

# *How to Reduce Cost and Improve Efficiency with Virtualization*

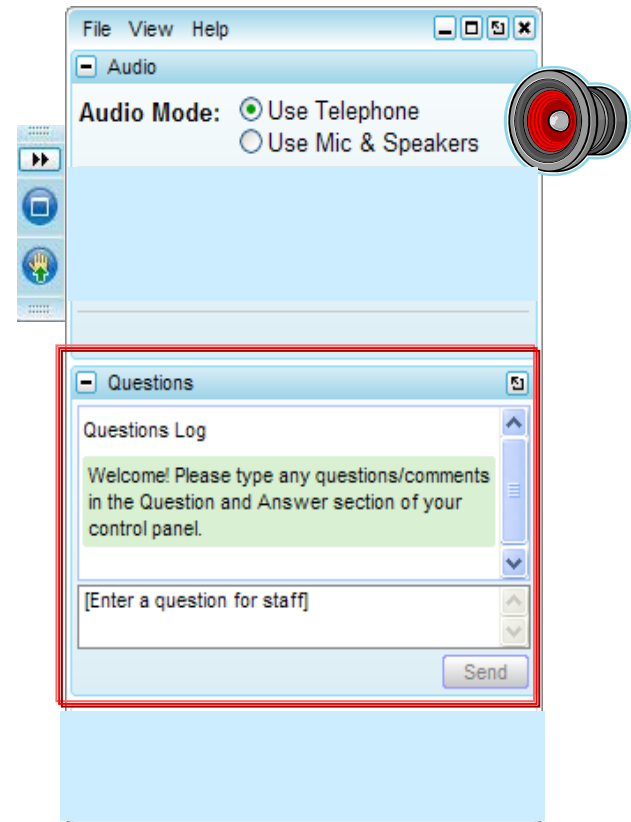
**Philip Dawson**  
**Vice President**

**Gartner Webinar**  
**24 June 2009**

# How to Participate Today

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# *How to Reduce Cost and Improve Efficiency with Virtualization*

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# The I&O Leaders' Key Initiatives

**Green IT/I&O**

**ITIL & Process Improvement**

**IT Modernization**

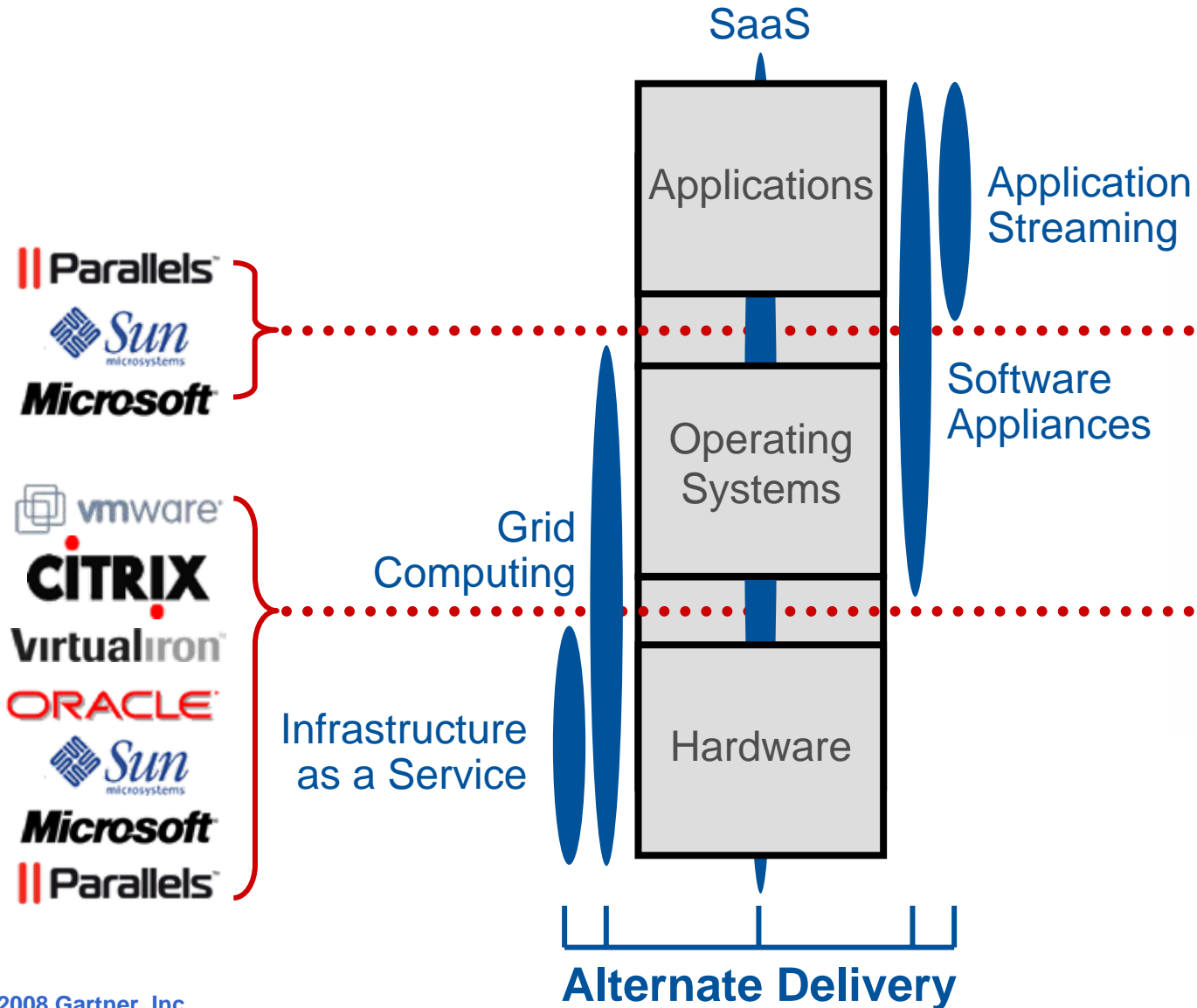
**Microsoft Migrations**

**Mobile & Remote Working**

**Virtualization & Consolidation**

**VoIP & Unified Communications**

# Virtualization: Consolidation and Deconsolidation



**Virtualization** technologies create layers of abstraction — decoupling interfaces — that enable alternate delivery models

# Poll: Why Are You Virtualizing?

**What is the primary benefit your organization will get from virtualization?**

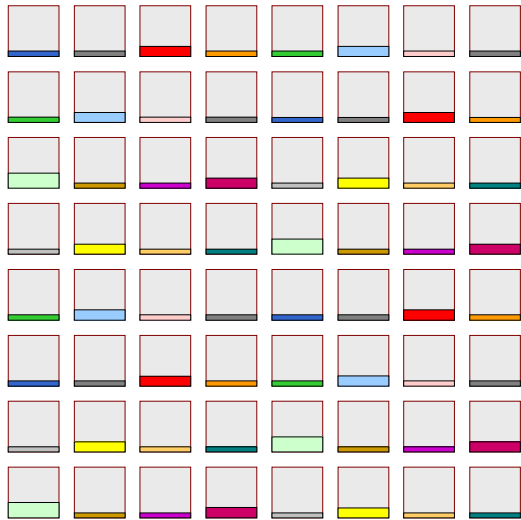
- A) Reduce server spending
- B) Reduce power costs and data center space
- C) Reduce administrative costs
- D) Increase flexibility and speed
- E) Improve quality of service

# Key Issues

1. How will the server virtualization market evolve through 2012?
2. What are the stages and processes of virtualization projects to help reduce costs?
3. What services can be shared in a x86 and non- x86 infrastructure?

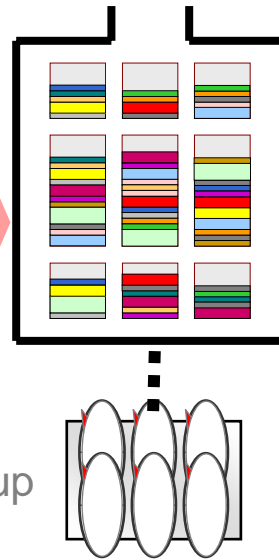
# Virtualization of the Data Center: The Vendor Conundrum

## 2007 Server Sprawl



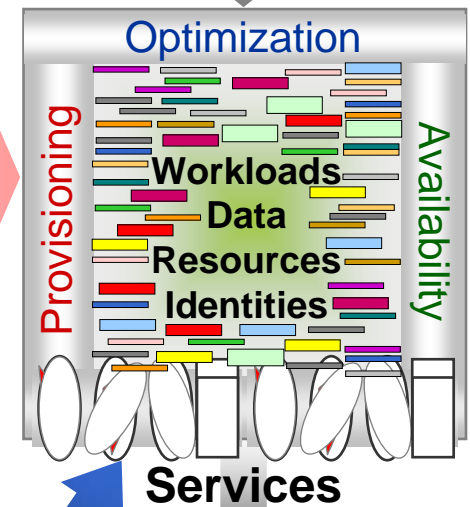
- Hardware refresh
- Flexibility up

## 2008-2012 Consolidation



- Service levels and agility up
- Rationalize hardware

## 2010-2016 RTI Policies



### HW/OS Vendors

- Server vendors like consolidation phase due to HW refresh with fewer bigger highly configured platforms —but resist going to full RTI
- Virtualization vendors sell hypervisor and system management tools

### VM/OS Vendors

- Virtualization vendors sell workload management and availability SW — and want to promote full RTI journey.
- HW refresh not needed because the cloud can run anywhere — if managed.



# Virtualization Is a Key Enabling Tool

**Resource User  
(subscriber)**

Interposing technology that masks the physical nature and boundaries of resources from resource users.

- ✓ Isolation from change
- ✓ Removes barriers
- ✓ Improvements in use and flexibility

**Layer of Abstraction  
(Virtualization)**

**Real Resources (provider)**

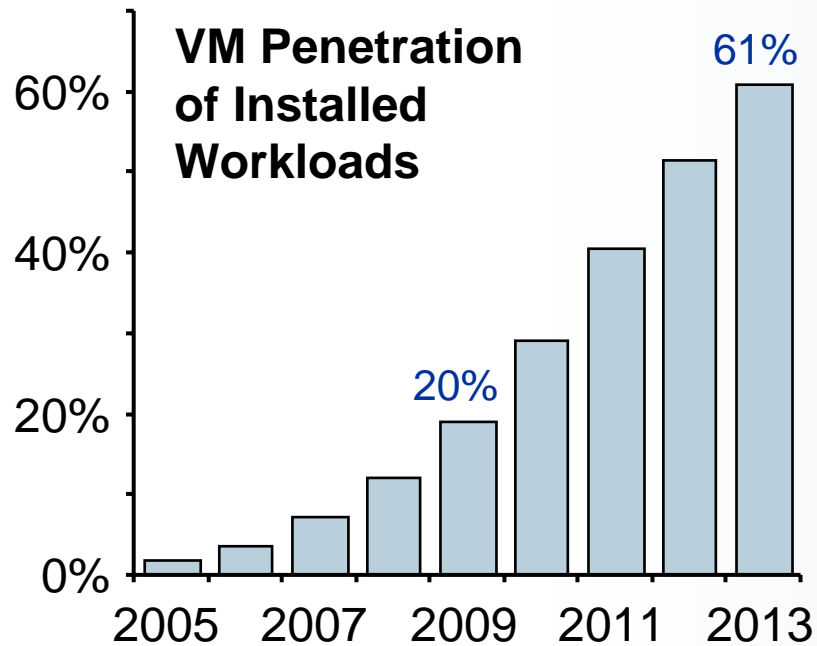
**Server**

**Network**

**Management**

**Storage**

# Virtualization Changes the X86 Server Architecture and Market



## VMs Making a Mark

- The VM installed base was 20M in 2009 — about 20% of the opportunity.

## Multicore

- Synergistic with virtual machines.

## Server Size

- Virtualization enables larger servers.

## Servers More Commoditized

- No lock-in with workloads, and blades more attractive.

## Predictions

- The installed base of VMs will grow more than threefold between 2009 and 2013.
- A Third of x86 workloads deployed or redeployed during 2008 will be installed in virtual machines.
- By 2012, the majority of x86 server workloads will be running in a virtual machine.

# Poll: VM Usage Today

**What x86 virtual machine technology are you using today?**

- A) VMware
- B) Microsoft (Virtual Server or Hyper-V)
- C) Xen
- D) VMware and Microsoft
- E) Xen plus VMware or/and Microsoft

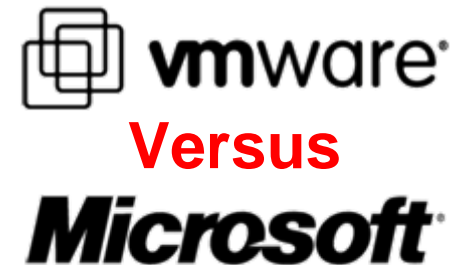
# Primary Considerations: VMware Versus Microsoft

**Maturity** 90% of the installed VMs are VMware, with more than 100,000 customers over seven years; Microsoft's Hyper-V needs proven deployments, few production references today awaiting live migration.

**Price** Combined with management tools, typical VMware pricing is three times higher; however, higher VM density and increased functionality reduces the pricing gap

**Stability** VMware's architecture is much more lightweight (32 MB footprint); Hyper-V leverages a Windows Server subset (1.5 GB footprint) — a very large OS based single point of failure

**Capabilities and Management** VMware is 2-3 years ahead of Microsoft in layered virtualization functionality, including Vmotion, DRS, HA, SRM; Microsoft offers heterogeneous physical and software management tools through Systemscenter that VMware lacks



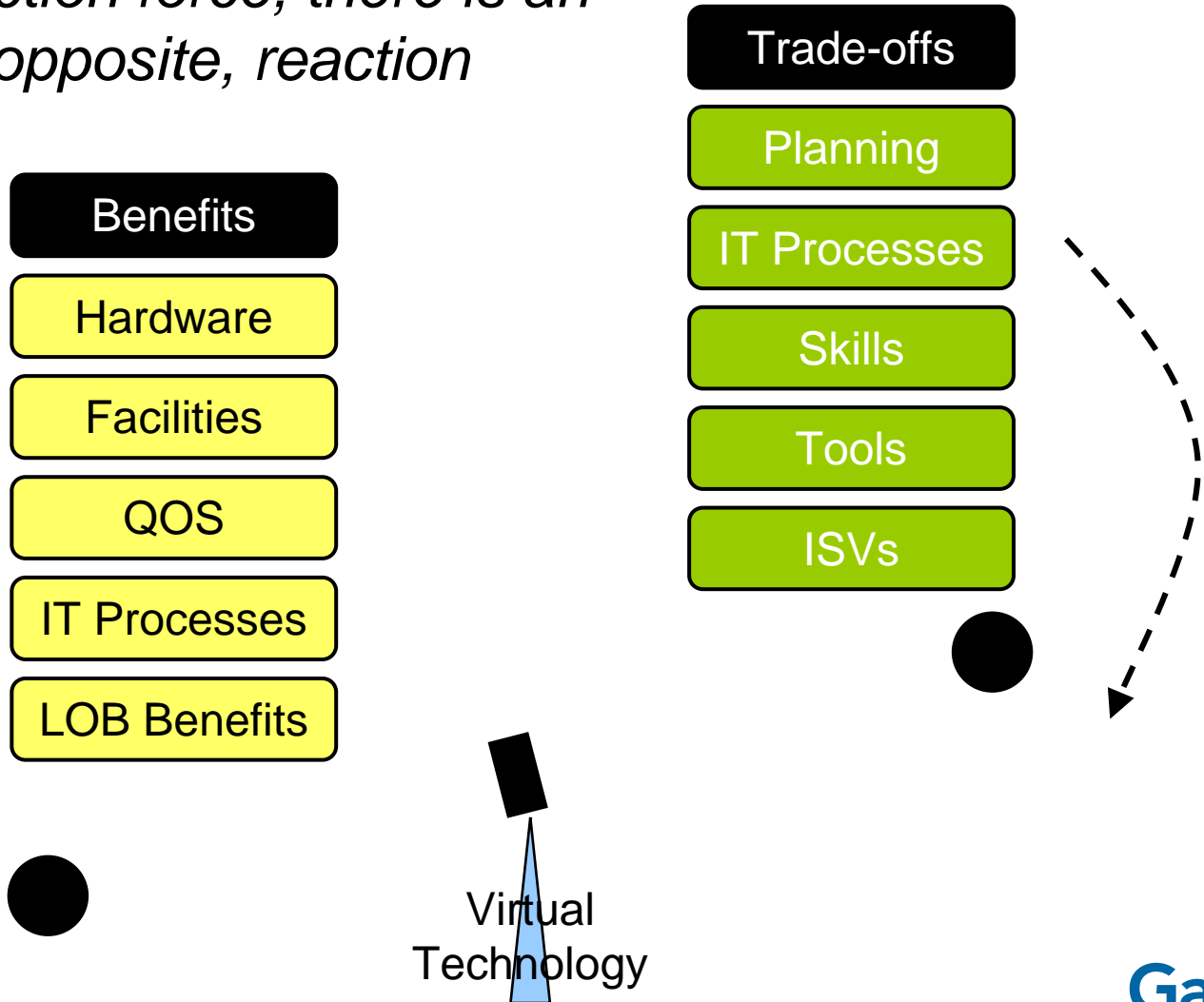
# Poll: VM Usage in Three Years

**What x86 virtual machine technology do you expect to be using in three years?**

- A) VMware
- B) Microsoft (Virtual Server or Hyper-V)
- C) Xen
- D) VMware and Microsoft
- E) Xen plus VMware or/and Microsoft

# Virtualization Dynamics: A Variation on Newton's Third Law of Reciprocal Actions

*"To every action force, there is an equal, but opposite, reaction force."*



# Identifying Infrastructure Virtualization Options

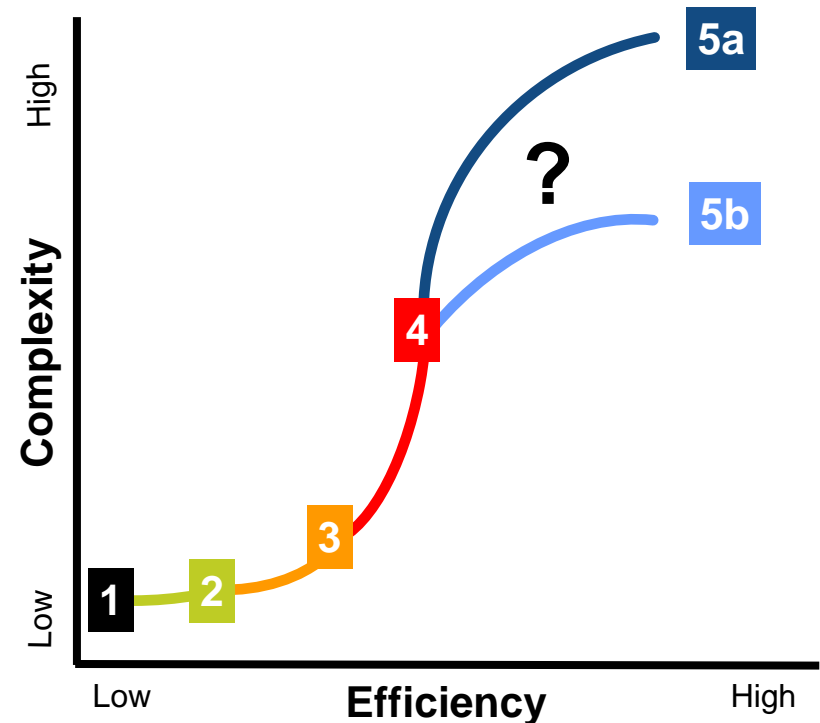
- Co-location: Reduction in place
  - Reduction in things focused on underlying data center components (raised floors, etc.)
  - Reduction in some asset maintenance contracts
- Rationalization: Reduction in kind
  - Reduce the variety of workloads or different types of things
  - May reduce the quantity of things, but might not
- Consolidation: Reduction in physical number
  - Reduce the quantity of physical things (installations, instances)
  - From Servers to partitions or domains
  - Could be the same or different things
- Virtualization: Reduction in logical number
  - Reduce the quantity of logical things (installations, instances)
  - From Servers to VMs or containers
  - Could be the same or different things

***Reducing infrastructure types and variety  
reduces complexity and cost***

# Rationalization can reduce virtualization costs by a further 10 - 20 %!

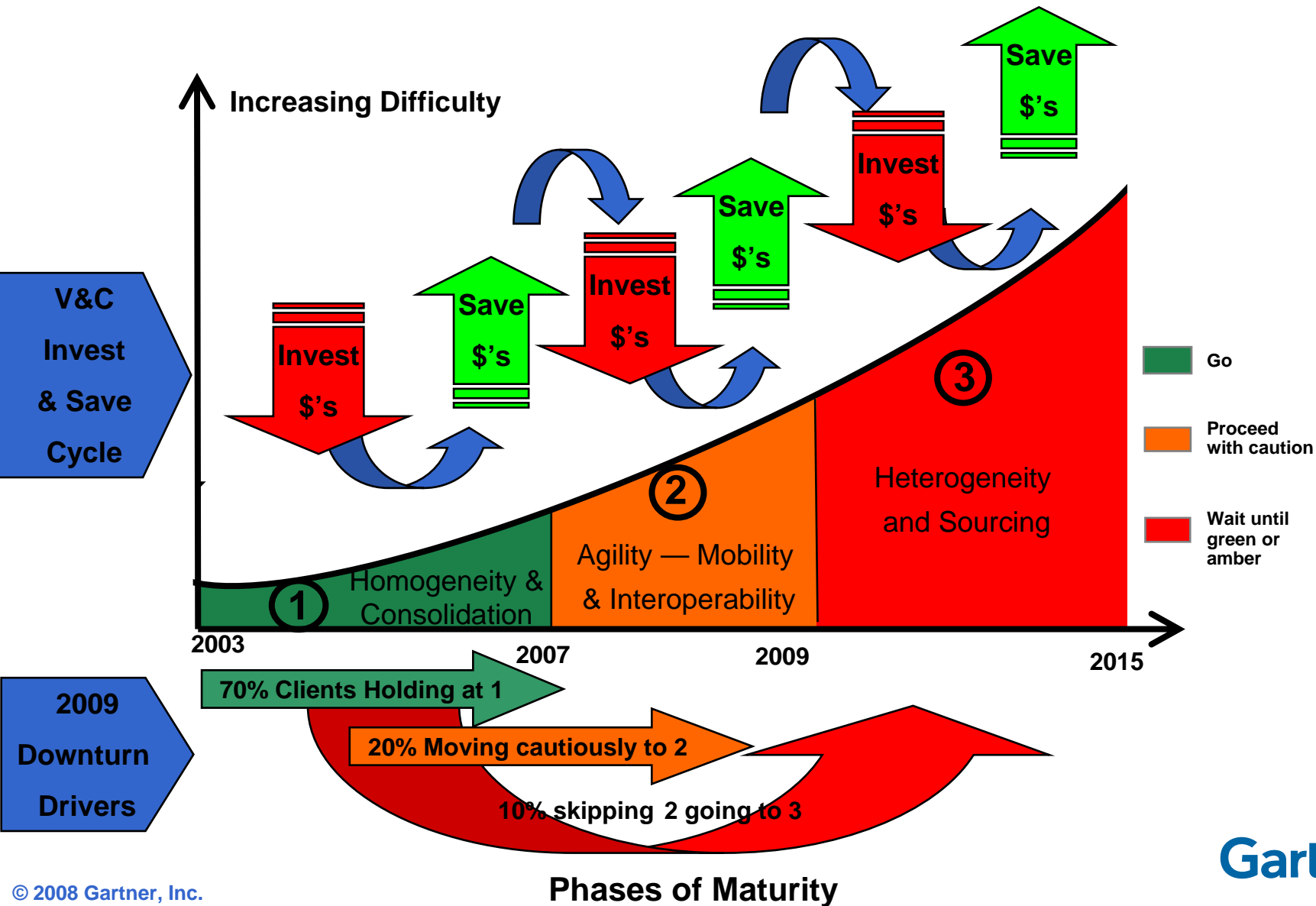
- 1 Random** server proliferation - Highly inefficient
- 2 Management** of physical systems Measure the success of future steps – Capex and Opex
- 3 Storage Separation:** (e.g. deploy SAN or NAS) Storage/server separation is necessary for future steps but can expose storage costs
- 4 Physical server consolidation** (e.g. 1000 Servers to 1000 blades). Commodity hardware addresses this space focus around blades with V I/O. Server management is key,
- 5a Virtualization** (e.g. 1000 blades to 1000 VM's on 100 blades) VMsprawl offsets potential benefits increases complexity
- 5b Rationalization & Virtualization** (e.g. 1000 blades to 800 VM's on 80 blades) Reduces cost and complexity by between 10 and 20%. Get rid of dead wood as part of virtualization initiative

## Server Virtualization Complexity Curve

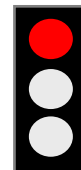
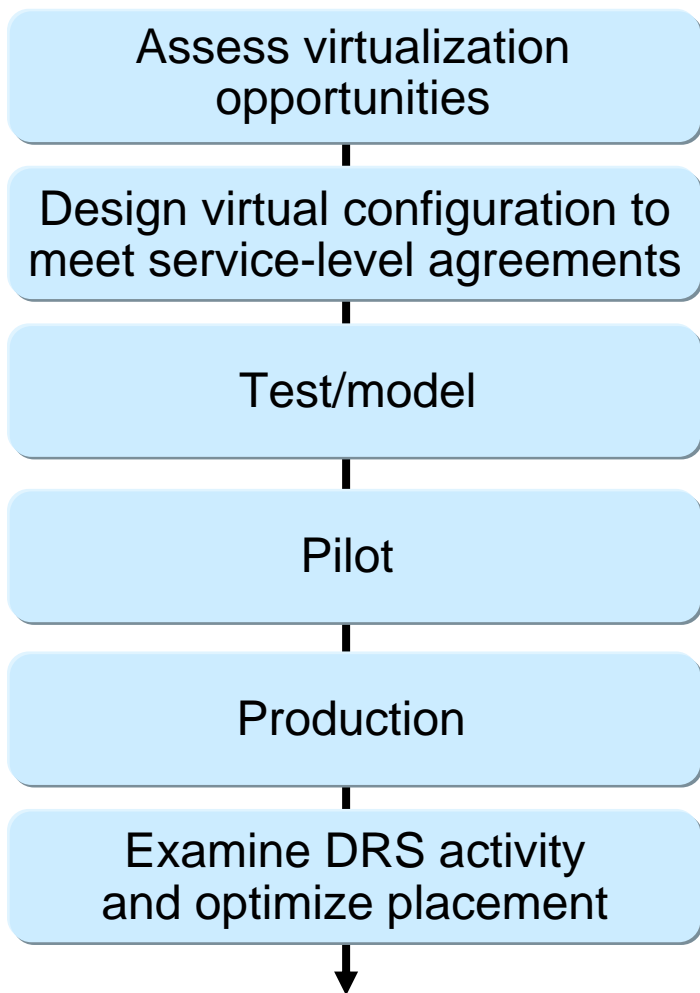




# Three Stages of Virtualization Invest/Save Maturity Cycle



# Planning: Formalize and Document an Application-Readiness Framework



- Modernized applications
  - E-mail
  - Databases
  - High concurrency
- ↓ ↓ ↓
- High I/O**



- ERP
- Terminal Services
- App/Java EE
- BI Tools
- High-utilized
- High Bandwidth
- Load testing



- File/print
- Directory
- Gateways/controllers
- Web/Java EE
- Pub. folders/OWA/LCS
- Portals
- Low-utilized
- Reporting/doc. servers

- It isn't just about maximizing density — understand profiles and requirements.
- Be careful: It's tempting to co-mingle test and production, but few do so.
- Some vendors still don't support virtualization. Plan for V2P if you go forward.

# ERP Applications Architectures, Still Candidates for Virtualization?

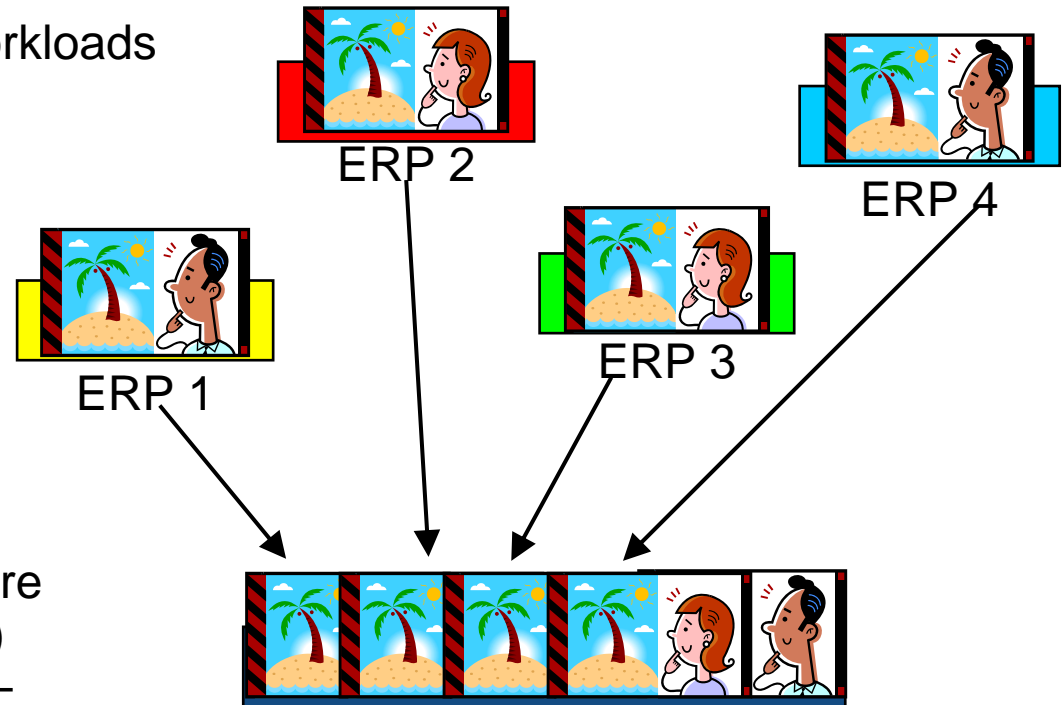
Legacy ERP application server workloads are strong candidates for both x86 and non-x86 virtualization.

- Management
- Utilization
- Availability
- Operations efficiencies

Re-architecting to new infrastructure (e.g. NetWeaver/ECC 6 or Fusion) may not have the same benefits — or support for virtualized environments

Horizontal scaling applications do not have the same benefits

Read vendor references, not write them!



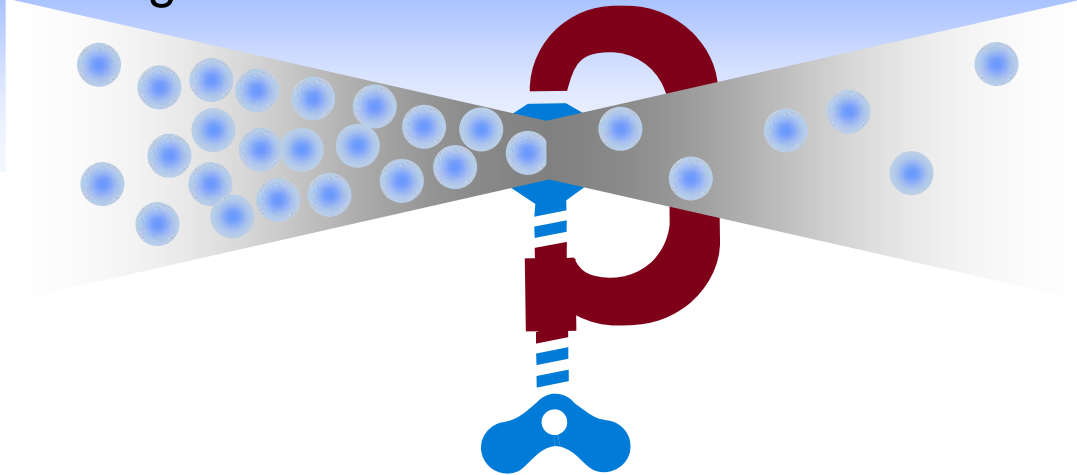
SAP R3 ✓

NetWeaver ?

# Virtualization — Inevitable (but Get Real)

## What not to virtualize, update 2009!

Virtualization changes server architecture and redefines all infrastructure



- Workloads with process constraints
  - Real Time applications — time stamp and abstraction don't mix!
  - Device drivers in unsupported configurations e.g. USB., edge devices.
- Workloads with transactional constraints
  - I/O intensive — requires more hardware assist initially with direct-path I/O (for throughput) and eventually multipath I/O (For concurrency)
  - Highly utilized workloads benefit from agility rather than consolidation!
- Workloads with commercial & support constraints
  - Licensing models, support contracts, break fix, requires parallel universes for production and test/dev

# Virtualization Impact: Start With the Simple Project Life Cycle Model

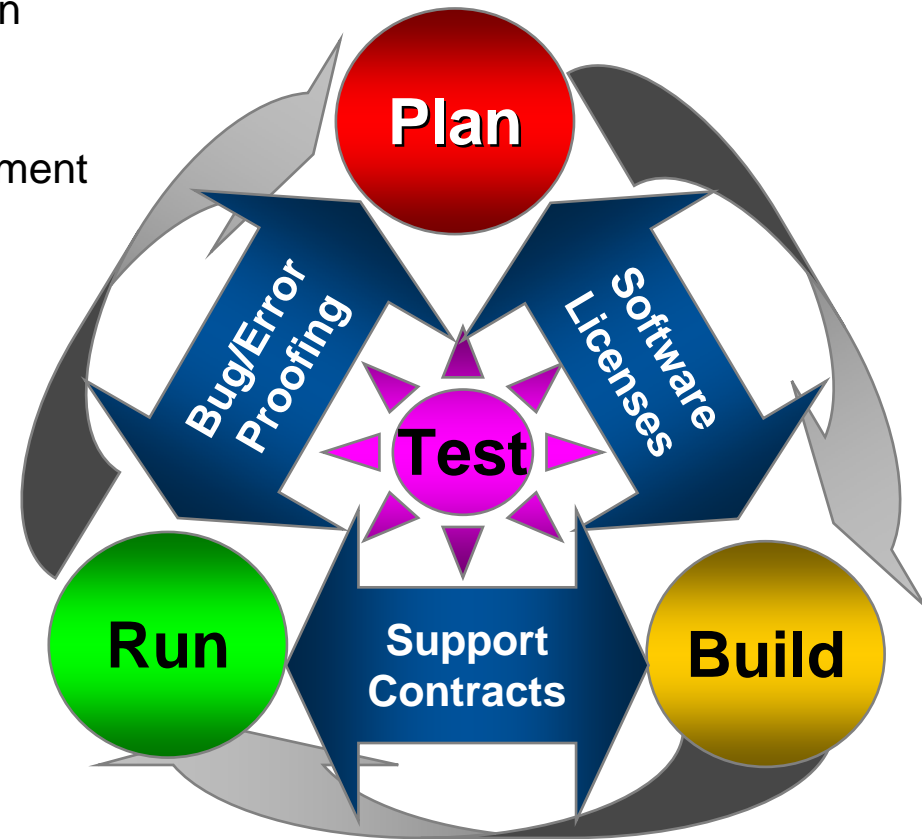
## Virtualization Considerations

- Software licensing can often put emphasis on test/development and production restrictions in virtual environments.
- Support contracts can increase test development issues between operations and support.
- Error proofing and reporting increase in complexity in virtualized environments.
- Test environments/services increase across the virtualization project life cycle.
- Nearly Fifty percent of virtualization projects still reside in test/development.

The boundaries between architecture (plan), infrastructure (build), operations (run) and test environments increase in complexity, blurring in virtualized environments.

Invest in **Test** to save on the rest.

## Project Life Cycle

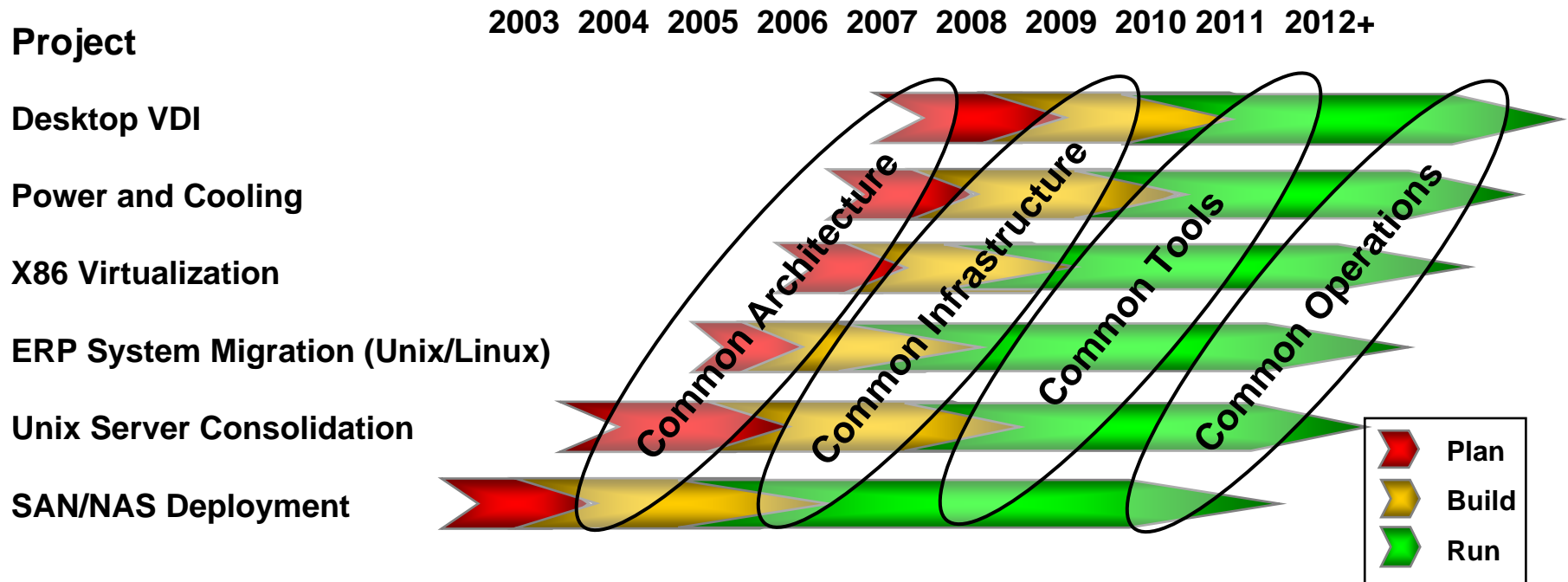


# Poll: Software Pricing and Licensing

**Have you encountered pricing and licensing issues with a software vendor due to virtual machine deployments?**

- A) Yes
- B) No

# Align IT Projects Alongside Virtualization and Reuse



- Understand and align the different IT projects in your portfolio; document time scales and dependencies together by services, not by project
- Move to common architecture, infrastructure, tools and operations, sharing as much between projects as possible — remember, reuse is less expensive than re-engineering.
- Look to offset IT projects and stagger the plan-build-run process to help leverage shared architecture, infrastructure, tools and operations. Do this for the established portfolio (spilt milk) and future projects (don't spill any more).
- **Avoid Islands of virtualization.**

# Energy Savings — The Hidden Benefit of Virtualization

**Non-Virtualized:** Assume 7% Growth Rate, 15% Performance — 4 Year Life Cycle

Year 1 Racks	Utilization	Servers	Images	Year 1 Energy
60	60%	2,040	2,040	\$1,515,395
Year 4 Racks	Utilization	Servers	Images	4 Year Total
74	60%	2,499	2,499	\$6,728,267

**Virtualized:** Assume 7% Growth Rate, 7 Instances per server

Year 1 Racks	Utilization	Servers	Images	Year 1 Energy
9	60%	291	2,040	\$272,862
Year 4 Racks	Utilization	Servers	Images	4 Year Total
11	60%	357	2,499	\$1,211,492

Total Energy Savings: **(\$5,516,775).**

Overall Savings (after Server & VM costs: **(\$2,644,893)**)

Floor Space Savings – **2,820 Square Feet**

Potential Storage Growth = **819TB**



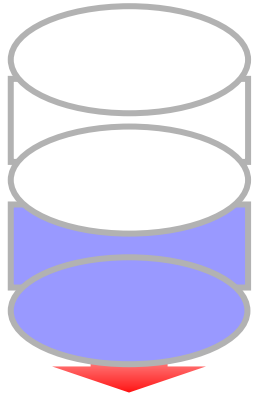
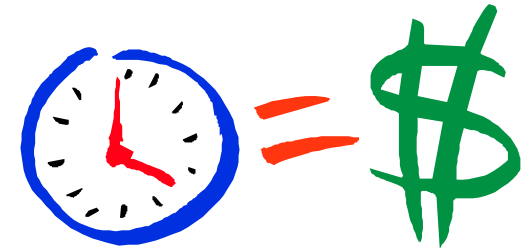
# Best Practices: Starting to Virtualize Servers



- Start small, but think big



- Require rapid ROI — but look beyond cost savings



- Define your storage strategy first
- Virtualize the right applications — "hot" and "not" to virtualize!
- Combine virtual machines effectively



# Poll: Why Are You Virtualizing (Revisited)?

**What is the primary benefit your organization will get from virtualization?**

- A) Reduce server spending
- B) Reduce power costs and data center space
- C) Reduce administrative costs
- D) Increase flexibility and speed
- E) Improve quality of service

# Key Actions for Consolidation & Virtualization/I&O

- ✓ When looking at IT projects, balance the virtualized services with investments and trade-offs.
- ✓ Reuse virtualized services across the portfolio. Every new project does not warrant a new virtualization technology or approach.
- ✓ Understand the impact of virtualization on the project's life cycle. In particular, look for licensing, support and testing constraints.
- ✓ Focus not just on virtualization platforms, but also on the management tools and the impact on operations.
- ✓ Look at how to reduce costs by rationalizing infrastructure as part of a consolidation/ virtualization process

# Top Ten Gartner Research Reports Virtualization & Consolidation

1. **Virtualization Changes Virtually Everything**, 28 March 2008, ID:G00156488
2. **The Fifth-Generation Server Evaluation Model Introduces Virtualization Workload** ..., 6 November 2008, ID:G00162858
3. **Energy Savings via Virtualization: Green IT on a Budget**, 10 November 2008, ID:G00161153
4. **Server Workloads: What Not to Virtualize**, 26 March 2008, ID:G00156214
5. **The Politics of Consolidation**, 31 October 2008, ID:G00162360
6. **The Virtual Organization: Roles and Structure in Support of Server Virtualization**, 6 August 2008, ID:G00159553
7. **Toolkit: How to Calculate TCO for Server Virtualization** , 19 May 2009 , ID:G00166854
8. **Toolkit Decision Framework: The Economics of x86 Server Sizing for Virtualized Workloads**, 8 February 2008, ID:G00155056
9. **The Impact of Virtualization and Alternative Models on Outsourcing**, 15 February 2008, ID:G00155034
10. **Demystifying Server Virtualization Taxonomy and Terminology**, 19 July 2007, ID:G00148373

*For additional information, contact your Gartner Account Executive*



# IT Infrastructure, Operations & Management Summit 2009, June 23-25, Orlando, FL, [gartner.com/us/iom](http://gartner.com/us/iom)



## IT Infrastructure, Operations & Management Summit 2009

### Keynote Sessions:

- Infrastructure and Operations – A Five Year Scenario
- Communicating the Business Value of IT Infrastructure and
- Cloud Computing – Will It Impact Infrastructure and Operations?
- The Top Emerging and Disruptive Technologies in Infrastructure and Operations

### Tracks:

- IT Operations
- Virtualization
- Agenda
- IT Modernization & Consolidation
- Networking & Communications
- Cost Optimization in Infrastructure & Operations - Thriving During Difficult Times

### Agenda Highlights:

- Five tracks with more than 40 sessions
- New track on cost optimization strategies
- New track on networking and communications
- Keynote panels and presentations
- Private analyst one-on-one sessions
- Audience polling for interactive peer feedback
- Facilitated peer-to-peer networking
- Analyst/user roundtables
- Sponsor case studies and Solution provider sessions

# Gartner Events for IT Infrastructure & Operations

## **Gartner IT Infrastructure & Operations Management Summit**

June 22-23, 2009

Gaylord Palms Resort & Convention Center

Orlando, FL

[gartner.com/us/iom](http://gartner.com/us/iom)

## **Gartner Data Center Summit**

October 5-6, 2009

Royal Lancaster Hotel

London, UK

[europe.gartner.com/datacenter](http://europe.gartner.com/datacenter)

## **Gartner 28<sup>th</sup> Annual Data Center Conference**

December 1-4, 2009

Caesars Palace

Las Vegas, NV

[gartner.com/us/datacenter](http://gartner.com/us/datacenter)

# Gartner Reduces IT Cost in Four Distinct Ways



Kurt Potter  
Research Director

Gartner

▶ 00:00 00:00 ◀

## FEATURED VIDEO

### Four Levels of Cost Optimization

Kurt Potter, Research Director

Research Director Kurt Potter discusses the use of Gartner's Four Levels of Cost Optimization framework as a planning and communication structure.

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Dialogue

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### 1. Get the *best pricing* and terms for your IT purchases

- Gartner ensures you get the best value from your IT purchases. Gartner analysts and consultants review thousands of vendor contracts and proposals each year. That expertise helps you:
  - Receive the best pricing and terms for products and services
  - Buy only what works and what you need, from functionality to service level
  - Avoid hidden costs and risks

### 2. Identify major *cost-saving opportunities*

- Leveraging our proprietary data, Gartner shows you exactly where your spend is high relative to best-in-class peers. We also quantify the financial benefit and help you prioritize initiatives appropriately.
  - Our IT Key Metrics Data (ITKMD) provides a comprehensive and granular database that helps you identify where you have the biggest opportunities.
  - Our benchmarking services are leveraged by more than 5,000 organizations every year. They compare your spend to the ITKMD, distilling implications and actionable recommendations for your unique situation.

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  - Application rationalization

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- Gartner is your vital partner in achieving hard-dollar savings from process improvement. In the last year alone, we answered thousands of critical client questions, authored hundreds of groundbreaking documents and engaged directly with clients to deliver cost savings. Our definitive expertise includes:
  - Project prioritization or portfolio management
  - Offshoring or outsourcing
  - Asset management
  - Workforce optimization

## Cost Optimization Fundamentals

### Key Issues for Cost Optimization, 2009

Kurt Potter

### Preserving Your Investments When Your IT Vendor is in Financial Difficulty

Debra Logan

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