

Scalability: Reducing downtime with enterprise-class HBA and CNA diagnostics and resolution capabilities

AT A GLANCE

The challenge of quickly pinpointing and resolving problems in large enterprise storage area networks (SAN) is a critical factor for SAN administrators and an important attribute of SAN scalability. Emulex LightPulse® Fibre Channel host bus adapters (HBAs) and Fibre Channel over Ethernet (FCoE) converged network adapters (CNAs) are designed to assist with troubleshooting and to minimize the impact of field upgrades. These are among the features that make Emulex LightPulse adapters the ideal foundation for a scalable SAN.

TECHNOLOGY

- Emulex LightPulse Fibre Channel HBAs
- Emulex LightPulse FCoE CNAs
- HBAnywhere®

APPLICATIONS

- Enterprise storage area networks

During SAN troubleshooting, the challenge is to quickly and accurately pinpoint the cause of a problem. This challenge only gets compounded as the SAN grows larger, with more storage devices, more connected servers and increasingly larger fabrics. The first requirement is to select an HBA or CNA that offers robust reliability measured by the inherent design, high MTBF (Mean Time Between Failures), as well as low defect rates. A scalable HBA/CNA solution must also provide the capabilities to quickly diagnose problems with not only the adapter itself but across the SAN. Additionally, a scalable HBA/CNA must be easily replaced when necessary.

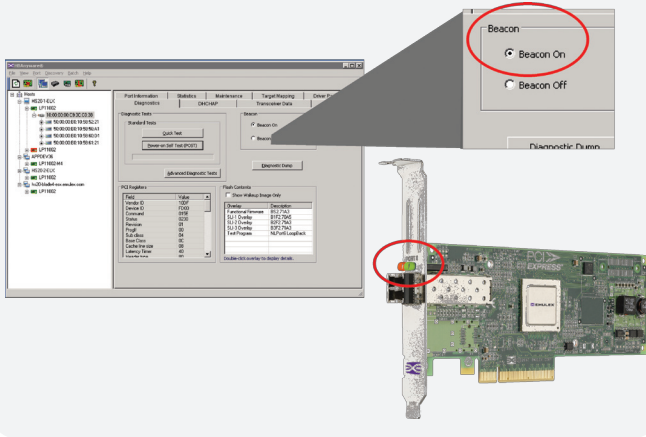
Emulex is the choice of more than ninety-five of the Fortune 100 for their mission critical applications. The diagnostic and troubleshooting features available exclusively with Emulex LightPulse HBAs, CNAs and management software are some of the key reasons why large-scale SAN enterprise customers choose Emulex.



Key features:

- ▶ **HBA/CNA beaconing**—Quickly and unequivocally identifying a specific adapter within large rack-mount server deployments can not only be challenging, but it exposes the SAN to human errors. The beaconing feature of Emulex LightPulse HBAs and CNAs removes this challenge and mitigates associated risks altogether by allowing the storage administrator to quickly identify any specific adapter that needs physical intervention.

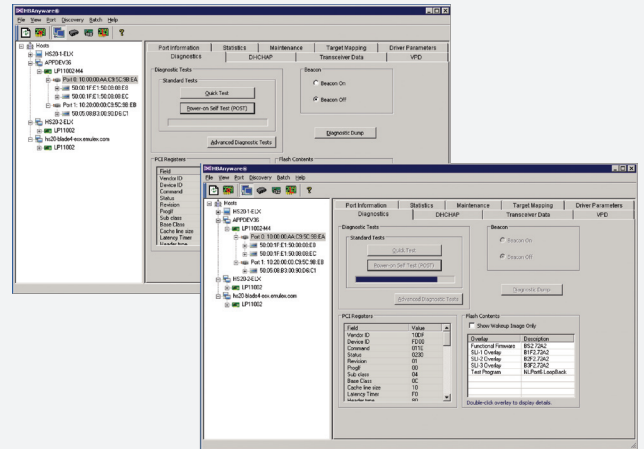
Figure 1—HBAAnyware Beaconing facilitates adapter identification.



- ▶ **Online diagnostics**—While troubleshooting a SAN incident, storage administrators often need to check whether a given component along the data link is fully operational. Being able to do this online without impacting the SAN environment is critical. Emulex HBAs/ CNAs uniquely feature a warm Power-On Self-Test, as well as powerful online diagnostic functions (various loopback levels), that can be invoked on demand and without disruption to the server. Above and beyond the adapter itself, end-to-end test functions are available to validate actual connectivity across the fabric.

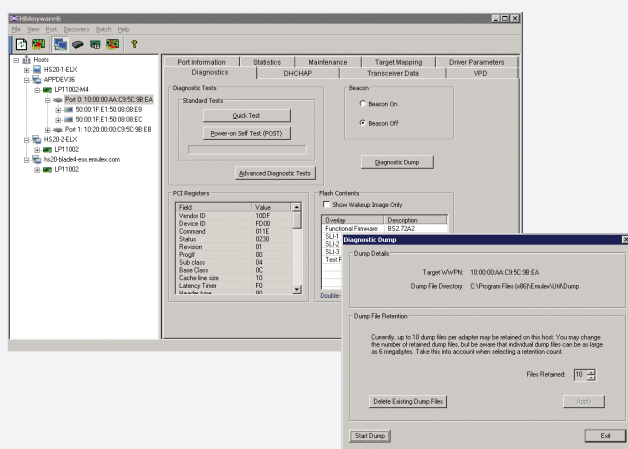
- ▶ **Detecting cable damage**—Fiber optic cables play a critical role in a SAN as they provide connectivity between servers, switches and storage arrays. It is important to remember at the center of a fiber optic cable is small diameter strand of glass filament. Therefore any damage to fiber optic cables will lead to a reduction in signal transmission quality, negatively impacting the performance of the SAN. To help identify cable related issues, HBAAnyware offers integrated transceiver monitoring based on digital diagnostics standard. This feature enables data center administrators to compare the electro-optical signal values at both ends of the cables, between the HBA port and the port on the Fibre Channel switch (or storage array). Any difference between the two sets of values can be a valuable indication of damaged fiber optic cabling.

Figure 2—HBAAnyware Power on Self Test (POST) enables disruption-free adapter self test.



- ▶ **Diagnostic log file**—Should a problem occur, technical support turn-around time is often a key satisfaction driver for IT administrators. Emulex adapters feature a unique capability whereby critical state information can be captured and saved, either automatically or on demand. Equipped with this state information, Emulex technical support staff can quickly trace the problem back to the root cause and recommend a course of action.

Figure 3—HBAAnyware Diagnostic Dump captures important state information on demand or automatically.



- ▶ **Streamlined HBA/CNA replacement**—In the unlikely event that an adapter needs replacement, Emulex HBAs and CNAs are designed to streamline the replacement process and avoid configuration errors.

- ◊ Emulex HBAs/CNAs store the port parameters on the host, so that when an adapter is replaced, the parameters associated with the previous port are inherited by the replacement adapter without user involvement. Competitors' products store port parameter information on the adapter itself in NVRAM; when an adapter is replaced, all the parameters go with it. Worse yet, if the adapter is re-used, those parameters may be unintentionally and inappropriately used when redeployed.

- ◊ HBAAnyware also makes quick work of ensuring that all HBA/CNA parameters are correct by allowing the administrator to save port parameter information into a profile that can be later applied to the adapter in the event the server is replaced or the operating system reloaded.
- ◊ In the case where an adapter is determined to be faulty or suspect, it is typically removed and a different adapter is installed in its place. Although the physical process of removing and installing the adapter will be simple and quick, the real challenge lies in reconfiguring the SAN with the newly installed adapter's worldwide port name. HBAAnyware provides the ability to change the world wide port name (WWN) while the server remains online. This negates the need of having to reconfigure the entire SAN, and streamlines the failover process.

Figure 4—Change the World Wide Name configuration while the server is online, simplifying and speeding up adapter change-over.

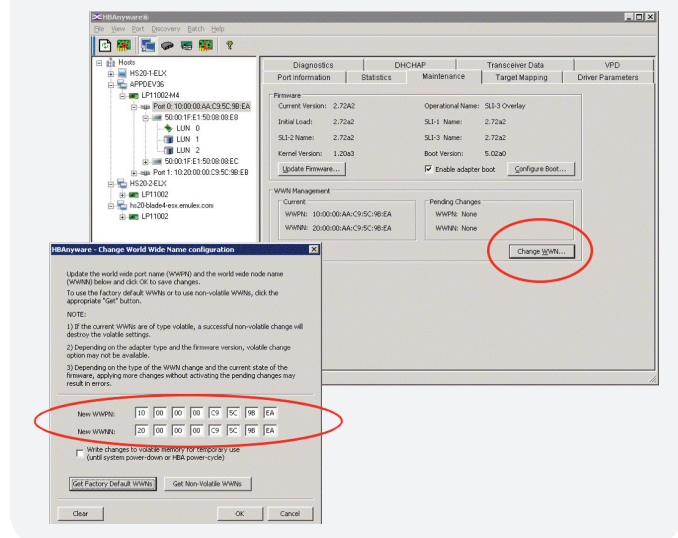


Table 1—Emulex offers a number of unique diagnostics and troubleshooting features that greatly improve administrative scalability.

Scalability Features	Emulex	QLogic
HBA beaconing to quickly identify HBAs	✓	✓
Online diagnostics providing centralized/remote inspection	✓	✓
HBA critical state information capture or firmware log data file	✓	
Online, non-disruptive Power-On Self-Test	✓	
Streamline HBA replacement using common drivers/stored parameters	✓	
Online worldwide port name rename feature	✓	

Conclusion

Emulex offers industry-leading diagnostics and recovery capabilities that storage administrators can rely on to sustain increasingly aggressive service level agreements. Emulex diagnostic and recovery capabilities are among the reasons why Emulex is the choice of more than ninety-five of the Fortune 100 for their mission critical applications.

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www.emulex.com

World Headquarters 3333 Susan Street, Costa Mesa, CA 92626 +1 714 662 5600

Wokingham, UK +44 (0) 118 977 2929 | **Munich, Germany** +49 (0) 89 97007 177

Paris, France +33 (0) 158 580 022 | **Beijing, China** +86 10 68499547