



# Improving Blade Economics with Virtualization

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# The agenda

- Description of Virtualization
- VMware Products
- Benefits of virtualization
- Overview of Blade systems
- Economies of Blades, and how they are enhanced by Virtualization.
- Conclusion

# Combining Blades with Virtualization

- ***Virtualization technology increases the economies obtained from blade servers by:***
  - increasing availability
  - increasing application density and efficiency
  - enhancing network, disk and KVM abilities
  - increasing manageability
  - improving provisioning capabilities.

# Description of Virtualization



# The Meaning of Virtualization

- **The user** sees the resources they need as if they were dedicated to them.
- **The administrator** manages those resources locally, optimizing globally across the needs of the enterprise.

**“Virtualization  
enables flexible,  
dynamic behavior”**

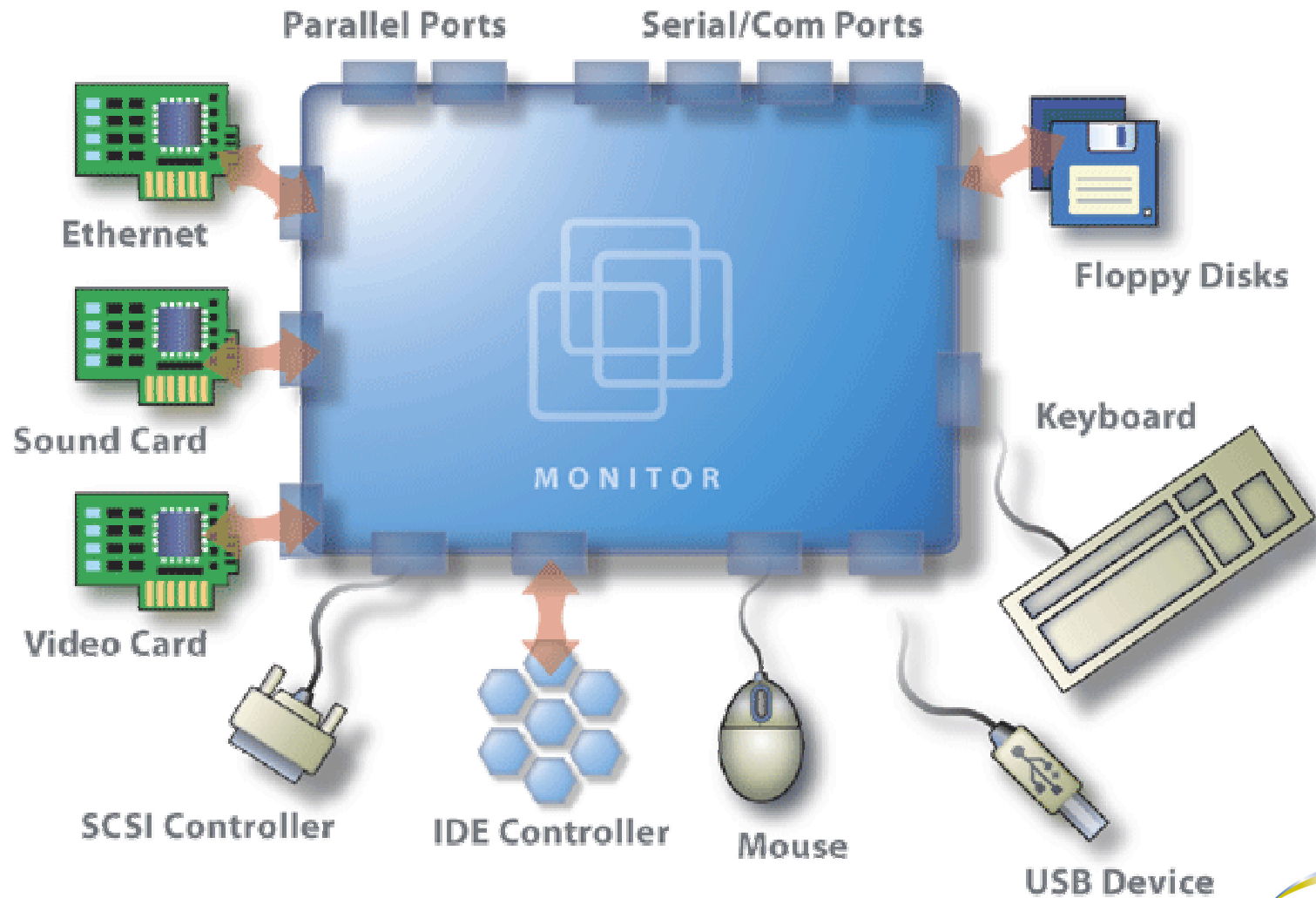
**Meta Group**

**Oct 2003**

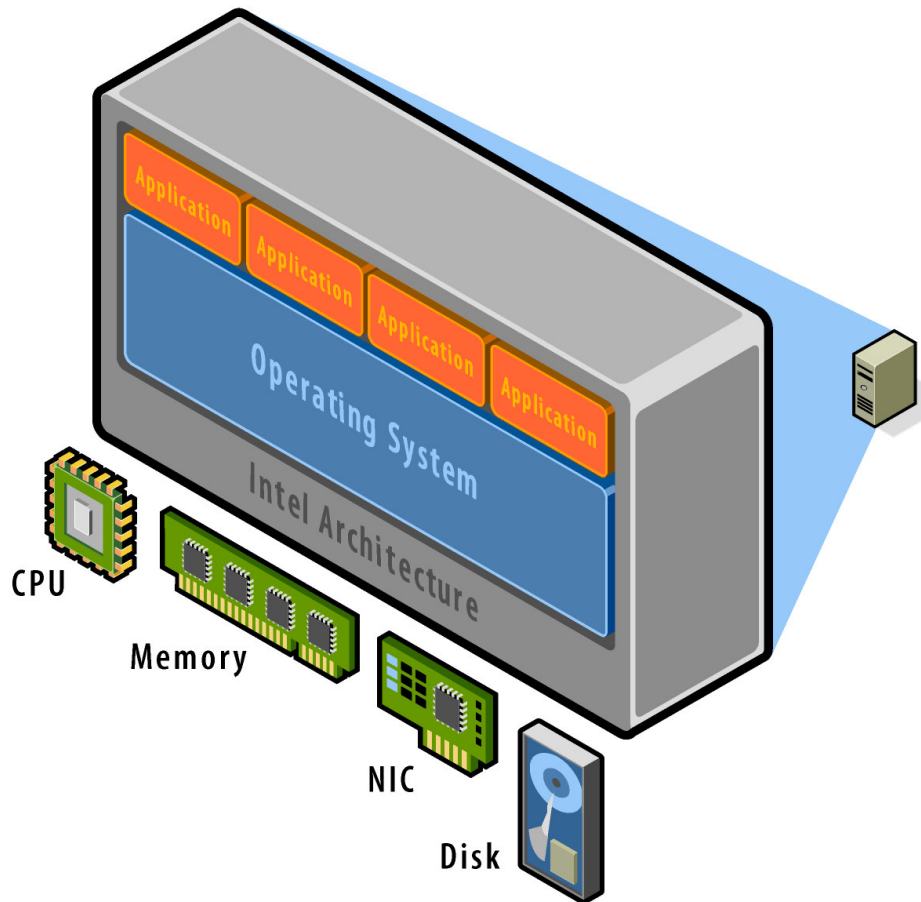


**Decreased Costs; Increased Efficiency and Responsiveness**

# Virtual Hardware

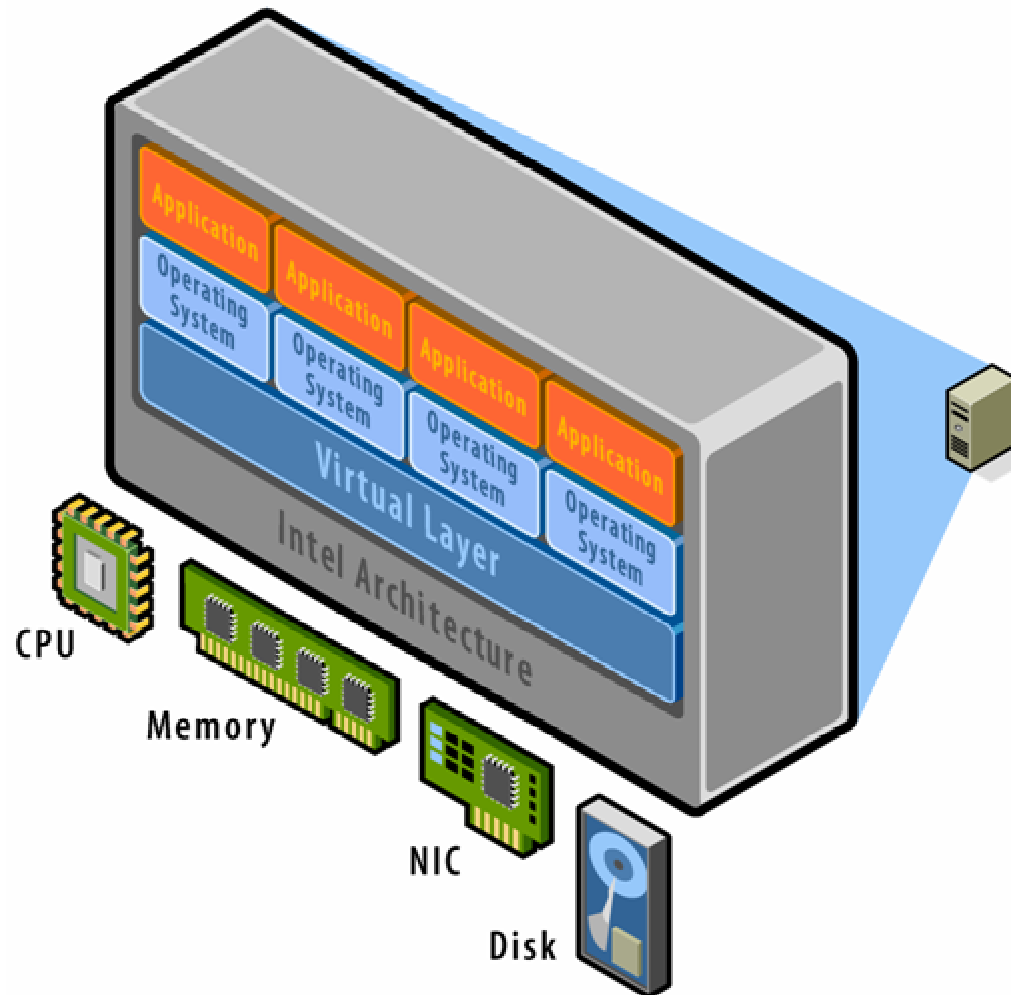


# Traditional Intel System Architecture



- Single OS image per machine
- Underutilized system resources
- Software and hardware tightly coupled

# Intel Architecture with VMware



- Multiple OS images per machine
- System resource utilization increased
- Software and hardware loosely coupled

# Virtualization Today

| NETWORK                                                                                               | STORAGE                                                                                | COMPUTE                                                                                      | MANAGE                                                                                                                             |
|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Virtual LAN</li><li>• VPN = virtual private network</li></ul> | <ul style="list-style-type: none"><li>• Storage Networks (SAN)</li><li>• NAS</li></ul> | <ul style="list-style-type: none"><li>• Mainframes</li><li>• Unix</li><li>• VMware</li></ul> | <ul style="list-style-type: none"><li>• Citrix, MS Terminal Server</li><li>• Virtual interface</li><li>• Virtual Offices</li></ul> |



Along with consolidation and centralization, virtualization is the next wave – whether that's Utility Computing, or Data Center optimization.

# Benefits of Virtual Infrastructure

| CEO                                                                                                                                                                                                                                                                            | CFO                                                                                                                                                                                                                                                      | CIO                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IT responds faster to business demands</b>                                                                                                                                                                                                                                  | <b>Costs are lower and easier to manage</b>                                                                                                                                                                                                              | <b>It's the most flexible way to build IT</b>                                                                                                                                                                                                              |
| <ul style="list-style-type: none"><li>• <b>Integration</b> with partners and customers is easier</li><li>• <b>Expansion</b> or M&amp;A activities can happen faster</li><li>• <b>Resources can be deployed or moved quickly</b> to the business units that need them</li></ul> | <ul style="list-style-type: none"><li>• You don't pay for what you don't need</li><li>• You <b>get more out of your IT investment</b> dollars</li><li>• <b>Easier to separate the strategic IT investments</b> from the commodity IT functions</li></ul> | <ul style="list-style-type: none"><li>• Leverages technologies you are already investing in</li><li>• Increases <b>quality</b> and <b>consistency</b></li><li>• Gives you <b>lower-cost platform options</b></li><li>• Minimizes technology risk</li></ul> |

# VMware Products



# VMware Virtualization Product Line



## Virtual Machine Platform

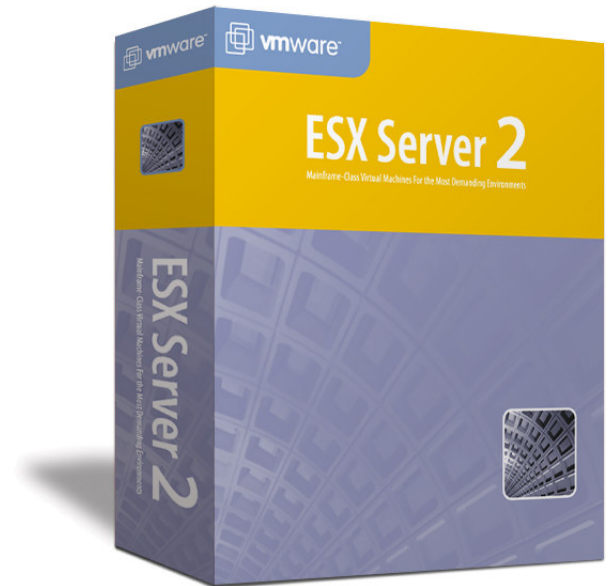


# VMware ESX Server 2

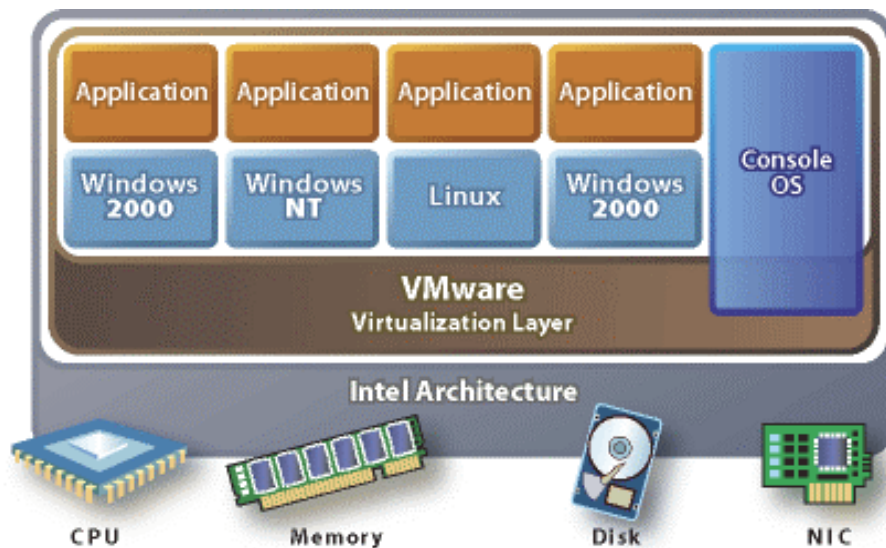
## Mainframe-class Virtual Machines

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- Mainframe-class virtual machines for the most demanding environments
- Server consolidation across the Enterprise Center
- Reduce the total cost of computing infrastructure
- VMware ESX Server delivers:
  - 40% reduction in hardware and software costs
  - 70% reduction in operations costs
  - Increased availability
  - Highest levels of scalability
  - Guaranteed resources for mission-critical applications

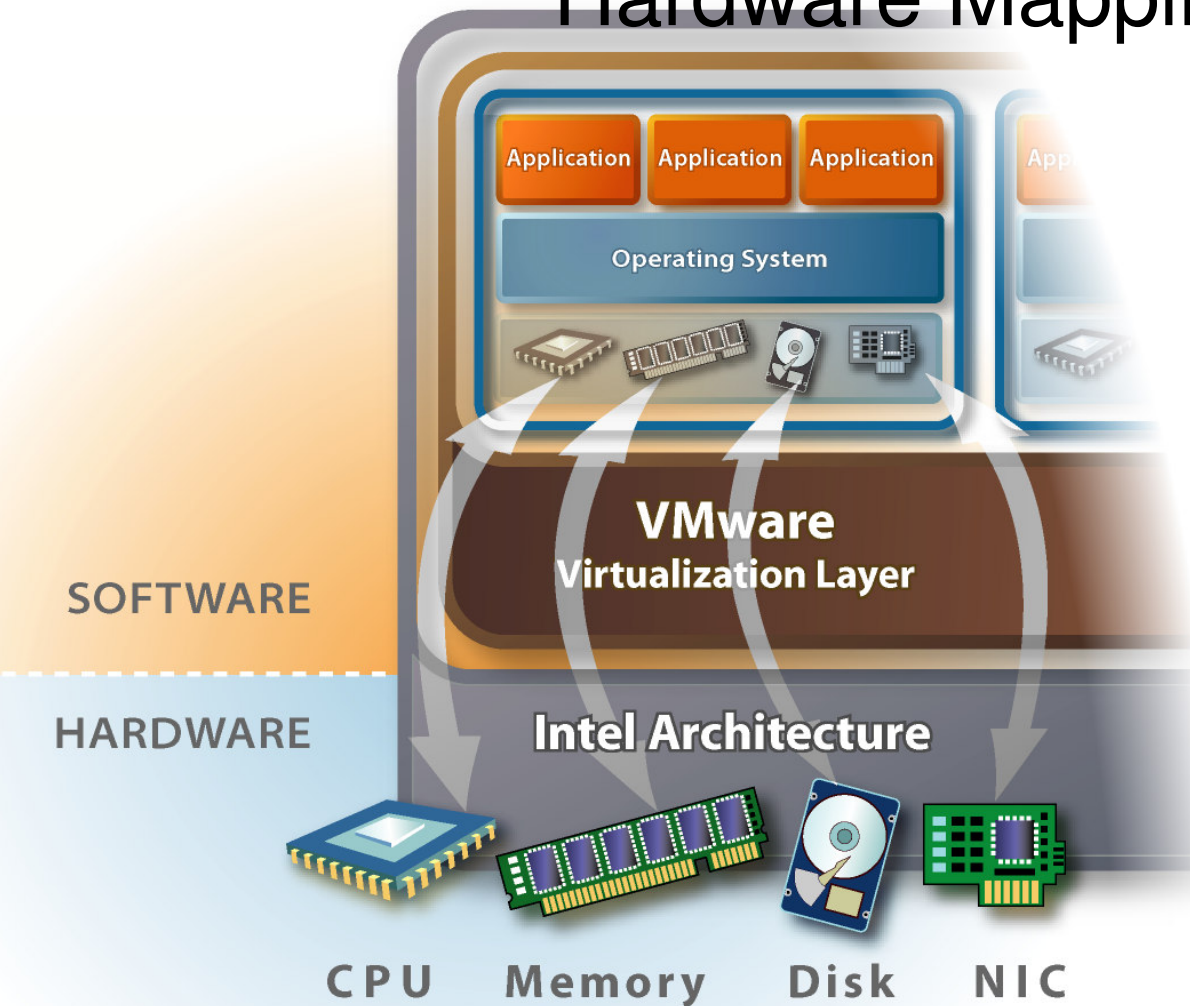


# Greater Flexibility for Virtual Environment



- Hyper-threading Support
  - Increased performance from existing infrastructure
- VLAN support
  - Security and isolation for virtual machines
  - Less need for multiple physical cards
- Clustering Support
  - Greater availability for applications in virtual machines
- Expanded SAN support
  - Greater compatibility with data center environment

# Hardware Mapping/Connections



- Virtualization layer maps virtual hardware to real hardware.
- Can multiplex several virtual hardware to single real HW.
- High Performance – map directly on hardware.

# VMware VirtualCenter Management System



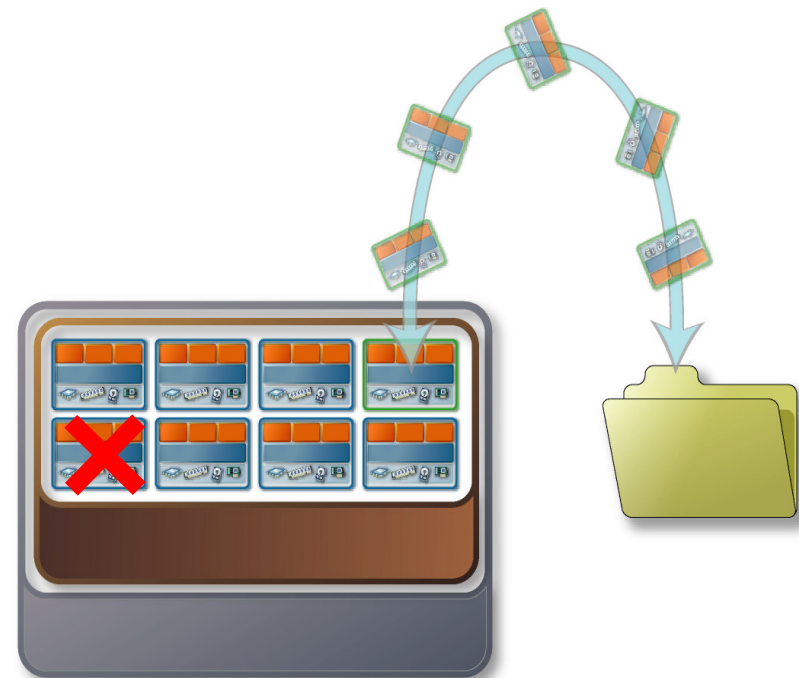
- **Manage** hundreds of servers from one location
- **Instantly provision** new servers with standardized templates
- **Eliminate scheduled downtime** with zero-downtime maintenance
- **Dynamically move workloads** across servers without service interruption

# Benefits of Virtualization

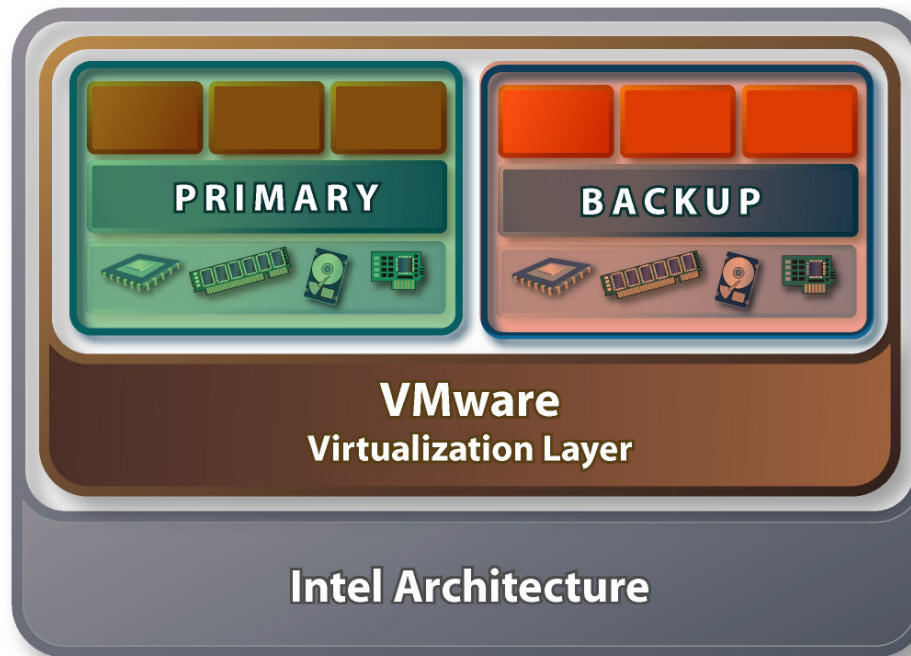


# Encapsulation & Isolation

- Entire state of VM encapsulated
  - Memory, disk images, I/O device state
- VM state can be saved to a file
- VM state can be transferred through time and space
  - Time: store in a file
  - Space: transfer over a network
- Fault in one machine doesn't bother others at all.



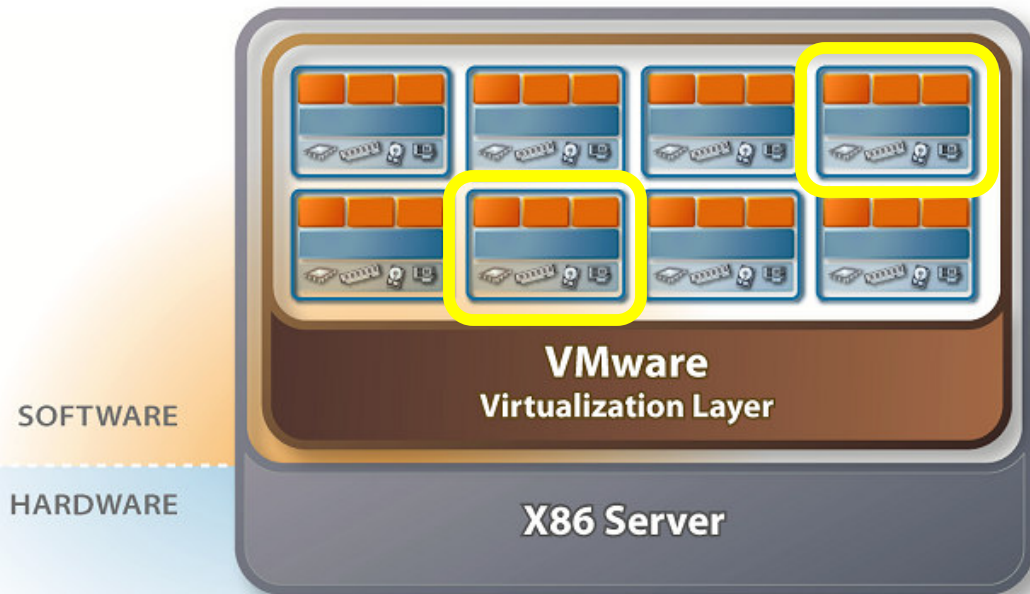
# Solution: High availability



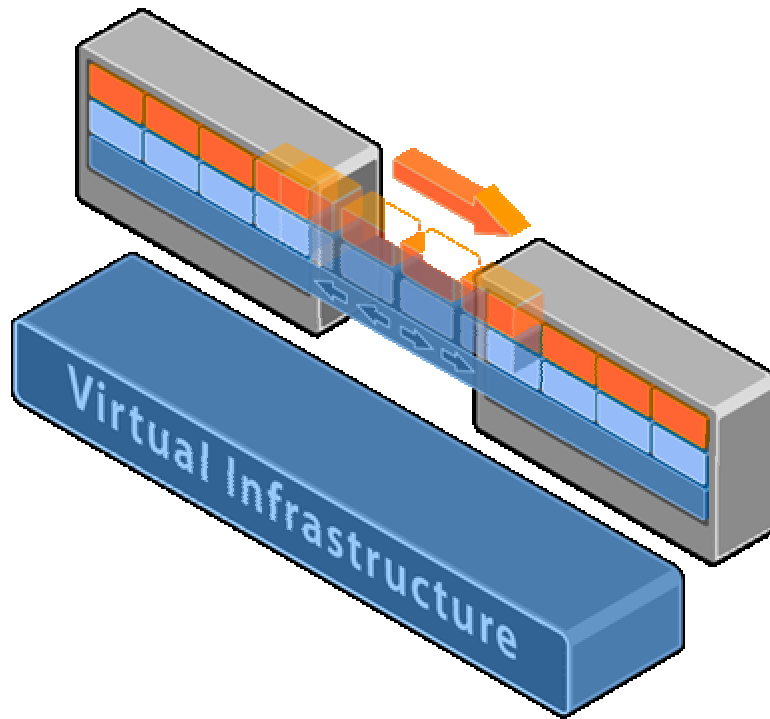
- Run cluster management software
- Support failover and other software reliability techniques

# Feature: Partitioning

- Run multiple operating systems on one physical machine
- Fully utilize server resources
- SCSI reservations enable clustering



# VMotion™: Moving Applications while serving users.



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

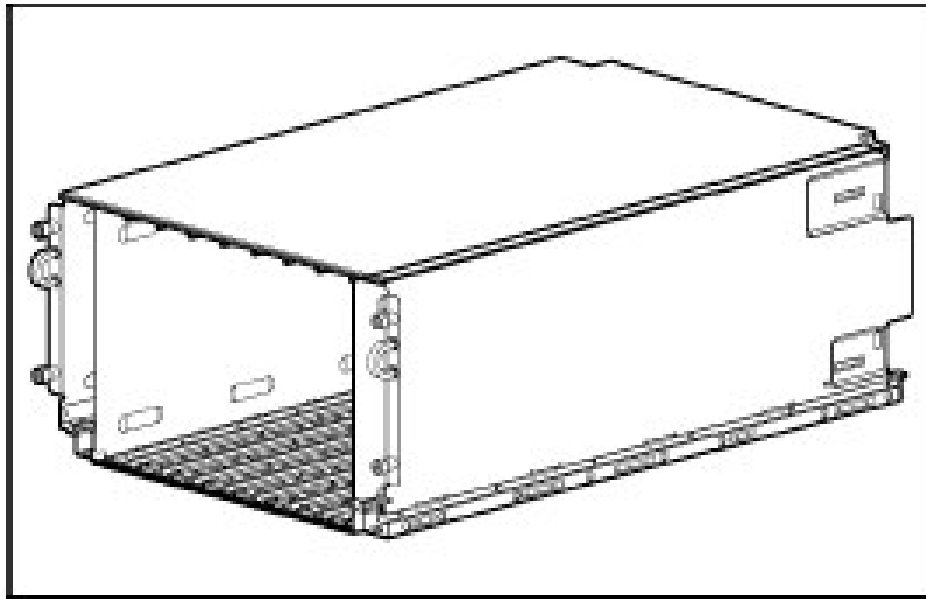
VMotion technology lets you move live, running virtual machines from one host to another while maintaining continuous service availability.

# Overview of HP Blades Systems



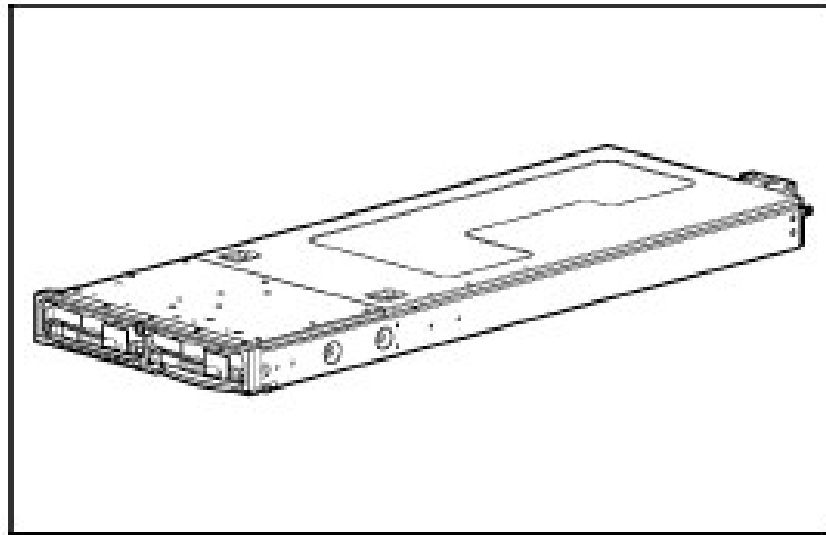
# Overview of the Blade System

- The blade enclosure
  - 6U
  - Network interconnects on each end
  - Dual redundant power supplies



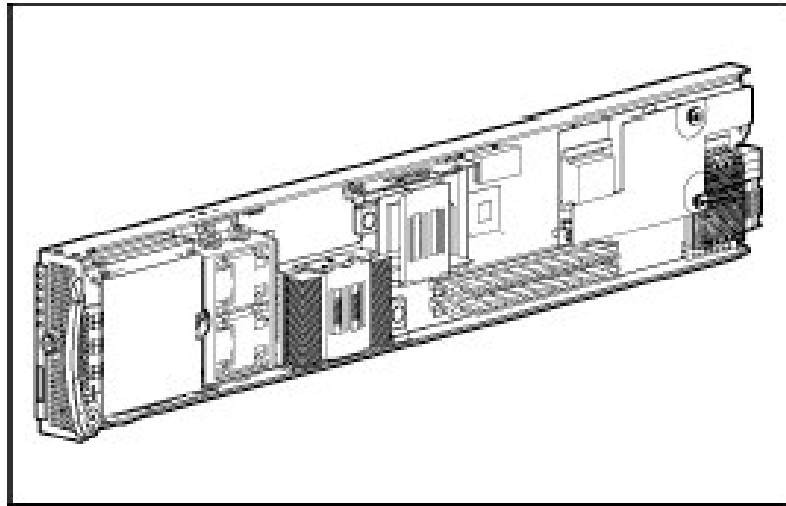
# BL 20p

- 2 processors
- Redundant SCSI hard disks
- 8 per enclosure
- 3 NICs, one extra for iLO
- 8gb
- Certified for ESX



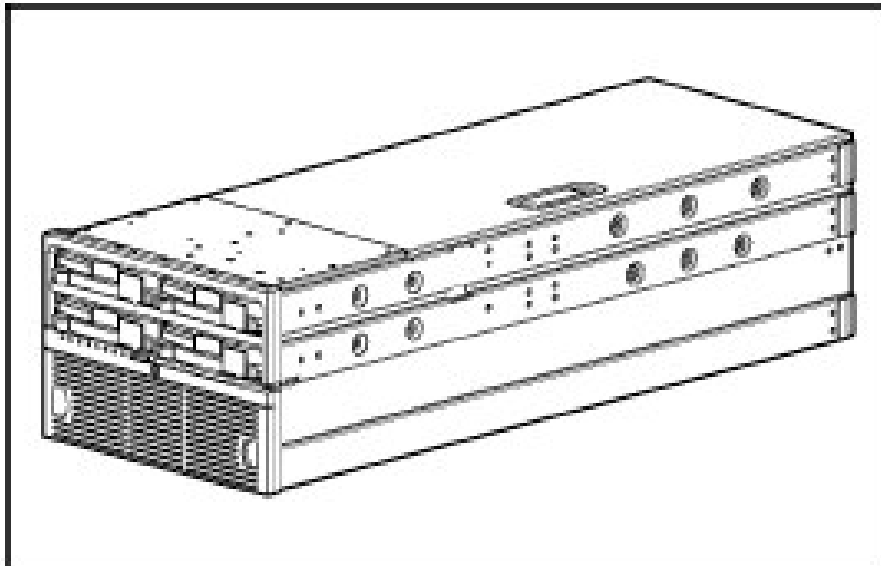
# BL 30p

- 16 per enclosure!
- 2 Processor
- Up to 4gb memory
- IDE only (Dual, mirrored)
- ESX requires SAN (MSA would do just fine)



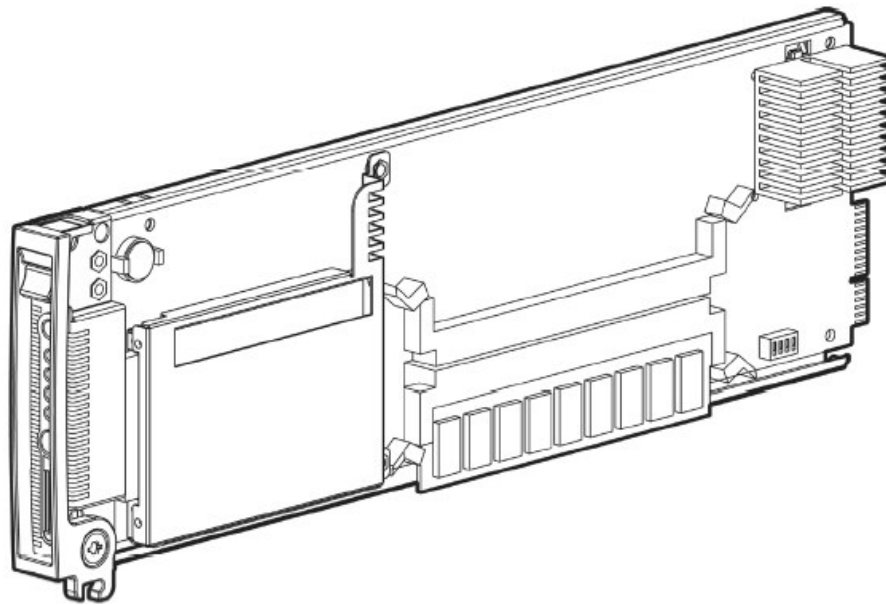
# BL40p

- 4 Processors
- 4 scsi drives
- 12gb memory
- 5 NICs
- 2 per enclosure



# BL10e

- Single processor, 20 per rack
- Too small for virtualization with ESX
- With GSX, makes a great **Desktop consolidation** device



# Economies of Blades, and how they are enhanced by Virtualization.

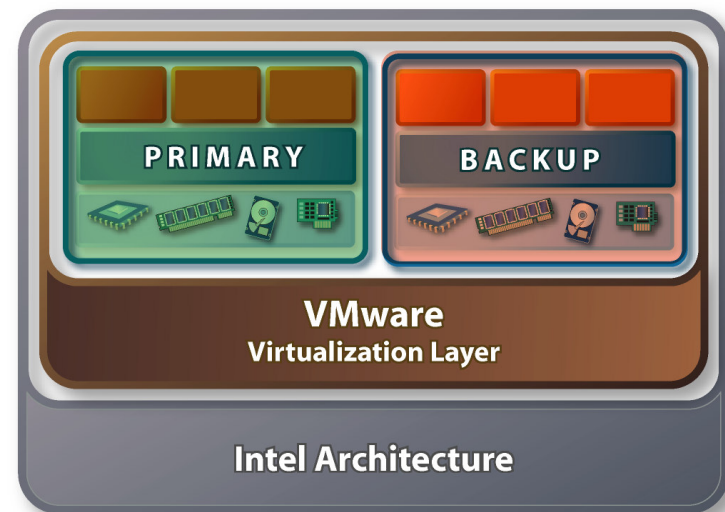


# Increased availability

- Blades increase availability with
  - Redundant hot plug power supplies
  - Hot plug scsi hard drives and integrated RAID
  - Dual port SAN connectivity
  - Multiple NICs per blade
  - Redundant pairs of hot plug interconnect switch options.

# VMware enhancements to availability

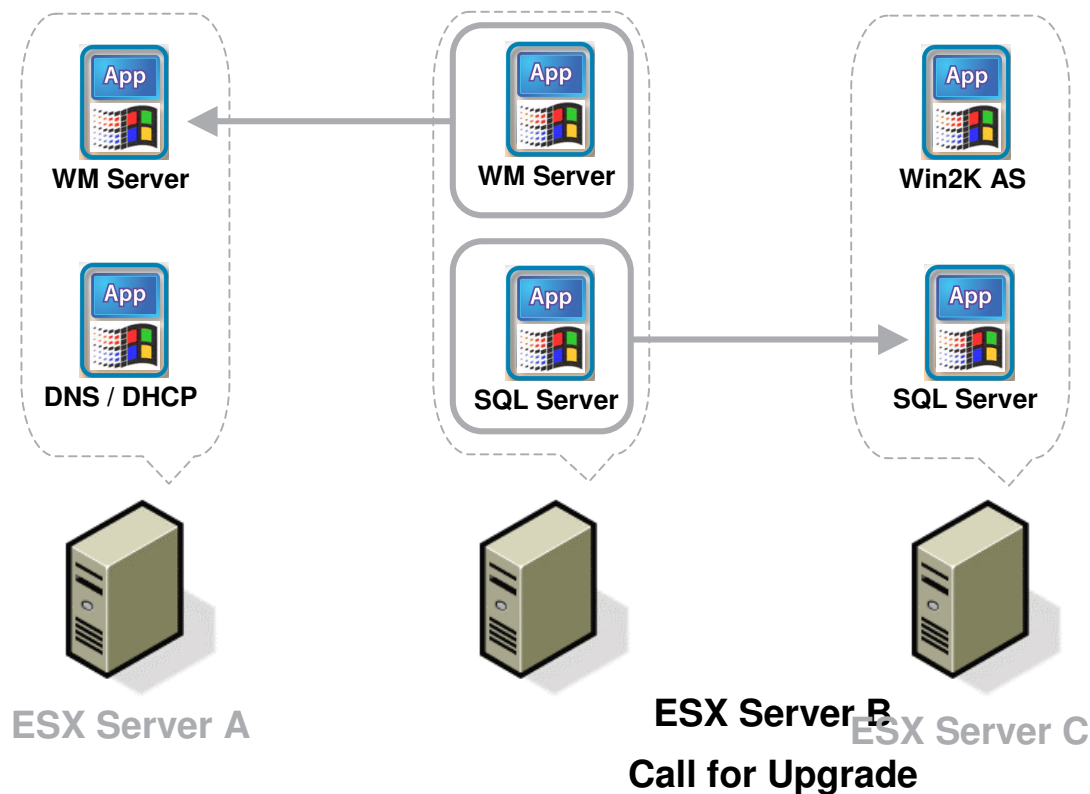
- VMs can be clustered
- Physical nic bonding allows aggregation, failover
- APIs allow restart of VM on other blade
- Veritas cluster services
- VirtualCenter events, tasks



# VMware enhancements to availability

## Zero downtime for maintenance:

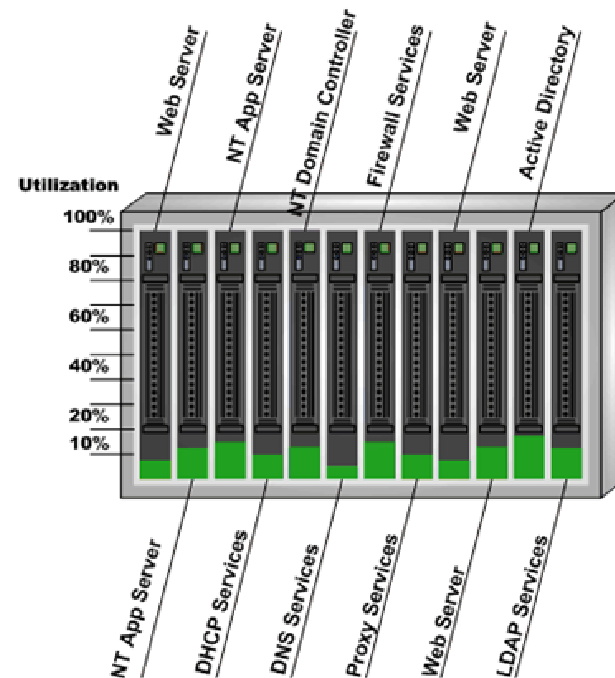
Upgrade and service production hardware through VM migration with zero downtime and 100% customer transparency



# Blades Increasing application density

- Blades allow many applications to coexist in a smaller physical space
- *Less electricity*
- *Less Real Estate*

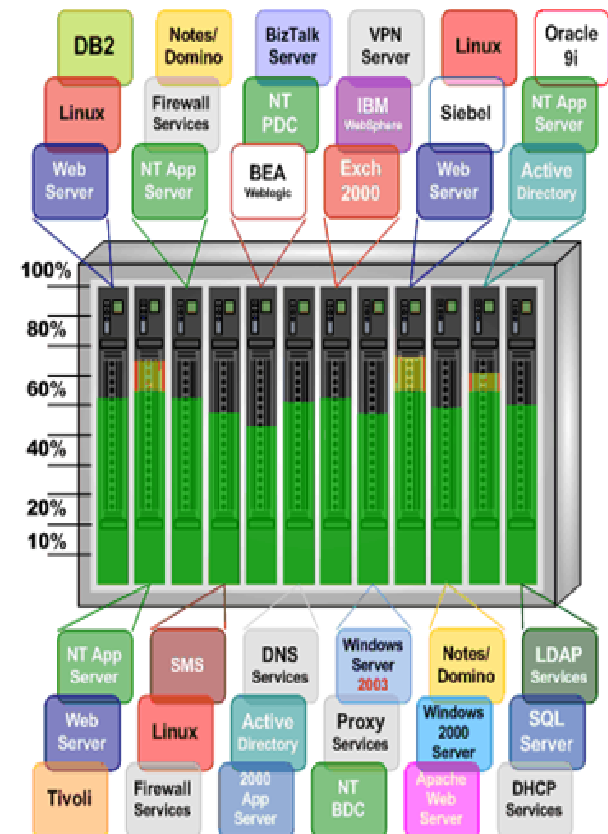
Blade Servers without VMware VirtualCenter



# VMware enhancements to application density

- *Virtual Machines share CPUs*
  - Factor of **5:1** per physical CPU
  - Your mileage may vary
  - Easy to adjust load with VMotion
  - Increase utilization
  - increase efficiency

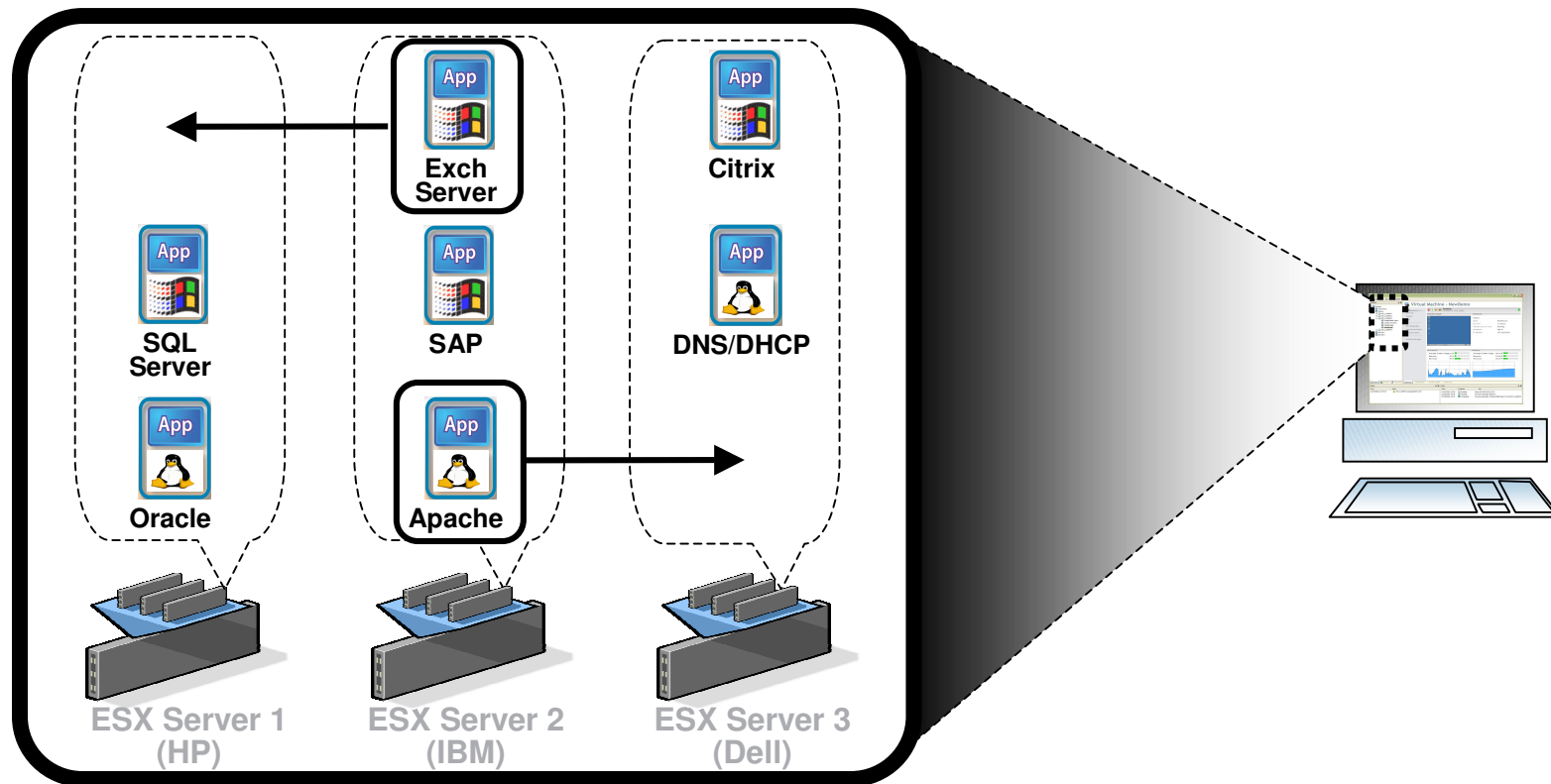
Blade Servers with VMware VirtualCenter



# Continuous Workload Consolidation

*Dynamically manage workloads across a heterogeneous environment.*

*Using VMotion™. Adds flexibility to Density*

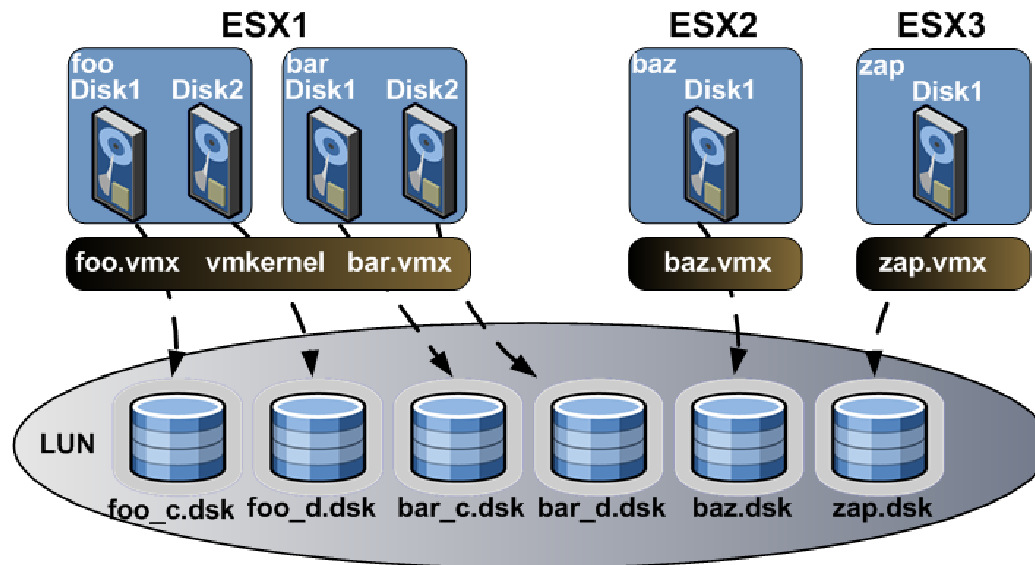


# Blades Enhancing network, disk and KVM abilities

- **Blades have less cabling**
  - *Less complication to install new capacity*
  - *Less complexity to manage*
  - *= Lower cost of ownership*
  - *Still maintains powerful network features*
  - *Retains dual path HBA for reliability*
  - *iLO allows remote management, removing need for local CDROM, Floppy, KVM*

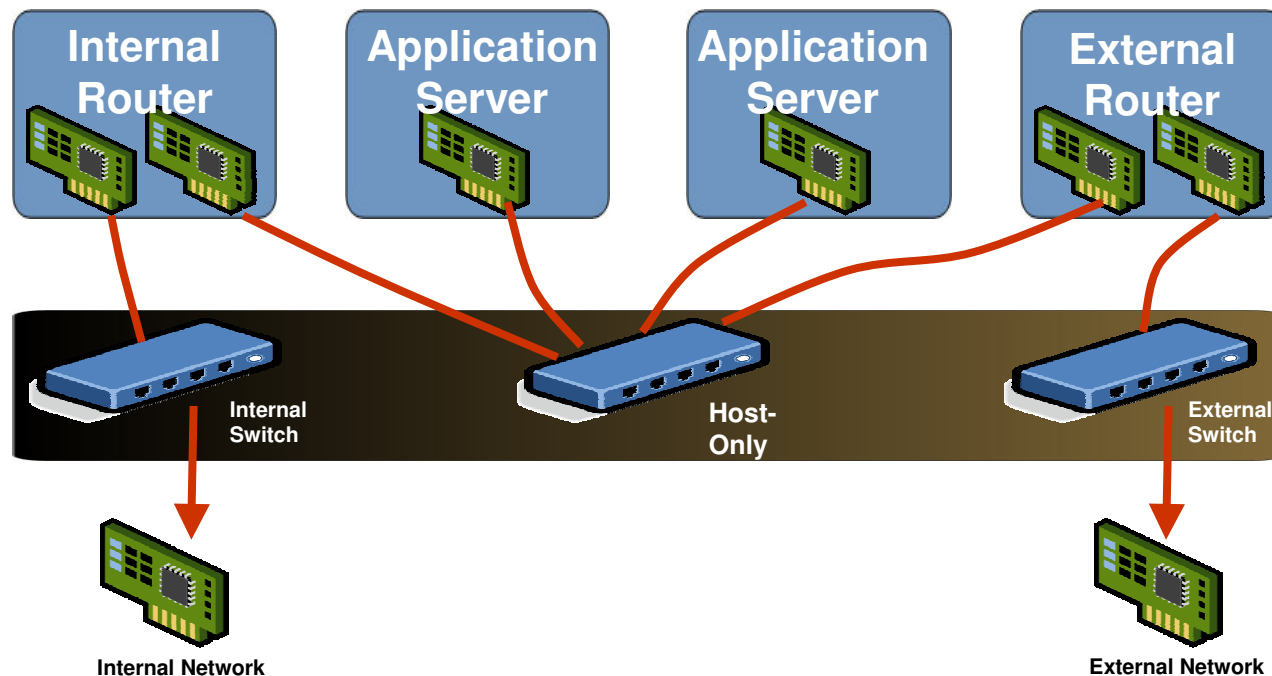
# VMware enhancements

- *More servers **without** more cables*
- *Virtualization of disk allows many disks on few LUN's.*
  - Less complexity, lower cost



# ***VMware Virtual Networking allows complex architectures with no extra ports***

- Internal switches isolate VMs, support VLANs***
- Remote Console software allows isolated access to VMs***



# Blades Increasing manageability

- **Blades managed entirely through SIM**
  - *Allows management remotely without visiting Datacenter*
  - *Blank hardware blade can be provisioned with RDP using PXE*
  - *A blade's function can be copied to a new blade with little time and effort!*
- **Flexibility allows rapid response to changes in conditions**

# VMware manageability

- ***ESX server and VMs can be provisioned using SIM!***
- ***VirtualCenter collects data on the ESX server and the VMs***
  - CPU, Memory, Disk IO, Network
  - Stored in your database
- ***VMotion allows Zero downtime for maintenance***



# VMware integration with HP Insight Manager

The screenshot displays the Compaq Insight Manager 7 web interface within a Microsoft Internet Explorer browser. The address bar shows the URL: <https://cim7sp1:50000/ui/jsp/appFrame2.jsp>. The interface features a navigation menu on the left with options like Overview, Queries, Device, Event, Cluster, Tasks, and Reports. The main content area shows the 'Device: 16.100.232.71' status, including a table of metrics (193, 10, 8, 4504, 3480, 76) and a 'Device Information' section. The 'Device Information' section lists details such as Status (Normal), Address (16.100.232.71), Management Protocols (HTTP, SNMP), Device Name (16.100.232.71), SNMP Alias (vmware), DNS Name (16.100.232.71), Contact (root@localhost), Location (room1), Device Type (Server), Product Name (PROLIANT 8500), and Description (Linux vmware 2.4.9-vmnix2 #1 Tue Apr 30 00:08:16 PDT 2002 i686). A 'Device Links' section provides links to Compaq Subsystem Status Information, Legacy Version Control, VMware Management Interface, Device Home Page, and SNMP Explorer. A green arrow points from the 'VMware Management Interface' link to a blue box containing text.

**Device: 16.100.232.71**

The following information is known about this device:  
( [Last Update:](#) Friday October 4, 2002 - 3:23:34 PM )

| Device Information    |                                                                |
|-----------------------|----------------------------------------------------------------|
| Status:               | Normal                                                         |
| Address:              | 16.100.232.71                                                  |
| Management Protocols: | HTTP, SNMP                                                     |
| Device Name:          | 16.100.232.71                                                  |
| SNMP Alias:           | vmware                                                         |
| DNS Name:             | 16.100.232.71                                                  |
| Contact:              | root@localhost                                                 |
| Location:             | room1                                                          |
| Device Type:          | Server                                                         |
| Product Name:         | PROLIANT 8500                                                  |
| Description:          | Linux vmware 2.4.9-vmnix2 #1 Tue Apr 30 00:08:16 PDT 2002 i686 |

| Device Links |                                                                                                                                                                                                                   |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Normal       | <a href="#">Compaq Subsystem Status Information</a><br><a href="#">Legacy Version Control</a><br><a href="#">VMware Management Interface</a><br><a href="#">Device Home Page</a><br><a href="#">SNMP Explorer</a> |

[Data Collection Report](#)  
[SNMP Communications Settings](#)  
[All Events Associated with this Device](#)

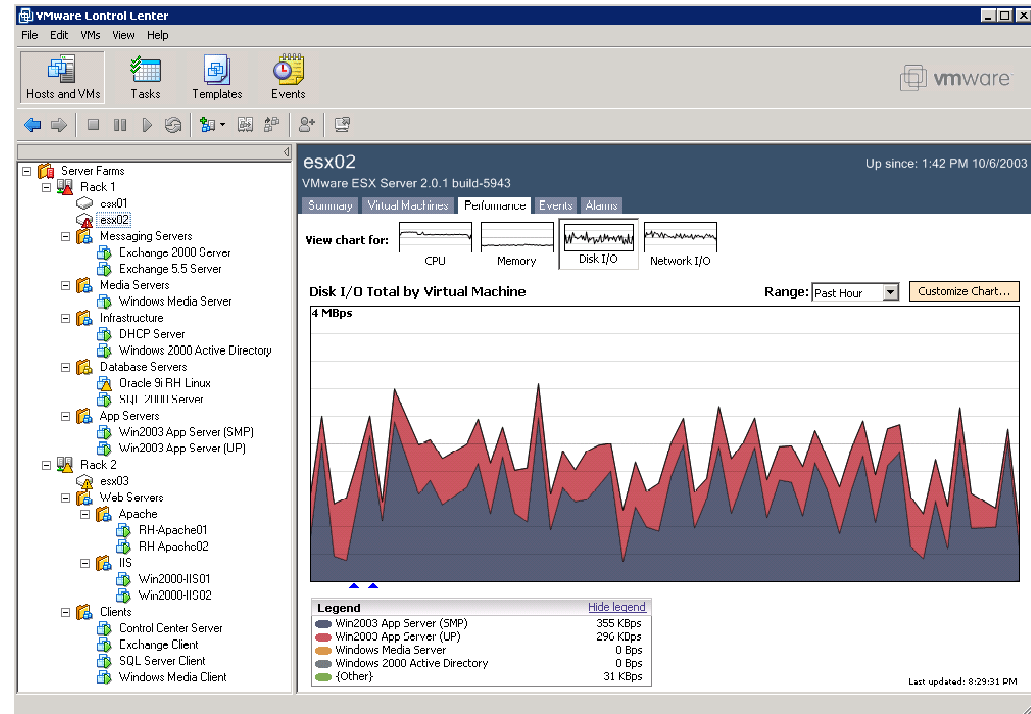
Insight Manager 7 (SP2) discovers the VM partitions and provides a link to the VM management interface

# HP Resources for VMware Software

- **Insight Manager Agents for VMware ESX Server**
- <http://activeanswers.compaq.com/ActiveAnswers/Render/1,1027,6615-6-100-225-1,00.htm>
- **HP Active Answers for VMware**
- Whitepapers, Best Practices, etc
- <http://activeanswers.compaq.com/ActiveAnswers/Render/1,1027,5360-6-100-225-1,00.htm>

# VirtualCenter 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



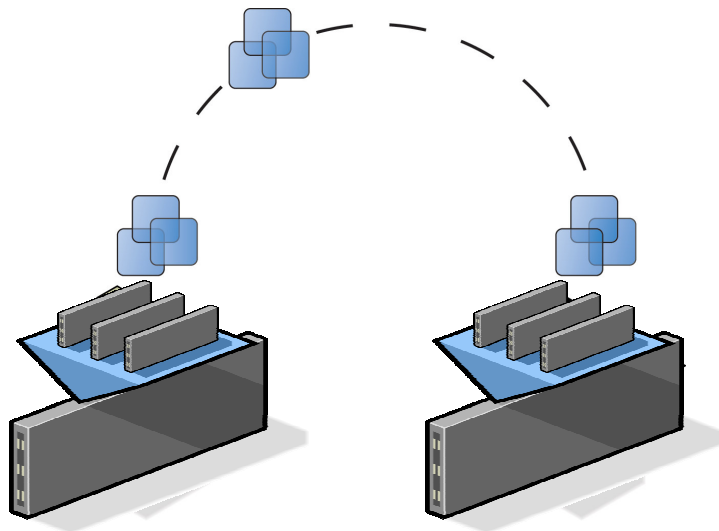
VirtualCenter

# Improving provisioning capabilities.

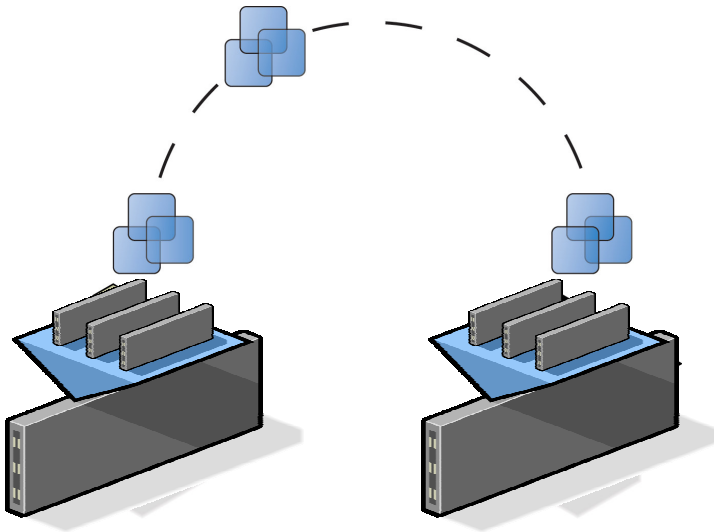
- **SIM installs an OS to a blade without having to do it by hand**
  - *Lowers errors*
  - *Saves time*
  - *Blades can be repurposed quickly, remotely*
  - *Send the role of one blade to another through SIM*
  - *Have a failover blade waiting*
  - *Deploy from tested templates*
  - *Copy/Clone*

# VMware provisions instantly

- *New VM can be deployed using VirtualCenter or SIM*
- Customized by a wizard or an XML file
- Select from Templates of preconfigured VMs
- *Copy/clone/Migrate*

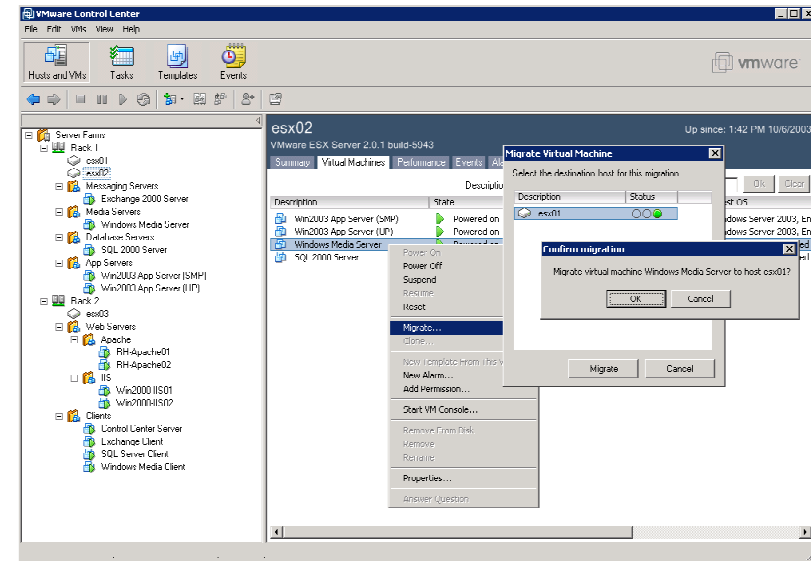


# Instant Provisioning



## VirtualCenter Provisioning Process

- 1) Start Deployment Wizard
- 2) Choose Server Template
- 3) Select Server location
- 4) Click Next, Next, Done



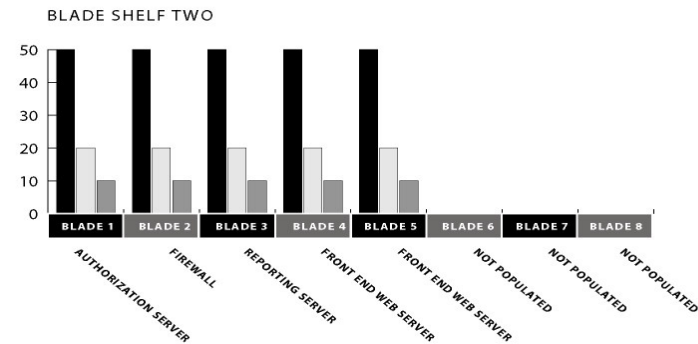
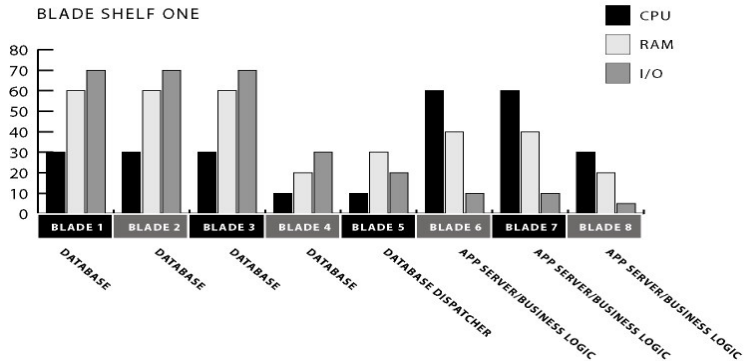
- Takes under 10 minutes
- Speed of a file copy
- Hardware-independent
- Template based
- Fully leverages the SAN
- Automatic and Standardized

# Conclusion

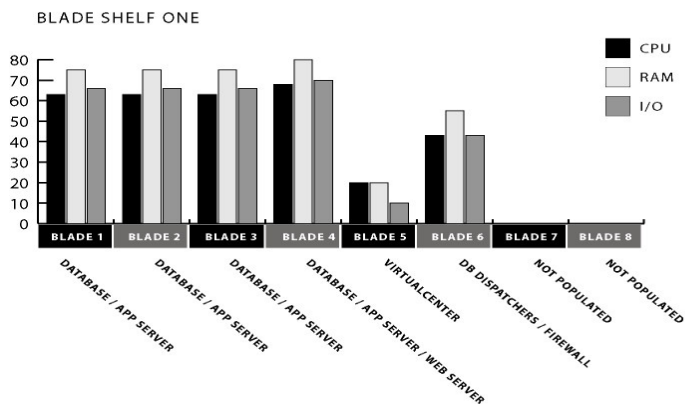


# Virtualization Reduces TCO on Blade Server

## BLADE SERVERS WITHOUT ESX SERVER & VMWARE VIRTUAL CENTER

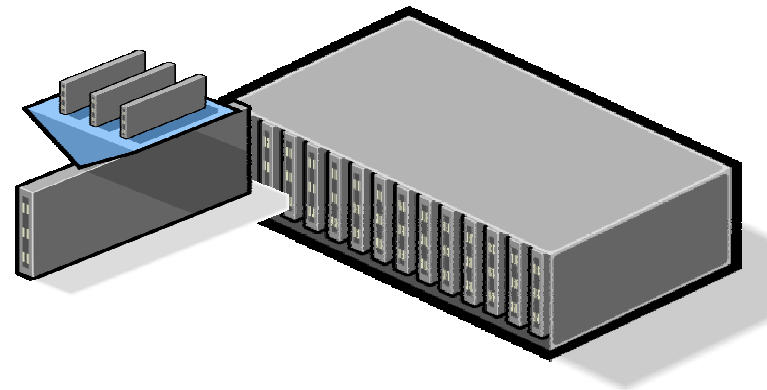


## BLADE SERVERS WITH ESX SERVER & VMWARE VIRTUAL CENTER



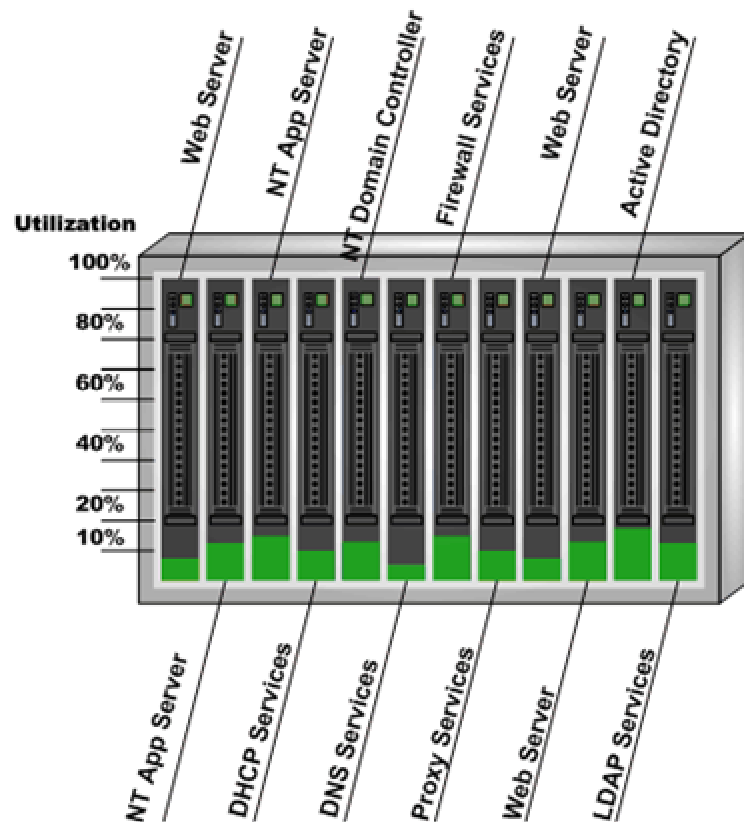
# Virtualization on Blades Reduces Cost

- Virtualization increases hardware utilization to 70% or higher so that solution with the same compute power requires fewer blades
  - Hardware acquisition savings
  - Facility, power, and cooling savings
  - Server support and maintenance savings
- Less downtime for maintenance
- Dynamic resource redeployment
- Application migration to different hardware without having to reinstall

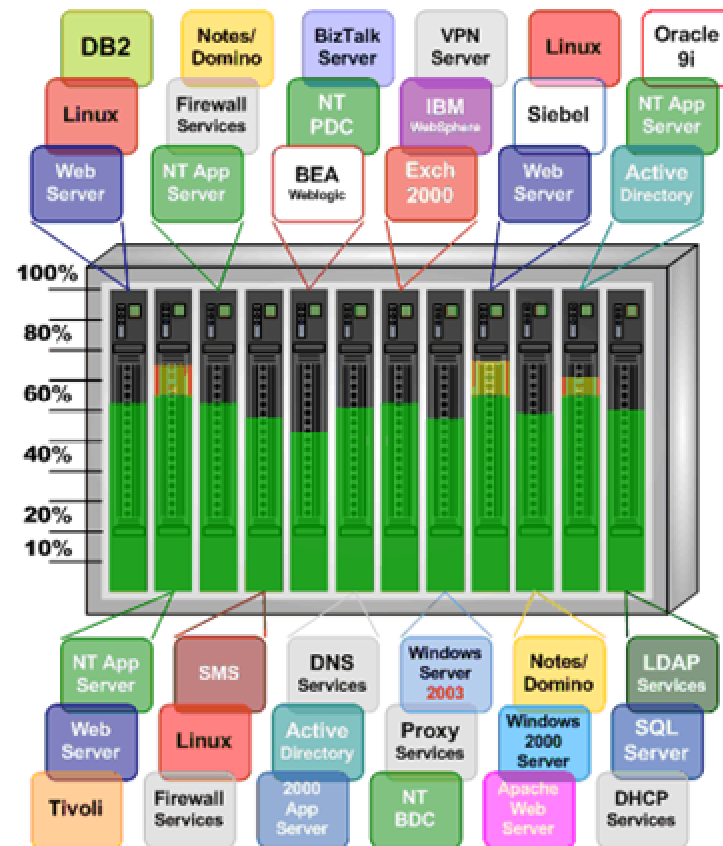


# VirtualCenter on Blades

Blade Servers without VMware VirtualCenter



Blade Servers with VMware VirtualCenter



# Questions?



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