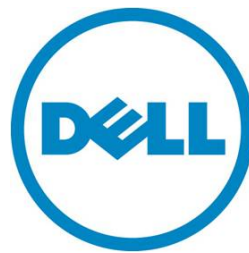# What Dell and Windows Server 2012 Can Do for You

*The newest Microsoft operating system and the latest generation of Dell PowerEdge servers can help you succeed in the future with greater productivity and lower costs.*

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# Introduction

The march toward cloud computing continues to accelerate. Those who do not "adapt and adopt" run the risk of being left behind, technologically and competitively. In an era where technology is expected to drive profitability, you need the versatility, availability and scale that cloud computing promises.

IT market researcher Gartner predicts worldwide cloud services revenues will approach $150 billion by 2014, equally driven by the need for software, infrastructure and platforms. Moving to the cloud requires a top-to-bottom strategy involving every department IT touches. Therefore, you need to keep many things in mind with a cloud deployment, including:

- Determining the right cloud approach—private, public or hybrid

- Identifying the right architecture and security; the right mix of services, such as SaaS, PaaS or IaaS

- Migrating legacy applications and how to change your future development patterns

- Developing best practices to minimize risk

Your timing could not be better to make a cloud move. Dell™ is preparing to ship Windows Server® 2012, a significant new Microsoft® server OS, with many key features supporting cloud computing environments. Microsoft has drawn upon its experience running the Azure cloud service on Windows Server 2008 and has made important changes to the structure of Windows Server 2012, from the Hyper-V® hypervisor to Windows PowerShell®, its task-based command-line shell and scripting language. And, as a perfect complement to this new OS, Dell has recently released its wide ranging portfolio of Dell PowerEdge™ 12th generation servers, loaded with innovative features that can power cloud computing and manage complex infrastructures in a simpler, centralized, more automated way.

# Why change now?

While reluctance to disrupt a smooth-running system is understandable, IT departments are facing an important cut-off date. Extended Support, the last phase of Microsoft OS support for Windows Server 2003, is scheduled to end in July 2015. This means no more fixes, no more support calls, nothing. If hackers find a new vulnerability, it will not be fixed.

Microsoft estimates that Windows Server 2003 comprises approximately 80 percent of its server OS install base; so a large number of businesses will have to make an important strategic decision in the next two years.

The good news is that with Hyper-V enabled in Windows Server 2012, Windows Server 2003 can run in a virtual environment. So even if you don't get your business-critical applications migrated to run on Windows Server 2012, they will still be able to run in a secure, virtual environment that is isolated from the rest of the system and protected with the advanced failover protection featured in Windows Server 2012.

# Built to scale

Windows Server 2003 was introduced in the era of dozens of servers in one cold room, or maybe a departmental server in a closet. Windows Server 2008 arrived in the era of hundreds of rack-mounted servers in a big, cold room. Now, we are in the era of thousands of blades in a data center the size of a supermarket.

The 80 percent of customers running Windows Server 2003 are using an OS written for single-core, 32-bit processors back in the era of application-dedicated servers, and they are likely running at single-digit utilization levels. This has caused many enterprises to develop a bad case of server sprawl as they have scaled out while trying to keep up with space, power and cooling demands because hardware and software limitations of the time kept them from scaling *up*.

With the Dell PowerEdge 12th generation server portfolio, you can reduce your hardware footprint to a fraction of what it once was, or use the same space and dramatically increase business productivity. Either way, you will find a drastic improvement in your electric bill because of advances in power efficiency and management. Windows Server 2012, combined with Dell's extensive PowerEdge portfolio, delivers the virtualization capabilities to consolidate the workloads of many physical servers to a single system, and the scalability you need to grow your business and be assured of the capacity you may need in the future.

This new server generation offers huge amounts of memory scalability, because we realize that memory is key to performance and virtualization. Dell's two-socket, Intel® Xeon® based PowerEdge 12$^{th}$ generation servers offer up to 12 cores and 24 memory DIMM slots, and a four-socket PowerEdge server contains up to 48 DIMM slots.

Likewise, the scalability of Windows Server 2012 is tremendous and is an ideal environment for the latest version Hyper-V. The previous version of Hyper-V was limited to 32GB of RAM in a VM. Now, Hyper-V will allow virtual machines to support up to 512GB of RAM and 2TB of disk storage.

Windows Server 2012 clusters can contain up to 64 nodes, well above the 16-node capability in Windows Server 2008. In addition, they support up to 2,048 total virtual processors per host and up to 1,204 active virtual machines per host, with up to 4,000 virtual machines per failover cluster. Hyper-V also supports up to 320 logical processors per hypervisor instance, with 64 virtual processors per VM.

# Integrated management

Part of the challenge in responding quickly and effectively to end-user problems and business requests is that you often have to use multiple tools from multiple vendors making each task time consuming.

Dell has worked extensively with Microsoft to ensure that we integrate our infrastructure management technology seamlessly with the systems management framework you already use to manage your Microsoft software environments. This allows you to reduce complexity and save time, achieve efficiency, and control costs, while empowering greater productivity. Dell OpenManage™ integration with Microsoft System Center enables you to use fewer tools to manage your infrastructure and streamline tasks with low-touch processes.

With Dell OpenManage Integration Suite for Microsoft System Center, you can improve overall IT asset manageability and optimize your existing IT skills, resources and investments. You can eliminate time-consuming tasks entirely and automate IT operations to reduce human error and downtime. Dell Server and Client Deployment Packs allow you to automate bare-metal configuration and deployment, and Dell Server and Client Update Catalogs update BIOS, firmware and drivers on Dell hardware through System Center 2012 Configuration Manager (SCCM).

Dell Hardware Management Packs allow you to discover, monitor and assess the status of Dell servers, storage, business clients and printers from the same System Center 2012 Operations Manager (SCOM) console you use to monitor your application environments.

Dell Server Pro Management Pack with PRO-Tips allows you to effectively manage PowerEdge servers that host virtual workloads running on Microsoft Hyper-V from System Center Virtual Machine Manager (VMM) and quickly take remedial action if an alert is generated.

## A faster network pipe

Dell already provides networking adapters that support partitioning of one 10Gb Ethernet port with up to four virtual ports. Windows Server 2012 enhances this offering with built-in network virtualization, something improved upon from Windows Server 2008 and new from Windows Server 2003. You used to need virtual LANs to divide the network traffic, which can be complex and difficult to manage. Windows Server 2012 comes with full network virtualization so you can even have the same, non-conflicting IP address range for two different tenants.

This enhancement allows for multi-tenancy, a crucial step in virtualization, where dozens and even hundreds of virtual machines can all co-exist on the same physical server and share the same I/O path without colliding or interfering with each other, or inadvertently sharing data or choking other servers.

Live migration is considerably improved in Windows Server 2012, both from server-to-server in the data center and between your private cloud and a public cloud provider. First, you can move virtual machines between a public and private cloud seamlessly—between your data center to Amazon EC2—and with no interruption, using VPN tunneling. To accomplish this, all you need is the IP address for the target location.

You will also be able to perform concurrent live migrations using Windows Server 2012, whereas Windows Server 2008 would only allow one migration at a time. All you need is a network connection between hosts to migrate a VM, and a virtual machine can now be moved without downtime.

## Beyond the cloud

Windows Server 2012 isn't just a cloud play, and it has plenty of other business applications. In a time of ever-shrinking IT budgets, along with Dell's OpenManage integration with Microsoft System Center 2012, Windows Server 2012 makes it cheaper to run a lights-out server operation with fewer staff and less hardware, all from a central management location.

One way this is done is with the improved PowerShell 3.0, which has been given a significant upgrade. Windows Server 2008 R2 had about 230 commandlets—powerful mini-scripts—for managing the server, while Windows Server 2012 introduces over 2,400 commandlets. Among the new features in

PowerShell is the ability to export commands and functions, so you write a function once and, if needed, it can be replicated over thousands of servers.

PowerShell is a perfect complement to Dell's iDRAC with Lifecycle Controller embedded management software that enables remote, agent-free management for the entire server lifecycle. Customers can create customizable scripts with PowerShell or take advantage of Dell Lifecycle Controller Integration (DLCI) with System Center 2012 Configuration Manager and Operations Manager to automate remote deployment, updates, monitoring and maintenance of Dell PowerEdge servers without installing an OpenManage agent.

Among the many storage improvements in Windows Server 2012 is one that Microsoft and Dell collaborated on, called Offloaded Data Transfer (ODX). This feature saves time and resources by eliminating the requirement to copy or move data up to the host system memory and back when transferring data from one set of storage resources to another. Data movement is offloaded to the external storage subsystem through a command with appropriate parameters via the host, thus allowing the array itself to perform the burden of copying the data to another storage device.

The offload functionality spares server hosts from using CPU cycles to perform Storage Migration copy operations. These operations are now handled on the storage system rather than consuming server and infrastructure resources.

Windows Server 2012 also introduces the Resilient File System (ReFS), which improves on the legacy New Technology File System (NTFS). ReFS uses a new 64-bit storage methodology for metadata and file data, which gives you maximum file sizes of up to 16 exabytes and a maximum volume size of 1 yottabyte. That's 1,000 exabytes, and we haven't even touched Exabyte computing. It has many new features to handle metadata, such as allocation-on-write update and 64-bit checksums for metadata, which are stored independently to protect integrity.

Windows Server 2012, combined with Dell PowerEdge 12$^{th}$ generation servers, Dell EqualLogic™ or Compellent™ Storage, delivers a level of reliability, clustering, and automated failover comparable to the five 9s uptime once promised only by mainframes and giant UNIX® servers.

This new capability presents the opportunity to consolidate and retire older, power-inefficient infrastructure for the latest, highly integrated servers, storage and networking that use a fraction of the power, require much less space, and make use of recent (today's) innovative technologies that will carry your business successfully into the future.