



Brochure

# Accelerate your applications

HPE FlexFabric and Ethernet 10 Gb and 20 Gb adapters for HPE ProLiant servers



**Hewlett Packard**  
Enterprise

# Boost business performance, accelerate server workloads

HPE and Emulex deliver VXLAN Tunnel offload and remote direct memory access over converged Ethernet technology with HPE FlexFabric 650, 556 and Ethernet 557 adapters to accelerate applications in HPE ProLiant and HPE BladeSystem servers.

## Good news for your data center network

### With overlay networking you can:

- Increase I/O throughput to HPE ProLiant and HPE BladeSystem servers
- Reduce CPU utilization
- Accelerate VM operations
- Increase network scalability
- Reduce power consumption

### With RoCE you can:

- Increase VM density
- Reduce VM latency
- Improve time-to-service

## Virtualization drives business operations

### Today's performance challenge

IT architecture is currently driven by the confluence of key infrastructure and workload trends across multiple industry verticals, including social business, cloud, mobile, and Big Data analytics. With 67 percent of workloads virtualized as of 2013, server virtualization is the underlying computing foundation for this new architecture. In turn, this architecture is driving change in data center networking.

Despite the continuing improvement in vMotion and Live Migration virtual machine (VM) migration capabilities, networking challenges and operational expenses (OPEX) with these technologies continue to impact your IT department. Moving a VM from one host server to another host server residing on a different network (including the cloud) requires extensive networking reconfigurations, inhibiting IT agility and extending time-to-service availability. Storage infrastructures are also affected by the lack of a fluid experience, as a magnitude of data affects application performance, storage I/O performance, and decreased user productivity.

If your organization is like many others, you may have built your infrastructure by adding additional servers, network, and storage connections for each application workload. While these deployments can help add bandwidth to enable faster migration, you are also left with underutilized resources and compute power, inefficient network sprawl, and more equipment to manage to ensure VM processing and migration across the infrastructures.

Yes, network and storage convergence plus server virtualization have helped address many of these inefficiencies. But addressing VM performance brings its own challenge: provisioning the appropriate bandwidth and data center resources while reducing CPU involvement for less-CPU intensive tasks like migration. In addition, storage must meet these varying demands for both physical and virtual resources.

## Efficiency problem solvers

### Overlay networking and RoCE

Reducing CPU involvement in non-compute tasks is important to maintain or improve overall business performance. Straightforward VM migration and workload mobility across the server is an aspect of virtualization that has ready solutions and yields significant benefits. The new HPE FlexFabric 650/556 and HPE Ethernet 557 adapters provide two key technologies to assist with streamlining application performance and VM transfers across the infrastructure: Overlay networking and remote direct memory access (RDMA) over converged Ethernet (RoCE). These two approaches enable your administrators to reduce the processing overhead on server CPUs in both physical and virtual environments. This enables higher VM density per server, faster storage I/O access, and increased server efficiency with lower power consumption, and helps provide secure network scalability.

HPE FlexFabric 650 Series Adapters deliver increased performance with industry-leading Flex-20 20GbE technology, accelerating converged data center performance further with HPE BladeSystem servers and HPE Virtual Connect modules. Converged FlexFabric technology consolidates the number of separate adapters needed to stream different traffic types, including Fibre Channel, Fibre Channel over Ethernet (FCoE), and iSCSI for HPE ProLiant rack, tower, and blade servers. You can count on capital expenditure (CAPEX) cost reductions as well. The HPE FlexFabric 10Gb 2-port 556FLR-SFP+ and HPE Ethernet 10Gb 2-port 557SFP+ Adapters enable efficient performance and flexibility for ProLiant Gen9 Rack/Tower servers.

### Accelerate service delivery

The evolution to cloud data centers require deployment, at scale, of tens of thousands (and more) secure, private networks for tenants. Current virtual LAN (VLAN) technology is limited to 4,096 VLAN IDs, allowing for a very small number of isolated private networks. With limited addressing, servers often queue up workload tasks in memory, while the hypervisor software determines which hardware path and network to use for the workload. This computation would steal CPU cycles and memory, making the server less efficient and unable to perform other valuable functions.

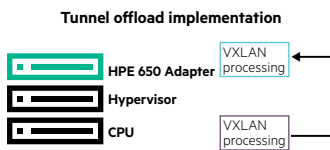


Figure 1: Reducing CPU overhead with Tunnel Offload

Two overlay networking technologies, Network Virtualization using Generic Routing Encapsulation (NVGRE—supported by Microsoft®) and Virtual Extensible LAN (VXLAN—supported by VMware®), address these challenges. Both enable VM-to-VM communications traffic to traverse virtual overlay networks while increasing network scalability—up to 16 million private, isolated networks. In this way, VMs can freely migrate across overlay networks without reconfiguration, saving you precious time needed to focus on other strategic IT initiatives.

HPE FlexFabric 650, 556 and Ethernet 557 adapters include the industry’s only hardware offload support for VXLAN and NVGRE tunnels in networking virtualization environments. Offloading the computation and network addressing from the server as shown in Figure 1 boosts networking performance and increases overall server efficiency. This translates to lowered CPU utilization, increased VM density, higher power efficiency, and increased throughput.

### Improve storage I/O

Social business. Cloud. Mobile. Big Data. These key data center-workload trends collectively demand anytime IT availability in order to consistently deliver fluid user experiences. As a result, enterprises and cloud service providers are investing in IT infrastructure to deliver the necessary application performance, as well as high-performance storage I/O access to support the expanding magnitude of data from servers into infrastructures.

From application to storage, VM traffic has to flow through from local server memory banks, be managed by the CPU through its operating system (OS), and fed out to the storage area network (SAN), often using TCP/IP Ethernet-based stacks. This process adds latency and consumes CPU bandwidth. RDMA technology accelerates this effort, reducing latency by directly accessing CPU memory and performing the data movement automatically to the target node. For server-to-storage environments where converged Ethernet protocols enable fast transfers, RoCE is a standards-based accelerated I/O delivery mechanism. RoCE bypasses OS, CPU, and the TCP/IP protocol, significantly reducing the overall data path and latency for workload mobility to storage infrastructures.

HPE FlexFabric 650, 556 and Ethernet 557 adapters are the first adapters to include RoCE support, as well as converged FC, FCoE, and iSCSI protocols on each port. Because the RDMA data transfer is performed by the DMA engine on the HPE 650/557/556 network processor, the server CPU is not used for the data movement. This frees up the server to perform other tasks, such as hosting more virtual workloads. RoCE reduces CPU utilization and helps maximize host VM density and server efficiency. It also accelerates the performance for key applications such as Microsoft Hyper-V Live Migration, Microsoft SQL, and Microsoft SharePoint with SMB Direct. For example, using SMB Direct with RoCE, Hyper-V Live Migration is much faster than with TCP/IP.

## Solution benefits

Overlay networking and RoCE from HPE and Emulex deliver the agility and performance your business requires from VM operations over standards-based Ethernet in converged infrastructures:

- Higher-throughput performance—Adapters offload CPU-centric functions in local hardware and integrate intelligently with virtual suites and hypervisors to deliver a fluid experience for users and the business.
- Enhanced CPU resources—With these technologies, servers run more efficiently, run more applications, and manage more virtual machines. Higher VM densities per server deliver a higher return on investment (ROI) for businesses, saving them costs in the long run.
- Reduced latency for workload mobility—RoCE reduces latency for storage I/O and communications to SAN infrastructures. Direct memory access technology bypasses software and reduces CPU utilization for fast data and application transfer.
- Lower power consumption—More throughput with fewer components and optimized environments for VM migrations also reduces server power and cooling requirements, which decreases operating costs.

## Boost business performance

HPE and Emulex continue to deliver innovation for ProLiant converged, rack and standalone servers with HPE FlexFabric and Ethernet adapters. Overlay Networking and RoCE technologies in HPE solutions reduce the burden of VM migration on servers by providing efficient server networking solutions and accelerating system performance. You can now enhance your infrastructure to reap performance, efficiency, and lower total cost of ownership (TCO) benefits.

Learn more at  
[hpe.com/servers/ProLiantNICs](http://hpe.com/servers/ProLiantNICs)



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