BROADCOM

Product Brief

Emulex® SAN Manager

Simplify Management, Generate Compliance Reporting, and Remediate Network Performance Problems

Key Benefits

Monitor

- Simplifies storage area network (SAN) management by providing visibility into the configuration status of all host bus adapters (HBAs) across the SAN.
- Provides a dashboard highlighting critical SAN host data.
- Captures complete SAN HBA host inventory; host names; and OS, software, and firmware versions.
- Sends alerts and reports for critical issues.
- Provides optics health warnings.
- Provides health warnings for physical layer issues.
- Highlights encryption-capable ports with detailed connection status.

Manage

- Lowers operational costs and improves IT agility with exclusive new managed HBAs.
- Centralizes management of HBAs with in-band administration across the SAN.
- Configures the Adaptive Congestion Management feature.
- Exports on-screen data to spreadsheets or databases.

Adapt

- Collaborates with the fabric to automatically identify, minimize, or mitigate application performance problems through fabric notifications.
- Visualizes SAN congestion with a dashboard that presents congestion and bandwidth graphs.
- Mitigates congestion automatically via the Adaptive Congestion Management feature.

Overview

Information technology departments continue to grapple with network management issues. The key challenges are: 1) the ability to enable IT administrators to manage complex networks, 2) the capability to continually improve operational efficiency, and 3) the tools that provide actionable insights.

Emulex works closely with its enterprise customers, developing tools aimed at lowering the cost of management. Emulex® SAN Manager was developed as a result of this effort. Emulex SAN Manager is an easy-to-use Podman-based solution that dramatically reduces the operational cost and complexity of running a Fibre Channel SAN via the following:

- Visibility and access to endpoints across an A/B fabric.
- Centralized in-band access to managed HBAs.
- Alerting, scheduling and reporting for critical issues and compliance.
- A solution to performance problems with direct communication between Emulex HBAs and Brocade® fabric switches and directors.

The Emulex SAN Manager tool provides centralized HBA management in-band through the SAN. No Ethernet connection to individual servers is required, no agents are required on hosts, and no dedicated server is required.

Emulex SAN Manager is designed for the data center with email alerts and reports to provide IT administrators with actionable insights.

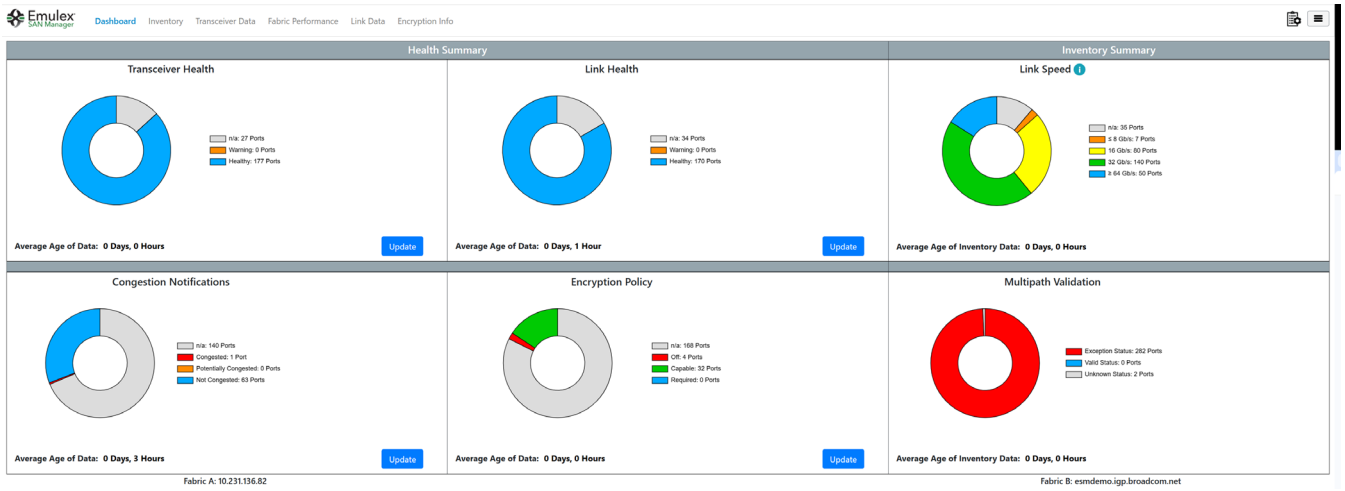
Monitor

Dashboard Feature

Emulex SAN Manager provides an overall view of Fabric Health enabling administrators to:

- Identify critical host issues on the fabric
- Click through to access detailed information
- Schedule updates and alerts for all critical data

Figure 1: Dashboard and Task Scheduler Tab



Task Scheduler

Port data for each table is updated with the frequency set below. To schedule a task, select "Activate Schedule".

Fabric A - 10.231.136.82

Inventory:
Days: 1
Hours: 0
Next run: 02/11/2025 11:22 AM
Activate Schedule
Alert
Full Report

Transceiver Data:
Days: 7
Hours: 0
Next run: 02/17/2025 05:02 AM
Activate Schedule
Alert
Full Report

Fabric Performance:
Days: 0
Hours: 1
Next run: 02/10/2025 12:06 PM
Activate Schedule
Alert

Link Data:
Days: 0
Hours: 1
Next run: 02/10/2025 12:06 PM
Activate Schedule
Alert

Encryption Info:
Days: 0
Hours: 1
Next run: 02/10/2025 12:06 PM
Activate Schedule
Alert

Defaults
Copy Fabric B

Fabric B - esmdemo.igp.broadcom.net

Inventory:
Days: 1
Hours: 0
Next run: 02/11/2025 09:01 AM
Activate Schedule
Alert
Full Report

Transceiver Data:
Days: 7
Hours: 0
Next run: 02/17/2025 09:01 AM
Activate Schedule
Alert
Full Report

Fabric Performance:
Days: 0
Hours: 4
Next run: 02/10/2025 12:03 PM
Activate Schedule
Alert

Link Data:
Days: 0
Hours: 1
Next run: 02/10/2025 12:04 PM
Activate Schedule
Alert

Encryption Info:
Days: 0
Hours: 1
Next run: 02/10/2025 12:04 PM
Activate Schedule
Alert

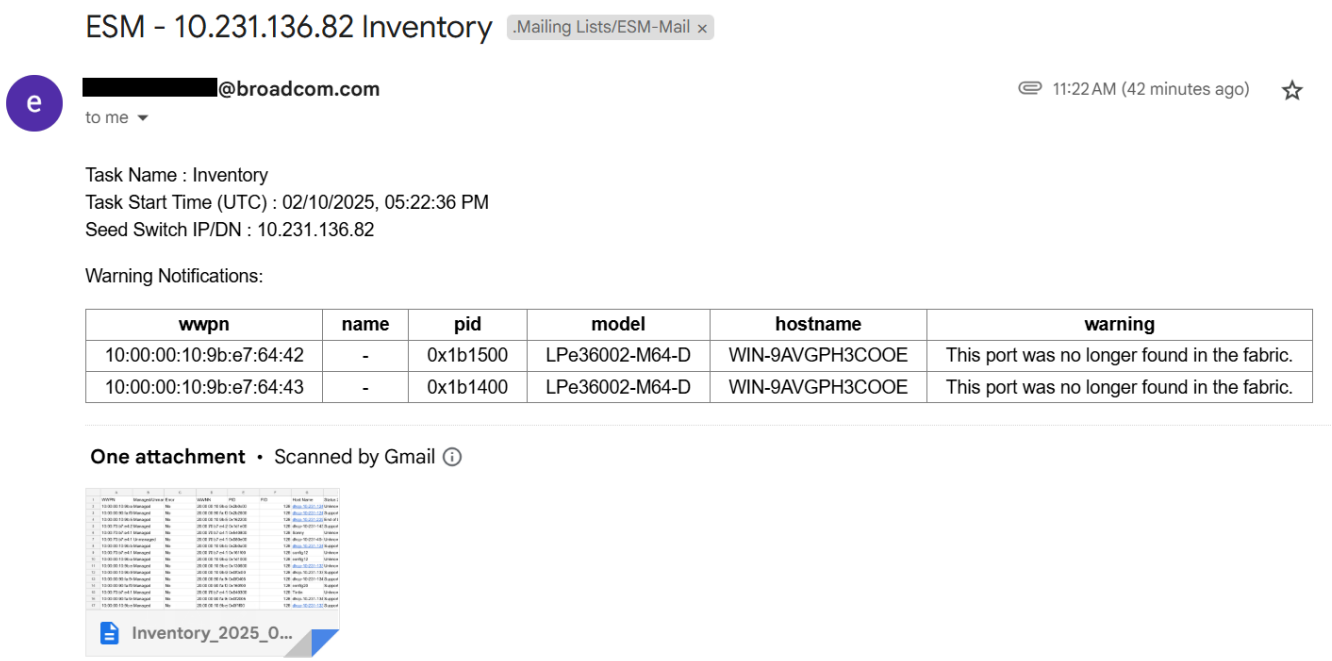
Defaults
Copy Fabric A

Multipath:
Days: 7
Hours: 0
Next run: mm/dd/yyyy --:-- --
Activate Schedule & Alert
Defaults

Note:
Next Run input is optional.
Please ensure future timestamps are set for all schedules before clicking Save.

Delete All
Save

Figure 2: Email Alert



ESM - 10.231.136.82 Inventory .Mailing Lists/ESM-Mail ×

e [redacted]@broadcom.com 11:22 AM (42 minutes ago)

to me

Task Name : Inventory
Task Start Time (UTC) : 02/10/2025, 05:22:36 PM
Seed Switch IP/DN : 10.231.136.82

Warning Notifications:

wwpn	name	pid	model	hostname	warning
10:00:00:10:9b:e7:64:42	-	0x1b1500	LPe36002-M64-D	WIN-9AVGPH3COOE	This port was no longer found in the fabric.
10:00:00:10:9b:e7:64:43	-	0x1b1400	LPe36002-M64-D	WIN-9AVGPH3COOE	This port was no longer found in the fabric.

One attachment • Scanned by Gmail

Inventory_2025_0...

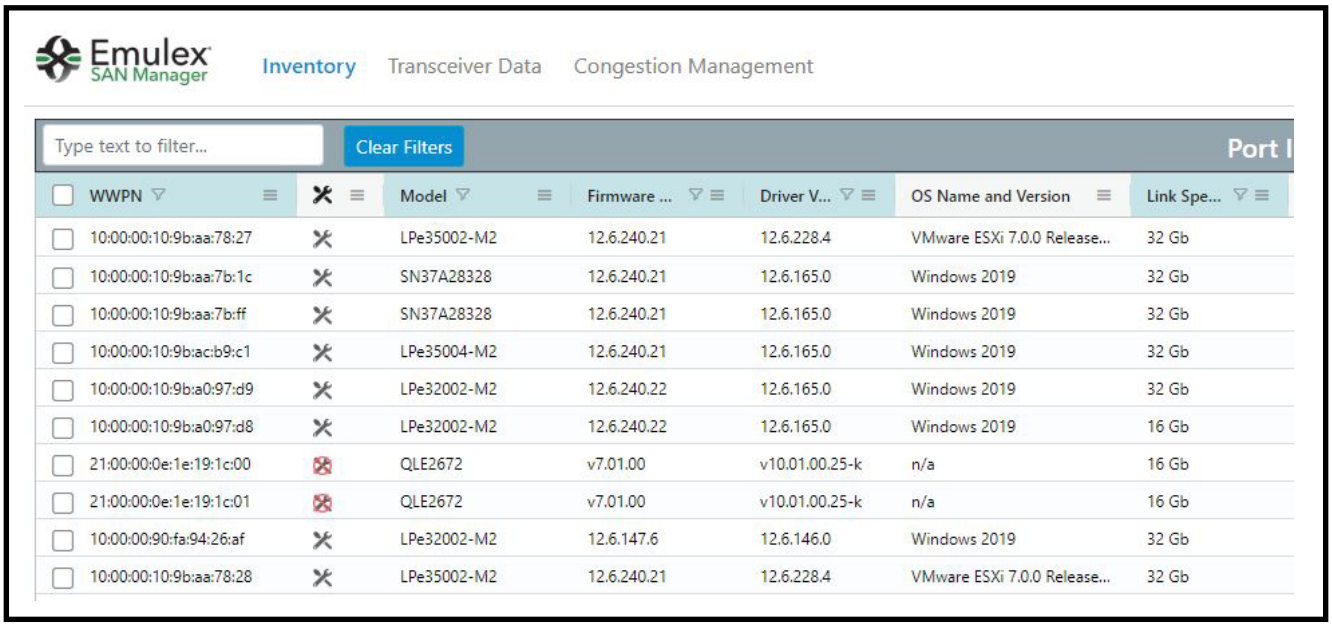
Inventory Feature

Emulex SAN Manager's centralized console provides visibility into all of the HBAs connected to the SAN so administrators can do the following:

- Identify driver-firmware mismatches in a single click.
- View and sort host HBA inventory details.
- Export information to a spreadsheet with a single click.

Emulex SAN Manager retrieves the following parameters from the SAN: WWPN, WWNN, PID, model, model description, vendor ID, serial number, firmware version, driver version, host name, OS name and version, fabric name, and link speed.

Figure 3: Inventory and Firmware/Driver Versions Tabs



Emulex SAN Manager | Inventory | Transceiver Data | Congestion Management

Type text to filter... | Clear Filters | Port I

WWPN		Model	Firmware ...	Driver V...	OS Name and Version	Link Spe...
10:00:00:10:9b:aa:78:27		LPe35002-M2	12.6.240.21	12.6.228.4	VMware ESXi 7.0.0 Release...	32 Gb
10:00:00:10:9b:aa:7b:1c		SN37A28328	12.6.240.21	12.6.165.0	Windows 2019	32 Gb
10:00:00:10:9b:aa:7b:ff		SN37A28328	12.6.240.21	12.6.165.0	Windows 2019	32 Gb
10:00:00:10:9b:ac:b9:c1		LPe35004-M2	12.6.240.21	12.6.165.0	Windows 2019	32 Gb
10:00:00:10:9b:a0:97:d9		LPe32002-M2	12.6.240.22	12.6.165.0	Windows 2019	32 Gb
10:00:00:10:9b:a0:97:d8		LPe32002-M2	12.6.240.22	12.6.165.0	Windows 2019	16 Gb
21:00:00:0e:1e:19:1c:00		QLE2672	v7.01.00	v10.01.00.25-k	n/a	16 Gb
21:00:00:0e:1e:19:1c:01		QLE2672	v7.01.00	v10.01.00.25-k	n/a	16 Gb
10:00:00:90:fa:94:26:af		LPe32002-M2	12.6.147.6	12.6.146.0	Windows 2019	32 Gb
10:00:00:10:9b:aa:78:28		LPe35002-M2	12.6.240.21	12.6.228.4	VMware ESXi 7.0.0 Release...	32 Gb

Emulex SAN Manager provides additional features that make it an ideal tool for managing large environments:

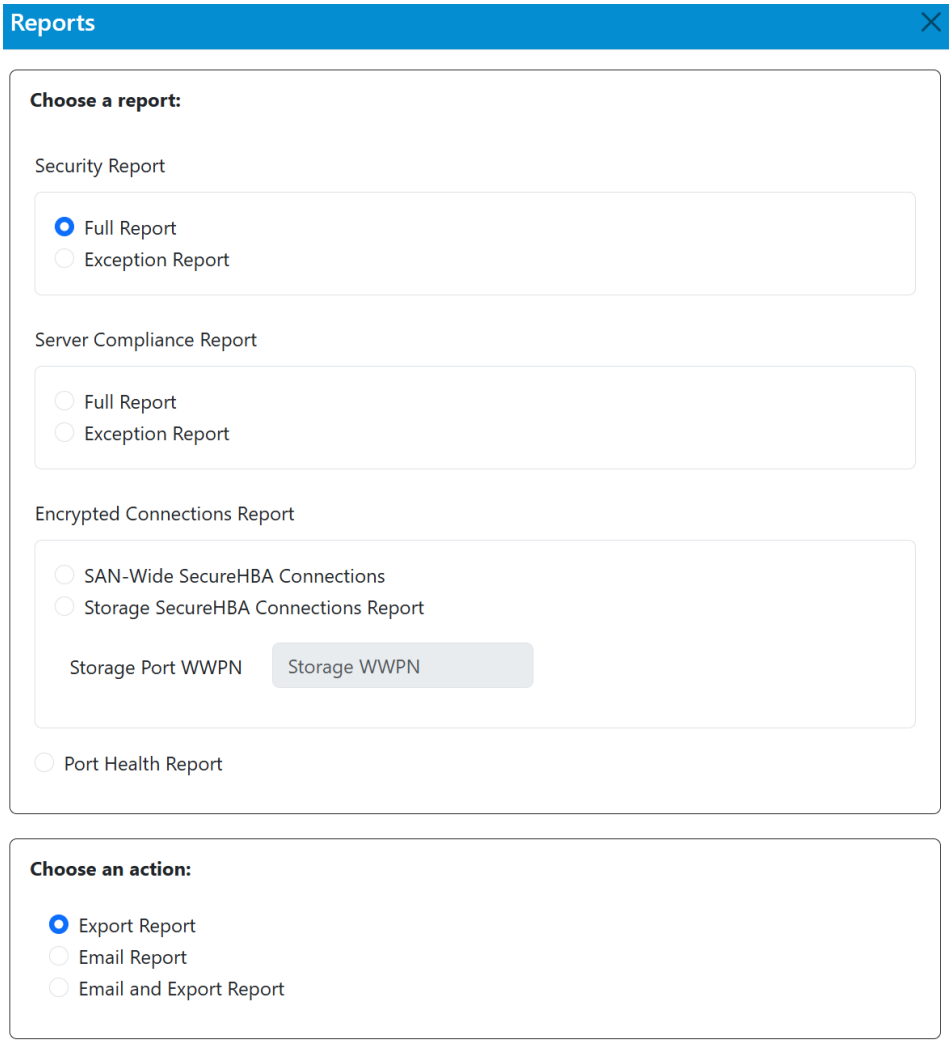
- Manage an A/B fabric in a single view.
- Multilevel filtering options allow administrators to quickly sift through the data and identify critical endpoints.
- The multipath validation tool allows SAN administrators to easily identify potential misconfiguration errors before taking a switch off-line for maintenance or upgrading. Supports A/B fabrics.

Compliance Reporting Feature

Emulex SAN Manager provides additional reporting features to assist with CNSA 2.0, and NIS2/DORA compliance. Reports can be generated with just a few clicks.

- Generate compliance reports
- Verify encrypted connections

Figure 4: Reports

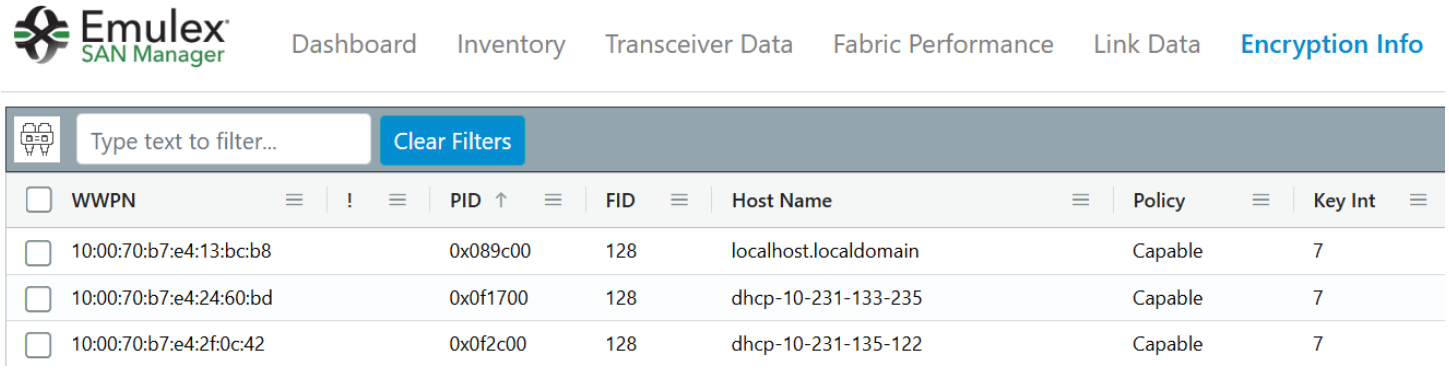


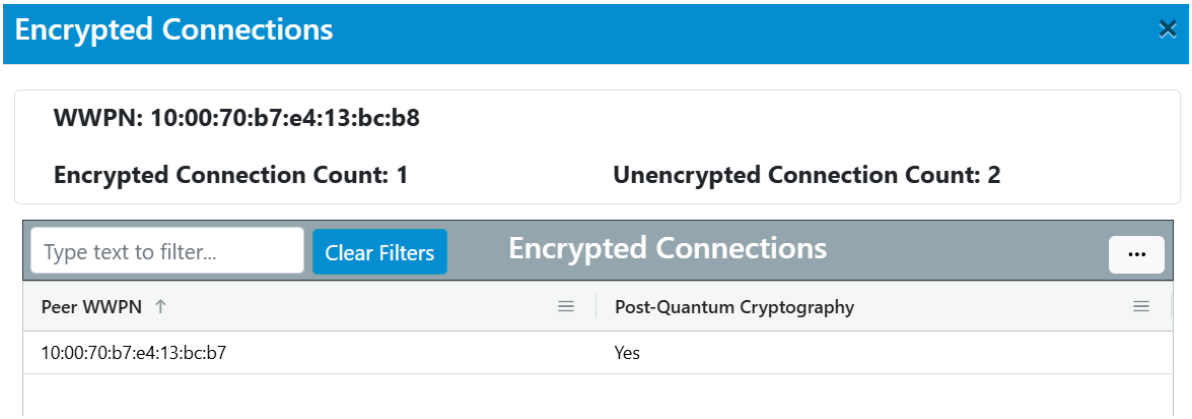
Manage

Encryption Feature

Emulex SAN Manager can identify all of the hosts with in-flight encryption capabilities. For those hosts, it will also identify all of the encrypted connections.

Figure 5: Encrypted Connection

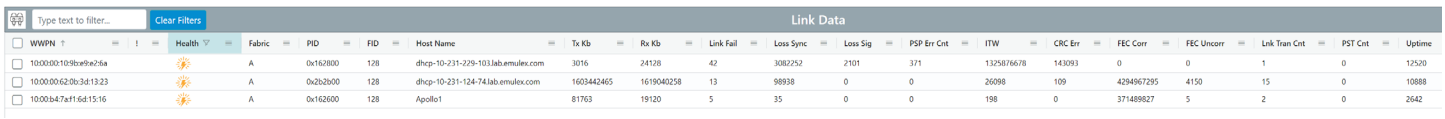




Centralized Link Health

Emulex SAN Manager enables administrators to easily identify links that have physical layer issues caused by faulty cabling or connectors.

Figure 6: ESM 2.0 Link Health



Centralized Optical Transceiver Health

Emulex Fibre Channel HBAs are recognized for their extreme reliability; however one of the most common causes for HBA downtime is optical transceiver failure. When managed HBAs are detected in the environment, Emulex SAN Manager communicates with them in-band across the SAN to retrieve a complete set of real-time HBA transceiver data and provide health warnings that can signal potential optical transceiver failures. This enables administrators to track and identify optical transceiver problems and mitigate them before the optical transceivers fail, ensuring maximum uptime and performance.

Figure 7: Optical Transceiver Health Alerts

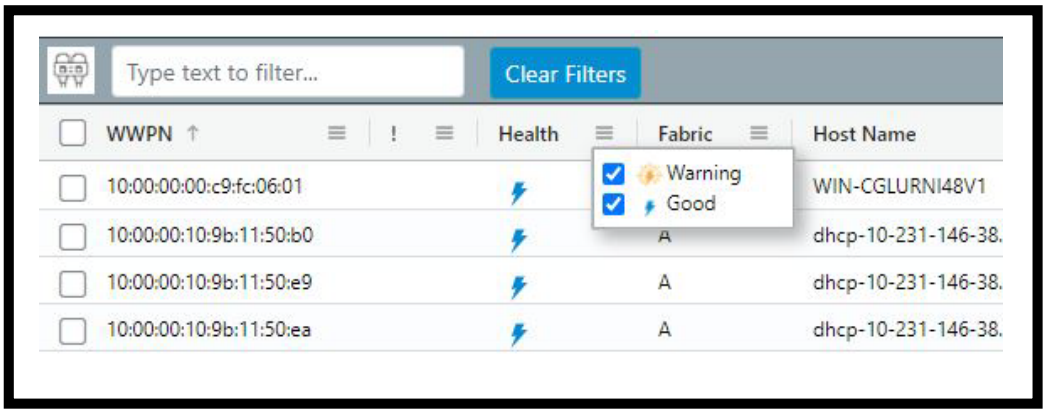


Figure 8: Transceiver History Graph

Centralized Fabric Performance Data

When new data-center infrastructure is deployed, administrators do a great job in right-sizing the server, HBA, Fibre Channel network, and storage to deliver the performance expected. Over time, some workloads outgrow the server that they are running on. This causes the server to ask for too much data from the storage system, more data than the server can ingest, which causes slow-drain or congestion problems in the fabric. This impacts both the overutilized server and other servers in the fabric, which can see their performance cut by half or more. The Congestion Management Dashboard identifies those congested host ports on the SAN. Adaptive Congestion Management, explained in the next section, addresses how these performance problems are mitigated. As seen in Figure 10, port congestion settings enable you to choose how to address congestion when it arises.

Managed HBAs can track bandwidth and I/O latency. As seen in Figure 9, Emulex SAN Manager displays the bandwidth and average response time for various time intervals. These graphs enable SAN administrators to track performance over time.

The Emulex SAN Manager also displays HBA queue depth settings, allowing SAN administrators to identify when HBAs may be misconfigured. HBA queue depths have historically been used to help mitigate congestion. Adaptive Congestion Management is an advanced method that uses real-time performance data.

Figure 9: Bandwidth/Average Response Time History

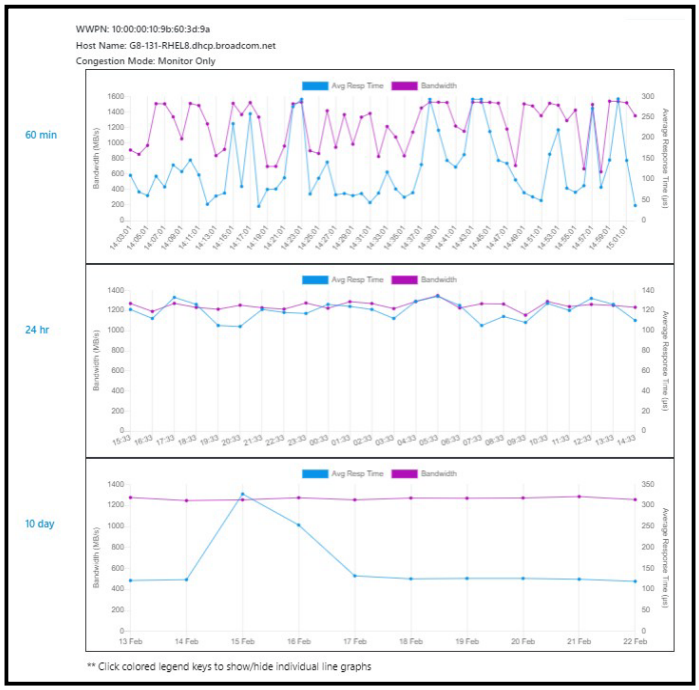


Figure 10: Port Congestion Settings

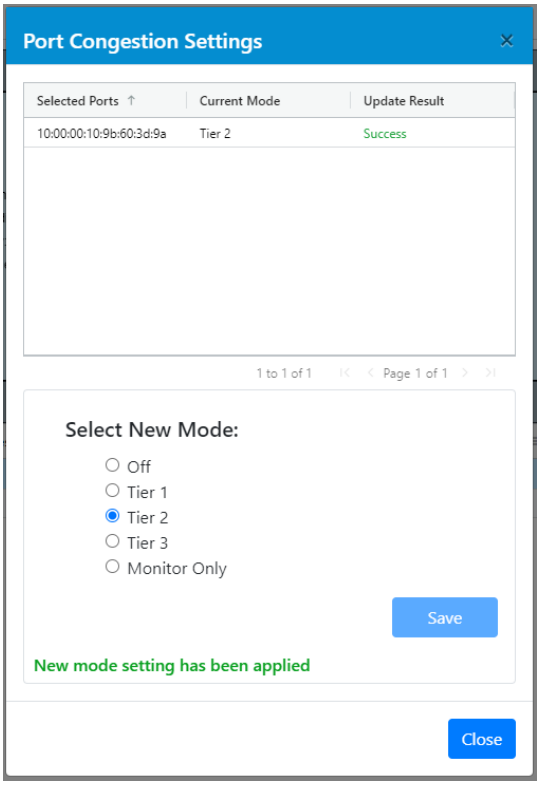


Table 1: Port Congestion Settings

Policy	Targeted Purpose
Monitor-only	Records HBA performance and congestion history for review.
Tier 1	Used for high-priority workloads; minimally impacts port performance to limit congestion.
Tier 2	Used for medium-priority workloads; moderately impacts port performance to balance congestion.
Tier 3	Used for low-priority workloads; aggressively impacts port performance to relieve congestion (minimize FPINs).

Adapt

Adaptive Congestion Management

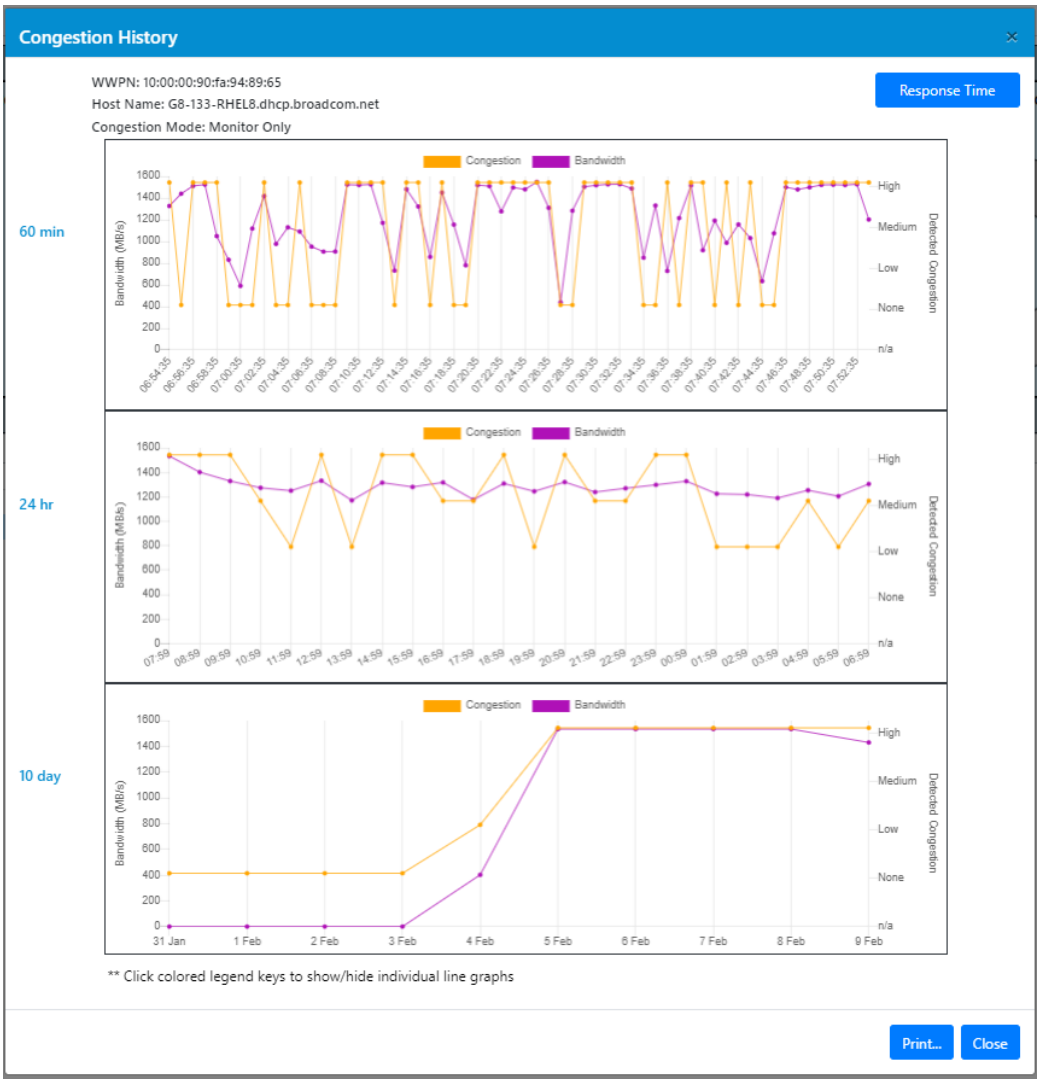
Emulex SAN Manager provides a unique capability that automatically addresses congestion monitoring, management, and remediation. The Adaptive Congestion Management feature enables the HBA to manage traffic in real time, matching the capabilities of the host. Emulex now supports Fabric Notifications, a new standard that enables the Brocade fabric and Emulex HBAs to collaborate and resolve performance issues in real time. Brocade fabrics notify the HBA in-band when a server is creating performance issues, and Emulex managed HBAs are able to resolve performance problems via Emulex Adaptive Congestion Management. The Emulex managed HBAs can be set to monitor and report the congestion, or they can be set by policy to remediate the congestion using a real-time adaptive algorithm.

Key features and benefits include the following:

- Performance monitoring: Provides real-time monitoring of the congestion state of a port.
- Port congestion settings: Provide policy-based settings to allow users to apply policies to endpoints to monitor or remediate congestion. By implementing policies, the hosts that are causing the performance issues can be managed, restoring optimal performance to the rest of the hosts across the SAN.

Emulex managed HBAs can be configured to monitor congestion, generating the graphs shown in Figure 11. These graphs show the congestion state of each port and the associated bandwidth. Table 1 lists the policy options available and provides guidance for policy selection.

Figure 11: Port Congestion History



Specifications

System Requirements for Emulex SAN Manager 3.0

Emulex SAN Manager is a light-weight Podman-based tool that can be installed on a bare-metal server or a VM. It does not require a dedicated server. The installation requirements include the following:

Server requirements:

- A bare-metal server, or
- A VMware® virtual machine, or
- A VM running on an Oracle VM VirtualBox version 6.0 or later
  Note: VirtualBox will be deprecated in a future release.
- A VM running on Microsoft Hyper-V version WS2019 or later

Minimum hardware requirements for a bare-metal system or a VM installation:

- Memory: 8 GB to run OS and ESM software.
- Hard drive: A minimum of 16 GB (includes OS and ESM Installation). The home directory of the Emulex SAN Manager administrator must be at least 6 GB.
- A NIC installed in the host server on which the Emulex SAN Manager will be connected to a TCP/IP network.
- Processor: Multicore.

Table 2: Managed HBA Support

Emulex Server HBA Model Number	Emulex HBA Firmware Version*	Operating System	Max # Servers/Ports Under Management	Seed Switch (One Required)	Emulex HBA Driver Version*
Gen 6 • LPe31000-series LPe32000-series Gen 7 • LPe38100-series SecureHBA • LPe37100-series SecureHBA • LPe35000-series • LPe36000-series OEM equivalent HBAs are also supported	Full support of all advanced features requires 14.2 or later	• Oracle UEK • RedHat • SUSE • VMware • Windows	30,000	Brocade switch with FOS 9.0	Full support of all advanced features requires 14.2 or later

**Refer to the ESM user guide for more details on firmware and driver version support by OS.*

For support, go to www.broadcom.com/support/emulex.

Software Licensing

To order an Emulex SAN Manager license, contact the Broadcom sales team and reference the following part number.

Part Number	Version	Number of Ports Supported	Details
ECD-ESM-EN1Y	Enterprise Edition	30,000	Emulex SAN Manager, Enterprise Product, 1 YR

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