



## Scalability: Reducing Downtime with HBA and UCNA Diagnostics and Resolution Capabilities

### Emulex solution quickly diagnoses adapter and SAN problems

#### At a Glance

The challenge of quickly pinpointing and resolving problems in large enterprise Storage Area Networks (SAN) is a critical factor for data center administrators and an important attribute of SAN scalability. Emulex LightPulse Fibre Channel Host Bus Adapters (HBAs) and Universal Converged Network Adapters (UCNAs) are designed to assist with troubleshooting and to minimize the impact of field upgrades. These are among the features that make Emulex adapters the ideal foundation for a scalable SAN.

#### Technology

- Emulex LightPulse® Fibre Channel HBAs
- Emulex OneConnect™ Universal CNAs (Fibre Channel over Ethernet, iSCSI)
- OneCommand™ Manager applications

#### Applications

- SANs

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

Emulex is the solution of choice for mission-critical applications. The diagnostic and troubleshooting features available exclusively with Emulex HBAs, UCNAs and OneCommand Manager management application (previously called HBAAnyware) are some of the key reasons why data centers choose Emulex.

#### Key Features

- **Port beaconing**—Quickly and unequivocally identifying a specific adapter port within large rack-mount server deployments can not only be challenging, but it exposes the SAN to human errors. The beaconing feature of Emulex adapters removes this challenge and mitigates associated risks altogether by allowing the IT administrator to quickly identify an adapter port that needs physical intervention.

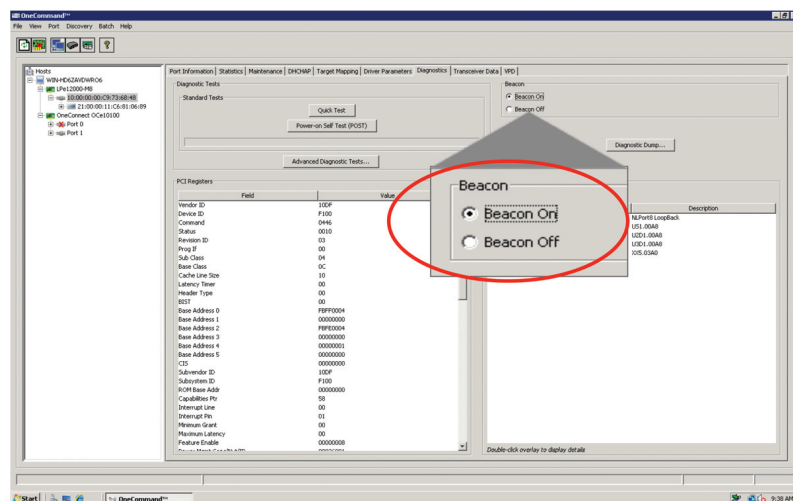


Figure 1 OneCommand Manager beaconing facilitates adapter port identification.



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- Online diagnostics**—While troubleshooting a SAN incident, data center 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 adapters feature a warm Power-On Self-Test (POST), 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, the OneCommand Manager application 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 adapter port and the port on the switch (or storage array). Any difference between the two sets of values can be a valuable indication of damaged fiber optic cabling.

- 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 capability whereby critical state information can be captured and saved, either automatically or on demand. Equipped with this state information, technical support staff can quickly trace the problem back to the root cause and recommend a course of action.

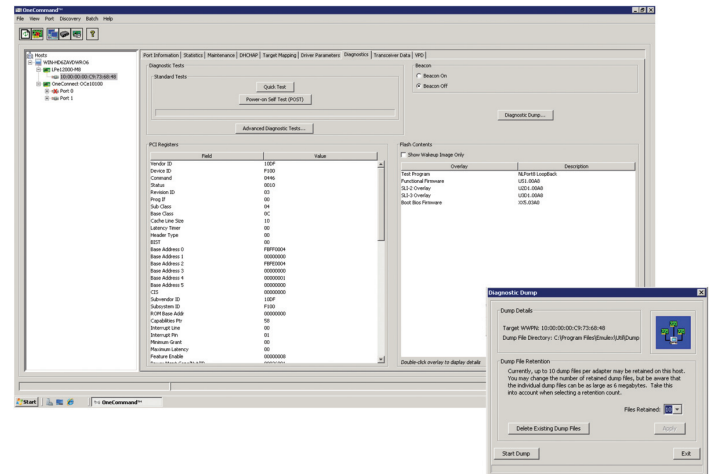


Figure 3 OneCommand Manager diagnostic log captures important state information on demand or automatically.

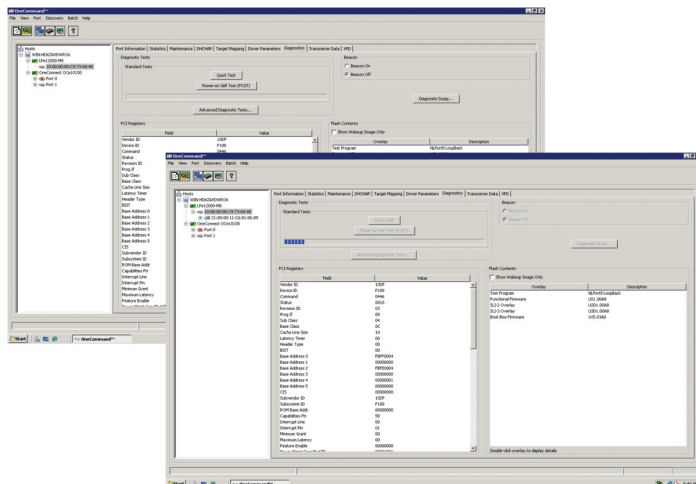
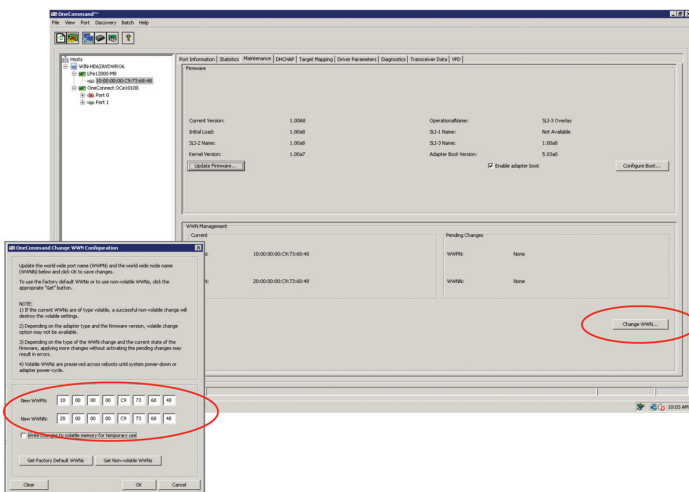


Figure 2 OneCommand Manager POST enables disruption-free adapter self test.

- Streamlined adapter replacement**—In the unlikely event that an adapter needs replacement, Emulex HBAs and UCNAs are designed to streamline the replacement process and avoid configuration errors.
  - Emulex adapters 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 the NVRAM. When a competitor's new adapter is installed, the IT administrator must then reconfigure it. Worse yet, if the adapter is re-used, the parameters may be unintentionally and inappropriately used when redeployed.

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- The OneCommand Manager application also makes quick work of ensuring that all parameters for Emulex adapters 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 (WWN). The OneCommand Manager application provides the ability to change the 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 WWN configuration while the server is online, simplifying and speeding up adapter change-over.

## Scalability Features

Beaconing quickly identifies adapter port
Online diagnostics provides centralized/remote inspection
Adapter critical state information capture or firmware log data file
Online, non-disruptive Power-On Self-Test
Streamline adapter replacement using common drivers/stored parameters
Online WWN rename

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

## 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 95 of the Fortune 100 for their mission-critical applications.



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