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# VMware Virtual Center and ESX Server

Martin Schmidt  
EMEA Microsoft/VMware Competency Center  
martin.schmidt@hp.com

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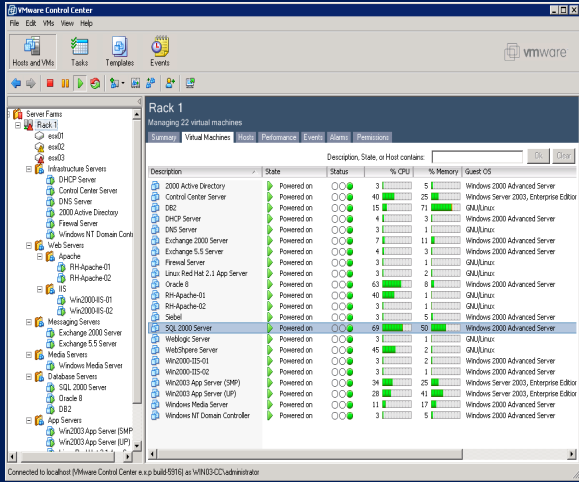
## Topics

- VMware Virtual Center
- HP Virtual Machine Management Pack (VMM)
- HP ProLiant Essentials Server Migration Pack
- VMware VMotion
- ESX Best Practices
- HP VMware Solution Sizer
- HP Support for Virtual Server and VMware

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# Virtual Center Overview



Manage hundreds of servers from one location

Instantly provision new servers with standardized templates

Eliminate scheduled downtime with zero-downtime maintenance

Dynamically move workloads across servers without service interruption

Secure the environment with robust access control

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# Three Key Aspects of VirtualCenter

- **Centralized Management**
  - Monitoring, Automation, Integration, Security.
- **Instant provisioning**
  - Much faster provisioning. Built-in deployment consistency.
- **VMotion™ Technology**
  - Zero-Downtime Maintenance: Moves servers while running
  - Continuous Workload Consolidation: Constant optimization

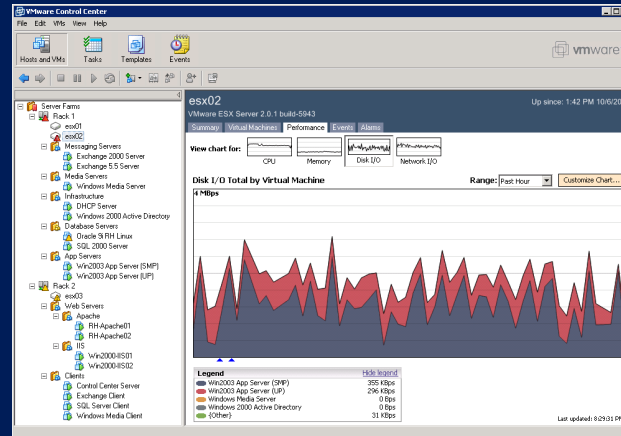
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## Centralized Management

- **Monitor** system availability and performance
- **Automated** notifications and email alerting
- **SDK** to **integrate** with existing management tools
- **Secure** the environment with robust access control



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## Best Practice: Create Templates

- Install Guest OS using ISO images because
  - Can be stored on a SAN (public VMFS) which makes deployment much faster
  - Always available and you don't have to visit the server to stick in the CD-ROM
  - Faster than using CD-ROM
- Install Service Packs and Patches
- VMware Tools
- Management Agents
- Anti-virus Software
- Backup Agents
- Any other Applications common on all VMs

Before you create the template (or clone a VM):

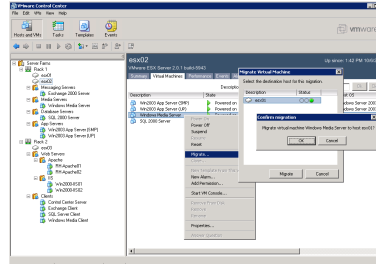
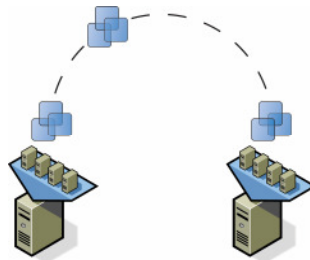
- Prepare your VC server (Install Sysprep Tools or Open Source Components) (<http://www.vmware.com/support/vc11/doc/c12prepcustomize.html>)
- Or run Sysprep within a Windows VM
- Try to have as few of these golden masters as possible, and always use them. The result will be that there are no needless differences among your deployed systems. These differences are a typical cause of operator error.

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# Instant Provisioning



## VirtualCenter Provisioning Process

- Start Deployment Wizard
- Choose Server Template
- Select Server location
- Click Next, Next, Done



- Takes under 10 minutes
- Speed of a file copy
- Hardware-independent
- Template based
- Fully leverages the SAN
- Automatic and standardized

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# Demo

## Deploy VM with Virtual Center

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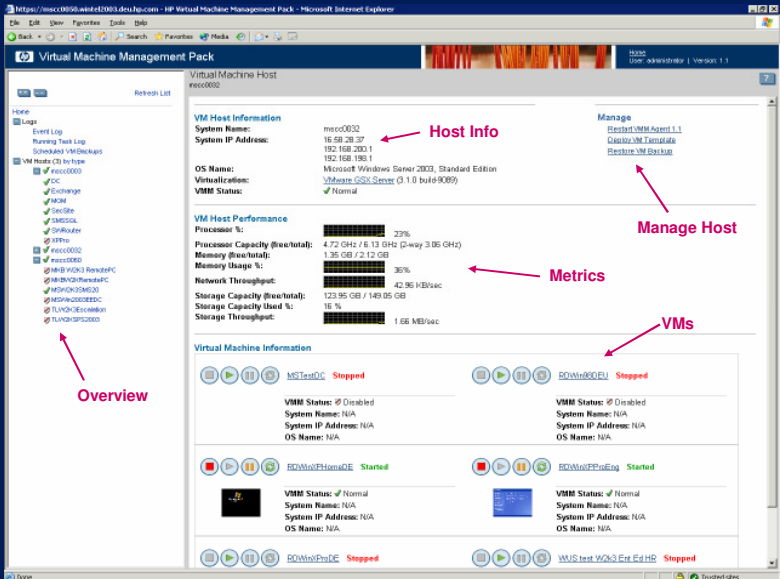
## HP Virtual Machine Management Pack

- Integrates completely with SIM (Systems Insight Management)
- Manage Virtual Server, VMware GSX and ESX hosts and guests by using only one GUI
- Start, stop, pause and reset VMs
- Copy and move VMs between hosts (of same architecture)
- Backup host to preserve guests, OS and config
- Online backup of VMs (put into suspend mode)
- Create and use templates for provisioning
- Performance metrics to monitor hosts and guests

<http://www.hp.com/servers/proliantessentials/vmm>  
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## HP Virtual Machine Management Pack



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# HP Virtual Machine Management Pack

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# HP Server Migration Pack


- Integrates completely with SIM
- P2V migrations into Virtual Server, GSX and ESX
- V2V migrations between Virtual Server, GSX and ESX
- Multiple P2V migrations concurrently
- Companion product to VMM

<http://www.hp.com/servers/proliantessentials/smp>

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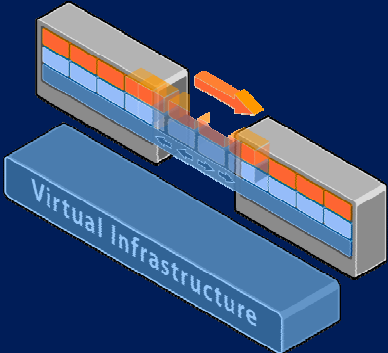
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# VMotion Technology


VMotion technology lets you move live, running virtual machines from one host to another while maintaining continuous service availability.



- Optimal Utilization
- Zero-downtime maintenance
- Fast Reconfiguration
- Continuous Workload Consolidation

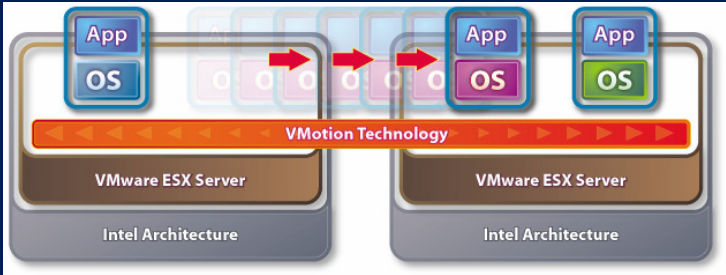
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# VMotion Technology

Instantly shift running systems across hosts with imperceptible downtime.



- 100% application availability
- 100% transaction integrity
- 100% data availability
- 100% transparency to end users

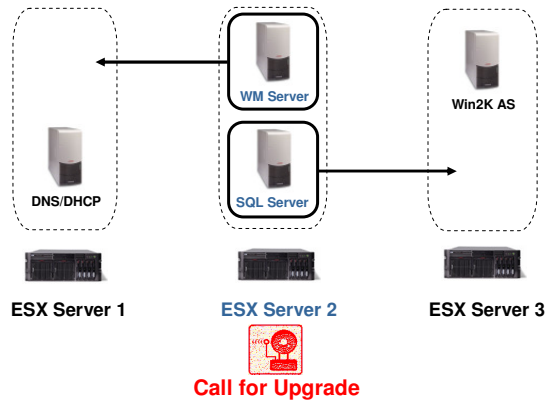
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# Zero Downtime Maintenance

Upgrade and service production hardware using VMotion with zero downtime and 100% customer transparency.



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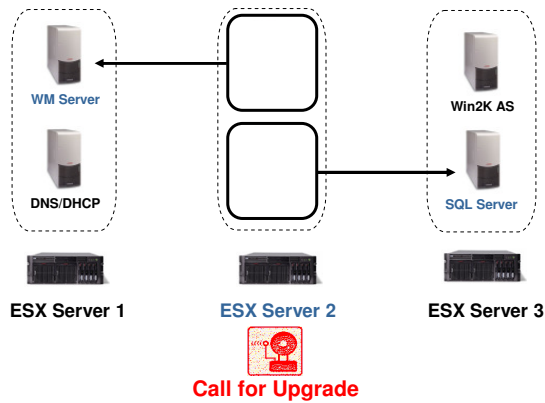
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# Zero Downtime Maintenance

Upgrade and service production hardware using VMotion with zero downtime and 100% customer transparency.



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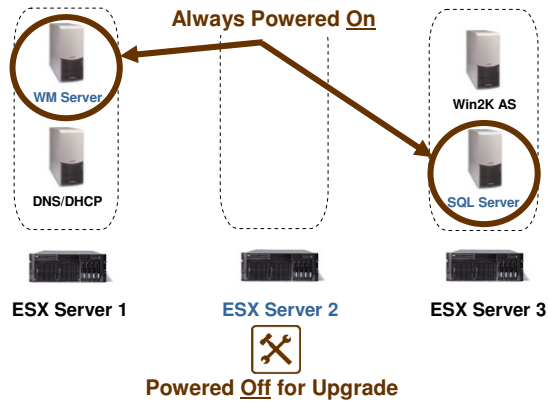


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# Zero Downtime Maintenance

Upgrade and service production hardware using VMotion with zero downtime and 100% customer transparency.



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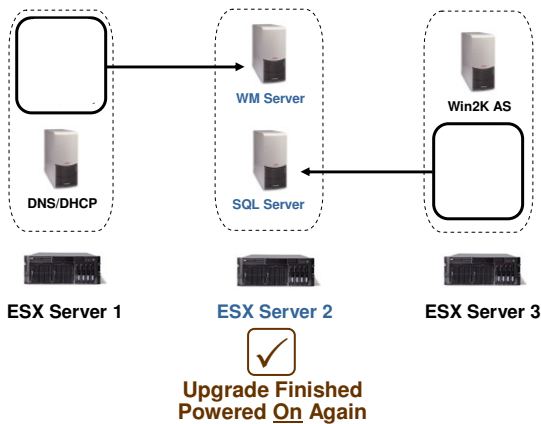
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# Zero Downtime Maintenance

Upgrade and service production hardware using VMotion with zero downtime and 100% customer transparency.



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## Workload Management

- A hot migration could take VMs off of one ESX server to give the remaining VMs greater access to resources.
- A hot migration could also transfer a VM to a lesser-used or unused ESX Server only during it's heavy traffic periods.
- Based on performance measurement data, ESX Servers can be "**load balanced**", and this balance can easily be changed, either based on "trend data", or dynamic changes.

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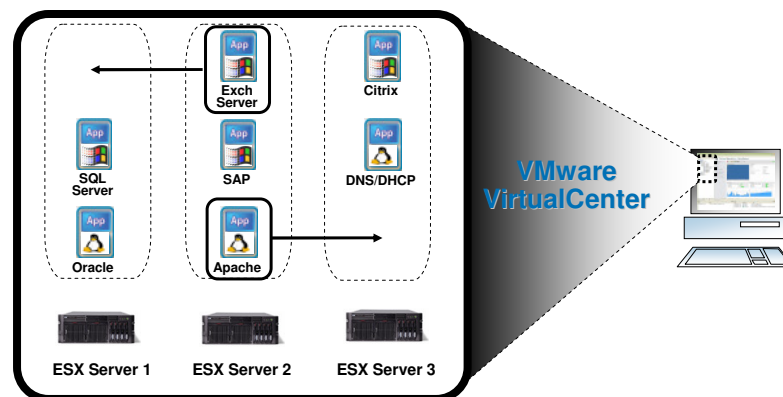
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## Workload Management with VMotion

Dynamically manage workloads in response to an unexpected increase in SAP utilization



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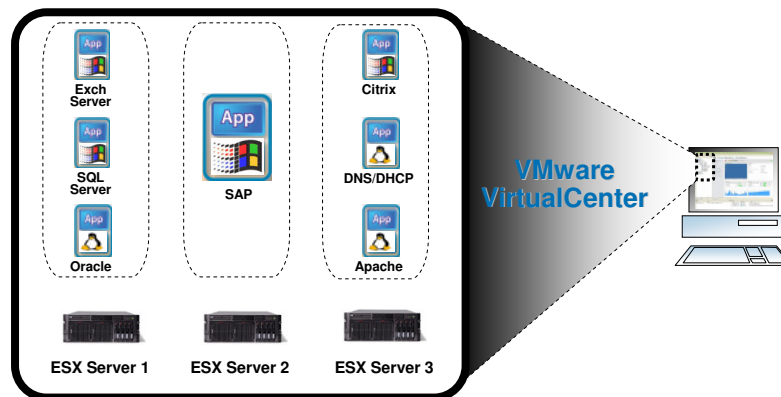
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## Workload Management with VMotion

Dynamically manage workloads in response to an unexpected increase in SAP utilization



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## Workload Management

- The allocation of CPU, Memory and Disk resources can also be changed dynamically, through guaranteed minimums, maximums, and a “**Proportional Share**” mechanism. Network traffic can be throttled through **Traffic Shaping**.
- This means that predictable service levels can be guaranteed, and resource allocations can be adjusted as needed, or even changed on a scheduled basis.

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# Demo

## VMotion

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# Best Practices: VM Design

- Critical or sensitive application -> Isolate on separate VM
- VMs with critical or sensitive data -> Separate VM
- Application prone to be security attacked -> Isolate on separate VM
- Complex application which could interfere with other apps -> Isolate
- Security applications, like firewalls should be isolated on a separate VM.
- Great risk for data corruption or unstable app -> Isolate

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## General Performance Considerations



- Load Mix. Put heterogeneous servers on one host. Avoid fighting for resources.
- Install VMware tools to improve video and mouse performance
- Disable screen-savers in your VMs
- During installation, choose the correct OS installation type (for the configuration .vmx file)
- Use the correct Windows HAL (for example multiprocessor HAL for SMP VM) or Linux kernel
- Each VM should only run one application, so resources can be finer-grained
- Only use VMware supported devices for your ESX host
- Run Linux VMs without X Window System if possible
- Disconnect CD-ROM and floppy devices from VMs
- Turn off unneeded services within the VM (Task Scheduler, Messenger etc.)

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## Best Practices: Service Console



- Give your Service Console enough memory (192 - 512 MB, depending on number of VMs). Otherwise, Service Console swapping will generate I/O load.
- Service Console runs on CPU 0, so let CPU-intensive VMs not compete for this CPU
- Give your Service Console a dedicated NIC
- Avoid sharing storage adapters between Service Console and VMkernel
- Do not use Remote Console, but RDP or VNC. Remote Console uses CPU resources in the Service Console

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## Best Practices: Networking

- Use vmxnet instead of vlance for your VMs NICs. (10 times faster).  
Note: By default, vlance is used since nearly any OS has a driver for it.
- Use vmnic instead of vlance especially for Gigabit networks
- High network bandwidth needed-> Virtual teaming: Bind multiple physical NICs to one virtual switch. No additional teaming software within the guest is needed.
- For back-end processing, use vmnets (host-only networking).
- If a VM needs one dedicated NIC, bind the VM exclusively to a virtual switch which is bound to one physical NIC.
- Another advantage of vmnets is their improved physical security.

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## Best Practices: CPU

- Make sure, Hyperthreading is enabled in BIOS
- VMkernel will schedule VMs intelligently: CPU-intensive Virtual CPU's will run in different Physical CPU's.
- Don't bind, (by CPU affinity setting) busy VMs into the same Physical CPU.
- A VM can be isolated from Hyperthreading: Useful for CPU-intensive or cache-intensive workloads.

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## Transparent Page Sharing

- Similarity of consolidated operating systems.
- Similarity of consolidated applications.
- **Design tradeoffs** - The more of the same instances of the same application, the greater the potential for duplicate pages to be reclaimed by transparent page sharing. However, there is also a greater likelihood of the same limiting resource to become saturated. I.E. multiple VM's that have CPU intensive workloads.

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## Best Practice: Storage

- Plan your disk storage structure
- VMware makes recommendations about the layout of your disks, especially about the size and placement of Service Console storage.
- Have a VMFS located on locally-attached storage. Use this for swap space for the VMkernel. (Note: VMkernel swap space is completely independent of, and needed in addition to, Service Console swap space.)
- Have a VMkernel core dump partition on locally-attached storage.
- Arrange for storage of golden masters and ISO images, as discussed above
- Protect your Service Console's root file system from filling.
- See ESX Server knowledgebase for a more detailed discussion.  
[http://www.vmware.com/support/kb/enduser/std\\_adp.php?p\\_faqid=1506](http://www.vmware.com/support/kb/enduser/std_adp.php?p_faqid=1506)

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## SAN

- Set VMFS accessibility mode to public (for shared cluster disks use shared)
- Persistent FC binding is recommended (fix target IDs)
- FC adapters should be dedicated exclusively to VMs
- LUNs > 7 are used -> Increase Disk.MaxLUN (the higher, the longer is the boot time)
- To hide specific LUNs, set DiskMaskLUNs
- DiskSupportSparseLUN -> If on, vmhba scans past missing LUNs, otherwise it stops.
- If zoning is used: ESX vmhba and Storage Array controller must be in the same zone
- Make sure that SAN switch has access to active (not the passive one) controller on Storage Array device.
- Firmware for FC controller, arrays and switches correct



## HP VMware Solution Sizer

[http://www27.compaq.com/sb/vmware/page\\_init.asp](http://www27.compaq.com/sb/vmware/page_init.asp)

### HP VMware Solution Sizer

This is an automated tool that assists users with the size and scope of their VMware server environment. This sizer will calculate the best way to consolidate current physical machines down to new target machines and then generate a bill of materials for the hardware. The printable view option will give a detailed report of the hardware specifications as well as a chart that reports the utilizations of different aspects of the servers.

If your requirements exceed the limits of this sizing tool, please [contact us](#) directly.

**Build Your Own Solutions**


Use this tool to build a solution that supports your VMware requirements.

**Build Solution >>**



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# HP VMware Solution Sizer



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- » Tools
- » SiteMap

## Maximum Utilization Rates

Max Rates
Servers to Consolidate
Platform Selection

Specify the maximum utilization rates desired for the target servers that will run the virtualized environments.

**Maximum CPU Utilization**  
80 %

**Maximum Memory Utilization**  
80 %

**Maximum Disk Utilization**  
75 %

**Maximum Network Utilization**  
75 %

**Additional Disk Space (GB)**  
10


Safe Calculations - less likely to exceed the above utilizations

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# HP VMware Solution Sizer



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## Servers to Consolidate

Max Rates
Servers to Consolidate
Platform Selection

Fill in the appropriate data about the servers you wish to consolidate to a virtualized environment.

If you have a large number of servers, feel free to download a [template of this spreadsheet](#) for later use. You can copy and paste your data from Excel into this application.

If you are pasting from a similar or older version of this spreadsheet, this tool will attempt to decipher the format as best it can.

Sample Data
Clear Data

Physical Server				Application								Preferences		
Current Server Name	Current Server Model	# of CPUs	CPU Speed (MHz)	OS version	App Disk Space (GB)	% CPU Utilization	Max RAM Usage (MB)	Avg Disk Throughput (IOPS)	Max Disk Throughput (IOPS)	Avg Network Throughput (Mbps)	Max Network Throughput (Mbps)	Min RAID Level	SMP	
devserv01	DL380	Pentium III	1	1000	Windows 2003	11	53	378	184	905	3	20	5	<input checked="" type="checkbox"/>
devserv02	DL380	Xeon	1	800	Windows 2000	21	13	465	776	863	8	14	0	<input checked="" type="checkbox"/>
devserv03	DL380	Xeon DP	2	600	Windows 2000	15	61	341	356	504	14	31	0	<input checked="" type="checkbox"/>
devserv04	DL380	Pentium III	1	300	Red Hat Linux	33	55	150	632	899	12	42	0	<input checked="" type="checkbox"/>
devserv05	DL380	Pentium III	2	800	Windows NT 4.0	15	38	456	332	960	12	30	0	<input type="checkbox"/>
devserv06	DL380	Pentium Pro	1	700	Windows XP	3	12	584	747	869	15	41	0	<input checked="" type="checkbox"/>
devserv07	DL380	Pentium Pro	1	400	Windows 2003	2	52	278	565	1641	13	28	0	<input checked="" type="checkbox"/>
devserv08	DL380	Xeon DP	2	500	Novell NetWare	8	17	120	123	975	12	38	0	<input type="checkbox"/>
devserv09	DL380	Pentium III	1	400	Red Hat Linux	6	18	352	745	1053	9	14	0	<input checked="" type="checkbox"/>
devserv10	DL380	Opteron 800	2	800	SuSE Linux	7	42	355	524	1123	12	25	0	<input checked="" type="checkbox"/>
testserver01	DL380	Pentium Pro	1	500	Windows 2000	17	44	352	256	309	9	32	0	<input type="checkbox"/>
testserver02	DL380	Pentium Pro	1	500	Windows NT 4.0	4	23	325	753	1121	6	21	0	<input type="checkbox"/>
testserver03	DL380	Pentium III	2	600	Windows XP	3	24	167	459	627	13	22	0	<input type="checkbox"/>
testserver04	DL380	Pentium Pro	1	500	Windows XP	1	13	279	765	812	16	33	0	<input type="checkbox"/>
testserver05	DL380	Pentium Pro	1	500	Windows NT 4.0	3	48	264	505	1532	17	42	0	<input type="checkbox"/>

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## HP VMware Solution Sizer

### Platform Selection

Max Rates
Servers to Consolidate
Platform Selection

Select the server platform you would like to consolidate to. You can compare up to four platforms at a time by checking each option that applies.

- ProLiant DL360 G3
- ProLiant DL380 G3
- ProLiant DL560
- ProLiant DL580 G2
- ProLiant DL585
- ProLiant DL740
- ProLiant DL760 G2
- ProLiant ML570 G2

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## HP VMware Solution Sizer

### VMware Sizer

[Feedback](#)

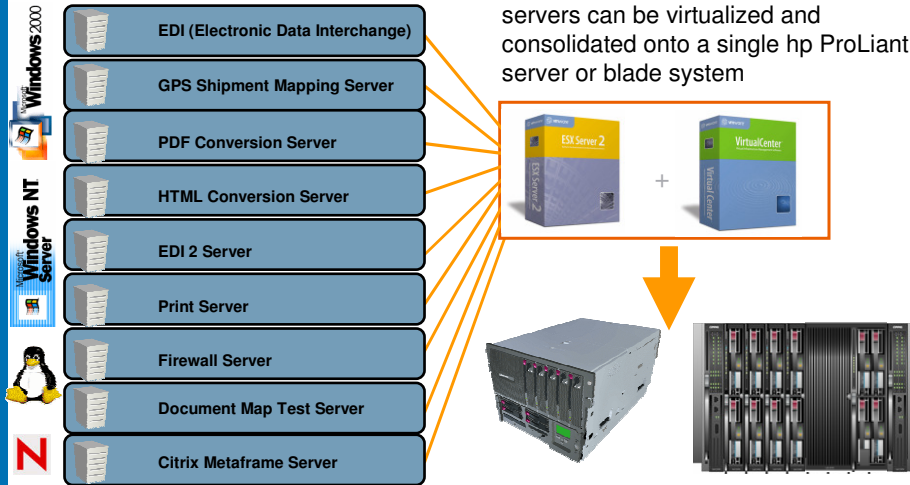
VMware - ESX Server

Profile	Price	Configuration	Operations
ML570	\$61,129.00 *	Target Server 1	<div style="background-color: #333; color: white; padding: 2px 5px;">Printable View </div>
		Target Server 2	

\*3/7/2005 Internet Price

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# Server Consolidation

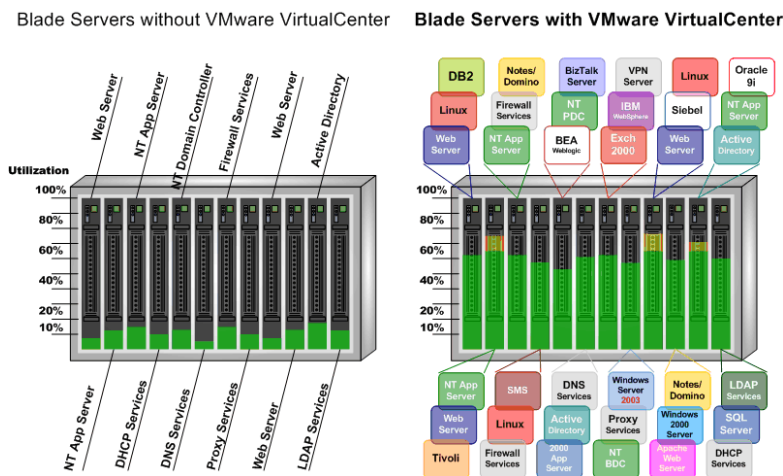


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# Increases Blade Density & Flexibility



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## Why choose HP?

- We provide complete solution for Virtual Server, GSX and ESX
  - Consulting
  - Planning
  - Hardware
  - Implementation
  - Support

Microsoft, Linux, Storage and SAN support personnel on staff  
Microsoft and Linux supported running in a VMware Virtual Machine  
Platinum Support Contract (24x7) with VMware  
Gold Support Contract (24x7) with Microsoft

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## Questions?

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