



Emulex and Novell Deliver High Performance Virtualization in Converged Network

Strong partnership results in leading edge virtualization solutions for converged network deployments

At a Glance

IT departments are implementing Novell SUSE® Linux Enterprise Server (SLES) and Novell PlateSpin® Orchestrate for virtualization management to increase operating efficiencies and improve resource utilization. Many are turning to the Emulex OneConnect™ universal converged network adapter (UCNA) for network connectivity. The Emulex OneConnect platform is based on a single-chip 10Gb Ethernet (10GbE) architecture that supports high performance offloads for 10GbE, iSCSI, TCP Offload Engine (TOE) and Fibre Channel over Ethernet (FCoE), delivering improved performance for networking and data center virtualization.

Products

- Emulex OneConnect Universal Converged Network Adapter Platform (OCe10000 and OCe11000)
- Emulex OneCommand™ Manager 5.0 (formerly HBAnyware®)
- Novell SUSE Linux Enterprise Server (SLES)
- Novell PlateSpin Orchestrate

Solution Benefits

- Consolidate the data center to a 10GbE infrastructure with offload support for 10GbE, TOE, FCoE and iSCSI
- Protect investments in existing server, network, storage and facilities assets
- Decrease CapEx and OpEx by simplifying the data center infrastructure
- Increase business agility with easier, faster and pervasive data center virtualization and management
- Enhance business resilience and performance by offloading CPU resources for greater operational efficiency

Novell Emulex Partnership

With a relationship that predates Novell's acquisition of SUSE, Emulex regularly provides hardware to Novell for development and testing. Additionally, Emulex provides code when needed, and did so recently for an N_Port ID Virtualization (NPIV) management project in Novell's system management product suite. Emulex and Novell collaborated to deliver an integrated management solution for administrators with server virtualization. The solution offered by Emulex and Novell provides virtual ports (vPorts) via NPIV technology with each Emulex adapter. The management of NPIV is then automated with Novell PlateSpin Orchestrate for efficient, unified and time saving management of all virtual assets (see Figure 1).

Emulex also qualifies its products under YES, Novell's self-certification program. Lastly, as a member of PartnerNet, Emulex and Novell regularly share roadmaps and strategies, ensuring that Linux customers continue to receive products that meet the robust needs of their enterprise environments. For example, the Emulex OneConnect UCNA now supports Single Root I/O Virtualization (SR-IOV) in the Linux kernel, described further below.

Evolution to Emulex Converged Networks

Data centers have typically deployed dedicated infrastructures for networking and storage, with each network requiring a separate set of adapters, switches and cables. To reduce costs, blade servers and server virtualization technologies are implemented which result in increasing demands for network bandwidth per host. In many cases, six or more 1GbE adapters are used to meet requirements for virtual machines, dynamic migration and management. With the growth of video, voice and graphical content, 1GbE networks are running out of bandwidth.

In many data centers, servers require multiple 1GbE adapters which lead to additional switch ports, cabling and management time. Added to this is the growing use of iSCSI to support storage traffic over Ethernet, resulting in another level of complexity and bandwidth usage. Applications, databases and virtualized servers that require high I/O rates are severely limited with 1GbE connections and CPU resources are absorbed when iSCSI software initiators are used with standard NIC adapters.

High-density blade deployments add to the difficulty with an increasingly complex collection of connections and cables per square foot, all contributing to high capital expense (CapEx) and operational expense (OpEx). These costs can be reduced by deploying a converged network with a single set of resources that can be dynamically provisioned for networking and storage in response to changing business requirements. Emulex OneConnect UCNA platform and Novell technologies combine to deliver an unmatched high performance data center solution that lowers CapEx and OpEx.



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Novell PlateSpin Orchestrate offers server virtualization management tools that help optimize resource utilization and simplify systems management for the toughest enterprise data centers, while SLES is widely used by enterprises. The Emulex OneConnect UCNA platform extends the benefits of Novell PlateSpin Orchestrate and SLES by delivering the following:

- 1. Common platform**—Applicable across all server tiers to enable simplification of server hardware, rapid deployment and migration of applications
- 2. High performance**—Capable of supporting multiple protocol offloads offering high levels of performance and efficiency
- 3. Virtualization support**—Complement server virtualization deployments, provide flexibility and infrastructure agility
- 4. Simplified management**—Deployment, administration and configuration from a centralized management console
- 5. Energy and space efficiency**—Minimal power and data center footprint

Why Emulex for Novell

Data centers with Novell SLES have long relied on high performance network connectivity from Emulex. With Emulex OneConnect UCNA and OneCommand Manager application, these data centers now can implement a high performance converged networking solution.

Streamline management

OneCommand Manager application provides comprehensive reporting, optimizing and troubleshooting, enabling management of Emulex adapters for servers throughout the network from a single console. With Emulex, IT administrators improve management efficiency for iSCSI, Fibre Channel and FCoE networks as well as maximizing availability of business critical applications that rely on Novell.

Improve asset utilization

Emulex 4Gb/s and 8Gb/s host bus adapters (HBAs), FCoE CNAs, OneConnect UCNAs, Novell drivers and Emulex OneCommand Manager fully support NPIV technology, enabling each adapter port to register multiple vPorts identified by a virtual worldwide port name (WWPN) within the fabric. In fact, Emulex OneConnect UCNAs enable IT administrators to create and support six times more NPIV-based vPorts than the nearest competitive solution. With Emulex, organizations that rely on Novell for Linux and server virtualization management can reduce their hardware expenditures.

Increase data center flexibility and availability

Emulex OneCommand Manager's vPort mapping capability enables viewing of virtual machine (VM) to vPort associations on a single management pane. With Emulex, IT administrators can improve the speed at which hardware resources can be reallocated within Novell VM environments, increasing data center flexibility and availability. Using NPIV, Novell delivers server virtualization management with Novell PlateSpin Orchestrate.

Seamless interoperability

Emulex shares a strong development partnership with Novell, ensuring Emulex and Novell solutions will work seamlessly together within the data center. As a member of the Novell PartnerNet and one of the first Fibre Channel HBA vendors to support Novell SLES, Emulex is a leading Storage Area Network (SAN) connectivity provider for Novell environments. Emulex and Novell offer many enterprise-class products that provide mission-critical interoperability, comprehensive support and innovation.

CapEx and OpEx savings

Emulex OneConnect UCNAs reduce cabling, hardware, rack space and power consumption costs. When combined with CPU off-load capabilities, fewer servers are required to support data center needs. With Emulex, IT administrators can maximize I/O consolidation with 10GbE ports and leverage existing hardware investments to drive significant savings in capital and operating expenses.

Novell SUSE Linux Enterprise Server

The SLES platform is designed for mission-critical computing across the enterprise, including physical, virtual, appliance and cloud deployments. At the heart of SLES is the Linux kernel itself. Like Novell, Emulex has been a pioneer in driving innovative technologies into the Linux kernel that deliver real business value to users. One such example of these innovations is the Linux kernel's Fibre Channel Transport class. Designed, developed and maintained by Emulex, the Fibre Channel Transport introduces a standardized substrate and development model for Fibre Channel and FCoE I/O devices in Linux. Further, the Fibre Channel Transport in the Linux kernel introduces a common userspace interface for the system administrator via Linux sysfs, helping to streamline and standardize operational aspects.

Another example of Emulex Linux leadership in innovation which addresses real business problems is NPIV. Emulex pioneered this technology and worked with partners to drive it into T11 for standardization. The NPIV capability was formally integrated with the Fibre Channel Transport class in the 2.6.23 version of the Linux kernel, providing a standardized model for implementing this Fibre Channel extension capability.

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Emulex and Novell then added NPIV support to the Xen hypervisor which is built into SLES, via Emulex drivers in SLES10/11, plus a jointly created Xen hotplug script (“block-npiv”). As a result of this work, virtual World Wide Node Names (WWNNs) and Port Names (WWPNs) can be allocated for Xen-based VMs which can then connect to the Fibre Channel SAN using a unique virtual WWPN rather than the shared physical WWPNs of the host’s adapters. This enables the location transparent mobility necessary for VM failover and live migration, without having to reconfigure Logical Unit Number (LUN) masking for physical hosts. Instead, LUNs are masked directly to each VM’s NPIV port.

Since storage array events and statistics are reported by the I/O initiator’s WWPN, this allows correlation of the storage vendor-collected I/O metrics with specific VMs regardless of the physical location of the VM. Novell and Emulex together deliver enhanced server virtualization capabilities.

Single Root I/O Virtualization (SR-IOV)

With SR-IOV, VMs can share adapter ports using virtual functions that optimize performance. VM to VM communication is enabled with a Layer 2 switch that is embedded in the Emulex OneConnect adapter. OneConnect adapters are PCI-SIG compliant and will support SR-IOV as available with hypervisors.

Novell PlateSpin Orchestrate

Novell PlateSpin Orchestrate dramatically simplifies the management of a data center’s heterogeneous virtual assets by controlling the entire lifecycle of each VM. Its grid-based extensible matching algorithms create a unique opportunity to match the specific requirements of VMs and their hosted distributed applications with new features of the converged network. Resource usage is kept aligned with business requirements via built-in automation. This maximizes the value of physical and virtual data center resources, where the latter can be based on VMware, Xen or Microsoft Hyper-V.

PlateSpin Orchestrate also features distributed storage repository management for VM images and data, together with constraint-based adaptive deployment of VMs to capability-matched physical servers. Administrators can create and test virtual machines, then automate deployment to suitable and available production servers. PlateSpin Orchestrate relies on the management of NPIV, co-developed by Emulex, for efficient, unified and time saving management of all virtual assets.

When a converged network solution is in place, it is managed and integrated with existing IT infrastructure by providing comprehensive data center workload automation solutions. For example, by provisioning a VM together with third party SAN storage, the infrastructure can be integrated through workflow automation that creates a SAN LUN, assigns a unique Fibre Channel NPIV to a VM, and configures the third party SAN storage

array to grant access from the VM (using its NPIV identity) to the LUN. Sophisticated automation helps break down management silos and reduces the complexity and risk of managing virtualized data centers. The result is an increased level of operational agility that creates a data center operating environment that’s aligned to the demands of business services hosted in VMs.

Deployment Architecture

As an example of deployment architecture, consider deploying a virtual machine into a data center production server pool. The VM requires two VTx-enabled CPUs, 512Mb of direct attached OS image storage, 1Gb of memory, and gigabit Ethernet connectivity for access to a converged Fibre Channel SAN. These requirements are expressed as a set of deployment constraints—references to facts which are matched to available resources by PlateSpin Orchestrate, when scheduling the VM for deployment.

Sophisticated resource allocation is made possible when combining a number of constraints into policy statements that are applied to groups of resources—matching supply with demand. The deployment of a VM to a physical server is therefore unified by a general purpose (grid-based) algorithm for assigning units of work to available resources, in a manner that’s respectful of competing work and shared capacity.

An example of this grid-based flexibility is PlateSpin Orchestrate 2.0’s management of Fibre Channel NPIV in SLES. PlateSpin Orchestrate constrains Xen VMs with assigned NPIVs to VM hosts, via policy that requires SAN attachment as a discovered attribute of VM hosts, matched to only the VMs that declare a NPIV port.

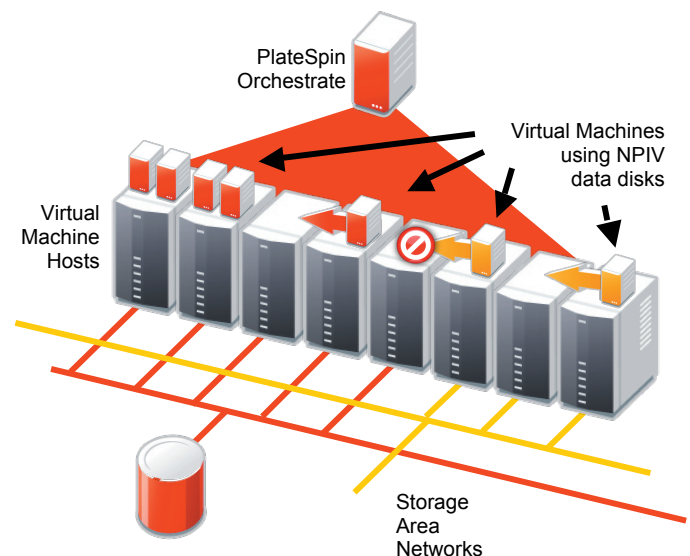


Figure 1 PlateSpin Orchestrate automates the management of NPIV-based VMs.

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Summary

Emulex and Novell together offer a robust converged networking solution to Linux data centers, delivering high performance for server virtualization management while reducing CapEx and OpEx. Converged networking is being used to automate VM life cycle management across heterogeneous virtualization platforms and hosted workload operating systems. It is ideally matched to service-oriented applications hosted in VMs because it supports VM mobility with respect to all of the VM's network access requirements, for both application and storage level communication. The combination of Novell technologies and Emulex OneConnect UCNAs enables data centers to achieve higher levels of performance and management while managing costs and protecting past investments. Look to Emulex and Novell to continue to deliver leading edge solutions aimed at meeting the most pressing data center needs.

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