

Visibility in the Modern Data Center with Brocade SLX Insight Architecture

HIGHLIGHTS

- Enables real-time network monitoring and troubleshooting through a dedicated visibility architecture embedded in every Brocade SLX device
- Supports dynamic flow identification, intelligent pre-processing, and flexible data streaming capabilities to dramatically improve network operations and reduce operational costs
- Provides an open guest VM in a KVM environment to run third-party applications on the platform for improved operational efficiency, monitoring, and troubleshooting
- Features a dedicated internal analytics path for monitored traffic, eliminating disruption to production traffic while increasing performance for monitoring and analytics
- Delivers flexible, high-performance data streaming options through in-band ports or an out-of-band services port for additional off-device processing, reporting, and archiving
- Provides an industry-leading 256 GB of dedicated on-device storage for analytics

Embedded Network Visibility for Pervasive Real-Time Monitoring

As organizations continue to transform their business and adapt to new digital workloads, IT operations teams struggle to keep pace with the volume and variety of digital data going across their networks. Visibility is critical, and in order to meet customer and end-user service and application expectations and remain competitive, organizations need to provide service and application assurance, improve operational efficiencies, and enable new monetization opportunities. They need comprehensive visibility into the operational state of the network and into the traffic that is transiting the network without compromising day-to-day operations and performance.

The Visibility Challenge

Network devices such as routers and switches that are not designed to provide clear and comprehensive network visibility can limit the ability to quickly, flexibly, and cost-effectively extract the data organizations require to meet SLAs, improve monetization, and increase operational efficiency as they digitally transform and need to support increasingly diverse applications and services and streamline operations.

Existing approaches to network visibility are often limited to the capabilities provided by the vendor and embedded in the router or switch operating system, or through separate devices connected via physical taps or span ports to monitor the router or switch. The first approach limits the organization to a finite set of tasks

and without the ability to tailor visibility capabilities to their specific environment or operational model. Additionally, they utilize the same internal resources in the router or switch that are used by the control and/or forwarding functions of the device, potentially causing a tradeoff in day-to-day network functionality or visibility.

There are many popular software tools for monitoring and troubleshooting networks that can be deployed on devices that are manually connected to a router or switch being monitored. Aside from additional cost and operational complexity, this approach does not provide a real-time, comprehensive, and holistic understanding of the network—making it challenging to easily address diverse and dynamic operational needs from troubleshooting problems for service

INSIGHT WITHOUT COMPROMISE

Gain unparalleled insight into the network through pervasive low-latency capture of real-time visibility traffic with no impact to performance or reliability of the network data plane or control plane.

Brocade SLX Insight Architecture Benefits

A key benefit of the Brocade SLX Insight Architecture is to enable organizations to deploy high-performance and flexible visibility applications via dedicated resources on the platform, including:

- *Dedicated internal and external bandwidth that allows applications running in the open KVM environment to extract data without disrupting forwarding or control plane traffic and to deliver the captured data to analytics applications off the platform*
- *Industry-standard x86 CPUs with open KVM environment*
- *Dedicated flash memory*

assurance to monitoring specific user traffic for tiered services to better enabling automation of operations.

The key challenge is getting the right data packets when they are needed. In one case, there is a limitation to what the routers and switches can show in terms of level or comprehensiveness based on the vendor capabilities provided, while in the other there is a limitation in getting the right data dependent on the location of taps and external packet capture devices. These limitations and challenges can lead to inadequate visibility, increased operational complexity, cost and time and potentially impact network performance.

The need in modern infrastructure for the digital era is for a highly flexible, pervasive, real-time visibility capability that does not impact network performance and operations. The visibility approach must be able to be deployed on an organization's

own terms with capabilities tuned to the needs of their business and IT operations delivering the right data in the way in which they need it. The visibility solution must also provide this capability pervasively and in real-time to deliver all the data when it is needed. And the visibility solution must do so with minimal additional cost, operational complexity, or impact to the performance and primary function of the network. Embedding a purpose-built, dedicated visibility architecture within the router or switch and combining both software and hardware innovation provides a superior solution to these needs.

Embedded Visibility Solution

The Brocade® SLX Insight Architecture™ delivers a new approach to network monitoring and troubleshooting that makes it faster, easier, and more cost-effective to get the comprehensive, real-time visibility needed for network operations and automation. This unique architecture is designed from the ground up leveraging an innovative combination of Brocade SLX-OS software and Brocade SLX platform hardware features to provide organizations unparalleled visibility into what is happening in their network, all without impacting normal network operation or performance.

This flexible and open solution enables organizations to deploy their choice of third-party or custom monitoring and troubleshooting applications, tools and utilities directly in the network, providing real-time visibility and tuned to meet their specific business and operational needs pervasively across the network. This enables them to better monitor and troubleshoot the network for improved service and application assurance, as well as dramatically reduce operational impact and cost.

Brocade SLX Insight Architecture Components

The Brocade SLX Insight Architecture is designed to enable organizations to deploy high-performance and flexible visibility applications pervasively throughout their network for improved monitoring and troubleshooting. By providing dedicated resources on the router or switch, organizations can gain unparalleled insight into the network through pervasive low-latency capture of real-time visibility traffic without impacting the normal control and forwarding of the network (see Figure 1).

Flexible Packet Filtering

The Brocade SLX Insight Architecture begins with flexible packet filtering in the packet processors for each interface. This provides a rich set of filters to select the exact type of traffic an organization wants to capture for visibility processing.

Open Guest VM

The architecture supports an open kernel-based virtual machine (KVM) environment to accommodate third-party and customer-specific applications that can consume and intelligently pre-process the network traffic captured from the router or switch interfaces. Enabled by the Brocade SLX-OS, this pre-configured KVM environment leverages high performance x86 CPUs to host these applications on every router or switch, extending visibility customized to the business and operational needs of the organization across the entire network. While the KVM environment is open, it is designed and ideally suited for networking applications, tools and utilities.

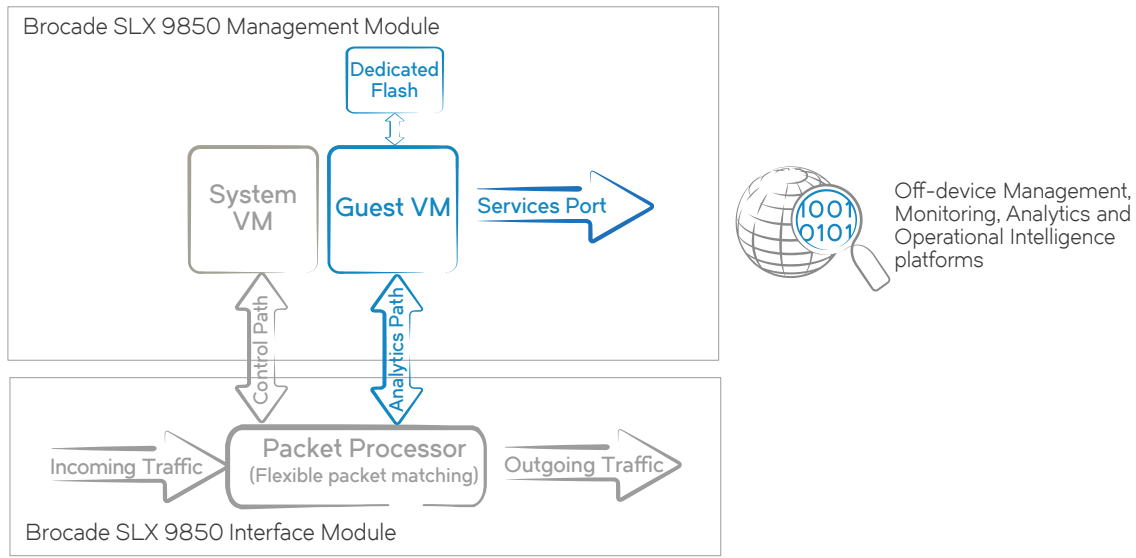


Figure 1: The Brocade SLX Insight Architecture in the Brocade SLX 9850 Router.

The Brocade SLX Insight Architecture open KVM environment supports several pretested and well-known packet capture applications, including Wireshark and tcpdump, and can be accessed via pretested RESTful utilities such as Chrome and Curl. There are a wide variety of additional applications, tools and utilities that organizations may choose to run in this environment, such as data analytics applications, packet generators, monitoring tools, troubleshooting utilities, and many others.

Internal Analytics Path

The architecture provides an innovative internal analytics path for transport of captured data packets between the packet processors on the Brocade SLX interfaces and the Brocade SLX Insight Architecture guest VM open KVM environment. This link provides applications running in the guest VM a dedicated resource for high performance packet capture without disrupting normal forwarding or control plane traffic of the network device.

Flexible Streaming

The Brocade SLX Insight Architecture provides flexible streaming options, enabling captured data to be delivered to applications off the platform for additional analysis, visualization and reporting, or logging and archiving. These options include a dedicated port for out-of-band streaming as well as streaming via any interface port.¹

Local Analytics Storage

The Brocade SLX Insight Architecture includes a provision for on-device storage dedicated to visibility applications running in the guest VM environment, providing real-time local capture for easy and fast access.

Brocade SLX 9850 Platform Innovation

The Brocade SLX 9850 delivers platform-specific innovation for the Brocade SLX Insight Architecture.

Guest VM

In Brocade SLX 9850 systems with dual management modules, the Brocade SLX Insight Architecture guest VM open KVM environment on the Active management module is independent of the open KVM environment on the Standby management module with each KVM environment able to run its own set of applications.

While the open KVM environment resides on the management module of the Brocade SLX 9850, the Brocade SLX-OS runs in a virtualized environment with the Brocade SLX 9850 guest VM distinct and isolated from the Brocade SLX 9850 system VM, which is also resident on the management module. The Brocade SLX 9850 operating system runs in the System VM, while the customer-specific monitoring and analytics applications of the Brocade Insight Architecture run in the guest VM open KVM environment.

¹The dedicated services port and in-band streaming are not supported in the current Brocade SLX-OS release.

BROCADE SLX INSIGHT ARCHITECTURE USE CASES

Key use cases for the Brocade SLX Insight Architecture fall into the general areas of monitoring and troubleshooting the network, and analyzing data.

Monitoring the Network

- Health of the device, CPU, and memory
- SLA monitoring for network parameters

Troubleshooting the Network

- Customized tools, apps, and scripts for troubleshooting
- Debugging for congestion, latency, and network performance issues
- Faster time-to-recovery

Analyzing Data

- All Packets (sniffer), for example, Splunk, Wireshark, Tcpdump
 - Sampled Packets, for example, sFlow-RT
 - DDoS attack detection and debugging
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By doing so, full isolation is provided between the switch VM and the guest VM with dedicated CPU, memory, and storage for each.

Analytics Path

All Brocade SLX 9850 interface modules support an internal 10 GbE link for transport of captured packets to the Brocade SLX 9850 management modules. This dedicated analytics path extends between the packet processor on the interface module and the guest VM open KVM environment on the management module supporting up to 10 Gbps of data consumption from the network by applications running in the guest VM. This dedicated link eliminates any disruption to internal control plane traffic to the interface module and guarantees dedicated bandwidth for captured traffic. Additionally, in Brocade SLX 9850 systems with redundant management modules, there is a 10 GbE path to each guest VM, providing in aggregate up to 20 Gbps of bandwidth between the forwarding interfaces and applications running in the two independent open KVM environments.

Dedicated Streaming

The Brocade SLX 9850 provides an innovative dedicated 10 GbE services port² on each management module supporting high performance out-of-band streaming of data from the guest VM off-device for additional processing, reporting, or archiving. Since each management module has this services port dedicated to the guest VM, there is in aggregate up to 20 Gbps of out-of-band data streaming available in Brocade SLX 9850 systems with redundant management modules.

Analytics Storage

The Brocade SLX 9850 provides an industry-leading 256 GB of dedicated on-device storage for analytics accessible by the guest VM enabling applications significant space to pre-process and optimize data locally before streaming to off-device monitoring, analytics, or automation platforms.

For more information, see the Brocade SLX 9850 Router product page on www.brocade.com.

² The dedicated services port is not enabled in the current release of Brocade SLX-OS.

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