time to configure is orders of magnitude less than with competitive products.
Aggregation 	Easily combine data from multiple sources to forward to a single tool for analysis. • Assess network performance by tracking a packet and latency through multiple links • Combine traffic to higher throughput when tools are capable of greater bandwidth – without worrying about traffic bursts with PacketStack Burst Protection • Support 1:1, Many:1 and many:many traffic streams when combined with replication

Replication



Be more efficient with ports and your time. We allow for replication at the ingress port as well as at the dynamic filter. Replication at the ingress allows the application of multiple dynamic filters to the same traffic stream. Replication at the dynamic filtering allows multiple tools to be connected to a given dynamic filter so the same traffic is sent to multiple tools. You don't have to setup complex logic or loop back.

- Save ports and rack space by replicating traffic to multiple tools
- Support 1:1, 1:many and many:many traffic streams when combined with aggregation

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Load Balancing

Don’t overload a single tool or duplicate setup. Easily distribute traffic according to mathematic algorithms to tools in a tool group. Supports session stickiness so the same TCP conversation are directed to the same tool.

Source Port Labeling (VLan Tagging)

Track packets easily by adding VLAN IDs to packets based on the source (ingress) port and remove them as they leave a packet broker via exit (egress) ports.

- Makes it easy to know where your data is coming from and where it goes.
- Uses VLAN tagging and stripping to differentiate packets from different network links. This is critical for inline tool sharing.

Native Tunneling

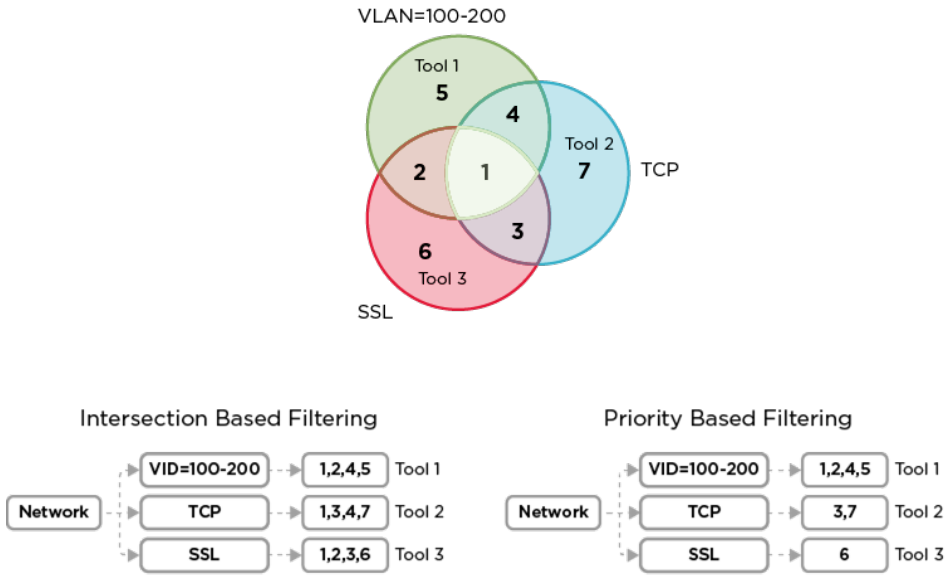
Support native tunnel origination and termination for L2GRE and VxLAN protocols. Each port can have a unique IP address for ARP/PING.

Packet Capture

Allow line rate capture up to 1000 packets for Tool Port/Group, Network Port, Interconnect Port, Loopback Port. Up to 50MB storage space. Capture file is saved in .pcap format with timestamp as part of the name and downloadable on demand.

Intersection mode filtering and priority based filtering

- Intersection Mode is based on our patented Dynamic Filter Compiler technology which allows overlap rules to be resolved seamlessly behind the scenes.
- This makes configuration easy when tools, rules, or both are changing on the fly. Intersection mode is ideal for out-of-band monitoring where portions of traffic may need to be monitored by multiple tools, ensuring that no blind spots develop, and visibility is complete.



Example: how intersection mode made filtering easy and ensure all tools get all needed traffic while similar setup using priority mode would cause blind spots for Tool 2 (missing 1,4) and Tool 3 (missing 1,2,3)

No.	Criteria	Action
0	VLAN 3 + TCP	Tool 1, 2, & 3
1	VLAN 1–3 + TCP	Tool 1 & 2
2	VLAN 4–6 + TCP	Tool 2 & 3
3	VLAN 3	Tool 1 & 3
4	VLAN 1–2	Tool 1
5	VLAN 4–6	Tool 3
6	TCP	Tool 2
7	Null	Drop

Figure 1. Example1- the right way to use priority filtering mode – complexity goes exponential when the number of rules or ports increase

Three stages of filtering

- Network packet brokers allow traffic management through filtering traffic based on select criteria and forwarding only traffic of interest to meet tool needs.
- We offer three stages of filtering for more effective, efficient filtering, with less error.
- Three stages of filtering allow the building of complex rules, without nested statements, or loss of ports through looping traffic back.

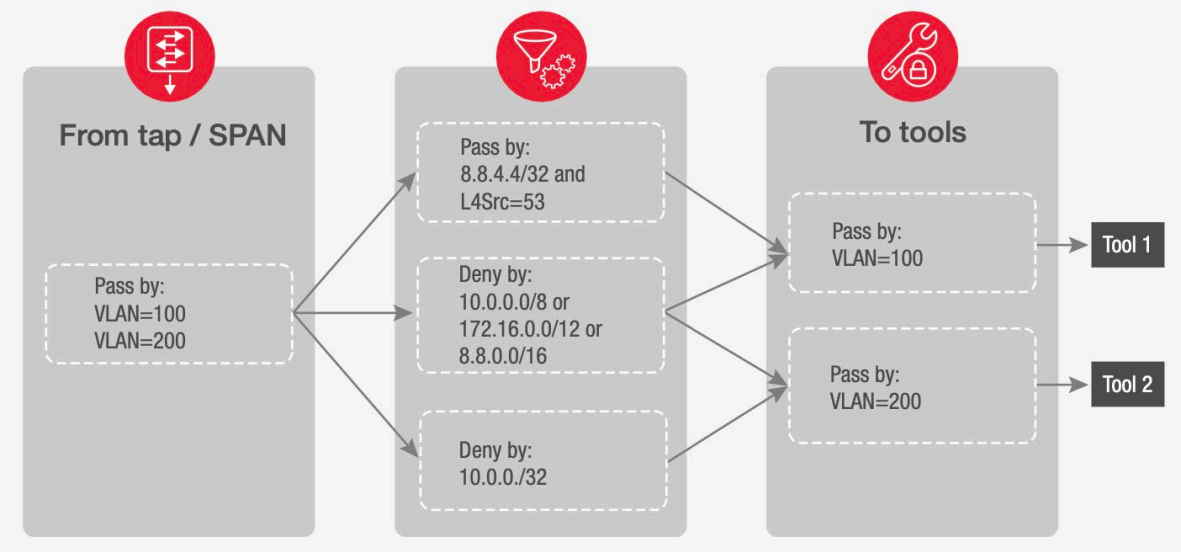
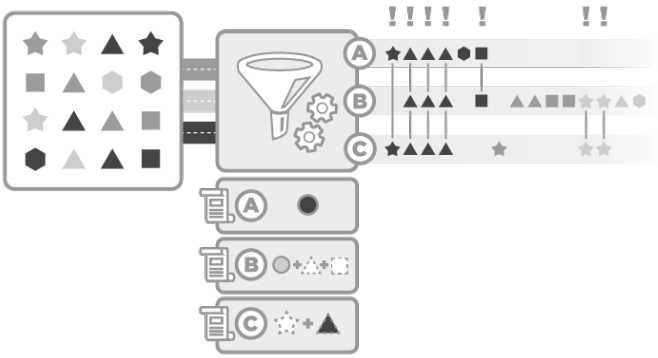


Figure 2. Example2 - how 3-stage filtering can meet complex filtering logic without burning loopback ports

Dynamic filter compiler

- Allowing the simplest configuration for complex filtering logic, our patented dynamic filter compiler resolves rule overlaps seamlessly behind the scenes, so tools receive the right traffic even with complex logic and heavy overlaps.
- Blind spots are easily created with traditional packet brokers that are strictly based on priority to perform traffic filtering. With the dynamic filter compiler capability, our packet brokers are extremely agile and allow changes on the fly.
- Time to configure is orders of magnitude less than with competitive products.

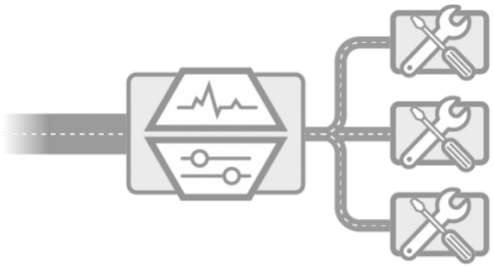
Dynamic filter compiler



Load balancing

- Don’t overload a single tool or duplicate setup.
- Easily distribute traffic according to mathematic algorithms to tools in a tool group.
- Supports session stickiness so the same TCP conversation are directed to the same tool.
- Supports algorithms include: session aware, asymmetric, weighted, random (selected platforms)

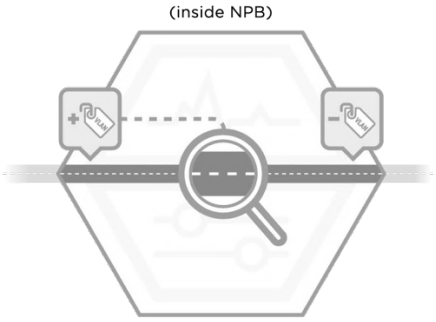
Load Balancing



Source port labeling (VLan tagging)

- Track packets easily by adding VLAN IDs to packets based on the source (ingress) port and remove them as they leave a packet broker via exit (egress) ports.
- Makes it easy to know where your data is coming from and where it goes.
- Uses VLAN tagging and stripping to differentiate packets from different network links. This is critical for inline tool sharing.

Source Port Labeling



Aggregation and replication

- Easily combine data from multiple sources to forward to a single tool for analysis.
- Combine traffic to higher throughput when tools are capable of greater bandwidth – without worrying about traffic bursts with PacketStack Burst Protection
- Support 1:1, Many:1 and many:many traffic streams when combined with replication

Aggregation

Replication

Inline tool deployment and Inline HA (high availability)

Inline security tools must monitor production network links to detect and defeat, for example, distributed denial-of-service (DDoS) attacks or malware in real time. Inline tool deployment brings a new set of requirements for both the bypass switch (the access device) and the NPB. When the number of security tools is small, the tool can be attached to the bypass switch directly. However, when there are many security tools, NPBs used in conjunction with a bypass switch offer full design flexibility and the reliability and resiliency necessary for inline tool deployments.

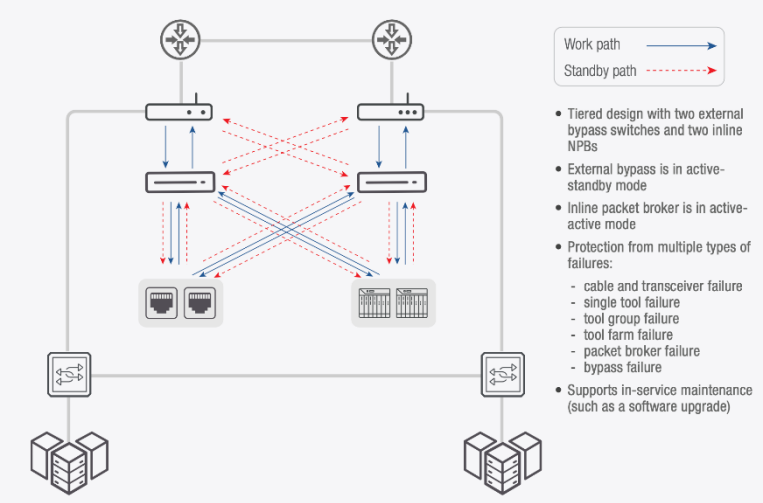


Figure 3. Example - deployment of inline security tools with Bypass and NPB. Tools sharing among multiple network segments.

To maximize reliability and resiliency, Keysight offers a high-availability architecture that allows for graceful tool maintenance and software or hardware upgrades. More importantly, it provides failover protection against all types of failures, including cable cuts, transceiver malfunction, inline tool breakdown, and NPB loss of power.

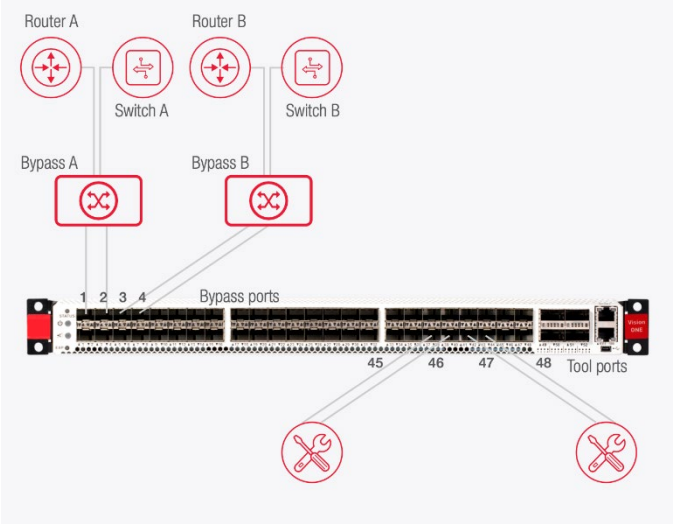


Figure 4. Example - Keysight Inline HA Architecture to Provide the Highest Availability and Resilience

See How We Stack Up!

Keysight offers an extensive set of visibility intelligence feature stacks so you can get the most out of your visibility and security platform – our capabilities allow filtering based on L2 through L7. Moreover, we provide industry-specific, specialized capabilities. Each stack of features is executed with a purpose-built design to ensure you get the best performance whether in a physical data-center or a private, hybrid or public cloud.

Find Your Platform

Stacks		
NetStack		Robust filtering, aggregation, replication, and more… Learn more: NetStack Software Suite | Keysight
PacketStack		Intelligent packet filtering, manipulation, and transport Learn more: PacketStack Software Suite | Keysight
AppStack		Context aware, signature-based application layer filtering Learn more: AppStack Software Suite | Keysight
SecureStack		Optimized handling for secure traffic Learn more: SecureStack Software Suite | Keysight
MobileStack		Visibility intelligence tailored for the mobile carrier evolved packet core Learn more: MobileStack Software Suite | Keysight
TradeStack		Market feed data management Learn more: TradeStack Software Suite | Keysight

Support

Keysight's Visibility industry-best products are backed by our industry-leading expertise. Our comprehensive product support does more than ensure uptime – it ensures a competitive edge. The Keysight support team partners with customers to:

- Avoid downtime and keep schedules on track
- Implement according to industry specifications
- Develop best practices to meet individual needs and objectives
- Maximize efficiency and reduce operating expenses
- Protect and maximize investments in test and visibility

In addition to above, Keysight customers registering for the secure area and access to the Support Site will also be able to view and download our product Security Advisories.

Access Keysight Visibility Support

About Keysight Visibility

Connect and secure the world with dynamic network intelligence

The need for always-on networks is pervasive, and expectations are high when it comes to keeping them connected and secure. As technologies advance, edge computing, cloud environments, sophisticated security threats, increasing bandwidth requirements, and demanding compliance regulations make it challenging to extract actionable insight from your network.

Keysight can help. Customers rely on our solutions to deliver rich data about network traffic, applications, and users across any networking environment. This deep insight is what we call dynamic network intelligence. It helps you continuously innovate, meet aggressive service level agreements, and keep applications running smoothly and securely.

Learn more about Keysight Visibility Solutions