

Microsoft Hyper-V: Bridging the Gap between Windows Server 2008 and SUSE Linux Enterprise 10

*Transforming Virtualization Solutions through
Combined Workloads*

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Executive Summary

The Microsoft® and Novell® development work done around Hyper-V virtualization has created a unique solution that enables Microsoft Windows Server® 2008 to host SUSE® Linux Enterprise Server 10 as an enlightened guest, consolidating workloads for increased efficiency and flexibility. A major benefit of the Microsoft and Novell interoperability partnership is the combined work done on cross-platform virtualization, which enables customers to run both Windows and Linux workloads side by side in a more seamless manner with the availability of cooperative support from both companies.

Introduction

Since 2006, Microsoft and Novell have announced a series of cooperative agreements to build, market, and support new solutions that help solve interoperability challenges for customers. The goal of the partnership is to create better solutions in a variety of technical areas, including virtualization, that help customers continue to realize the unprecedented choice and flexibility of running both SUSE Linux Enterprise Server 10 and Windows Server 2008 with the confidence that both operating systems will work together seamlessly. Through this effort, Microsoft and Novell have collaborated closely to provide a dynamic virtual environment for optimal consolidation of resources in a mixed source data center.

Virtualization enables multiple operating systems to run simultaneously on a single machine, combining workloads and reducing server-sprawl. As part of the joint technical work, Microsoft and Novell have created a Virtualization Adapter that allows Hyper-V, the virtualization platform in Windows Server 2008, to efficiently host SUSE Linux Enterprise Server 10 as an enlightened guest. By allowing Linux to run virtually on Windows, rather than virtualizing the two platforms separately, IT professionals can reduce the time and complexity associated with managing multiple physical servers for disparate workloads.

The Growing Need for Heterogeneous Virtualization

The majority of organizations today are running more than one operating system, with a growing number using both Windows and Linux. Heterogeneous virtualization allows organizations to further consolidate physical servers onto a smaller number of fully virtualized machines. With virtual machines, data center administrators can create new levels of flexibility and agility in their environments by improving resource utilization on individual servers, thus increasing the total return on those investments. Moreover, virtualization can integrate distributed systems, transforming disparate racks of compute and storage servers into a powerful, effective enterprise platform.

Microsoft's new server virtualization technology, Hyper-V, was built with such organizations in mind. Hyper-V uses enlightened virtualization, a term used to describe operating systems that are modified and optimized for virtual environments. Enlightened virtualization leads to greater performance compared to full virtualization since only a portion of the hardware is emulated. Also, Application Programming Interfaces (API) enable communication and assistance for key I/O paths.

Enterprises can take advantage of SUSE Linux Enterprise Server 10 running on Microsoft Hyper-V to:

- Increase server utilization by enabling multiple platforms to run in parallel on a single server.
- Manage one virtualization platform and streamline processes and automation scripts, while focusing expertise.
- Increase business continuity and system uptime by creating greater reliability and security through microkernelized hypervisor architecture, minimal Server Core installation, live backups with Volume Shadow Copy Services (VSS), and role-based security through Active Directory integration.
- Leverage excess data center capacity and improve response times by load balancing across data center resources.
- Redeploy physical server resources quickly and easily to meet the changing needs of the business.
- Provide application portability and flexibility across hardware platforms using Hyper-V to create a dynamic IT environment that provides self-managing dynamic systems and operational agility.
- Improve system performance by streamlining IT infrastructures onto a single server and allowing IT professionals to fully leverage the power of x64 computing.

Innovation through Partnership

Hyper-V enables IT professionals to standardize on one platform, allowing for greater levels of flexibility by running multiple platforms in parallel on a single server. As a feature of Windows Server 2008, Hyper-V can host SUSE Linux Enterprise 10 as an enlightened guest, meaning that it is Hyper-V aware. When the Xen-enabled SUSE Linux Enterprise Server 10 guest runs on Hyper-V, it uses the native Xen hypercalls to access virtualization functions. Microsoft and Novell have developed a software translation layer that adapts the Xen hypercalls into Hyper-V hypercalls so that the SUSE Linux Enterprise Server 10 guest can run with full performance as an enlightened guest. These adapters are made available through the Linux Integration Components for Hyper-V.

The Linux Integration Components provide synthetic device driver support for network, storage, and input devices for virtual Linux operating systems. Synthetic devices reside on the guest virtual machine and handle device requests at the kernel level, between the guest operating system and the parent partition via a low level communication channel called the VMBus. In addition to the synthetic device driver support, the Linux Integration Components install a hypercall adapter for the Xen-enabled Linux kernel to

provide a translation layer between Microsoft and Xen hypercalls. By enabling the Linux Integration Components, Hyper-V delivers the same high performance expected of Windows virtual machines for Linux virtual machines.

The hypercall adapter was developed as part of the collaborative interoperability effort by Microsoft and Novell engineers at the two companies' joint interoperability lab in Cambridge, Massachusetts. At the lab, engineers collaborate to optimize interoperability solutions and test interoperability scenarios to create the best solutions and user experience for customers. The Linux Integration Components can be downloaded at <http://connect.microsoft.com>.

Microsoft and Novell are constantly working together to provide the best possible solutions accompanied by a unique technical support program allowing users of Windows Server 2008 to contact either Microsoft or Novell for assistance. The two companies work together to provide enterprise-level technical support for the virtual solution, so customers can get the seamless help they need, regardless of which company they contact.

Management of Virtual Machines

Microsoft and Novell have collaborated to develop compatible implementations of WS-Management (WS-Man) protocols, which enable customers to manage Hyper-V with a single, common set of tools such as Microsoft System Center with Virtual Machine Manager. With these familiar management tools, IT professionals can streamline administration tasks across systems. The two companies are also developing a set of Linux management providers based on the Distributed Management Task Force (DMTF) Common Information Model (CIM), which will support the Open Group OpenPegasus project's Common Information Model Object Manager (CIMOM) and WS-Management. The result of this collaboration will be greater customer freedom and interoperability from management applications using common protocols to manage heterogeneous environments.

Conclusion

Until now, no two companies have worked this closely together in a partnership to create a unified solution for Windows and Linux customers. From this partnership, organizations now have a solution that allows them to run Windows and SUSE Linux

Enterprise in a way that is easy to manage and that helps optimize their servers, leveraging the benefits of virtualization. The Microsoft and Novell business model solution bridges the gap between open source and proprietary software to deliver interoperability and intellectual property (IP) peace of mind for organizations running mixed-source IT environments.

With Hyper-V, Windows Server 2008 users can host SUSE Linux Enterprise Server 10 as an enlightened guest, consolidating workloads for increased efficiency and flexibility. Microsoft and Novell have worked closely together since 2006 and are committed to provide future solutions that solve interoperability challenges. In the future, both companies will work with channel partners to create additional combined offerings for Linux and Windows.

For more information on Microsoft and Novell interoperability solutions, go to www.moreinterop.com.

Additional resources:

- www.microsoft.com/windowsserver2008/
- www.microsoft.com/virtualization/
- www.novell.com/linux/
- www.novell.com/virtualization/

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