Evaluation Report: Emulex 16GFC LPe16002B VMware VDI Bootstorm Evaluation

Evaluation report prepared under contract with Emulex, an Avago Technologies Company

Executive Summary

In a virtual desktop infrastructure (VDI) environment, the act of booting each of the virtual machines frequently has the largest impact on the underlying server, networking and storage resources. In particular, a strong storage system implementation is critical for optimum performance of virtualized desktops, especially during boot storms.

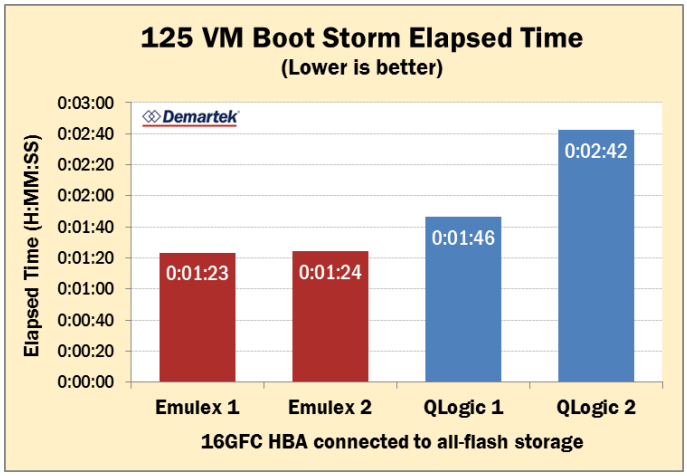
Emulex commissioned Demartek to evaluate the performance of the Emulex LightPulse LPe16002B 16 Gb Fibre Channel (16GFC) HBA in a VMware VDI bootstorm environment and compare the performance to the QLogic QLE2672 16GFC HBA in the same environment. For these tests, 125 virtual machines were booted simultaneously. The storage system used for the virtual desktop environment was an all-flash array.

Key Findings

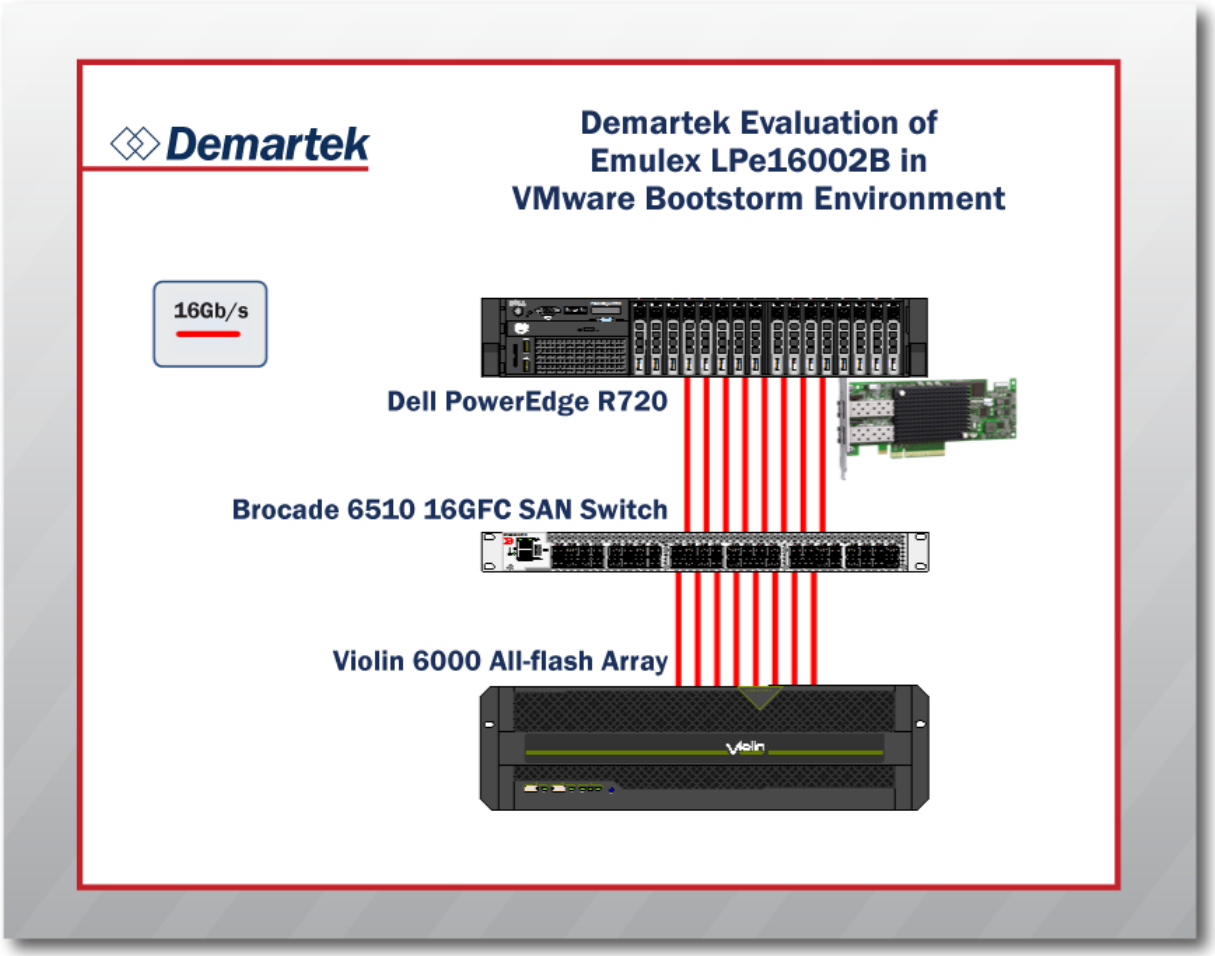
We have two key findings:

- The Emulex LPe16002B showed more consistent and predictable VDI boot performance than the QLogic QLE2672.
- The boot process for the complete set of 125 virtual desktops using the QLE2672 took almost twice as long, in one case, as the Emulex LPe16002B.

We ran the boot sequence multiple times and recorded the best two runs for each brand of 16GFC HBA. The times to complete booting all 125 virtual desktops using the QLogic 16GFC HBA ranged from 27% slower to 95% slower than the same environment using the Emulex 16GFC HBA.



Test Configuration



Dell PowerEdge R720

- 2x Intel Xeon E5-2697 v2, 2.7 GHz, 24 total cores, 48 logical processors
- 196 GB RAM
- VMware vSphere 5.5 Enterprise

Brocade 6510 16GFC Switch

- 8x 16-Gb ports connected to the host server
- 8x 16-Gb ports connected to the storage target

Violin 6000 All-flash Array

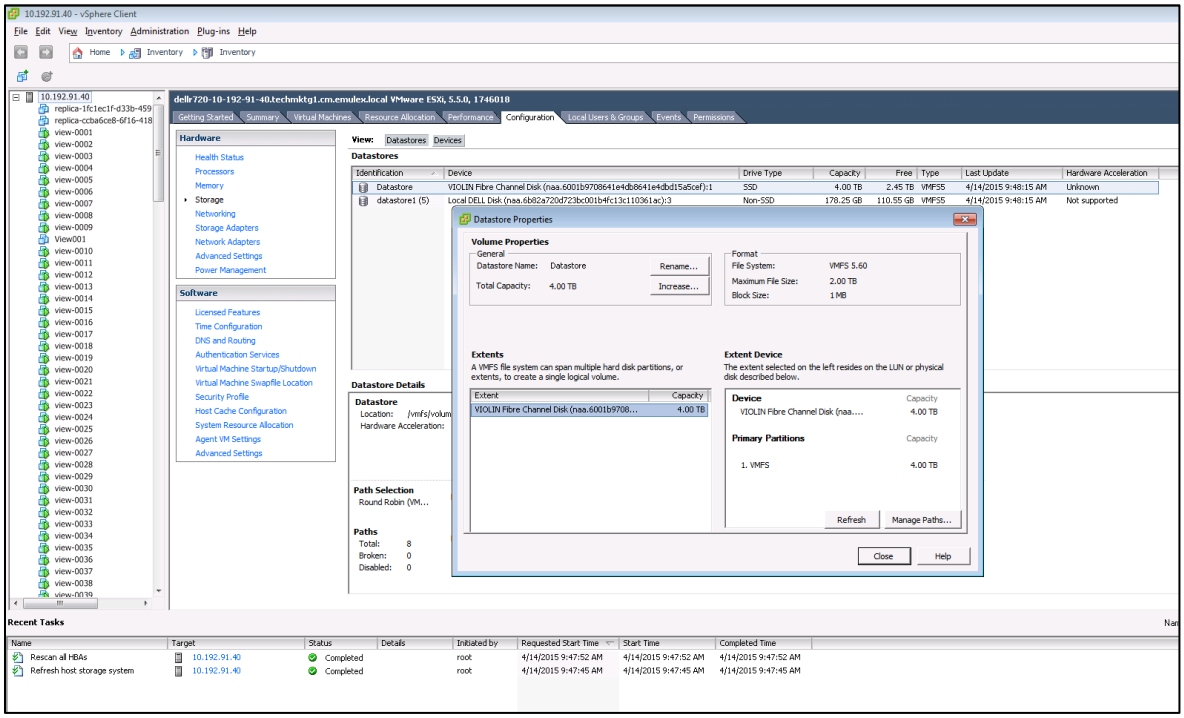
- 7.83 TB total capacity
- 4 TB LUN configured

Test Procedure

We ran a series of boot storm tests, booting 125 virtual machines simultaneously in the VMware vSphere 5.5 environment.

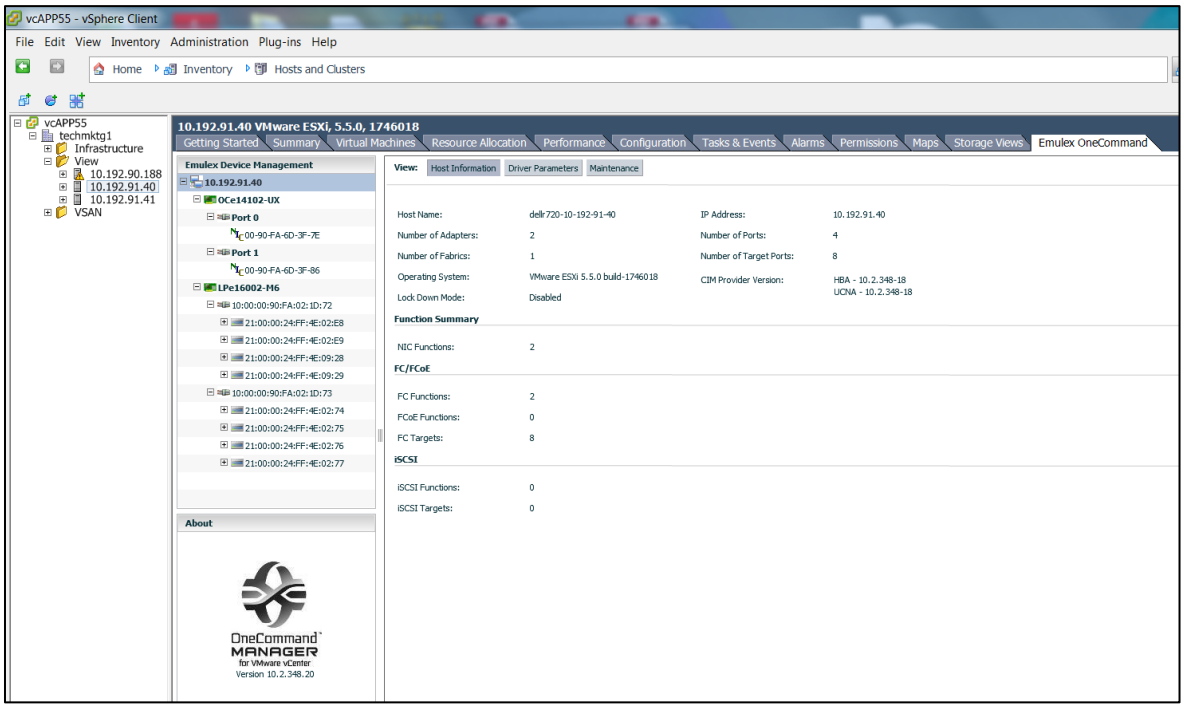
Storage Configuration

There were eight paths to eight LUNs on the all-flash array, and the boot images for all the VMs were stored on this all-flash array.



Adapter Configuration

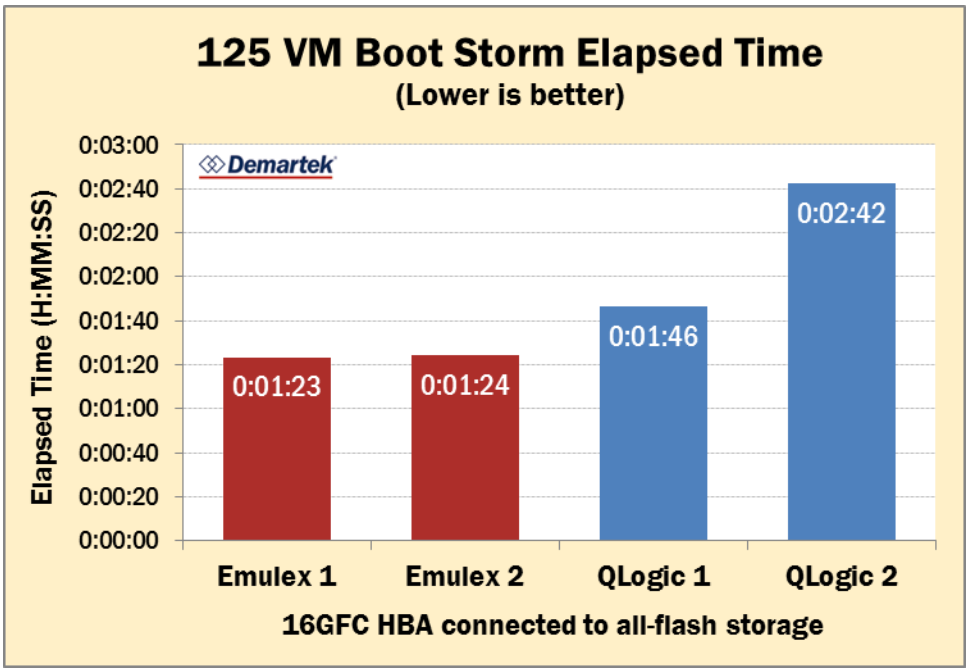
Two physical two-port adapters were installed into the host server: one 10GbE dual-port NIC and one 16GFC dual-port HBA. The 10GbE NIC was used for regular LAN communication and the 16GFC HBA was used to communicate to the storage system.



The QLogic QLE2672 16GFC HBA was configured in the same way, with four targets for each port of the HBA.

Test Results

Several runs of the bootstorm process were conducted with each Fibre Channel adapter. We recorded the elapsed time to complete the boot process for all the VMs. These times were taken from the vSphere vCenter console. The best two results for each are shown below.



The elapsed times to complete the boot sequence for all 125 VMs were significantly faster and more consistent with the Emulex LPe16002B FC HBA, leading to a higher degree of confidence and predictability for the VDI boot procedure. By contrast, the QLogic QLE2672 FC HBA displayed higher variability and slower performance, in one case taking almost twice the amount of time to complete the full set of virtual machines.

Summary and Conclusion

Supporting a virtual desktop environment requires that the administrators maintain consistently high performance of the underlying infrastructure. The server and storage hardware are key components of this infrastructure. In our tests, the Emulex LightPulse LPe16002B Fibre channel adapter provided more consistent and faster performance than the QLogic QLE2672 in this bootstorm of 125 virtual desktops. Customers should consider the Emulex LPe16002B FC HBA for connection to storage for VDI environments.