Hardware-Accelerated Open Source Virtualization

Cisco Unified Computing System and Red Hat Enterprise Virtualization Software

At-A-Glance

Network Virtualization, Simplified

Virtualization technology has never been more essential, acting as the engine behind consolidation efforts and enabling the transition to cost-effective and scalable cloud computing models. Yet even as organizations of all sizes look to virtualization to deliver enhanced economy and agility, challenges remain. Deploying mission-critical applications in virtualized environments can be problematic, especially those that are I/O or network intensive. Visibility and control of virtualized resources is often lacking, and large-scale virtualization efforts can engender considerable complexity. For virtualized environments to deliver on their promise, they must provide scalable application and network performance — while offering a predictable operational model, greater operational efficiencies, and a compelling cost model that can yield real return on investment (ROI).

To address these challenges, industry leaders Cisco and Red Hat have combined the Cisco Unified Computing System™ (UCS) with Red Hat Enterprise Virtualization (RHEV) software. This innovative combination offers hardware-accelerated virtual I/O that simplifies the network to yield greater network control, visibility, and performance for virtualized applications. Overcoming the limitations of traditional virtualized environments, this cost-effective solution helps organizations rapidly deploy, manage, scale, and secure physical and virtual infrastructure. Combining the built-in virtualization-aware networking of the Cisco Unified Computing System with the leading open source Linux distribution, this unique solution is integrated, open, and tuned to deliver results for even the most challenging enterprise applications.

The solution builds upon a long history of results-oriented collaboration between Red Hat and Intel and the partnership between Cisco and Intel that brought the power of Intel® Xeon® processors to the Cisco Unified Computing System. The Cisco Unified Computing System uses Intel Xeon processor 7500 series for scalable performance with its four-socket servers, and Intel Xeon processor 5600 series for efficient performance on its two-socket servers.

Hardware-Accelerated Virtual I/O

Cisco® VN-Link technology in tandem with Red Hat Enterprise Virtualization technology brings the benefits of hardware-accelerated virtualized I/O to the open source community. The result combines higher visibility and network control with improved network performance to allow organizations to manage the virtual network infrastructure as they do their physical infrastructure.

Cisco and Red Hat deliver hardware-accelerated Cisco VN-Link technology by integrating support for the Cisco UCS M81KR Virtual Interface Card into the open source Kernel-Based Virtual Machine (KVM) hypervisor as provided with RHEV. Combined with Red Hat support of Linux I/O virtualization, the solution delivers multiple 10 Gigabit Ethernet NICs to virtual machines, improving network throughput and freeing CPU cycles to deliver greater application performance and improve virtual machine density. These benefits are amplified by the intelligent performance of Intel Xeon processors that can increase processor frequency when more application performance is needed.

Beyond performance, Cisco VN-Link technology offers greater network visibility and control on a per-virtual-machine basis for applications running under Red Hat Enterprise Virtualization. The ease of managing and securing virtual environments gives CIOs the confidence to virtualize even their most mission-critical applications, while administrators get the information, access, and control they need for effective troubleshooting, tuning, and service-level agreement maintenance. Perhaps best of all, the collaboration between Cisco and Red Hat is aligned with the emerging IEEE standards process for virtualized bridging.

Overcoming the Limitations of Traditional Virtualized Environments

Virtualization technology can be effective for a wide range of uses, but increased management complexity, scalability, network visibility, and security challenges can limit organizations' ability to deploy crucial mission-critical enterprise applications in virtualized environments. The integration of the Cisco Unified Computing System and Red Hat Enterprise Virtualization is an economical solution that helps organizations rapidly deploy, manage, scale, and secure physical and virtual infrastructure with greater efficiency. The combined benefits are enhanced by flexible virtualization support of Intel Xeon processors that enable servers from multiple generations to be consolidated to the same virtualized server pool to extend failover, load balancing, and disaster recovery capability.

Simplified Virtual Infrastructure

Cisco's radical infrastructure simplification, combined with Red Hat's cost-effective subscription approach provides organizations with both lower up-front acquisition costs and superior ROI and lower total cost of ownership (TCO) than competing solutions. Cisco UCS service profiles help deploy servers and scale infrastructure more quickly, eliminating time-consuming and error-prone manual provisioning operations. Instead, automated and policy-based procedures can be employed to reduce risk, significantly reduce provisioning time, and contain costs.

Through a single point of management for the entire hardware stack, organizations can move their servers from the loading dock and into production in minutes, rather than the days or weeks required of traditional servers or blade systems. When business requirements change, server resources can be reconfigured and repurposed with click-of-the-mouse simplicity, with everything from firmware revisions and settings to I/O device configuration managed through Cisco UCS Manager and Cisco UCS service profiles.

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Cisco UCS Manager combined with Red Hat 6 enable administrators to construct an end-to-end automation plan.

Balanced Scalability and Performance

In addition to raw performance, deploying critical applications in a virtualized environment requires balance in terms of computational scalability, memory capacity, and network throughput for virtual machines. The capability of the Cisco Unified Computing System to deliver multiple 10 Gigabit Ethernet links to individual virtual machines combines with the proven scalability of Red Hat Linux on Intel Xeon processors. Supporting a large number of virtual machines, a large number of virtual CPUs per virtual machine, and a large platform memory space, RHEV applications deployed on systems with Cisco Extended Memory Technology also yield greater virtual machine scalability and density.

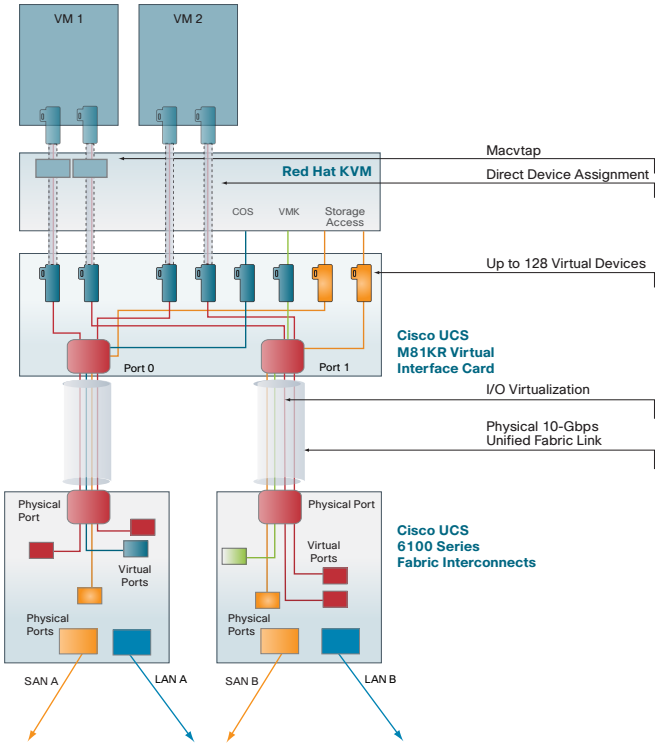
The patented Cisco Extended Memory Technology enables higher consolidation ratios and lower memory costs by supporting large memory configurations using economical 4-GB DIMMs — more than any other vendor can deliver on a two-socket server. The result is fewer systems with fewer CPUs to purchase, power, and license. The six cores of Intel Xeon processor 5600 series gives organizations an enhanced ability to balance processor and memory resources.

Exceptional Security for Virtualized Environments

In typical virtualized environments, security is often sacrificed to simplify network configurations and avoid interfering with virtual machine mobility. In some environments, virtualized I/O further obscures the networking layer, making management of security and isolation of problems even more difficult.

In contrast, Cisco's revolutionary VN-Link technology and its first hardware-accelerated implementation enables organizations to manage security on a per-virtual-machine basis, making virtual links as manageable as physical links

Figure 1. Cisco Virtual Interface Cards Implement VN-Link in Hardware and Support the RHEV I/O Requirements While Simplifying Infrastructure, Improving Performance, and Reducing Costs



(Figure 1). No other open source solution brings network visibility and control directly to VMs.

Innovation Propelled by the Momentum of the Open Source Community

The combination of Cisco Unified Computing System and Red Hat Enterprise Virtualization build on the momentum of the open-source community, providing an open, integrated and tuned environment for virtual infrastructure deployment.

- **Integrated**: Cisco and Red Hat together have integrated Cisco UCS innovations with KVM, the leading open source hypervisor. With the KVM at the heart of Red Hat Enterprise Virtualization, this integration extends benefits to the entire Linux community. Moreover, because KVM is a standard part of Red Hat Enterprise Linux, applications that run on RHEL will also run on RHEV, greatly reducing risk for those deploying virtualized applications.
- **Open**: Cisco and Red Hat together have collaborated and made significant contributions to the open source KVM hypervisor and the Linux community in general. Every innovation, from tuning efforts to new features, automatically becomes part of Red Hat Virtualization because it is derived from Red Hat Enterprise Linux. This collaboration gets new technology into customer hands more quickly: from innovations to bug fixes.
- **Tuned**: Rather than being limited by the innovations of a single vendor, the collaboration between Cisco and Red Hat draws on the nearly limitless imagination of the open source community to increase performance, resolve issues, and integrate a broad source of enhancements to propel their business.

Make the Move Today

The combination of the Cisco Unified Computing System and RHEV software means that organizations can exploit Cisco innovations such as Cisco VN-Link backed by the full momentum of the open source community. The result is an open, integrated, and tuned environment for virtual infrastructure deployment. Deploying the most demanding network- and I/O-intensive mission-critical applications in a virtualized environment has never been easier.

For More Information

Please visit: http://www.cisco.com/go/redhat.

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