



Accelerate VMware Hybrid Cloud Workloads with Emulex®

Unique Emulex offload technology delivers higher throughput, CPU effectiveness and power efficiency

Emulex Advantages

Emulex OneConnect adapters accelerate VMware hybrid cloud workloads via the world's only overlay network tunneling offload support for VXLAN.

- Superior application performance with 129% higher I/O throughput than adapters without offload¹
- Higher VM density/server with 46% higher CPU effectiveness²
- Reduce server power and cooling costs due to up to 122% higher server power efficiency³

VXLAN Solution Benefits

- Simplify VM-to-VM communications across networks (IP subnets)
- Move VMs (vMotion) easily and without network reconfiguration costs
 - Save up to \$1,800 per VM migration event⁴
- Deliver multi-tenant isolation and security by breaking the 4,096 VLAN ID barrier to enable up to 16 million private networks
- Applicable to *any* workload on private and hybrid VMware-based cloud networks

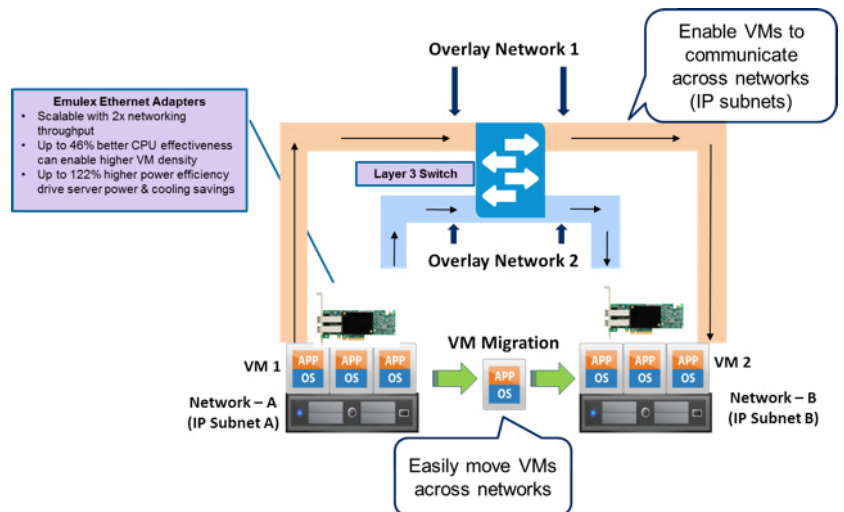
Products

- Emulex OneConnect Ethernet and CNAs for 10Gb Ethernet (10GbE) and 40GbE

Server virtualization is the core data center technology used for private and hybrid cloud environments, allowing IT groups to dynamically run a variety of workloads seamlessly. Implementing cloud environments, with capabilities such as “cloud bursting,” presents new networking challenges. To address the I/O demands of private and hybrid clouds, and to manage large virtualized network deployments, the following issues need to be considered:

1. Virtual machine (VM) mobility: What technologies and I/O performance are required to simplify VM migration and handle VM-VM communications?
2. Network scalability and security: How will my choice of I/O help scale my network capacity while accommodating large numbers of secure and isolated multi-tenant networks?
3. IT service value: How can I/O help me reduce my operational expenditures (OPEX) and maximize return on investment (ROI) on my capital expenditures (CAPEX) related to scale-out networks?

VMware's new NSX platform utilizes Virtual eXtensible LAN (VXLAN) overlay networking technology to address these challenges. Emulex OneConnect® Ethernet and Converged Network Adapters (CNAs), deliver significant I/O performance and architectural features to provide a superior VXLAN implementation, as shown below.



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Before VXLAN, the promise of true IT agility was partially fulfilled. Users either dealt with a new type of sprawl – namely VM sprawl – or spent up to \$1,800 per VM migration on network reconfigurations after the VM was migrated.

VXLAN Overlay Network Provides Layer 2 Tunnels to Address VM Mobility and Multi-Tenant Security

Historically, cloud scale-out network deployments have been hindered by a few issues. Moving a VM from one host server to another host server residing on a different network required significant networking reconfigurations, inhibiting IT agility and extending time-to-service availability from the migrated VM. Additionally, virtual LAN (VLAN) technology is limited to 4,096 VLAN IDs, allowing for a very small number of secure and isolated networks. VXLAN addresses both of these issues.

VXLAN is a virtual Layer 2 overlay network (tunnel) that is automatically created on top of a Layer 3 network. It accelerates service delivery and enables secure network scalability as follows:

- VM-to-VM communications traffic across a network traverses a VXLAN and a VM can be freely migrated across the data center, from one network (IP subnet) to another, without reconfiguration, saving IT precious time
- Up to 16 million (theoretical limit) secure, isolated networks are enabled by VXLAN for superior scalability

Emulex Supports VXLAN Offload

Emulex provides superior overlay networking solutions for x86 and x64 servers. With the industry's only hardware offload support for VXLAN, Emulex OneConnect adapters deliver higher CPU effectiveness and higher power efficiency when compared to all other adapters that lack offload capability. Additionally, the VXLAN technology embedded in Emulex adapters unburden top-of-rack (ToR) switches from the requirement to store large VM address tables by offloading this to the hypervisor and adapter. Finally, 10 and 40GbE connectivity drives more traffic without adding more I/O ports.

Conclusion

Emulex delivers the only VXLAN offload-enabled adapters, allowing IT managers to build the most efficient and resilient hybrid cloud scale-out networks:

IMPROVED VM MOBILITY	GREATER NETWORK SCALABILITY	HIGHER IT SERVICE VALUE
<ul style="list-style-type: none"> ■ Up to 129% higher I/O throughput with Emulex adapters accelerates VM migrations, delivers superior application performance and workload availability 	<ul style="list-style-type: none"> ■ 10 and 40GbE connectivity delivers network capacity to drive more VM traffic across more host servers ■ More traffic without adding I/O ports with Emulex VXLAN offload-enabled adapters ■ Preserve ToR switch ports with hypervisor/ adapter based virtual network IDs 	<ul style="list-style-type: none"> ■ Up to 46% higher I/O CPU effectiveness can enable more VMs per server maximizing ROI on system CAPEX ■ Up to 122% higher I/O power efficiency minimizes server power and cooling OPEX

¹ IT Brand Pulse Test Report, "OCe14000 Performance," July, 2014

² CPU effectiveness = Percentage of server CPU utilization for every 1Mbps of throughput

³ Higher power efficiency = Server power consumption in watts per 1Mbps I/O throughput

⁴ Allwyn Sequeira, CTO and VP, Security & Networking, VMware, presentation at Open Networking Summit, April, 2012

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