



# Accelerate Microsoft SQL Server on Hyper-V with HP and Emulex

Optimize SQL Server on Hyper-V performance, efficiency and return on investment (ROI)

## HP and Emulex Advantages (650FLB & 650M adapters)

- Compared to adapters without NVGRE offload, HP FlexFabric adapters provide:
  - Superior application performance with up to 41% higher I/O throughput<sup>1</sup>
  - Reduced server energy and cooling costs with up to 36% higher power efficiency<sup>2</sup>
- Accelerate file storage I/O by up to 82% with SMB Direct RDMA over Converged Ethernet (RoCE)<sup>3</sup>

## HP and Emulex Advantages (LPe1605 Fibre Channel (FC) adapter)

- Up to 26% faster database response time<sup>4</sup>
- Up to 21% higher database transactions per second in 8KB block size compared to nearest competitor<sup>4</sup>
- Data warehousing completion time up to 28% faster than 8Gb FC infrastructure<sup>4</sup>

## Hyper-V Solution Benefits

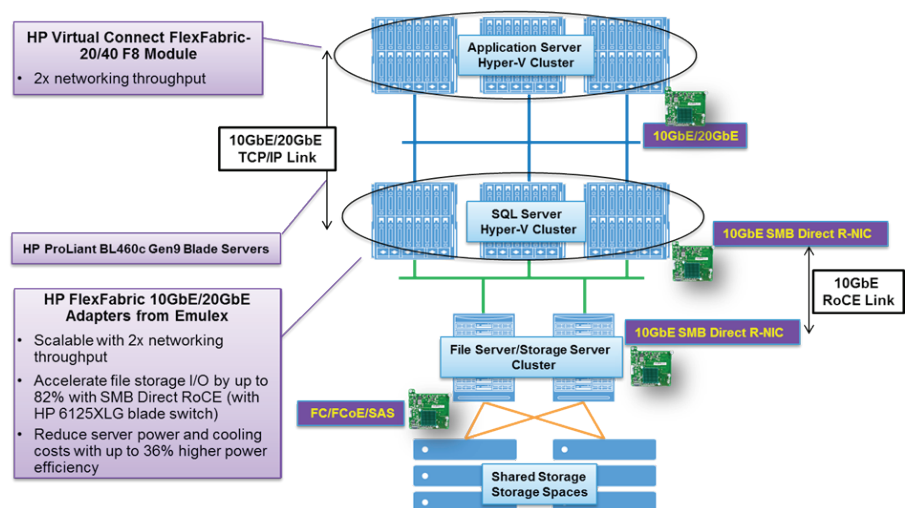
- Move SQL Server database server VMs (Live Migration) easily and without network reconfiguration costs
  - Save up to \$1,800 per VM migration event<sup>5</sup>
- Deliver multi-tenant isolation and security by breaking the 4,096 Virtual LAN (VLAN) ID barrier to enable up to 16 million private networks

Microsoft SQL Server is an enterprise-class relational database management system (RDBMS) used for mission critical applications. Microsoft Windows Server 2012 Hyper-V (Hyper-V) now provides an industrial strength virtualization and cloud platform to run I/O intensive enterprise applications, such as Microsoft SQL Server.

To address the I/O demands of Microsoft SQL Server running on large Hyper-V deployments, the following questions need to be considered:

1. How can I/O technologies help optimize SQL Server performance on servers running Hyper-V?
2. What I/O technologies and performance will simplify virtual machine (VM) migration, accelerate VM-to-VM communications and help scale network capacity, while accommodating large numbers of secure and isolated multi-tenant networks?
3. How can improvements in storage performance help optimize SQL Server performance in a Hyper-V environment?

HP FlexFabric 10Gb and 20Gb Ethernet (20GbE) adapters (650FLB and 650M) dramatically improve the performance and scalability of any SQL Server deployment on Hyper-V, by providing offload for Microsoft Network Virtualization with Generic Routing Encapsulation (NVGRE) overlay networking. Furthermore, it supports Microsoft's Server Message Block (SMB) Direct protocol. (Note: SMB Direct works independent of FlexFabric mode and requires HP 6125XLG blade switch).



## Throughput and Efficiency with Emulex NVGRE Tunnel Offload Support

Three-tier SQL-Server deployments, such as Web and e-commerce applications deployed in private or hybrid clouds, require capacity on-demand and fluid VM mobility. In such scenarios, VM-to-VM communications traffic traverses an NVGRE overlay network and a VM can be freely migrated across the data center, from one network (IP subnet) to another, without reconfiguration; thus saving IT precious time and meeting operational Service Level Agreements (SLAs).

Emulex 10GbE networking solutions deliver up to 41 percent higher throughput and up to 36 percent higher power efficiency, through hardware offload support for NVGRE, when compared to adapters that lack offload capability. Additionally, using other virtualization features, such as Single Root I/O Virtualization (SR-IOV), virtual Receive Side Scaling (vRSS) or dynamic virtual machine queue (dVMQ), data centers can gain even more performance efficiencies.

## Boost SQL Server Performance with Microsoft SMB Direct Storage I/O

HP FlexFabric adapters, with support for RoCE, accelerate application file storage I/O by up to 82 percent, when compared to adapters lacking SMB Direct support, accelerating database transaction velocity and faster reporting. Microsoft SQL Server performance when running in Hyper-V clusters is now dramatically improved with RoCE, when using Network Attached Storage (NAS) to reduce I/O time, by bypassing the host TCP/IP stack and reducing data copies. (NOTE: SMB Direct requires optional HP 6125XLG blade switch).

## Consistent SQL Server Storage Performance with Emulex I/O Portfolio

With FC over Ethernet/iSCSI performance of up to 1.5 million I/O operations per second<sup>6</sup> (IOPS) and Fibre Channel (FC) performance of up to 1.2 million IOPS, Emulex adapters from HP accelerate any SQL Server on Hyper-V deployment. In-box Windows Server 2012 R2 drivers for both Ethernet and Gen 5 FC Host Bus Adapters (HBAs) provide assurance that “it just works.”

## Conclusion

Data centers can increase their ROI with HP and Emulex, delivering the only Ethernet adapters with NVGRE offload and SMB Direct RoCE support, allowing IT managers to build the most efficient and resilient Hyper-V scale-out networks to accelerate Microsoft SQL Server applications for improved end user productivity.

SQL SERVER PERFORMANCE	GREATER NETWORK SCALABILITY	HIGHER IT SERVICE VALUE
<ul style="list-style-type: none"><li>■ Larger data set capacity from up to 41% higher I/O throughput with NVGRE offload support on Emulex OCe14000 adapters</li><li>■ Accelerate transaction and reporting I/O by up to 82% with SMB Direct RoCE</li><li>■ Gen 5 FC HBA capable of up to 1.2 million IOPS on a single port and Fibre Channel over Ethernet (FCoE) or iSCSI up to 1.5 million IOPS on a single port</li></ul>	<ul style="list-style-type: none"><li>■ 20GbE connectivity delivers network capacity to drive more transaction traffic across more host servers</li><li>■ SR-IOV, vRSS and VMQ scaling efficiencies</li><li>■ More traffic without adding I/O ports with HP FlexFabric NVGRE offload-enabled adapters</li><li>■ Preserve Top of Rack switch ports with hypervisor/adaptor based NVGRE virtual network IDs</li></ul>	<ul style="list-style-type: none"><li>■ Up to 36% higher I/O power efficiency with NVGRE offload minimizes server power and cooling costs</li><li>■ Flexibility with in-box Windows Server 2012 drivers for both Ethernet and Gen 5 FC HBAs</li><li>■ HP FlexFabric adapters with SMB Direct RoCE have up to 80% better server electrical power efficiency than adapters not using RoCE</li></ul>

<sup>1</sup> IT Brand Pulse Test Report, “OCe14000 Performance,” July 2014

<sup>2</sup> Power efficiency = Server power consumption in watts per 1Mbps I/O throughput

<sup>3</sup> IT Brand Pulse report “Blade server IO and workloads of the future”, November 2014

<sup>4</sup> Demartek Report, Dec 2014

<sup>5</sup> Presentation at Open Networking Summit, April 2012

<sup>6</sup> Maximum product specification