

Implementing Microsoft Windows Server 2008 Hyper-V on HP ProLiant servers

Integration note, 3rd edition

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Introduction

The purpose of this integration note is to help you install Microsoft Windows Server 2008 with Hyper-V, Microsoft Hyper-V Server 2008, and the R2 versions of these products. It describes the level of support available for these hypervisor-based software platforms for running multiple guest operating systems on a single server. This integration note addresses the following key topics:

- Introduction to Microsoft products that provide Hyper-V functionality
- Recommended system configurations
- Hardware prerequisites
- Supported configurations of HP ProLiant servers
- Procedures for new installations
- Known issues and workarounds

You can install Windows Server 2008 Hyper-V as a server role on Windows Server 2008 Standard, Enterprise, or Datacenter x64 edition installations (both full and server core installations).

Microsoft Hyper-V Server 2008, on the other hand, is a dedicated stand-alone product. It contains only the Windows Hypervisor, Windows Server driver model, and virtualization components, which leave a small footprint and require minimal overhead. Microsoft Hyper-V Server 2008 is available as a free download from the Microsoft web site at <http://www.microsoft.com/hyper-v-server>.

The following editions of Windows Server 2008 do not support Hyper-V

- Windows Server 2008 x86 editions
- Windows Server 2008 Foundation
- Windows Server 2008 Standard
- Windows Server 2008 Enterprise
- Windows Server 2008 Datacenter
- Windows Server 2008 for Itanium-Based Systems
- Windows Web Server 2008 x86

All versions of Windows Server 2008 available from HP include support for Hyper-V. If you require additional information about Windows Server 2008, go to the "For more information" section at the end of this paper.

NOTE

Microsoft included a beta version of Hyper-V with most Windows Server 2008 RTM for x64 editions. If you purchased these versions, you must download and install the final release version of Hyper-V before using it in a production environment. The final released version of Hyper-V is available from Microsoft. Go to <http://www.microsoft.com/hyper-v>.

Windows Hyper-V platforms

Your administrators want flexibility in allocating compute resources for specific tasks. Windows Server 2008 Hyper-V and Microsoft Hyper-V Server 2008 include virtualization technologies that give them this flexibility by decoupling the hardware from the work performed. These platforms offer the following functionality:

- Live backups with Volume Shadow Copy Services (VSS)—Support for VSS enabling live snapshot backups of running virtual machines
- Virtual Hard Disk (VHD) Tools—Tools to compact, expand, and inspect VHDs created with Hyper-V
- VM Manageability—The ability to clone virtual machine characteristics across different hosts through backups of imported or exported virtual machine configurations
- Linux Integration Components—Support for SLES 10 SP1 (x86 and x64 editions). It is available at <http://www.microsoft.com/download/en/search.aspx?q=linux+integration> .
- Improved performance—Enhancements that will improve system performance
- Improved access control with Authorization Manager (AzMan)—Secure role-based access control models for improved administration available through AzMan
- Remote management—Support for remote management and for a Hyper-V Microsoft Management
- Console-only option for separate management nodes
- Increased virtual SCSI support—Support for up to four virtual SCSI controllers per virtual machine
- Increased memory support—Support for up to 64 GB of memory per virtual machine
- Quick reset—Option to quickly reset check boxes and to delete saved credentials when connecting to virtual machines

Table 1 lists common virtualization terminology that administrators should know.

Table 1: Virtualization terminology

Term	Description
Child virtual machine	Guest OS running in separate partition on the host OS
Guest operating system	OS running on a virtual machine
Host operating system	OS on the physical computer running Windows Server 2008 Hyper-V software
Parent virtual machine	Physical computer that hosts one or more child virtual machines
Partition	A virtual machine
Virtual hard disk	VHD file that provides storage for the virtual machines
Windows hypervisor	Layer of software that leverages the Windows Server driver support and hardware-assisted virtualization technology

Windows Server 2008 Hyper-V 2

Windows Server 2008 Hyper-V is a robust, scalable hypervisor-based virtualization platform for provisioning and managing virtual server workloads. It includes the following features that were not available with Microsoft Virtual Server 2005 R2:

- Full integration with Windows Server 2008 (installed as server role)
- Support for both 64-bit and 32-bit guest OSs
- Ability to assign up to four virtual CPUs and 64 GB of RAM to each guest OS
- Improved management interface
- Extensible VMBus architecture that improves performance by reducing the overhead of guest OS I/O

Microsoft identifies the following as target environments for Windows Server 2008 Hyper-V:

- Production Server Consolidation—Windows Server 2008 Hyper-V can benefit organizations that want to consolidate servers in their data centers.
- Business Continuity Management—Windows Server 2008 Hyper-V can minimize the impact of unscheduled downtime.
- Software Test and Development—Administrators can assign a child partition to development resources to reduce the server hardware in the data center.
- Dynamic Data Center—Administrators can add resources to virtual machines and move them across physical machines without affecting users.

Windows Server 2008 Hyper-V includes the following new technologies:

- Quick Migration—The ability to move running virtual machines from one host server to another with minimal downtime
- High Availability—Support for host-to-host connectivity and cluster support for all virtual machines running on a host server
- Server Core Role—Support for Windows Server 2008 Hyper-V as a role within server core-based installations of Windows Server 2008
- Server Manager Integration—Installation of the role available within the Server Manager administrative console

NOTE

Certain features could require additional Microsoft software. Visit the Microsoft website (www.microsoft.com) for details on software requirements for these features.

A list of supported guest operating systems that are compatible with Windows Server 2008 Hyper-V is available at the Microsoft website. Find it at www.microsoft.com/windowsserver2008/en/us/hyperv-supported-guest-os.aspx.

Microsoft Hyper-V Server 2008

Microsoft Hyper-V Server 2008 is a dedicated, stand-alone product that contains only the Windows Hypervisor, driver model, and virtualization components. The virtualization solution improves server utilization and reduces costs. As a server core-based installation, Hyper-V Server leaves a small footprint and requires minimal overhead. It easily plugs into customers' existing IT environments and uses existing patching, provisioning, management, support tools, and processes. Microsoft Hyper-V Server 2008 is well suited for customers who want a basic virtualization solution to consolidate servers and to develop and test environments. Hyper-V Server 2008 offers the most basic of virtualization features:

- Test and development
- Basic server or branch office consolidation
- Hosted desktops by using virtualized desktop infrastructure (VDI)

Comparison of Microsoft Hyper-V enabled products

Table 2 shows the differences in functionality between Microsoft Hyper-V Server 2008 and Windows Server 2008 Hyper-V.

Table 2: Functionality comparison of Hyper-V enabled products

Virtualization need	Microsoft Hyper-V Server 2008	Windows Server 2008 Hyper-V		
		Standard	Enterprise	Datacenter
Server consolidation	✓	✓	✓	✓
Test and development	✓	✓	✓	✓
Mixed OS virtualization (Linux and Windows)	✓	✓	✓	✓
Local GUI		✓	✓	✓
High availability—clustering			✓	✓
Quick migration			✓	✓
Large memory support (host OS) > 32 GB RAM			✓	✓
Support for > 4 processors (host OS)			✓	✓
Ability to add additional server roles		✓	✓	✓
Virtualization rights per server license	Each VM guest requires a server license	1 physical + 1 VM	1 physical + 4 VMs	1 physical + unlimited VMs

Obtaining Windows Hyper-V and required patches

For Windows Server 2008 Hyper-V, you can find download and installation instructions at www.microsoft.com/hyper-v. The download replaces the beta version of Hyper-V that shipped with Windows Server 2008. Microsoft Hyper-V Server 2008 is a free download that does not require Windows Server 2008. For download and installation instructions, visit www.microsoft.com/hyper-v-server. Microsoft recommends several updates and hot fixes for Hyper-V installations.

Configuration requirements

Hyper-V uses a hardware-assisted feature built into Intel and AMD processors.

- On Intel-based ProLiant servers, this feature is called Intel Virtualization Technology, or VT-x.
- On AMD-based ProLiant servers, this feature is called AMD-Virtualization, or AMD-V.

On ProLiant servers, you must activate this feature before installing Hyper-V. Refer to the section [“Enabling support for hardware-assisted virtualization in the ROM-Based Setup Utility \(RBSU\)”](#) in this document.

Recommended system configurations

Microsoft and HP established the recommended system configurations for Windows Server 2008 OS installations listed in this section.

Microsoft recommendations

Microsoft recommends the configurations in Table 3 for running Windows Server 2008 with Hyper-V or Microsoft Hyper-V Server 2008.

Table 3: Host OS configuration recommended by Microsoft

Component	Requirement
Processor speed:	
Minimum	1 GHz
Recommended	2 GHz
Optimal	3 GHz or faster
RAM per processor:	
Minimum	512 MB
Recommended	2 GB
Optimal	2 GB (full) or 1 GB (core)
Maximum RAM 64-bit systems: [1]	
Hyper-V Server 2008	32 GB
Standard	32 GB
Enterprise or Datacenter	2 TB
Monitor	SVGA resolution (800 x 600) or higher
Optical storage	DVD drive
Available disk space [2]:	
Minimum	10 GB
Recommended	40 GB or greater

NOTES:

[1] Computers with more than 16 GB of RAM will require more disk space for paging and dump files.

[2] Available disk space refers to the free disk space on the partition to contain the system files. Additional space is required if the Windows Server 2008 CD contents are copied to the hard disk during installation.

HP recommendations

HP recommends the configurations in Table 4 for running Windows Server 2008 Hyper-V as the parent virtual machine.

Table 4: Configurations recommended by HP for running the parent virtual machine

Component	Requirement
Processor:	
Minimum	Dual-core, 1.6 GHz
Recommended	Dual-core, 2.66 GHz
Optimal	Two quad-cores, 3 GHz or faster
RAM per processor core:	
Minimum	512 MB
Recommended	2 GB
Optimal	3 GB
Disk subsystem:	
Minimum	1 physical disk for host OS, 1 additional disk per guest OS
Recommended	1 redundant disk for host OS, 1 additional redundant disk per 2 guest OSs
Optimal	1 redundant disk for host OS, 1 additional redundant disk for snapshots, and 1 additional redundant disk per two guest OSs
Network interface controllers:	
Minimum	1 NIC for host OS management and guest virtual networking
Recommended	1 NIC for host OS Management and 1 NIC for guest virtual networking

Processor requirements

Microsoft provides virtualization functionality in Windows Server 2008 x64 Standard, Enterprise, or Datacenter Edition for systems with the following processors:

- Intel Xeon processors with Intel Extended Memory 64 Technology (EM64T)
- Advanced Micro Devices, Inc. (AMD64) Opteron Series processors

Table 5 lists the processor requirements for Hyper-V.

Table 5: Configurations recommended by HP for running the parent virtual machine

Component	Requirement
Processor	AMD-V or Intel-VT
RAM per processor:	
Minimum	1 GB
Recommended	2 GB
Optimal	4 GB
Hardware data execution prevention	Enabled

Hyper-V supports 24 logical processor cores. A maximum of four virtual processors can be assigned to a single guest OS. For steps on how to enable hardware data execution prevention and virtualization in the HP ROM, refer to the installation instruction section of this integration note.

HP ProLiant support of Hyper-V

Due to hardware requirements, not every ProLiant server platform will support Hyper-V. Windows Server 2008 Hyper-V and Microsoft Hyper-V Server 2008 should run on any correctly configured ProLiant server listed in Table 6. Review this paper for the recommended system configuration and possible issues, but do not use this paper as your sole source of information. Table 6 lists the ProLiant servers with processors that support hardware-assisted virtualization and the minimum ROM revision required to support Hyper-V. HP highly recommends that your administrators review the information in Table 6 before attempting to install Windows Server 2008 Hyper-V or Microsoft Hyper-V Server 2008.

Table 6: ProLiant server platforms that support Hyper-V

Server platform	ROM family	ROM date (earliest)	Server platform	ROM family	ROM date (earliest)
ProLiant BL servers					
ProLiant BL260c G5	I20	04/15/08	ProLiant BL480c	I14	08/21/07
ProLiant BL280 G6	I22	03/21/09	ProLiant BL490c G6	I21	02/24/09
ProLiant BL460c	I15	08/21/07	ProLiant BL495 G5	A14	09/15/08
ProLiant BL460c G5	I23	08/04/08	ProLiant BL680c G5	I17	08/09/07
ProLiant BL460c G6	I24	02/24/09	ProLiant BL685c	A08	09/23/07
ProLiant BL465c	A13	09/23/07	ProLiant BL685c G5	A08	03/27/08
ProLiant BL465c G5	A13	02/14/08			
ProLiant DL servers					
ProLiant DL160 G5	O12	08/22/08	ProLiant DL380 G5	P56	08/21/07
ProLiant DL160 G5p	O12	08/22/08	ProLiant DL380 G6	P62	02/23/09
ProLiant DL160 G6	O33	03/10/09	ProLiant DL385 G2	A09	09/23/07
ProLiant DL165 G5	O13	08/15/08	ProLiant DL385 G5	A09	03/27/08
ProLiant DL180 G6	O20	03/10/09	ProLiant DL385 G5p	A22	09/17/08
ProLiant DL360 G5	P58	08/21/07	ProLiant DL580 G4	P59	08/10/07
ProLiant DL360 G6	P64	03/03/09	ProLiant DL580 G5	P61	08/08/07
ProLiant DL365	A10	09/23/07	ProLiant DL585 G2	A07	11/21/07
ProLiant DL365 G5	A10	03/27/08	ProLiant DL585 G5	A07	03/28/08
ProLiant DL370 G6	P63	03/04/09	ProLiant DL785 G5	A15	3/31/08
ProLiant ML servers					
ProLiant ML150 G6	O21	03/19/09	ProLiant ML370 G5	P57	08/21/07
ProLiant ML350 G5	D21	08/21/07	ProLiant ML370 G6	P63	03/04/09
ProLiant ML350 G6	D22	02/23/09			

The ROM versions indicated in Table 6 are the minimum required for support. We recommend that you download the current ROM release and apply the latest updates to the ProLiant server. We continually adds support for new servers. To see the current list of supported servers, visit www.hp.com/go/windowscert.

Supported ProLiant components

Software

We recommend using the drivers on the Windows Server 2008 media for Windows Server 2008 Hyper-V. Before installing the Windows Server 2008 Hyper-V role, install the HP ProLiant Support Pack for Windows Server 2008. It is included with SmartStart 8.00 (or later). With this release, We do not support installing the Support Pack on a Windows Server 2008 server running as a guest OS within Windows Server 2008 Hyper-V.

NOTE

ProLiant 100 series servers do not use the ProLiant Support Pack. For supported 100 series servers, use the Driver Support CD that came with the server to install and update drivers.

Storage options

Table 7 lists supported ProLiant storage options and recommended driver revisions needed to work with Windows Server 2008. We have updated the ProLiant Support Pack (PSP) 8.70 for Windows Server 2008 with the latest drivers. You can find this package on the HP website at www.hp.com/go/ws2008.

Table 7: Supported ProLiant storage controller options

Option	Driver	Location		Installation support		Supported architecture	
		PSP 8.70	Windows Media	Full	Server Core	X86	X64
Management drivers							
Notification driver, Smart Array 5xxx	CPQCISSE.SYS	✓		✓		✓	✓
SAS/SATA Notification Service	CISSESRV.EXE	✓		✓		✓	✓
StorageWorks Fibre Channel Array Notification Driver for Windows 2000/ Server 2003	CPQFCAC.SYS	✓		✓		✓	✓
6-Port SATA RAID Controller	AAC.SYS	✓		✓		✓	

Table 7: Supported ProLiant storage controller options (Continued)

Option	Driver	Location		Installation support		Supported architecture	
		PSP 8.70	Windows Media	Full	Server Core	X86	X64
Smart Array Controllers							
E200	HPCISS2.SYS (full-feature)	✓		✓	✓	✓	✓
E200i	HPCISS2.SYS (full-feature)	✓		✓	✓	✓	✓
E500	HPCISS2.SYS (full-feature)	✓		✓	✓	✓	✓
P400	HPCISS2.SYS (full-feature)	✓		✓	✓	✓	✓
P400i	HPCISS2.SYS (full-feature)	✓		✓	✓	✓	✓
5i	HPCISS.SYS (full-feature)	✓		✓	✓	✓	✓
5i Plus	HPCISS.SYS (full-feature)	✓		✓	✓	✓	✓
6i	HPCISS.SYS (full-feature)	✓		✓	✓	✓	✓
6402	HPCISS.SYS (full-feature)	✓		✓	✓	✓	✓
6404	HPCISS.SYS (full-feature)	✓		✓	✓	✓	✓
641	HPCISS.SYS (full-feature)	✓		✓	✓	✓	✓
642	HPCISS.SYS (full-feature)	✓		✓	✓	✓	✓
P600	HPCISS2.SYS (full-feature)	✓		✓	✓	✓	✓
P800	HPCISS2.SYS (full-feature)	✓		✓	✓	✓	✓
ProLiant Host Bus Adapters							
HP 8 Internal Port SAS HBA with RAID	TBD	✓		✓	✓	✓	✓
SC44Ge Host Bus Adapter	TBD	✓		✓	✓	✓	✓
Integrated Dual Channel Ultra320 SCSI Controller	SYMMPI.SYS		✓	✓	✓	✓	✓
64-bit/13-MHz Single Channel Ultra320 SCSI Host Bus Adapter	SYMMPI.SYS		✓	✓	✓	✓	✓
64-bit/13-MHz Dual Channel Ultra320 SCSI Host Bus Adapter	SYMMPI.SYS		✓	✓	✓	✓	✓

Table 7: Supported ProLiant storage controller options (Continued)

Option	Driver	Location		Installation support		Supported architecture		
		PSP 8.70	Windows Media	Full	Server Core	X86	X64	
Fibre Channel Host Bus Adapters								
HP model	Vendor model							
AB429A	QLogic QLA2460	QL2300.SYS	✓	✓	✓	✓	✓	✓
AE369A	QLogic QLa2462	QL2300.SYS	✓	✓	✓	✓	✓	✓
AE311A	QLogic QLe2460	QL2300.SYS	✓	✓	✓	✓	✓	✓
AE312A	QLogic QLe2462	QL2300.SYS	✓	✓	✓	✓	✓	✓
QMH2462	QLogic QMH2462	QL2300.SYS	✓	✓	✓	✓	✓	✓
81Q	QLogic QLe2560	QL2300.SYS	✓	✓	✓	✓	✓	✓
82Q	QLogic QLe2562	QL2300.SYS	✓	✓	✓	✓	✓	✓
A7388A	Emulex LP1050	ELXSTOR.SYS	✓	✓	✓	✓	✓	✓
A7387A	Emulex 1050DC	ELXSTOR.SYS	✓	✓	✓	✓	✓	✓
FC2243	Emulex LP11002	ELXSTOR.SYS	✓	✓	✓	✓	✓	✓
FC2143	Emulex LP1150	ELXSTOR.SYS	✓	✓	✓	✓	✓	✓
FC2242	Emulex LPe11002	ELXSTOR.SYS	✓	✓	✓	✓	✓	✓
FC2142	Emulex LPe11050	ELXSTOR.SYS	✓	✓	✓	✓	✓	✓
81E	Emulex LPe1200	Elxstor.sys	✓	✓	✓	✓	✓	✓
82E	Emulex LPe12002	ELXSTOR.SYS	✓	✓	✓	✓	✓	✓

You can find firmware upgrades for many of these devices through variations of the Options ROMPaq. The latest version of each Options ROMPaq is available on the software and drivers website www.hp.com/cgi-bin/hpsupport/index.pl.

NOTE

For information about Storage Array Network (SAN) components, supported host bus adapters, switches, and other components, go to the Single Point Of Connectivity Knowledge (SPOCK) website. Find it at <http://www.hp.com/storage/spock>.

Network interface controllers

Table 8 lists ProLiant NICs supported by Windows Server 2008. All NIC drivers are available on the Windows Server 2008 ProLiant Support Pack (PSP) and have a digital signature. HP-branded drivers are not available on the Windows Server 2008 media. NIC drivers from Intel and Broadcom install by default during Windows Server 2008 installation.

Table 8: ProLiant Gigabit Ethernet NICs supported by Windows Server 2008

Gigabit NIC	Driver	Location		Installation support		Supported architecture	
		PSP 8.70	Windows Media	Full	Server Core	X86	X64
NC1020	Q57XP32.SYS	✓	✓	✓	✓	✓	
	Q57AMD64.SYS	✓	✓	✓	✓		✓
NC112T	N1Q6032.SYS	✓		✓	✓	✓	
	N1Q60X64.SYS	✓		✓	✓		✓
NC150T	Q57XP32.SYS	✓	✓	✓	✓	✓	
	Q57AMD64.SYS	✓	✓	✓	✓		✓
NC130	N1000325.SYS	✓	✓	✓	✓	✓	
	N1G5132E.SYS	✓	✓	✓	✓		✓
NC320m	Q57XP32.SYS	✓	✓	✓	✓	✓	
	Q57AMD64.SYS	✓	✓	✓	✓		✓
NC320T	Q57XP32.SYS	✓	✓	✓	✓	✓	
	Q57AMD64.SYS	✓	✓	✓	✓		✓
NC325m	Q57XP32.SYS	✓	✓	✓	✓	✓	
	Q57AMD64.SYS	✓	✓	✓	✓		✓
NC326m	Q57XP32.SYS	✓	✓	✓	✓	✓	
	Q57AMD64.SYS	✓	✓	✓	✓		✓
NC340T	N1000325.SYS	✓	✓	✓	✓	✓	
	N1G5132E.SYS	✓	✓	✓	✓		✓
NC360T	N1E5132.SYS	✓	✓	✓	✓	✓	
	N1E5132E.SYS	✓	✓	✓	✓		✓
NC364T	N1E5132.SYS	✓	✓	✓	✓	✓	
	N1E5132E.SYS	✓	✓	✓	✓		✓
NC370T/F/i	BXVBDX.SYS	✓	✓	✓	✓	✓	
	BXVBDA.SYS	✓	✓	✓	✓		✓

Table 8: ProLiant Gigabit Ethernet NICs supported by Windows Server 2008 (Continued)

Gigabit NIC	Driver	Location		Installation support		Supported architecture	
		PSP 8.70	Windows Media	Full	Server Core	X86	X64
NC371i	BXVBDX.SYS	✓	✓	✓	✓	✓	
	BXVBDA.SYS	✓	✓	✓	✓		✓
NC373T/F/M/i	BXVBDX.SYS	✓	✓	✓	✓	✓	
	BXVBDA.SYS	✓	✓	✓	✓		✓
NC374M	BXVBDX.SYS	✓	✓	✓	✓	✓	
	BXVBDA.SYS	✓	✓	✓	✓		✓
NC380T	BXVBDX.SYS	✓	✓	✓	✓	✓	
	BXVBDA.SYS	✓	✓	✓	✓		✓
NC512m	BXVBDX.SYS	✓	✓	✓	✓	✓	
	BXVBDA.SYS	✓	✓	✓	✓		✓
NC522SFP	HPND6X86.SYS	✓		✓	✓	✓	
	HPND6X64.SYS	✓		✓	✓		✓
NC6170	N1000325.SYS	✓	✓	✓	✓	✓	
	N1G5132E.SYS	✓	✓	✓	✓		✓
NC7170	N1000325.SYS	✓	✓	✓	✓	✓	
	N1G5132E.SYS	✓	✓	✓	✓		✓
NC7761	Q57XP32.SYS	✓	✓	✓	✓	✓	
	Q57AMD64.SYS	✓	✓	✓	✓		✓
NC7771	Q57XP32.SYS	✓	✓	✓	✓	✓	
	Q57AMD64.SYS	✓	✓	✓	✓		✓
NC7781 (PCI-X LOM for 32-bit systems)	Q57XP32.SYS	✓	✓	✓	✓	✓	
	Q57AMD64.SYS	✓	✓	✓	✓		✓
NC7783 PCI-X	Q57XP32.SYS	✓	✓	✓	✓	✓	
	Q57AMD64.SYS	✓	✓	✓	✓		✓

HP ProLiant Network Teaming Software [HP Network Configuration Utility (NCU) version 9.35 or greater] supports NIC teaming for Hyper-V. We include it with HP ProLiant Support Pack (PSP) 8.70 on the HP SmartStart CD. You can also download it from the HP website at <http://www.hp.com>.

Deploying Windows Server 2008 Hyper-V on ProLiant servers

You must install Windows Server 2008 Hyper-V manually after installing Server 2008.

IMPORTANT

The procedures in this integration note are for installing Windows Server 2008 Hyper-V with a full Windows Server 2008 installation. For instructions on performing a migration from an existing beta version of Hyper-V or for installation using server core, go to [http://technet.microsoft.com/en-us/library/cc753802\(v=WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc753802(v=WS.10).aspx)

To install Windows Server 2008 Hyper-V on a ProLiant server, do the following:

- Ensure that the server is listed in Table 6 and has the necessary support for hardware-assisted virtualization.
- Ensure that any additional storage options added to the server are supported ProLiant storage options.
- Ensure that NICs added to the server are supported ProLiant Gigabit Ethernet NICs.
- Go to the support and drivers page at www.hp.com/support to obtain the supported ROM for Windows Server 2008 installations for the server.
- Ensure that Microsoft Windows Server 2008 has been installed using the procedure outlined in the document "Implementing Microsoft Windows Server 2008 on HP ProLiant servers."
- Enable support for No-Execute and hardware-assisted virtualization in the RBSU (if necessary).
- Use the RBSU to set date and time and to configure the boot controller order (if necessary).
- Use the Online RAID Configuration Utility (ORCA) to configure the RAID settings for the server.
- If you install HP Systems Insight Manager and agents, ensure that SNMP is loaded and the service is started.

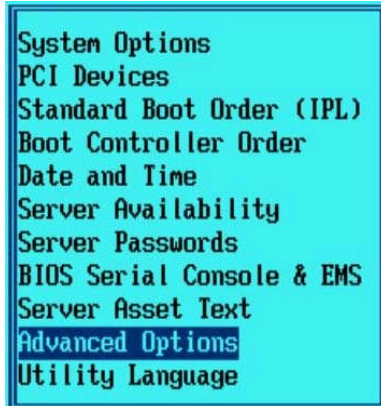
Enabling support for hardware-assisted virtualization in the RBSU

Windows Server 2008 Hyper-V uses an advanced processor feature known as hardware-assisted virtualization. In most ProLiant servers, you must enable this feature before installing Windows Server 2008 Hyper-V. Enable hardware-assisted virtualization by following the appropriate procedure in the following sections.

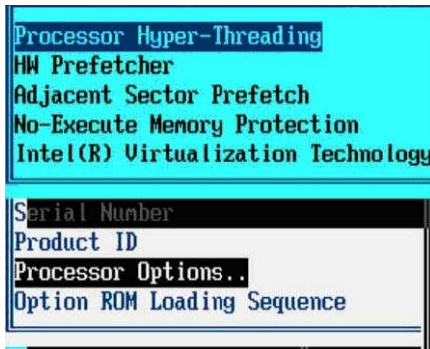
ProLiant servers with Intel processors

To enable support for hardware-assisted virtualization in the RBSU, complete the following steps:

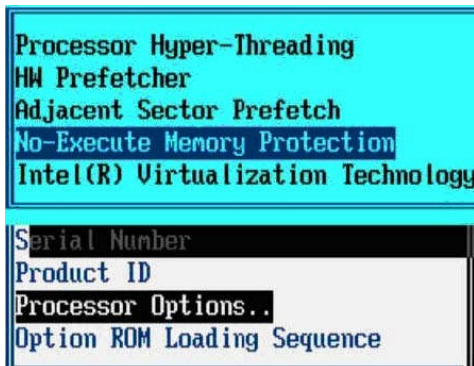
1. Restart or power-on the server.
2. Access the RBSU by pressing **F9** when prompted.
3. From the RBSU Menu, select **Advanced Options**.



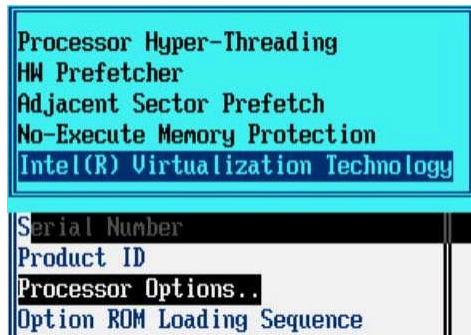
4. From the Advanced Options menu, select **Processor Options**.
5. If the server supports Hyper Threading, select **Processor Hyper-Threading**, press **Enter**. For G6 and G7 systems, the recommended Enabled/Disabled setting is Enabled.



6. Select **No-Execute Memory Protection**, press **Enter**, and then select **Enabled**.



7. Select **Intel(R) Virtualization Technology**, press **Enter**, and then select **Enabled**.

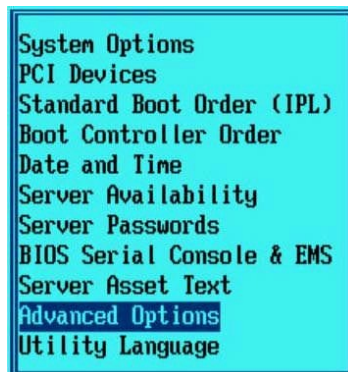


8. Press the **Esc** key until you receive a prompt to press **F10** to confirm exiting the RBSU. The server will perform a restart.

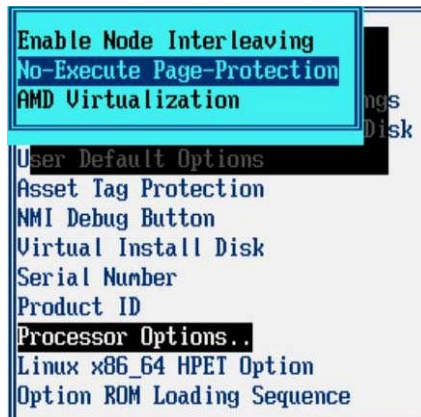
ProLiant servers with AMD processors

To enable support for hardware-assisted virtualization in the RBSU, complete the following steps:

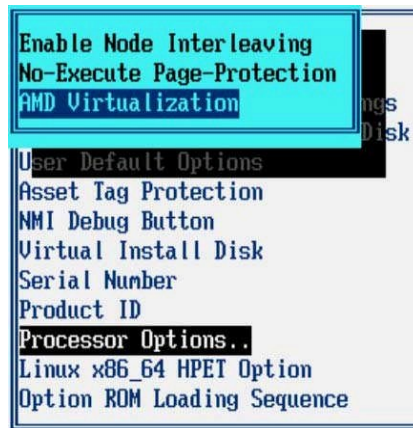
1. Restart or power-on the server.
2. Access the RBSU by pressing **F9** when prompted.
3. From the RBSU Menu, select **Advanced Options**.



4. From the Advanced Options menu, select **Processor Options**.
5. Select **No-Execute Page-Protection**, press **Enter**, and then select **Enabled**.



6. Select **AMD Virtualization**, press **Enter**, and then select **Enabled**.



7. Press the Esc key until you receive a prompt to press F10 to confirm exiting the RBSU. The server will perform a restart.

Installing Windows Server 2008

To install Windows Server 2008 64-bit edition, complete the following steps:

1. Ensure that the server has a DVD drive (either native to the system or attached).

Or...

Boot the server into Microsoft Windows Preinstall Environment (Windows PE or WINPE) from a USB key. This is possible from across a network using Windows Deployment Services. For details on Booting WINPE, refer to the Windows Automated Installation Kit.

NOTE

iLO virtual media requires a license key with ProLiant ML and DL servers and in certain circumstances with ProLiant BL servers.

2. Place the Windows Server 2008 media into the DVD drive and boot the server from the DVD to begin the installation.
3. Follow the on-screen instructions to complete the installation.

IMPORTANT

The F6 option for updating drivers is not available during the Windows Server 2008 installation. Microsoft has added the option to inject a driver during installation through the "Update Driver" button if you cannot find a boot controller driver. The driver may reside on USB media, floppy drive, or CD-ROM drive.

NOTE

If you cannot find the driver for the storage controller (HP Embedded SATA controller on BL495c G5 server), the storage drive will not be recognized during Windows Server 2008 installation. In this case, insert USB media, floppy drive, or the CD-ROM that has the appropriate driver. Microsoft provides a "Load driver" option to install the storage controller driver. When prompted, select the Load driver option, locate and select the appropriate storage driver, and click OK to install.

For additional information on Windows Server 2008 support for HP ProLiant Servers, go to <http://h18004.www1.hp.com/products/servers/technology/whitepapers/os-techwp.html#lh>.

Installing Windows Server 2008 Hyper-V server role

Complete the following steps to install the Windows Server 2008 Hyper-V server role:

1. Start the installation program (available at <http://www.microsoft.com/hyper-v>).
2. Click **Add Roles**. If this is the first role being added to the server, you may see a page describing the process for adding roles. Click **Next**.
3. Check the box for **Hyper-V** and click **Next**. Review the Windows Server 2008 Hyper-V overview and then click **Next**.
4. Choose the NICs to configure as virtual networks for use by guest OSs. Click **Next**.

IMPORTANT

When you bind the virtual network switch to the NIC, all protocols are removed.

Instead of the TCP/IP protocol, the Microsoft Virtual Network Switch Protocol is installed; therefore, all possible open Terminal Server sessions will close. To re-enable the old TCP/IP settings, login to the server locally or through IRC, and then configure the newly created network adapter while using the old TCP/IP configuration.

NOTE

Microsoft recommends keeping one NIC reserved to manage the host-operating environment. In scenarios where this is not possible, network connectivity to the host can be interrupted temporarily during configuration changes to the virtual network.

5. Review the summary installation. Make a note of which NICs require configuration as virtual networks.

6. When prompted, choose to reboot the server to complete the installation. After the server reboots, log in as Administrator to finish the installation process.

ProLiant Support Pack (PSP)

The HP Smart-Update Manager (HPSUM) utility lets you deploy PSP software and firmware components from a single, easy-to-use graphical interface. You can also maintain ProLiant Support Packs and Smart Components on a local server or on one or more remote servers accessible over a network connection. This utility provides legacy support for existing software and firmware components and simplifies the overall deployment process. The utility also checks installation logic and version control for dependencies, and installs only the correct updates for optimal configuration. HPSUM includes the following functions:

- Detects hardware and software on the server
- Checks component dependency automatically
- Detects components that have available updates
- Allows remote deployment of PSP components
- Supports command line entry

PSP requirements

To use Windows Server 2008 PSP Version 8.70 with Windows Server 2008 Hyper-V, you must satisfy the following requirements:

- Use only with HP ProLiant servers.
- Use only on the host server for Windows Server 2008 Hyper-V. Do not install the PSP on a guest OS as it is not required or supported.
- Install the PSP before installing the Windows Server 2008 Hyper-V role.

IMPORTANT

Do not install the Network Configuration Utility (NCU) included in the PSP before you install Windows Server 2008 Hyper-V. Otherwise, the network interface adapters may not work. Install the NCU after Hyper-V has been installed and enabled.

NOTE

ProLiant 100 series servers do not use the PSP. For ProLiant 100 series drivers, go to the "Support/drivers" page at www.hp.com.

Complete the following steps to download the PSP Version 8.70 from the HP website.

1. Go to the HP website at www.hp.com.
2. Select **Support & Driver Downloads**.
3. Enter the ProLiant server model (for example, ProLiant DL380 G5).
4. Select the appropriate server model from the Product Search List.
5. Select the appropriate **Microsoft Windows Server 2008** operating system (W32 or x64).
6. Select Software-Support Pack for the quick jump selection
7. Select ProLiant Support Pack for Microsoft Windows Server 2008.

Installing the PSP

Complete the following steps to download the PSP self-extracting executable:

1. Go to the directory that contains the PSP executable.
2. Invoke the executable and extract the PSP to a desired location (see note below).

NOTE

When installing the PSP on a system running Server Core, run the executables rather than double-clicking on them. On server core systems, you cannot specify the location for extracting the PSP files. The files extract to the same location as the PSP self-extracting executable. Go to the directory where the extracted PSP is located.

-
3. Invoke setup.exe to start the PSP deployment.

NOTE

For proper PSP installation, all PSP files must be in the same directory as the setup.exe program.

-
4. When the PSP deployment begins, it inventories the available updates and checks the local system for hardware and software.
 5. After the inventory and discovery processes finish, the “Select Installation Hosts” screen displays. Select either the local host, a remote host, or multiple hosts for PSP deployment.
 6. After you select the host(s), the “Select Bundle Filter” screen displays information about the PSP bundle that requires installation. Select the bundle and the appropriate filter options. For remote deployments, additional screens allow you to update information on a per-host basis.
 7. After selecting the bundle for all hosts being updated, open the “Select Items to be Installed” screen to complete the following tasks:
 - a. Select the components for installation.

NOTE

Ensure that Hyper-V is installed and enabled before installing the Network Configuration Utility (NCU).

-
- b. Configure the components, if necessary.
 - c. Review failed dependencies and the revision history of the components.
8. After selecting the components to install, click **Install** to proceed. Once the installation completes, the Installation Results screen displays. If the PSP installs, the process is complete.
 9. If any components did not install successfully, complete the following steps:
 - a. Exit HPSUM.
 - b. Make corrections to your environment.
 - c. Restart the application to install the components that had problems.

Deploying Microsoft Hyper-V Server 2008 on ProLiant servers

Microsoft Hyper-V Server 2008 is a stand-alone component. It is not necessary to install Windows Server 2008 before installing Microsoft Hyper-V Server 2008. To prepare for installation, do the following:

- Ensure that the server selected for installation is included in Table 6 and has the necessary support for hardware-assisted virtualization.
- Ensure that storage options added to the server are included as supported ProLiant storage options in Table 7.
- Ensure that any NICs added to the server are included as supported ProLiant Gigabit Ethernet NICs in Table 8.
- Go to the support and drivers page at www.hp.com/support to obtain the supported ROM for Windows Server 2008 installations for the server.
- If necessary, enable support for No-Execute and hardware-assisted virtualization in the RBSU.
- Use the RBSU to set date/time and configure the boot controller order (if necessary).
- Use the Online RAID Configuration Utility (ORCA) to configure the RAID settings for the server.
- If installing HP Systems Insight Manager and agents, ensure that the SNMP service is loaded and started.

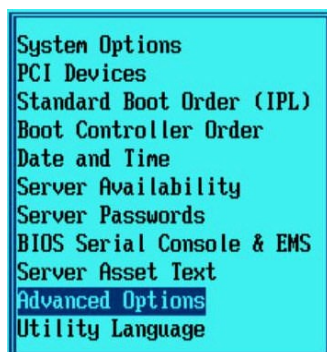
Enabling support for hardware-assisted virtualization in the RBSU

Microsoft Hyper-V Server 2008 uses an advanced processor feature known as hardware-assisted virtualization. On most ProLiant servers, this feature is disabled by default and must be enabled prior to installing Microsoft Hyper-V Server 2008. Enable hardware-assisted virtualization by following the appropriate procedure in the following sections.

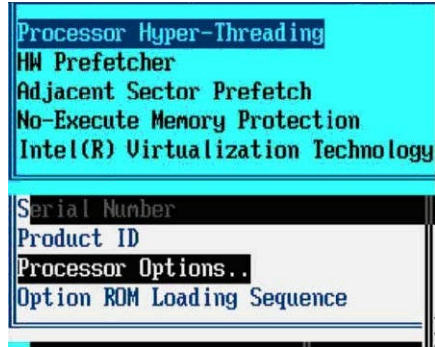
ProLiant servers with Intel Processors

Complete the following steps to activate support for hardware-assisted virtualization in the RBSU:

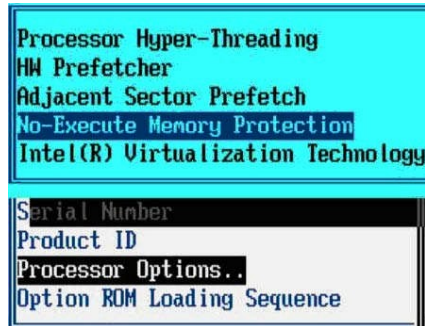
1. Restart or power-on the server.
2. Access the RBSU by pressing **F9** when prompted.
3. From the RBSU Menu, select **Advanced Options**.



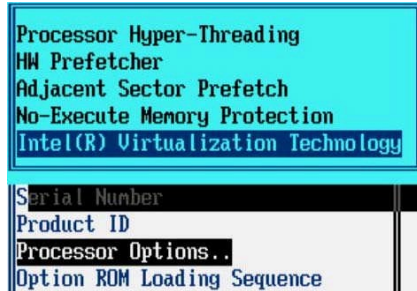
4. From the Advanced Options menu, select **Processor Options**.
5. If the server supports Hyper Threading, select **Processor Hyper-Threading**, press **Enter**, and then select **Disabled**.



6. Select **No-Execute Memory Protection**, press **Enter**, and then select **Enabled**.



7. Select **Intel Virtualization Technology**, press **Enter**, and then select **Enabled**.

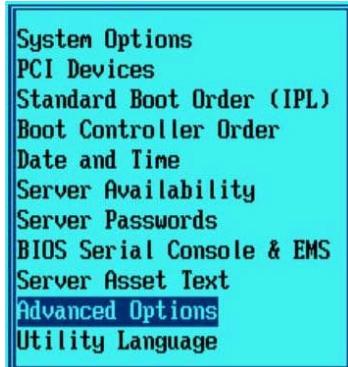


8. Press the **Esc** key until you receive a prompt to press **F10** to confirm exiting the RBSU. The server will restart.

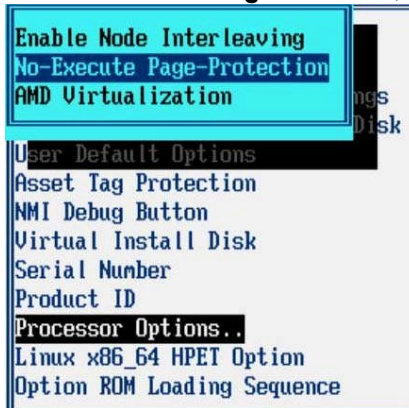
ProLiant servers with AMD processors

Complete the following steps to enable support for hardware-assisted virtualization in the RBSU:

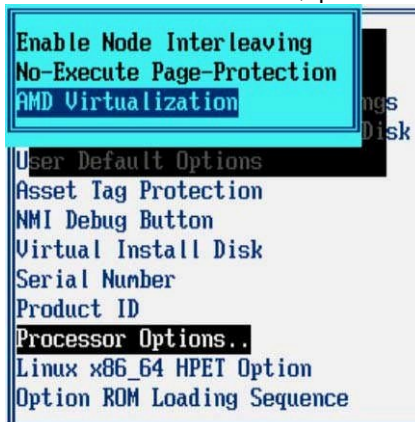
1. Restart or power-on the server.
2. Access the RBSU by pressing **F9** when prompted.
3. From the RBSU Menu, select **Advanced Options**.



4. From the Advanced Options menu, select **Processor Options**.
5. Select **No-Execute Page-Protection**, press **Enter**, and then select **Enabled**.



6. Select **AMD Virtualization**, press **Enter**, and then select **Enabled**.



7. Press the **Esc** key until you receive a prompt to press **F10** to confirm exiting the RBSU. The server will perform a restart.

Installing Microsoft Hyper-V Server 2008

Complete the following steps to install Microsoft Hyper-V Server 2008:

1. Ensure that the server has a DVD drive (either native to the system or attached)

Or

Boot the server into Microsoft Windows Preinstall Environment (Windows PE or WINPE) from a USB key. It is possible to boot the target server from across a network using Windows Deployment Services. For details on Booting WINPE, refer to the Windows Automated Installation Kit (WAIK).

NOTE

iLO virtual media requires a license key with ProLiant ML and DL servers and, in certain circumstances, with ProLiant BL servers.

-
2. Place the Microsoft Hyper-V Server 2008 media into the DVD drive and boot the server from the DVD to begin the installation.
 3. Follow the on-screen instructions to complete the installation.

IMPORTANT

The F6 option for updating drivers is not available during the Microsoft Hyper-V Server 2008 installation. Microsoft has added the option to inject a driver during install (through the "Update Driver" button), if you cannot find a boot controller driver. The driver may reside on USB media, floppy drive, or CD-ROM drive.

NOTE

The storage drive is not recognized during Microsoft Hyper-V Server 2008 installation if the storage controller driver (SATA storage controller on BL495c G5 server) is not found during the installation. In this case, insert the USB media, floppy drive, or CD-ROM that contains the appropriate driver. Microsoft provides a "Load driver" option to install the storage driver. When prompted, select the **Load driver** option, locate and select the appropriate storage driver, and click **OK** to install it.

Installing the ProLiant Support Pack

Complete the following steps to install the ProLiant Support Pack (PSP):

1. Create a directory to copy the PSP executable on the Hyper-V standalone server (for example, C:\>mkdir PSP).
2. Copy the executable from external media to a PSP directory and run the executable to extract PSP components in the directory.
3. If installing HP Systems Insight Manager (SIM) and agents, ensure that the SNMP service has started. If SNMP has not started, execute the command ">start /w ocsetup SNMP-SC" to start the SNMP service.
4. From the PSP folder, run Setup.exe to start the PSP deployment. When the PSP deployment starts, it performs an inventory of the available updates and checks the local system for installed hardware and software.
5. After the inventory and discovery processes finish, the **Select Installation Hosts** screen displays. Select either the local host, a remote host, or multiple hosts for PSP deployment.
6. After selecting the host(s), the **Select bundle filter** screen displays information about the PSP bundle to be installed. Select the bundle and the appropriate filter options. For remote deployments, additional screens allow users to update information on a per-host basis.
7. After selecting the bundle for all hosts being updated, open the **Select Items to be Installed** screen to complete the following tasks:
 8. Select the components for installation.
 9. Configure the components, if necessary.
 10. Review failed dependencies before installation.
 11. Review the revision history of the components.
 12. After selecting the components to install, click **Install** to proceed with the installation. When the installation is finished, the **Installation Results** screen displays. If the PSP installed successfully, the process is complete.
13. Complete the following steps if any components did not install.
 - a. Exit HP SUM.
 - b. Make corrections to your environment.
 - c. Restart the application to install the components that had problems.

Appendix A

Table A-1 lists the known issues with ProLiant servers and Windows Server 2008 Hyper-V.

Table A-1: Known issues on ProLiant servers

Issue	Description	Workaround
1	When attempting to enable Windows Server 2008 Hyper-V, the installer reports that the server does not contain the required hardware support	Ensure that support for both no-execute and hardware-assisted virtualization have been enabled in the RBSU. Refer to the section titled "Enabling support for hardware assisted virtualization in the RBSU" section for instructions on performing this task.
2	The Windows Server 2008 Hyper-V folder and components are not found in C:\Windows.	Check that Windows Server 2008 x64 Edition has been used to complete the installation of Windows. Windows Server 2008 Hyper-V ships only with the x64 edition of Windows. If the x86 version of Windows Server 2008 has been installed, reinstall the OS using the x64 edition.
3	Installing guest operating system from an HP-Branded Windows Server 2008 media DVD in full-installation or server-core mode may not be successful on a ProLiant server.	Refer to Customer Advisory c01452454 at http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?lang=en&cc=us&objectID=c01452454&jumpid=reg_R1002_USEN

For more information

Visit the URLs listed below if you need additional information.

Resource description	Web address
HP website for Hyper-V	www.hp.com/go/hyper-v
HP and Microsoft Frontline Partnership website	www.hp.com/go/microsoft
HP website for Windows Server 2008	www.hp.com/go/ws2008
HP website for management tools	www.hp.com/go/insight
Information on HP ProLiant Network Adapter Teaming for Hyper-V	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01663264/c01663264.pdf
Microsoft website (general)	www.microsoft.com
Microsoft Hyper-V website	www.microsoft.com/hyper-v
Microsoft Hyper-V server website	www.microsoft.com/hvs
Microsoft general virtualization website	www.microsoft.com/virtualization
HP Single Point Of Connectivity Knowledge (SPOCK) website with information on HP Storage Array Network (SAN) components, supported host bus adapters, and switches	http://www.hp.com/storage/spock

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