

# Server Trends: Blades, Virtualization and 64-Bit Computing

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Midsize Enterprise  
Summit. 2007



# Enjoy the Ride

Expect more numerous and more frequent innovations and breakthroughs in server technology during the next five years — possibly more than in the past 20 years.

**Check your seat belts!**

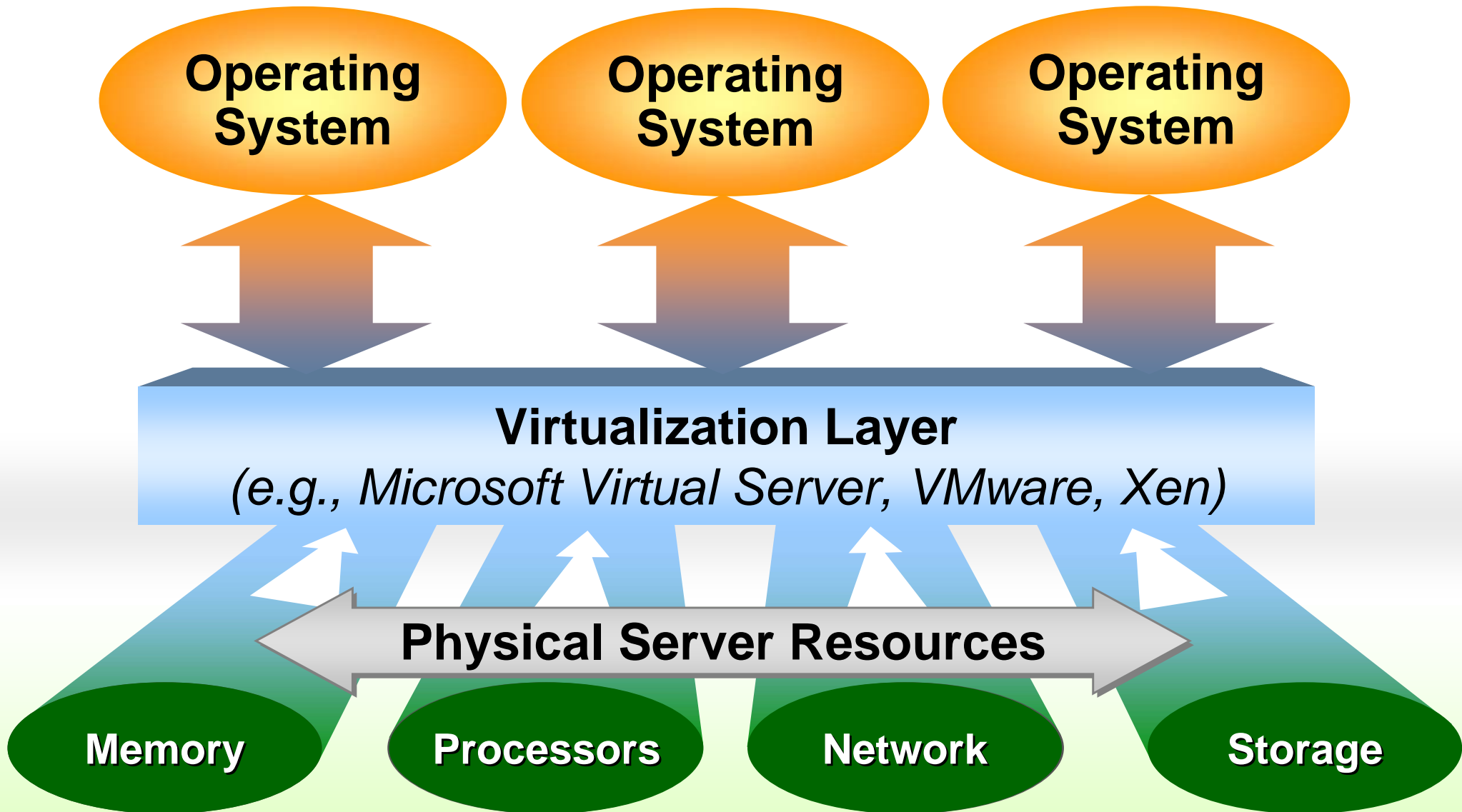
# Key Issues

1. How will virtualization technology affect the server market during the next five years?
2. How will blades and blade infrastructures evolve during the next five years?
3. How will the operating system landscape change during the next five years?

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# Server Virtualization: A Megatrend



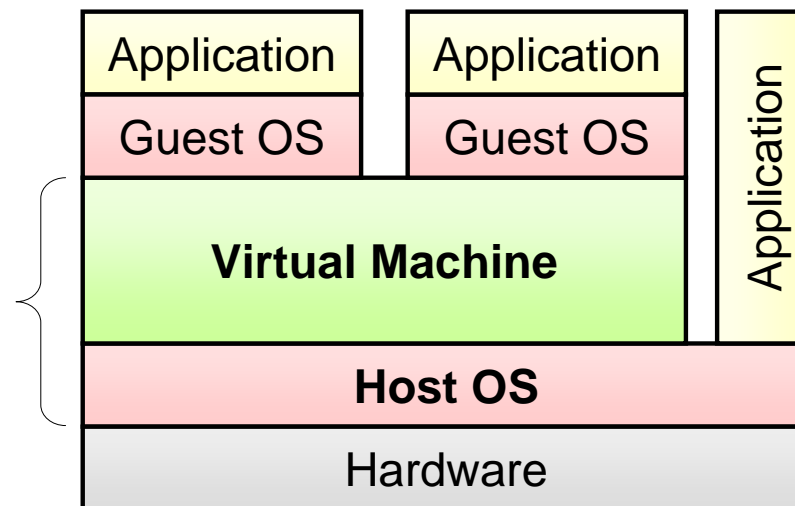
# Virtual Machine Architectures

Easy to use (established OS features for installation, some management)

Uses drivers of host OS

More-vulnerable single point of failure/attack

Performance overhead

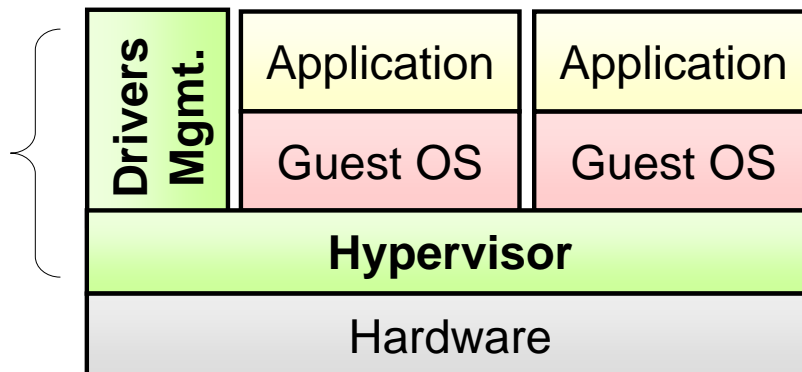


**VMware Server**  
**Microsoft Virtual Server 200x**

Best performance

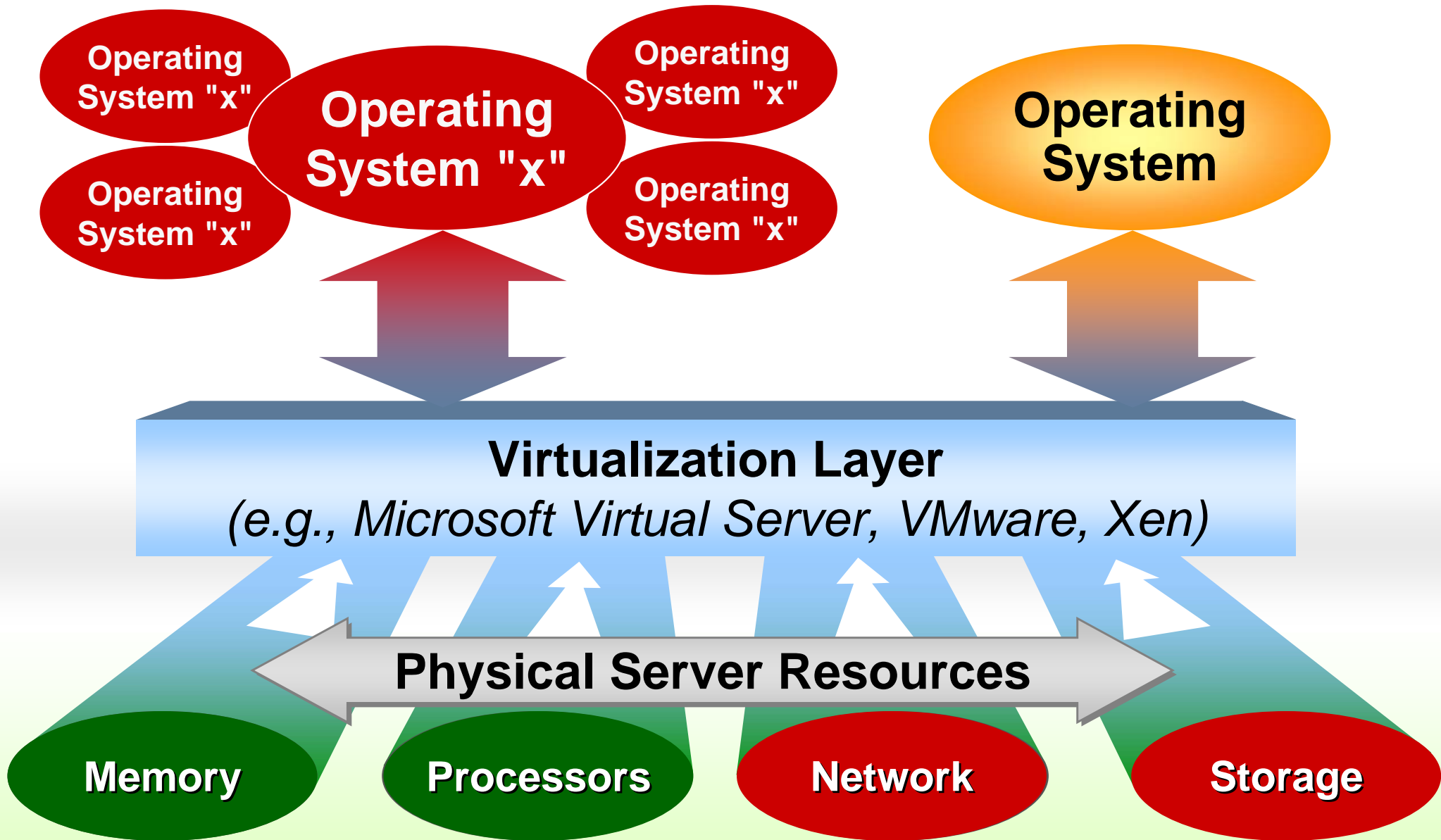
Smallest failure/attack surface

Drivers and management interfaces separate from hypervisor



**VMware ESX**  
**Xen**  
**Microsoft Post-Longhorn Hypervisor**

# Server Virtualization: Moving Deeper



# Virtualization Deployment Drivers

- **Consolidation:** Virtualization reduces the need for separate physical servers.
- **Protection:** Virtualization lowers the cost/complexity of disaster recovery.
- **Deployment:** Virtualization speeds up the deployment of new server-based applications.
- **Freedom of choice:** Virtualization lessens concerns about being tied to a specific server vendor.
- **Agility:** Virtualization helps midsize businesses rapidly address changes in workload demands.



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# The Ongoing Evolution of Blade Servers

Volume  
Opportunity

## Third Generation

- Variety of blade types
- Better I/O solutions
- Better manageability
- Wide range of uses

## Second Generation

- Higher power
- Better performance
- Medium density
- For data centers

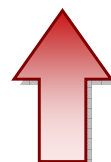
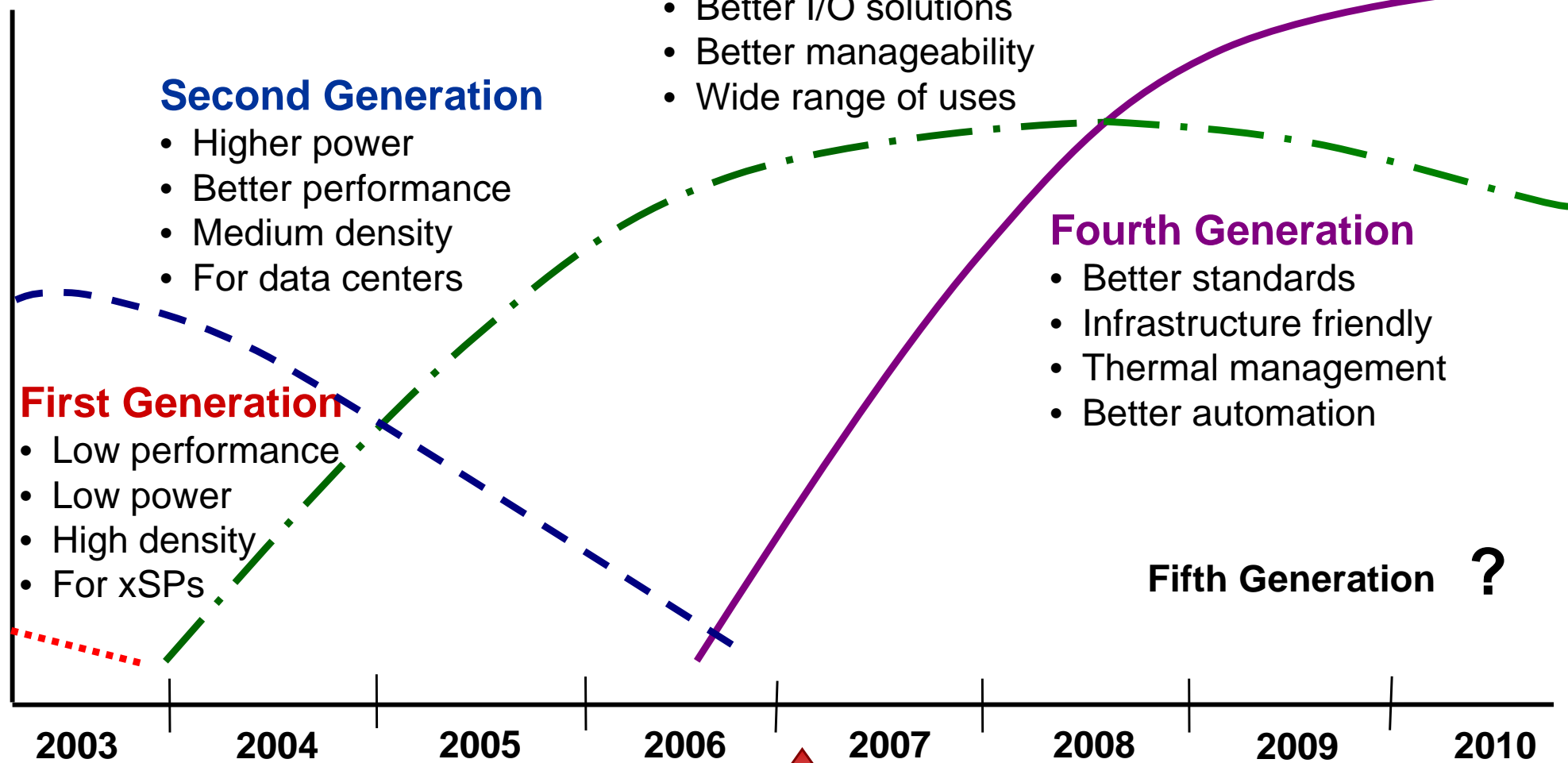
## First Generation

- Low performance
- Low power
- High density
- For xSPs

## Fourth Generation

- Better standards
- Infrastructure friendly
- Thermal management
- Better automation

Fifth Generation ?



You are here

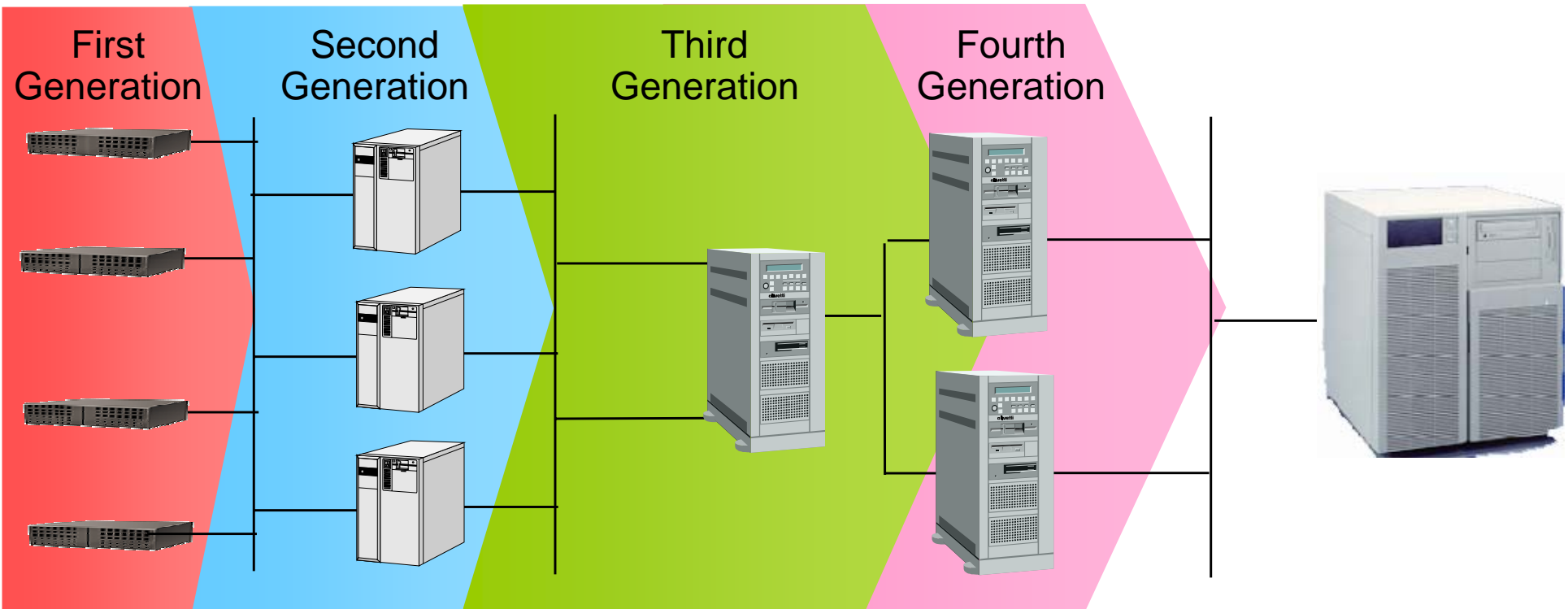
# Blades: Increasing Functionality With Each Generation

Network  
Edge  
Functions

Static Web  
and Farmed  
Applications

Dynamic Web Content,  
Midsize Applications  
and Midsize Databases

Global Applications  
and Mission-Critical  
Databases

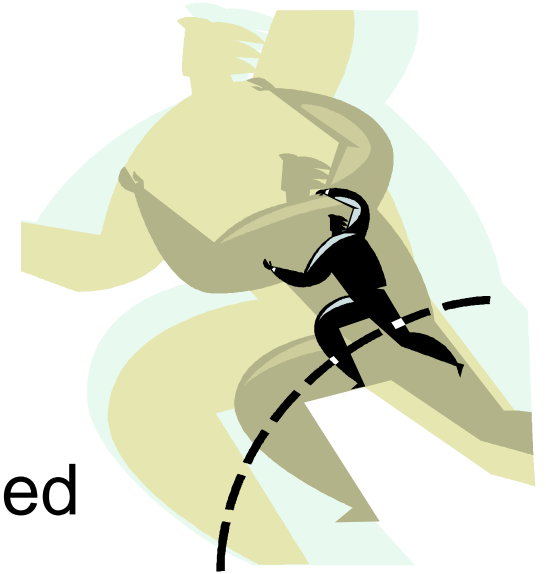


## Example Blade Applications/Functions

- Web serving
- Remote caching
- Proxy server
- Firewall
- Encryption engines
- Portal services
- Directory servers
- DNS/DHCP servers
- Thin-client servers
- Mid-tier applications
- Small/mid-tier DBs
- HPC clusters

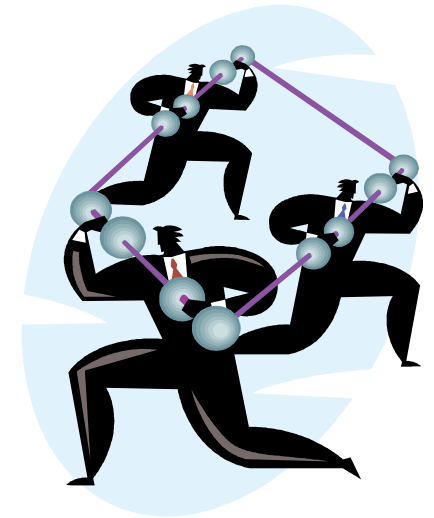
# Top Five Blade Server Strengths

- 1. Time to deploy:** Servers can be quickly added to a chassis and provisioned.
- 2. Density:** Blades represent a significant reduction in rack space.
- 3. Time to repair:** Technicians replace a failed blade while other blades continue to run.
- 4. Administration agility:** Blades can be provisioned or de-provisioned using scripts or a few mouse clicks.
- 5. Cable reduction:** Network and storage connections can often be cabled to the chassis.



# Top Five Blade Server Challenges

- 1. Vendor lock-in:** Blades are **not** a new type of industry-standard server.
- 2. Configuration flexibility:** Blades cannot be configured the same way as conventional servers.
- 3. I/O interoperability:** Blade solutions do not always connect well to existing SAN and network environments.
- 4. Power/cooling:** Blades may be a challenge to data center environmental capacities.
- 5. Rate of change:** The history of blades shows that the technology has undergone rapid change.



# Using Blades With Virtualization



## Strengths

2. Virtual I/O
3. Density
4. Physical repair
5. Software management synergies



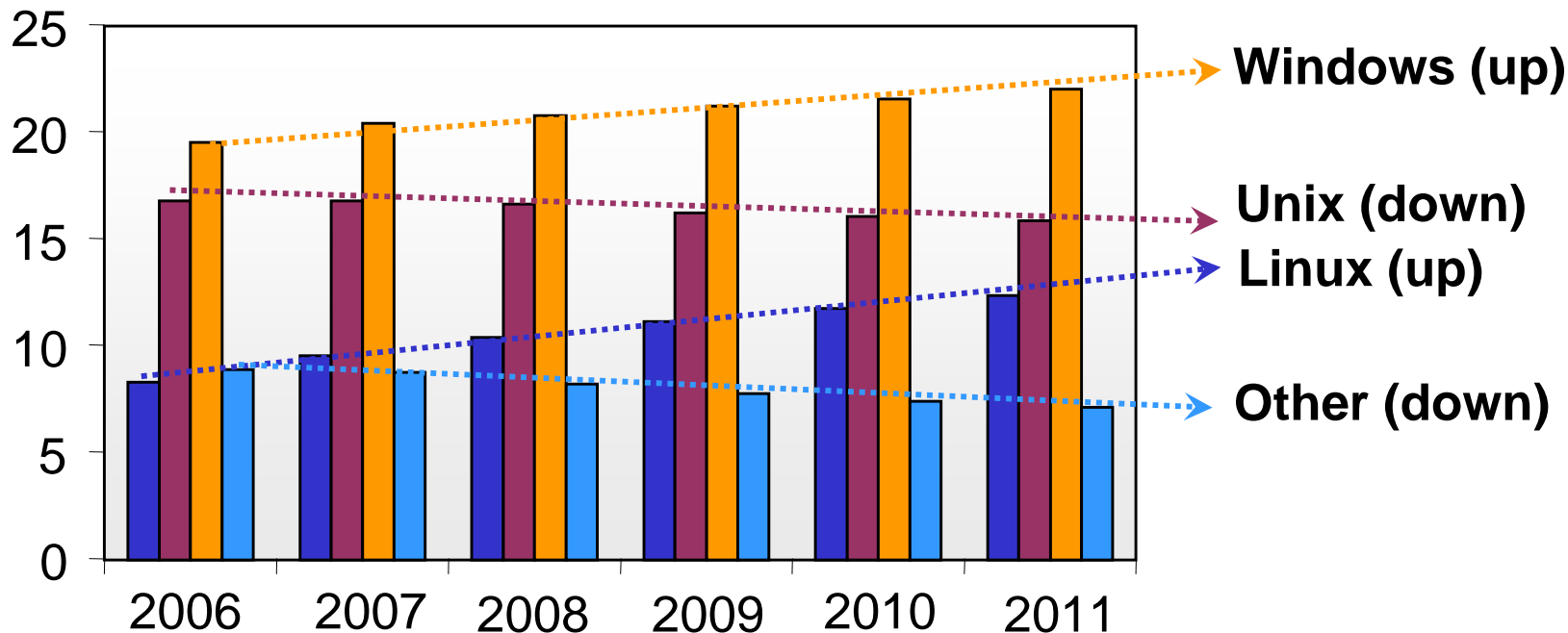
## Challenges

1. Chassis point of failure
2. Vendor lock-in
3. Configuration limitations
4. Cost of entry
5. Software management conflicts

# Forecast for Server Operating Systems

## Worldwide Server Shipment Revenue by OS

\$ Billion

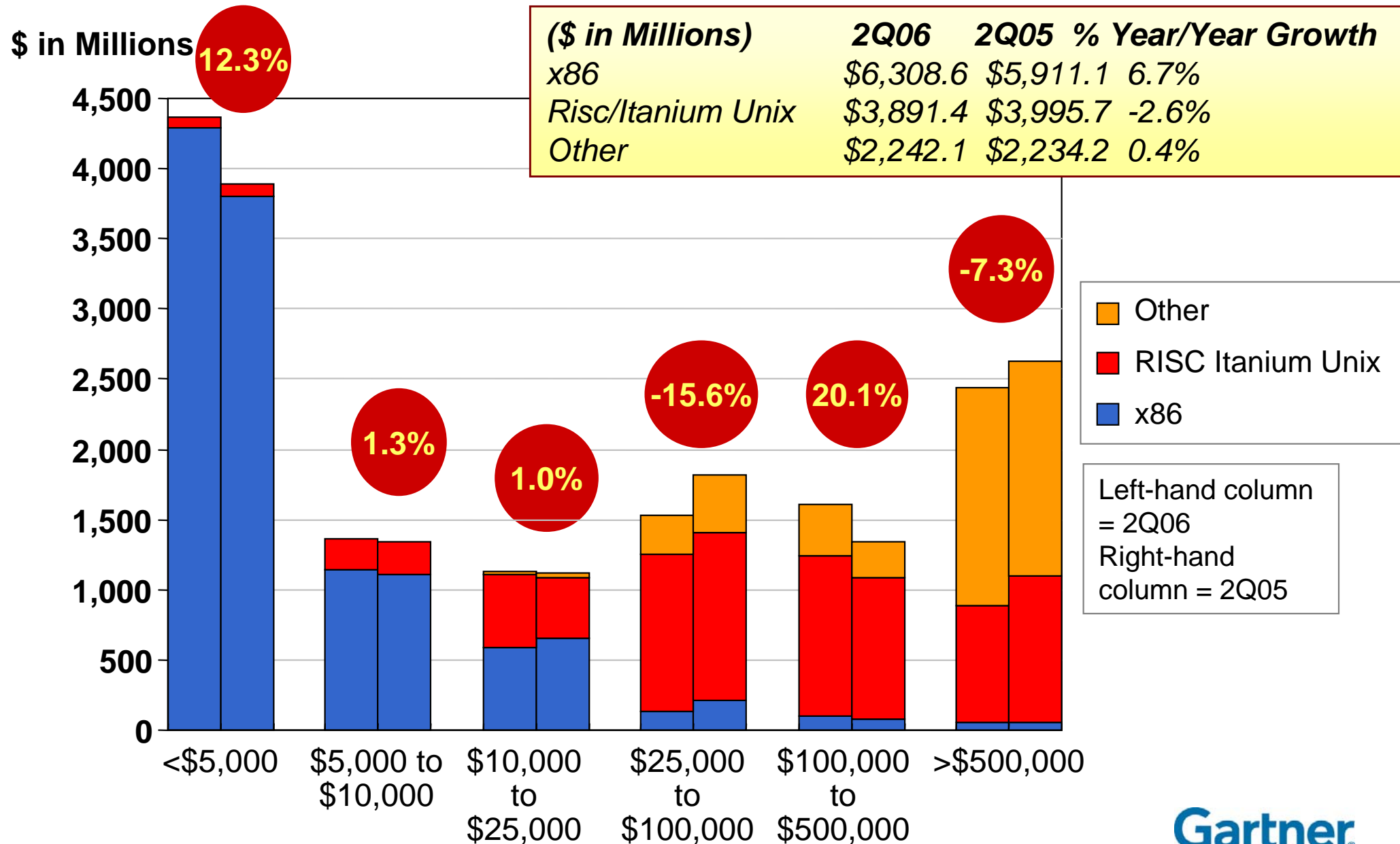


OS	2006	2007	2008	2009	2010	2011
Linux	8,334,444,302	9,562,679,207	10,443,409,813	11,148,156,816	11,775,257,937	12,395,158,044
Unix	16,813,740,794	16,794,620,428	16,660,583,236	16,251,598,282	16,066,545,300	15,897,364,707
Windows	19,536,097,547	20,454,841,406	20,800,998,739	21,242,448,681	21,590,006,361	22,046,644,828
Other	8,933,586,865	8,771,974,668	8,243,834,068	7,815,112,286	7,434,011,596	7,150,751,722
<i>Total</i>	<i>53,617,869,508</i>	<i>55,584,115,707</i>	<i>56,148,825,856</i>	<i>56,457,316,065</i>	<i>56,865,821,193</i>	<i>57,489,919,300</i>

# Key Issues

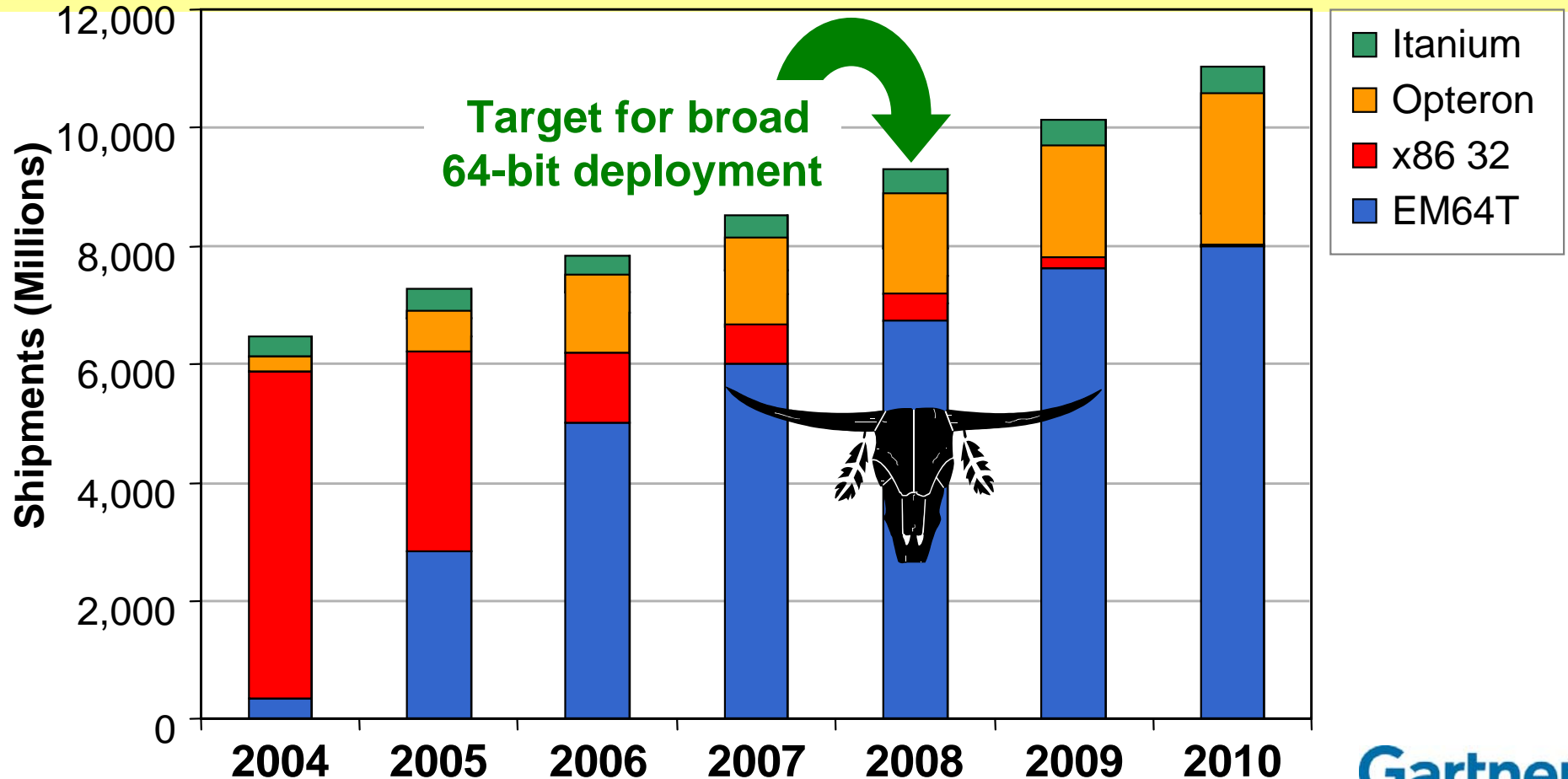
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# Worldwide Server Price Bands (Revenue)



# Windows Server and 64-Bit

- 64-bit x86 began shipping prior to 2004 and ramped quickly.
- AMD Opteron is viable, competitive and gaining in market share.
- Windows-on-Itanium use continues to be niche, mostly database.
- Multiple 64-bit architectures result in increasingly complex choices.
- Windows Longhorn is the logical target for x64 adoption.



# Windows Server Technology Road Map

## Windows Server 2003 R2

- Active Directory, replication and storage enhancements

## Windows Longhorn Server

- Reliability/performance improvements
- Componentized — small footprints
- Policy-based networking
- Branch-office improvements
- Last of the monolithic releases?

## Windows Longhorn R2

- **64-bit only?**

2006

## Windows Server 2003 SP2 Windows Compute Cluster Windows Vista (desktop)

- Common code with Longhorn

2007

2008

## Windows Hypervisor

- Drives ubiquity of hypervisors
- The VM management wars begin

2009

2010

Componentized/Virtualized  
Delivery Model

Gartner

# Windows 64-bit Deployment Accelerators

- Exchange 2007
- SQL Server 2005
- Internet Information Server
- Terminal Server (Microsoft and Citrix)
- Any application ported to 64-bit environment
- Any 32-bit application that crosses the 4GB memory boundary
- Virtualization (at the hypervisor layer)



# New Technology Evaluation Criteria

- **Will it play well with established infrastructure?**  
This evaluation should involve physical and management interconnects.
- **Are the target applications certified/proven?**  
Not all applications are suitable for new technology deployment.
- **Are the environmental capacities sufficient?**  
New technology can stress power and cooling facilities.
- **What is the vendor's investment protection offering?**  
New technology evolves rapidly.
- **Is there a reasonable ROI?**  
A formal or informal ROI analysis will help drive the decision.
- **Do software licenses and contracts support it?**  
Licensing and support can be barriers to adoption.



# Conclusions

- ✓ Virtualization has proven effective as a means for increasing server efficiencies and as a potential solution for disaster recovery.
- ✓ Expect multiple forms of server virtualization to be deployed in development, test and production.
- ✓ Blades represent forward movement on the evolutionary path of servers, but they are still a moving target.
- ✓ Blades and virtualization typically "play well" together, but not always.
- ✓ Linux and Windows are the only two operating systems with significant growth ahead; the future of Unix is unstable.
- ✓ 64-bit deployment is inevitable; however, it requires software testing.
- ✓ Balance short-term 64-bit deployment requirements against Longhorn adoption requirements.

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