



# Windows Server® 2008 Hyper-V™

**Hyper-V Hosting Guidance:  
Using and Licensing Microsoft® Server Products in  
Hyper-V Virtual Hosting Scenarios**

**Hyper-V Hosting Guidance**

**Wednesday, 1 October 2008**

**Version 1.0**

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## LIST OF ACRONYMS

<b>Acronym</b>	<b>Meaning</b>
DC	Datacenter
DNS	Domain Name System
LOB	Line of Business
OEM	Original Equipment Manufacturer
OS	Operating System
OSE	Operating System Environment
SAL	Subscriber Access License
SAN	Storage Area Network
SCCM	System Center Configuration Manager
SCDPM	System Center Data Protection Manager
SCOM	System Center Operations Manager
SKU	Stock Keeping Unit
SMSE	Microsoft System Center Server Management Suite Enterprise
SPLA	Service Provider License Agreement
SPUR	Service Provider User Rights
VDS	Virtual Dedicated Server
VHD	Virtual Hard Disk
VL	Volume Licensing
VM	Virtual Machine
VMM	Microsoft System Center Virtual Machine Manager

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## HOSTING SCENARIOS AND LICENSING CONSIDERATIONS

This white paper documents common hosting scenarios using Windows Server® 2008 Hyper-V™ virtualization technology and Microsoft SQL Server® database management software with the Microsoft Services Provider License Agreement (SPLA). The SPLA has two licensing models – Per Processor and Per Subscriber (via a Subscriber Access License, or SAL). Some products are available through both licensing models. In a virtual environment, there are no new restrictions on the number of instances running under the SAL licensing model. However, the Per-Processor model introduces new considerations, which are outlined in this white paper.

In the context of Hyper-V, a physical server (called a **host**) can be used to create numerous virtual machines or virtual servers (called **guests**). Each guest runs its own operating system (OS), independent of other guests. Operating systems such as Windows Server 2000 SP4, Windows Server 2003, Windows Server 2008 (Web, Standard, Enterprise and Datacenter), SUSE Linux Enterprise, and so forth, can run as a guest OS. However, the host OS must be Windows Server 2008 (Standard, Enterprise, or Datacenter). For a list of supported virtual guests, please visit the following link:

<http://www.microsoft.com/windowsserver2008/en/us/hyperv-supported-guest-os.aspx>

The primary focus of this paper is how to license different editions of Windows Server 2008 and SQL Server 2008 in a virtualized hosting environment that is leveraging the SPLA model. We will outline the SPLA licensing implications for some common Hyper-V-based virtualized hosting scenarios. These scenarios include:

1. Unmanaged dedicated server with Hyper-V
2. Virtual dedicated server (VDS) for Web scenarios (using Windows Server guests in anonymous mode)
3. Virtual dedicated server with line-of-business (LOB) scenarios (using Windows Server guests in authenticated mode)
4. Use of virtualization in shared hosting scenarios
5. Desktops as Hyper-V guests
6. End customers running Microsoft products using the customers own licenses on the guest OS

In addition to these common scenarios, we present how the Microsoft System Center family of products can be used to help manage the virtualized hosting environment and the associated licensing implications.

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## LICENSING OF VARIOUS WINDOWS SERVER EDITIONS

Windows Server 2008 is licensed on a per-processor basis: When reviewing the table below, please bear in mind that a license for each processor is needed. While there is no technical limitation on the number of guests you can run on the Standard, Enterprise, or Datacenter editions, the number of licenses included (for free) as part of the host license vary by edition. The following table indicates the number of guests included in the license of the host. If additional guests over the allowed limit are run on any edition, then they need to be reported separately.

Furthermore, the Active Directory® directory service is included with certain editions of Windows Server 2008. This affects the licensing in specific hosting scenarios. The use of Active Directory for the Windows Server host and guest OS is allowed only with the Standard and Enterprise editions. Since the Datacenter edition is licensed only for anonymous use, Active Directory cannot be used with this edition.

The table below provides only a general licensing overview of Windows Server 2008. Depending on the scenario and which edition of Windows Server 2008 is installed on the host, numerous licensing scenarios exist. These are described in the following sections.

Host Edition	Guests Included in Host SPLA	Allowed Guest Types
Windows Server 2008 Standard	1	Windows Server 2008 Standard Windows Server 2008 Web Windows Server 2003 Standard*
Windows Server 2008 Enterprise	4	Windows Server 2008 Enterprise Windows Server 2008 Standard Windows Server 2008 Web Windows Server 2003 Enterprise* Windows Server 2003 Standard*
Windows Server® 2008 Datacenter	Unlimited unauthenticated guests	Windows Server 2008 Datacenter (Anonymous) Windows Server 2008 Enterprise (Anonymous) Windows Server 2008 Standard (Anonymous) Windows Server 2008 Web (Anonymous) Windows Server 2003 Enterprise (Anonymous)* Windows Server 2003 Standard (Anonymous)*

Table 1 : Guest licenses and guests types for various Windows Editions (\*Allowed if already licensed under SPLA)

## Windows Server 2008 Enterprise

As you can see in the table, if licensing a Windows Server 2008 Enterprise host, up to 4 guests are included in the initial license. If a fifth guest is added to the server, an additional full Windows 2008 Enterprise license is needed for each processor on the host is needed. This additional license will allow up to four additional guests to run on the server, for a total of eight guests. This process of purchasing additional licenses can be continued as more and more guests are added, up to the physical capacity of the host. When hosting with Windows Server 2008 Enterprise, the guest may be Windows Server 2008 Standard, Web, or Enterprise.

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## **Windows Server 2008 Datacenter**

With Windows Server 2008 Datacenter (Anonymous), you may run as many unauthenticated guests as the hardware will support. Windows Datacenter edition allows you to install and run any version of Windows Server for the guest operating system; however, the guest operating systems need to run in unauthenticated mode. Furthermore, neither the host nor guests can be configured to run under Active Directory.

### **Use of Central Storage**

In many scenarios, Hosting Providers use central storage to manage guest images as virtual hard disks, or VHDs. This storage is typically based on a storage area network (SAN) or Windows® Storage Server 2003 R2, which is an OEM-only product used as a cost-effective substitute for a SAN. At this time, Windows Storage Server is not available in a SPLA. We are looking into adding it to the SPLA depending on the interest we see from Hosting Providers. The use of central storage does not affect the licensing for SQL Server software.

### **Use of Other Non-Microsoft Virtualization Technologies**

This document applies equally well to other virtualization technologies such as VMWare and XenSource when using Windows Server as a host or guest OS. However, Microsoft does not make claims on how those technologies are licensed, and use of those technologies does not diminish the number of licenses required for Microsoft products. Please consult the vendor of those virtualization technologies for their licensing requirements.

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## HOSTING SCENARIOS

### Scenario 1: Unmanaged Dedicated Server as Host with One or More Guests

In this scenario, a hoster sells a physical server as a host enabled with Hyper-V. The end customer buys a dedicated server and can create any number of guests using Hyper-V Server Manager. The administration of the physical server and virtual instances is performed by the end customer. If the Hosting Providers use Microsoft System Center Virtual Machine Manager (VMM), through delegation they could provide the ability for end customers to manage guests through the VMM Self-Service Portal. Note that the VMM Self-Service Portal requires Active Directory.

Figure 1 depicts an example of an “unmanaged” Hyper-V configuration where all management and administration of the hosts and virtual guests is performed locally on the server. In this scenario, the hoster is hosting a dedicated Hyper-V-enabled server and allowing the customer to directly access the host (typically via Terminal Services).

The number of guests and the type of guest installed is dependent on the editions of Windows Server 2008. As explained above, if the host is a Datacenter anonymous SKU, all the guests must also be anonymous. However, if the end customer wants authenticated servers, they can use Standard or Enterprise editions as host.

As depicted in Figure 1, Hosting Providers may wish to install and expose System Center Virtual Machine Manager to allow customers to manage their virtual guests. Please see “Microsoft System Center Products in a Hosting Environment” in this document for information on minimal deployments of VMM in a hosting environment.

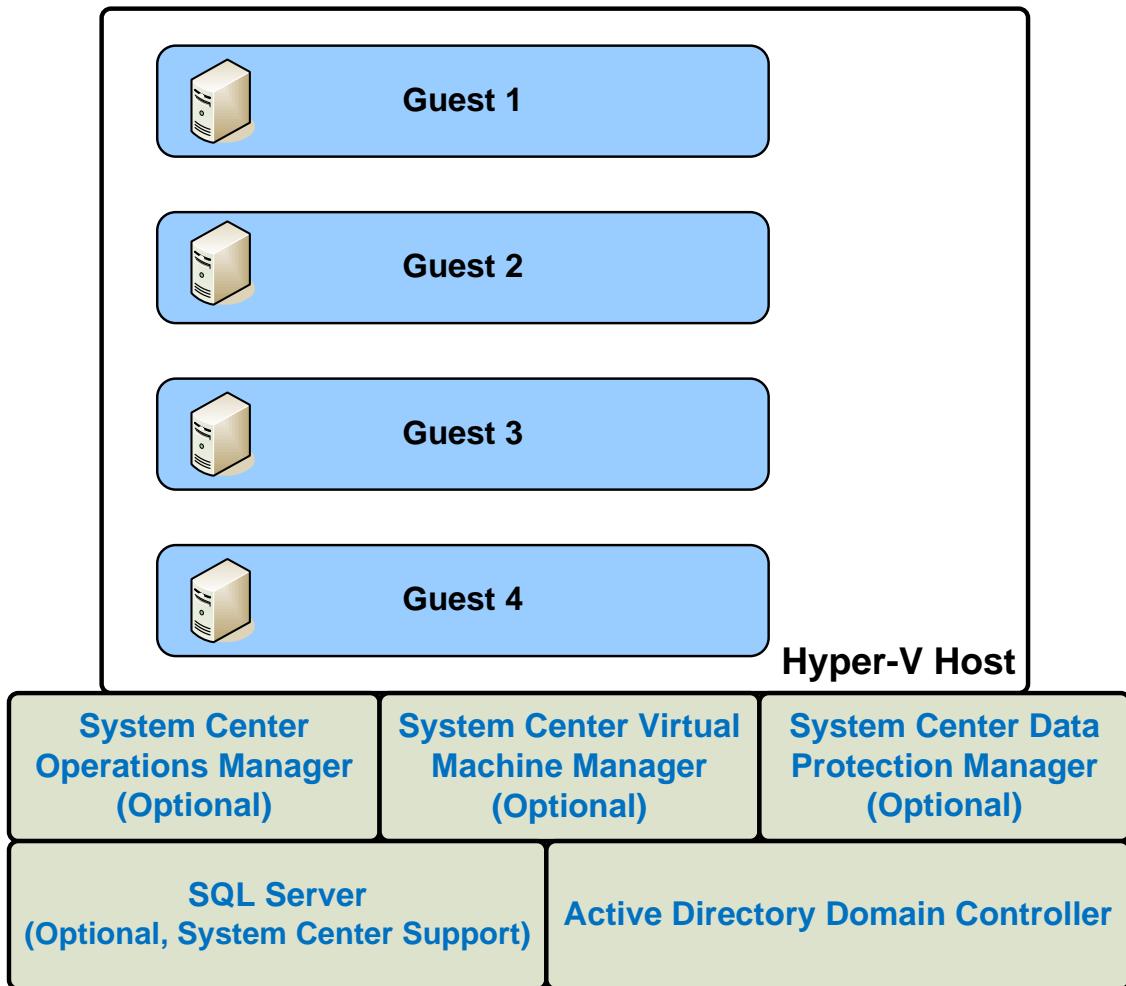


Figure 1: Unmanaged Hyper-V

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## Scenario 2: Virtual Dedicated Server (VDS)

In a VDS scenario, a hoster uses a Windows Server 2008-based server with Hyper-V as a host for one or more guests. These guests can run Windows Server or Linux operating systems. Each guest is sold as a virtual dedicated server to end customers. Each guest has a guaranteed set of resources, which can be specified when it is created.

The end customer has complete control of the guest and its OS. The VDS can be accessed via Terminal Services. The hoster or the end customer also can install a control panel on the guest to manage the hosting environment on the VDS. From an end-customer perspective, a VDS looks and feels like a dedicated server, where patching, software loading, and so forth do not affect other guests on the server.

In order to improve the manageability of these servers, Microsoft offers the System Center Server Management Suite Enterprise, which may be leveraged to offer the same managed services to the hoster's customers. For example, when provisioning, System Center Virtual Machine Manager (VMM) may be used for provisioning either the managed or un-managed server.

The System Center Server Management Suite Enterprise includes the following products that can simplify the management of hosted guests and provide value-added services to the hoster:

- System Center Virtual Machine Manager (VMM)
- System Center Operations Manager (OpsMgr)
- System Center Data Protection Manager (DPM)
- System Center Configuration Manager (SCCM)

As depicted in Figure 2, Hosting Providers may wish to install and expose System Center Virtual Machine Manager to allow customers to manage their virtual guests. Please see "Microsoft System Center Products in a Hosting Environment" in this document for information on minimal deployments of VMM in a hosting environment.

### Scenario 2a: VDS – Unmanaged

In this scenario, the hoster allows the end customer to have full management of the guest operating system. Loading software, patching, backups, and such would be handled by the customer.

### Scenario 2b: VDS – Managed

In a managed scenario, the hoster may offer one or more value-added services related to the management of the guest to its customers. These value-added services may either be included in the base pricing of the hosted offer or included as an additional charge. One benefit for Hosting Providers is that these servers can be centrally managed by another server running virtual machine management software such as Microsoft System Center Virtual Machine Manager. Value-added services may include:

- Managed services – such as SQL Server administration
- Guest server software – patching, security updates, installs
- Utilities – disk and storage management
- Backup/Restore
- Domain Name Services (DNS)

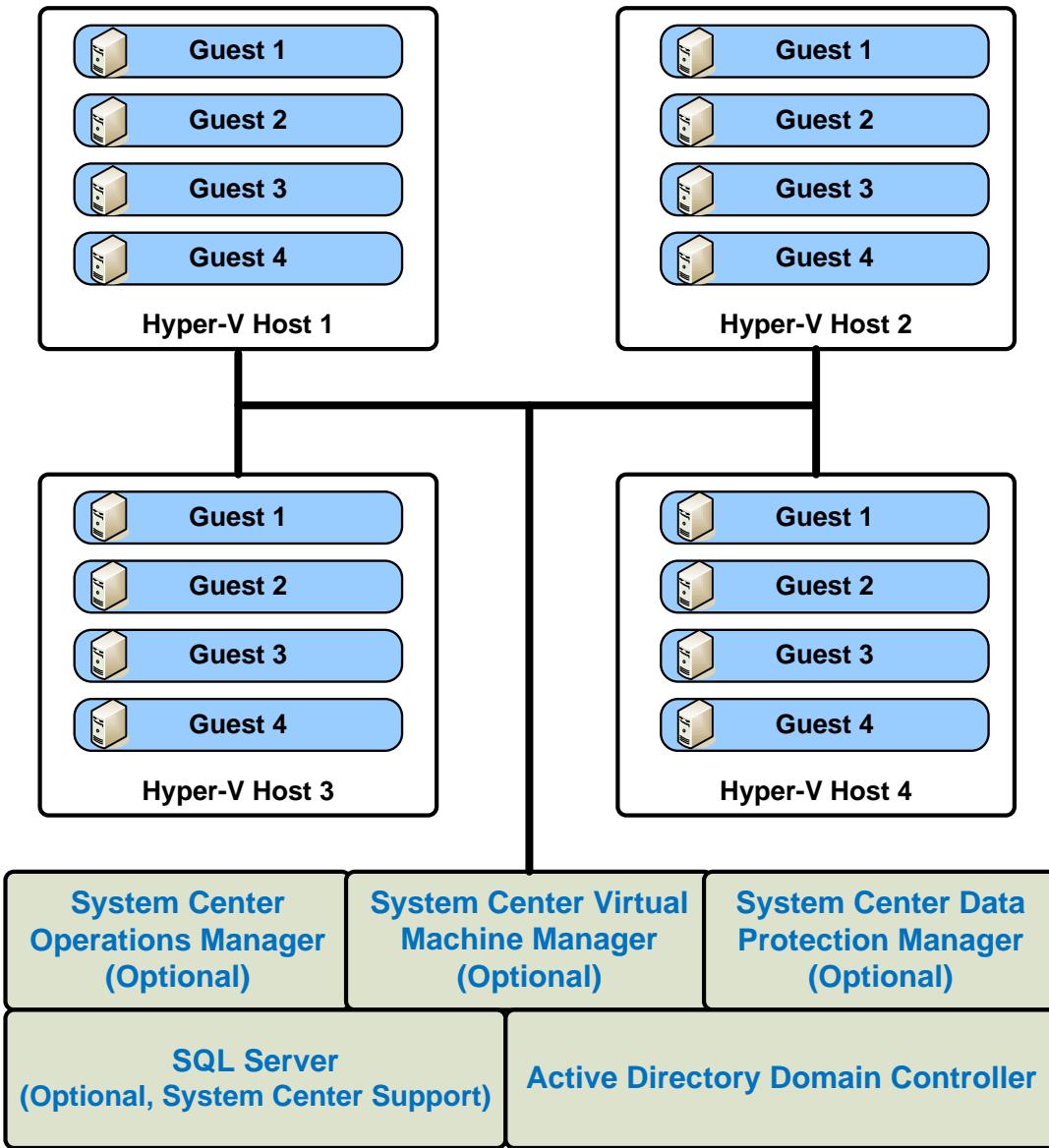


Figure 2: Managed Hyper-V

System Center Virtual Machine Manager requires membership in Active Directory; however, VMM can manage non-Active Directory hosts and guests. For more information about configuring Active Directory, see “Windows Server System Reference Architecture” in the References section of this document.

System Center also requires a Microsoft SQL Server database for storage. Hosting Providers may choose to use an existing SQL Server installation or create a dedicated server, depending on their needs. As Hosting Providers increase the number of guests they manage, high-availability configurations of SQL Server, Active Directory, and System Center products may be utilized. See “Windows Server System Reference Architecture” and “System Planning and Design” in the References section of this document for more information.

Another optional component that may be very useful in a Hyper-V hosting environment is System Center Operations Manager. Operations Manager can be used to monitor the health of the host servers, domain controllers, and SQL Server software, as well as the guest systems.

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## **Scenario 3: Authenticated Virtual Dedicated Servers**

In the two previous scenarios, were based on non-authenticated hosting scenarios where the end users were not being authenticated by the Windows Server operating system. In scenarios where the guest system must authenticate end users, the recommended host is Windows Server 2008 Enterprise, which accommodates up to four guest systems per host license. (More than four guests can run on the Enterprise edition, but more licenses must be added and reported.)

Note that Windows Server Datacenter may not be used in this scenario, as it is only licensed for anonymous guests. This restriction with Windows Server Datacenter applies when either the Hyper-V-based host server or the guest is authenticating an external user. If the guests need to be authenticated, then the Hosting Providers needs to license Windows Server Standard or Enterprise.

Authenticated configurations also may include hosting for Microsoft Exchange Server, Microsoft Office SharePoint® Server, or other applications that require end-user authentication.

## **Scenario 4: Shared Hosting Configurations**

In this scenario, the hoster is using a server as a host and creates one or more guests to host one or more Web sites for shared hosting scenario. The end users are not exposed to virtualization. Some Hosting Providers are using virtualization in this manner to provide better isolation for Web sites. For example, if a server hosts 2,000 Web sites, a hoster can create four guest virtual machines, each with 500 sites.

In the shared hosting configuration, the user is anonymously accessing Web-based content being hosted on the virtual guest; hence, Windows Center Datacenter can be used.

## **Scenario 5: Running Desktop Systems as Hyper-V Guests**

In this scenario, Hosting Providers can offer access to desktop-based applications such as Microsoft Office programs or other worker productivity tools. From a technical perspective, hosting a guest desktop environment running the Windows Vista® or Windows XP operating system is currently supported in certain configurations. See the Supported Operating Systems link in this document for the latest list of supported guests. However, this scenario is currently not allowed in the SPLA.

## Scenario 6: Using End-Customer Licenses on the Guest

Hosting Providers frequently ask if end-customer-owned licenses (such as Small Business Server, SQL Server, Exchange Server, or other server applications acquired through Microsoft Select or Enterprise Agreements) can be relied upon for licensing the guest. Currently, these scenarios are not allowed in the SPLA for shared use in either the host or virtual environment. All licenses for the guest must be reported by the service provider using the SPLA.

In a non-Hyper-V-based virtualized environment, an end customer can bring in their own license if they have a dedicated hosted server. They cannot apply their license if the server is shared among multiple customers. The Figure below illustrates the scenario where the end customer can or cannot use their software licenses.

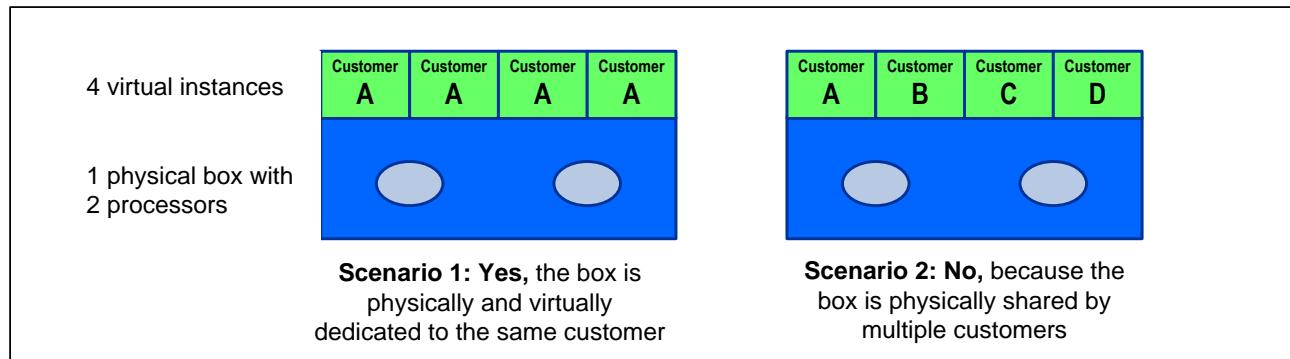


Figure 3: End-Customer License on Guest

If a server is physically and virtually dedicated to the same customer, then the end customers can install their own licenses. An example is a managed or unmanaged dedicated server. However, if the box is physically shared by multiple customers, even though, they may own Virtual Machines running on the box, they are not allowed to bring their own software licenses for Microsoft Products.

**Note:** We are working to remove the restrictions in Scenario 2, and allow customers to use their own license on the virtual machines. An update for this scenario will come out shortly from your friendly licensing coordinator. In the current SPLA, please note that end users cannot install their own licensed software on virtual servers.

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## **RUNNING MICROSOFT SQL SERVER 2008 WITH HYPER-V**

Hosting Providers typically offer SQL Server to customers as part of their hosting offers. There are five different SQL Server 2008 editions available: Express, Web, Workgroup, Standard, and Enterprise. (See Table 1 to compare features.) Where applicable, SQL Server 2008 is licensed per processor. Virtualization does not affect the number of SALs required.

### **SQL Server 2008 Express**

SQL Server 2008 Express is a free, downloadable version that has most commonly used features but limitations on size of database (4 GB), number of CPUs (1), and amount of RAM it can leverage (1 GB). SQL Server 2008 Express is a good option for starter Web sites and for development-related activities. There are no limitations or restrictions on the number of instances that can be run on any physical or virtual server.

### **SQL Server 2008 Web**

SQL Server 2008 Web is a new version specifically geared for the hosting industry. It may be used only to support public and Internet-accessible Web sites, pages, applications, and services.

SQL Server 2008 Web is also licensed on a per-processor basis. The licenses required are based upon the number of processors (or sockets) used, up to a maximum of four processors per server. To run instances on the host, a license is required for each physical processor that the host operating system uses. To run instances of SQL Server 2008 Web on guests, a license is required for each virtual processor that each of those guests uses.

### **SQL Server 2008 Workgroup**

SQL Server 2008 Workgroup is a more restrictive license than SQL Server 2008 Web. Therefore, we recommend Hosting Providers to consider using the Web edition.

### **SQL Server 2008 Standard**

SQL Server 2008 Standard is licensed on a per-processor basis. The licenses required for the host are based upon the number of physical processors used, up to a maximum of four processors on a server. To run instances on the host, a license is required for each physical processor that the physical operating system uses. To run instances of SQL Server 2008 Standard on guests, a license is required for each virtual processor that each of those guests uses.

### **SQL Server 2008 Enterprise**

Like SQL Server 2005, SQL Server 2008 can be installed on high-end servers with up to 128 processors. In a Hyper-V-based virtualized environment, SQL Server 2008 Enterprise offers a unique licensing benefit. If it is licensed for the host, then each guest running on that host may also run any number of instances of SQL Server Enterprise. This provides cost advantages, as the cost of SQL Server Enterprise may be amortized among the guests running on that host.

Feature	Express	Web	Workgroup	Standard	Enterprise
CPU's	1	4	2	4	32/128
RAM	1 GB	Unlimited	3 GB	Unlimited	Unlimited
64 bit	Yes	Yes	Yes	Yes	Yes
DB size	4 GB	Unlimited	Unlimited	Unlimited	Unlimited
Log shipping	No	Yes	Yes	Yes	Yes
Partitioning	No	No	No	No	Yes
Resource governor	No	No	No	No	Yes
Transparent Data Encryption	No	No	No	No	Yes
Backup Compression	No	No	No	No	Yes
SQL Agent	No	Yes	Yes	Yes	Yes
Service broker	Yes (Limited)	Yes	Yes	Yes	Yes
Replication	Subscribe only	Subscribe only	Yes (Restricted)	Yes	Yes
Policy Based Configuration	Yes	Yes	Yes	Yes	Yes
Centralized multi-server management	No	No	No	No	Yes
Reporting Services	Yes (Local Only)	Yes	Yes	Yes	Yes
Analysis Services	No	No	No	Standard	Full
Integration Services	No	No	No	Standard	Full
Import/Export Wizard	Yes	Yes	Yes	Yes	Yes
Publishing tools for hosted environments	Yes	Yes	Yes	Yes	Yes

Table 2: SQL Server 2008 features by edition.

## SCENARIO-BASED LICENSING MATRIX

The following tables summarize the different permutations and combinations of Windows Server 2008 and SQL Server 2008 in a virtualized environment using Hyper-V. Each row lists the scenario in which the server is being used, and the columns list the editions. A "y" means yes, this combination of (row, column) is allowed ; an "n" means no, this combination is not allowed. A number in a cell indicates the number of licenses allowed or included with the base license; "UL" implies unlimited licenses.

**Table 3: Hosting Scenarios**

High Level Scenario Based View							
Hosting Scenario	Windows Server 2008				SQL 2008		
	Web	Std	Ent	DC	Web	Std	Ent
Phy. Dedicated - Authenticated	n	y	y	n	n	y	y
Phy. Dedicated - Unauthenticated	y	y	y	y	y	n	n
Vir. Dedicated - Authenticated	n	y	y	n	y	y	y
Vir. Dedicated - Unauthenticated	y	y	y	y	y	n	n
Phy. Shared - Authenticated	n	y	y	n	n	y	y
Phy. Shared - UnAuthenticated	y	y	y	y	y	y	y
Vir. Shared - Authenticated	n	y	y	n	n	y	y
Vir. Shared - UnAuthenticated	y	y	y	y	y	y	y
Shared - SharePoint (WSS)	y	y	y	n	n	y	y
Exchange Server	n	y	y	n			
Dynamics - CRM Server	n	y	y	n			
Database - Web	y	y	y	n			
Database - Std	n	y	y	n			
Database - Ent	n	y	y	n			

**Table 4: Dedicated Host: Hardware View**

Hardware-Centric View for Dedicated Hosts				
Processors	Windows Server 2008			
	Web	Std.	Ent.	DC
One	y	y	y	y
Two	y	y	y	y
Four	n	n	y	y
Eight or more	n	n	n	y

**Table 5: Hyper-V-Based Host: Hardware View**

Hardware-Centric View for Hyper-V Host				
	Windows Server 2008			
Processors	Web	Std.	Ent.	DC
One	n	y	y	y
Two	n	y	y	y
Four	n	n	y	y
Eight or more	n	n	n	y

**Table 6: Hyper-V Guest: Authenticated**

	Hyper-V Guest - Authenticated Windows Server 2008			
Windows Server 2008 Based Host	Web	Std.	Ent.	DC
Web	n	n	n	n
Standard	y	y	n	n
Enterprise	y	y	y	n
Datacenter	n	n	n	n

**Table 7: Hyper-V Guest: Unauthenticated**

	Hyper-V Guest - Unauthenticated Windows Server 2008			
Windows Server 2008 Based Host	Web	Std.	Ent.	DC
Web	n	n	n	n
Standard	y	y	n	n
Enterprise	y	y	y	n
Datacenter	y	y	y	y

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**Table 8: Hyper-V Guest: Licenses Included with Host License**

Host	Hyper-V Guest – Licenses Windows Server 2008			
	Web	Std.	Ent.	DC
Web	0	0	0	0
Standard	1	1	0	0
Enterprise	4	4	4	0
Datacenter	UL	UL	UL	UL

**Table 9: Hyper-V Guest Database: Licenses Included with Host License**

Guest Database License	Hyper-V Guest Database – Licenses Windows Server 2008		
	Web	Std.	Ent.
Web	1	0	0
Standard	1	1	0
Enterprise	UL	UL	UL

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## MICROSOFT SYSTEM CENTER PRODUCTS IN A HOSTING ENVIRONMENT

### Microsoft System Center Virtual Machine Manager 2008

Hosting Providers planning to do a large-scale virtual deployment will benefit from use of Microsoft System Center Virtual Machine Manager 2008. VMM can be deployed in multiple topologies. The simplest topology is to install all necessary components of VMM on a single server—or even on a guest virtual machine. Alternatively, to scale out, each VMM component can be installed individually on separate servers. The different server roles and components needed for a simple VMM topology are provided in Figure 5.

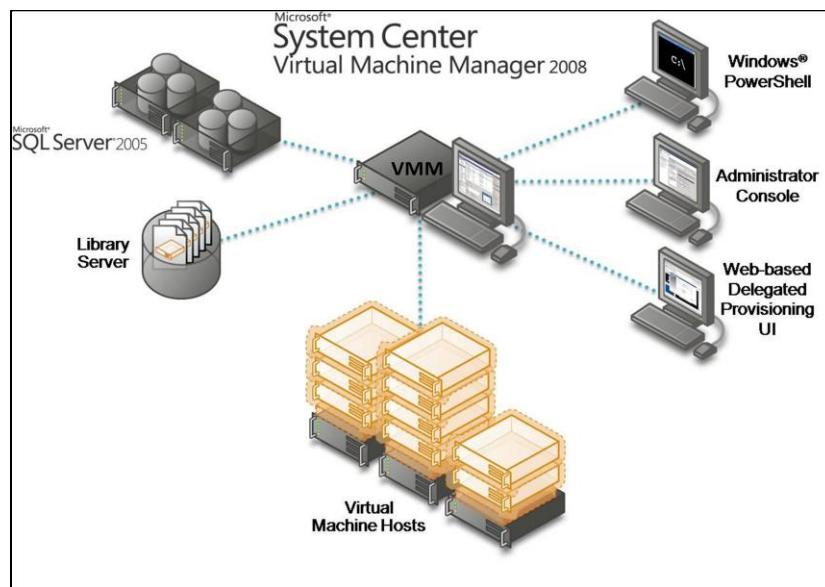


Figure 4: Server roles and components for a simple Virtual Machine Manager-based topology

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Table 10 describes the topology from a software licensing perspective.

Table 10: Required Licensing for Hyper-V Host, Per Server Role

Server Role	Software Installed	Software License Needed
Hyper-V Host	Windows Server 2008 Standard or Enterprise without Active Directory	Windows Server 2008 Standard, Enterprise, or Datacenter (the most cost-effective licensing option is Datacenter, but users must be unauthenticated)
Hyper-V Management Node Data Storage Web-Based Provisioning Admin Console Library Server	Windows Server 2008 Standard or Higher SQL Server 2005 Standard or Workgroup Edition OR SQL Server 2008 Standard, when supported System Center Virtual Machine Manager	Windows Server 2008 Standard, Enterprise, or Datacenter (the most cost-effective licensing option is Datacenter, but Datacenter can be licensed only for anonymous use) SQL Server 2005 Standard System Center Server Management Suite Enterprise SAL (per device)
Active Directory Domain Controller	Windows Server 2003 or 2008 Standard	Windows Server 2008 Standard Edition Authenticated

A stand-alone version of VMM is also available, which can be acquired instead of the Suite Enterprise. The license is called a Microsoft System Center Virtual Machine Manager Enterprise Server Management License.

Reference topologies are available for download in the Resources section of this document. The minimal single machine configuration for VMM is available in the following document:

[http://download.microsoft.com/download/4/5/a/45ab5519-26cd-4ea4-91a3-50ec391e7e18/HardwareReqs\\_Final.pdf](http://download.microsoft.com/download/4/5/a/45ab5519-26cd-4ea4-91a3-50ec391e7e18/HardwareReqs_Final.pdf)

Please note:

- The Microsoft System Center Server Management Suite Enterprise (SMSE) SAL is licensed per device. When using VMM, no additional licenses are required for each managed host or guest.
- Even though Windows Server needs to be joined to a domain, you can still report a Datacenter Anonymous SKU as long as use of Active Directory authentication is limited to System Center functionality and not used by end customers for authentication of their own application.

## Using Other System Center Products to Manage the Hosting Environment

Microsoft System Center products such as System Center Operations Manager, System Center Configuration Manager, and System Center Data Protection Manager provide Hosting Providers with the ability to better manage the virtual as well as the dedicated environment. All of these products run on Windows Server 2003 and Windows Server 2008 with a software update (that is, a Service Pack). Please check the installation instructions of each product for details.

In Figure 6 below, we illustrate one way in which different components within System Center can be installed to manage the virtual environment.

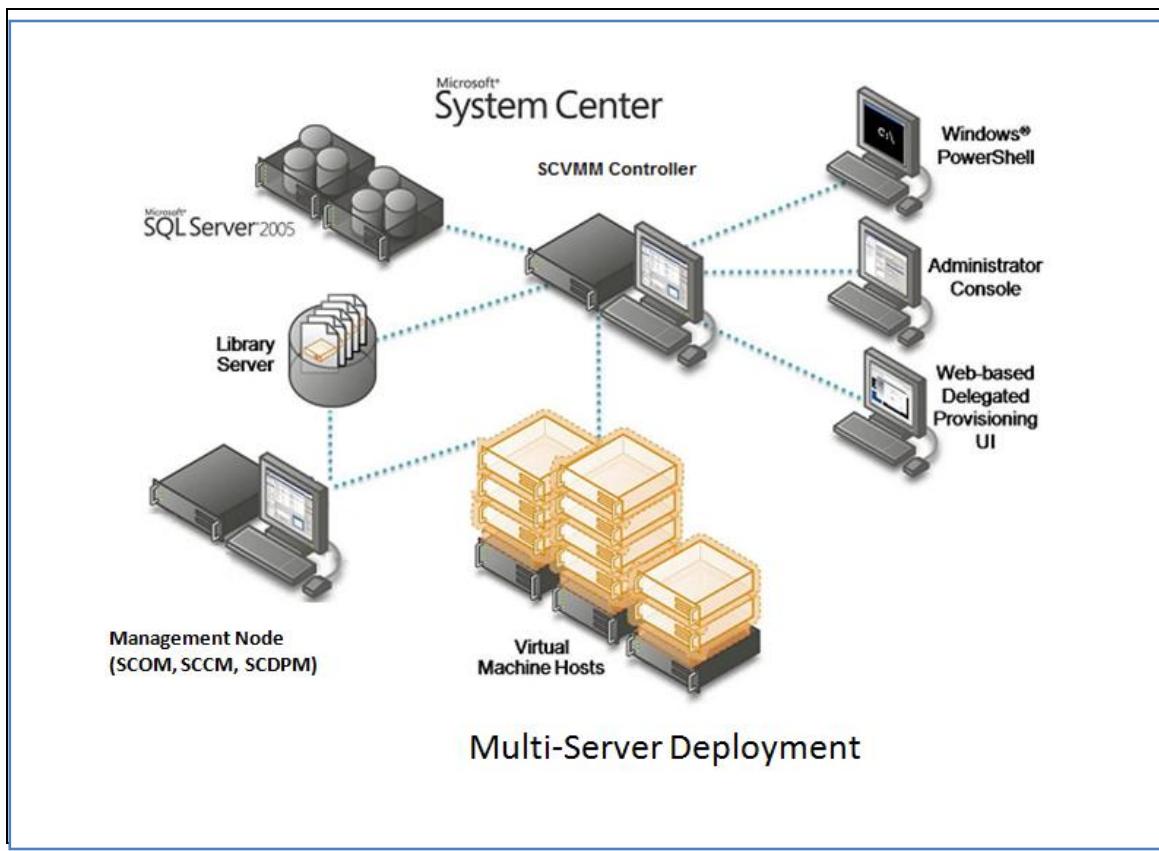


Figure 5: A Typical System Center Deployment

Table 9 shows the software and licenses needed to deploy the configuration illustrated in Figure 6.

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**Table 9. Required Licensing for Hosting with System Center Management Products**

<b>Role</b>	<b>Software Installed</b>	<b>Software License needed</b>
<b>Hyper-V Host</b>	Windows Server 2008 Standard or Enterprise without Active Directory	Windows Server 2008 Standard, Enterprise, or Datacenter (the most cost-effective licensing option is Datacenter)
<b>Web Based Provisioning</b> Admin Console Library Server VMM Controller	Windows Server 2008 Standard Edition or Higher System Center Virtual Machine Manager	Windows Server 2008 Standard, Enterprise, or Datacenter (the most cost-effective licensing option is Datacenter, but Datacenter can only be licensed for anonymous use) System Center Server Management Suite Enterprise SAL
<b>Management Node</b>	Windows Server 2003 Standard or Higher System Center Operations Manager System Center Configuration Manager System Center Data Protection Manager	Windows Server Standard, Enterprise, or Datacenter (the most cost-effective licensing option is Datacenter, but Datacenter can only be licensed for anonymous use)  Note: If you assigned the SMSE SAL, you do need the System Center Operations Manager SAL. In addition, there are two server SALs for Operations Manager: Standard and Enterprise.
<b>Data Storage</b>	Windows Server 2003 or 2008 Standard or Higher SQL Server 2005 or 2008 Standard	Windows Server Standard, Enterprise, or Datacenter (the most cost-effective licensing option is Datacenter, but Datacenter can only be licensed for anonymous use) SQL Server 2005 Standard
<b>Active Directory Domain Controller</b>	Windows Server 2003 or 2008 Standard	Windows Server Standard Authenticated

## Sample System Center pricing in SPLA

The diagram below provides an example of how different system center products are going to be priced. The amounts listed are just examples; please get the actual pricing from your license provider or resellers.

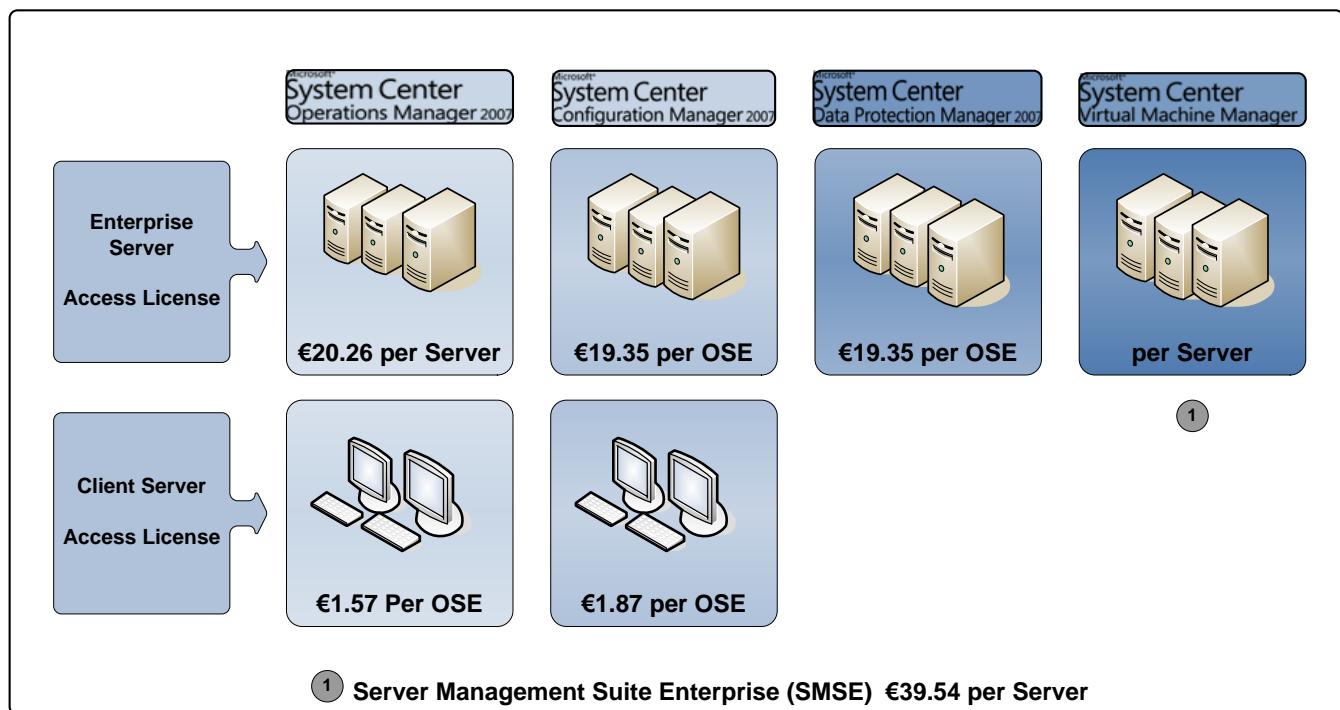


Figure 6: Sample pricing for SMSE vs. Individual components

**Note these prices are used as examples only to give you the list of System Center SKUs. SPLA pricing will vary by region. A DPM SAL may be available in H1-CY09.**

The new SPLA for Server Management Suite Enterprise (SMSE) for use to manage a Hyper-v based virtualized environment works as follows: Assume a Hyper-v cluster with 4 Physical Servers; and each server can have up to 8 Virtual Machines for a total of 32 guest VMs (8x4). In order to manage this cluster, you install Server Management Suite Enterprise on two servers; with one server dedicated to Virtual Machine Manager, and the other server running Operations Manager, Data Protection Manager and Configuration Manager. Using the sample pricing in the figure above, the licensing cost to manage all 4 Physical Servers (hosts) and 32 Virtual Machines with these two SMSE servers will be  $2 \times €39.54 = €79.08/\text{month}$ . The configuration described in this example is similar to Figure 5. Please note that with SMSE, the Client Access Licenses for agents that run on individual hosts or guest VMs are included in the Server Access Licenses.

In summary, for Hyper-v based virtualized environments, the cost of using SMSE is based on the actual number of servers on which the SMSE bits (of any of its server side components) are installed. For larger virtualized environments, if SMSE is installed on 4 servers with each server dedicated to each role (Data Protection Manager, Operations Manager, Configuration Manager and Virtual Machine Manager), then, the cost of licensing SMSE is  $4 \times €39.54 = €158.16$ . Once again, the prices used here are just examples. Please consult with your licensing coordinator to get actual costs.

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## LICENSING FAQ

Can Windows Server 2008 Web be used as a host OS on a Hyper-V-based server?

No. Windows Server 2008 Web does not have a Hyper-V role. It can be used only as a guest. Only the Datacenter, Enterprise, and Standard editions of Windows Server 2008 with the Hyper-V option can be used as a Hyper-V host OS.

For Windows Server 2008 Standard (or any other edition), can the “included” licensed guest be any version of Windows Server?

Not necessarily. For each edition of Windows Server on the host, the following guest restrictions apply:

- Windows Server Standard: Included guest can only be Windows Server Standard.
- Windows Server Enterprise: Included guests can only be Windows Server Enterprise or Standard.
- Windows Server Datacenter: Included guests can be Windows Server Datacenter, Enterprise, Standard, or Web.

Is the software for Windows Server Datacenter available only from an OEM?

Windows Server Datacenter fulfillment media is currently available on SPLA price lists. Because of the down edition rights for Windows Server Datacenter, Hosting Providers may deploy Windows Server Enterprise, Standard, or Web, and report Windows Server Datacenter in their SPLA.

Is there a limit on how many guests I can run when I license Windows Server Enterprise? What if I run all Linux guests?

The Windows Server Enterprise license includes up to 4 guests; additional licenses are required if you have more than four Windows Server guests. If you are running Linux, you need to determine the licensing requirements for Linux from your Linux vendor. Microsoft does not place limitations on the number of Linux-based guests a hoster may run.

Does the use of Windows Server Datacenter as a platform for SQL Server change the number of licenses required for SQL Server as indicated in the SPUR? For example, if I have 50 SQL Server instances running on their own virtual machines (i.e., guests) in a Windows Server Datacenter cluster, how many SQL Server licenses do I report?

This depends on the edition of SQL Server:

- The use of Windows Server Datacenter does not diminish the number of licenses required for SQL Server as spelled out in the SPUR.
- With SQL Server Enterprise, you must acquire a license for each physical processor on the server, which allows you to run an unlimited number of virtual instances on the same server.

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- For SQL Server Standard or Web to run instances in virtual operating system environments, a license is needed for each virtual processor that each of those virtual operating system environments uses.

What are the licensing implications of clustering? Do I pay for only the active nodes? Are passive nodes charged as well?

For SQL Server in an active/passive configuration, passive nodes do not need to be reported.

For Windows Server cold disaster recovery, the cold VM does not need to be reported. In cold disaster recovery scenarios, the machines must be physically turned off or not running, except in some testing scenarios. In warm disaster recovery with failover, you need to license both Window Server licenses.

Does Microsoft allow a downgrade to Windows Server Web from Windows Server Standard and Enterprise, instead of just from Windows Server Datacenter?

We don't think this is a realistic scenario to support. It would be extremely uncommon to see someone buy a Windows Server Standard or Enterprise license at \$145 or \$195 and then downgrade to a product that costs \$10. Also, if they are using features or resources that are enabled in Windows Server Standard or Enterprise and these are not available in Windows Server Web, then the downgrade may have unwarranted consequences.

Please explain the difference between a virtual processor and a physical processor.

Just as a physical server utilizes one or more physical processors, a virtual server or guest utilizes one or more virtual (or logical) processors. Hyper-V technology makes use of virtual processors in the guest operating system.

From a licensing perspective, certain products like Windows Server are licensed according to number of physical processors (sockets). Other products such as SQL Server are licensed according to the number of virtual processors. Hyper-V may mix and match the physical cores from different processors to create a virtual processor. An example is illustrated in Figure 10.

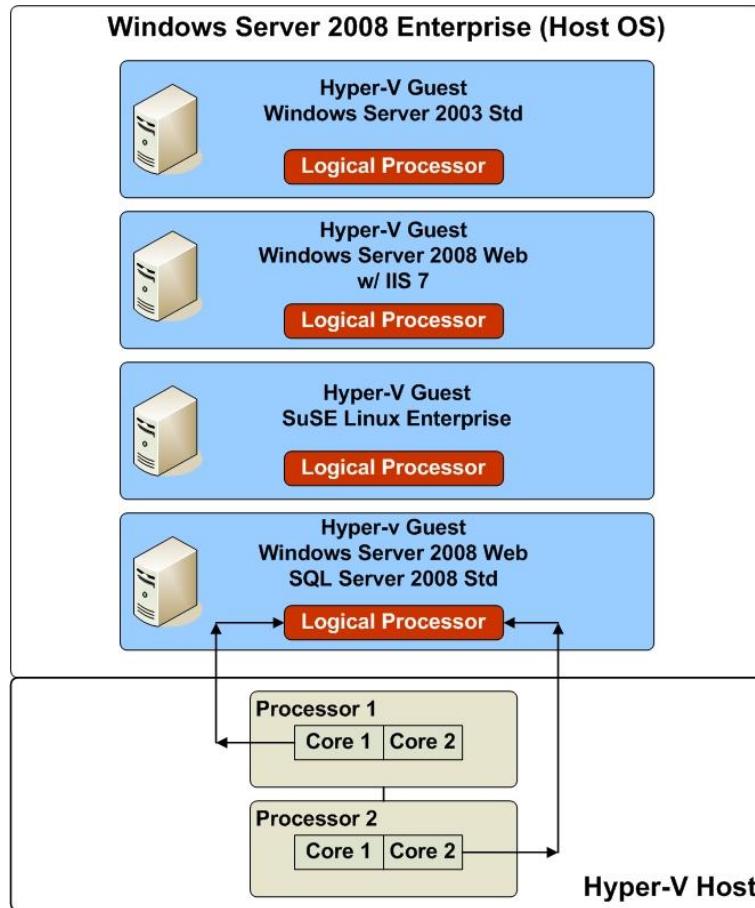


Figure 7 : Construction of Logical (or Virtual) Processors

For reliability and performance, Hyper-V technology may allocate resources from separate physical processors in the server to create a virtual processor for use by a particular guest operating system environment. For licensing purposes, virtual processors are considered to have the same number of threads and cores as each physical processor in the underlying physical hardware system. Microsoft is adopting this definition to enable Hosting Providers to take advantage of the licensing policy we announced in 2004 for multicore processors. Microsoft generally considers multicore and hyperthreaded processors to be a single processor, regardless of the number of cores and/or threads they contain.

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### System Center Virtual Machine Manager 2008 Overview

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