The Role of the Mainframe in Tomorrow's Enterprise

Rakesh L. Kumar

Vice President

Gartner®

The Business is NEVER Happy with IT!

60% of business leaders

think their current enterprise

IT capability

constrains their choices

Gartner

2009: The "Worst Case Scenario" Arrived..

Selected Regional and National Annual (Real) GDP Growth Forecasts

-2.3%

-7.5%

-5.1%

-4.0%

-2.7%

+8.0%

-0.5%

- 5.7%

+5.6%

-7.4%

+2.6%

-0.9%

-0.2%

0.2%
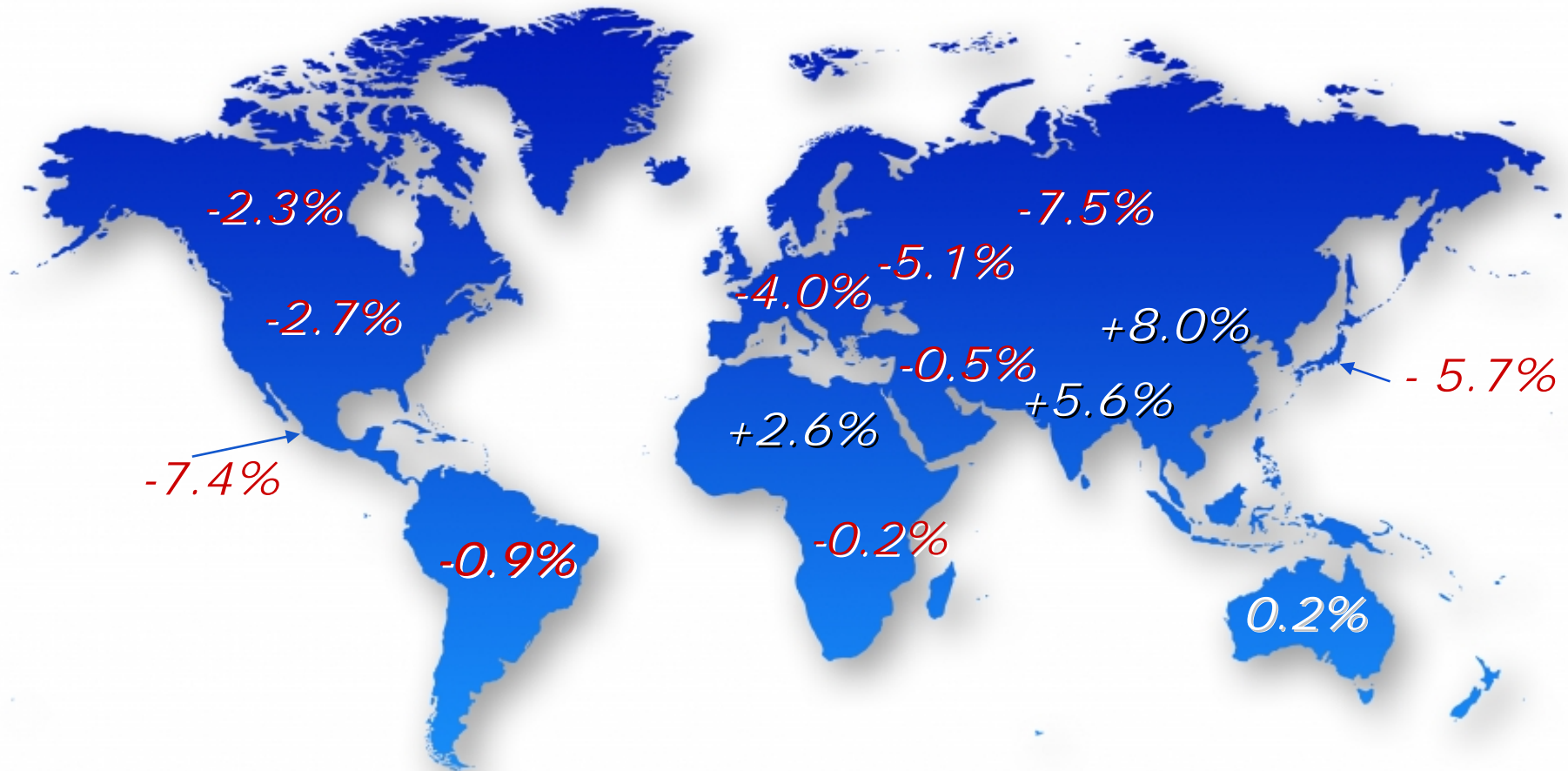
2009 World GDP Growth Rate = -2.3%

Gartner®

2010: A Return to Growth Is Forecast, With Emerging Markets in the Lead Once Again

(Selected 2010 Regional and National Annual Real GDP Growth Forecasts % Over Previous Year)

1.9%

1.8%

2.3%

2.8%

0.6%

0.9%

1.5%

10.1%

3.5%

7.0%

3.3%

0.9%

2.7%

1.4%

Well-Known Benefits:
- ✓ Cost arbitrage
- ✓ New markets
- ✓ Follow the sun
- ✓ Bottom of pyramid
- ✓ Constraint Innovation

2010 World GDP Growth Rate = +2.4%
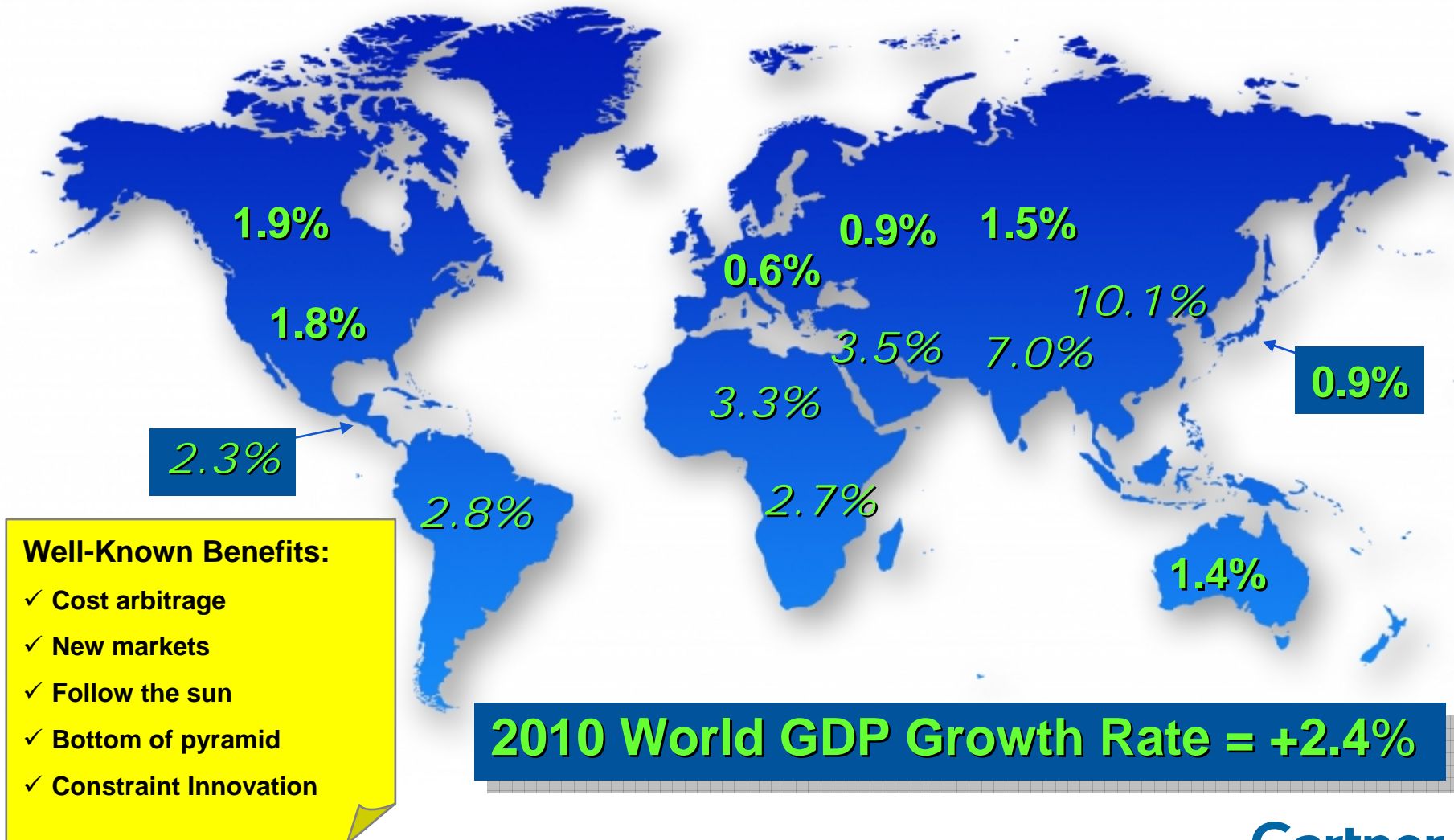
Gartner

So IT Is <u>One</u> of the Most Resilient Investment Areas (*Relatively*)

Which investments will you increase in 2009?

Investment Area	Percentage
Product Enhancement	48%
IT	48%
Sales	47%
Risk Management	39%
Research and Development	35%
Marketing	33%
People and Culture Development	33%
Partnerships, Alliances, Value Networks	29%
Intellectual Property	24%
Legal and Compliance	24%
Property and Facilities	23%
Capital Equipment	23%
Staff (Hiring)	22%
Business Services	16%
None of the Above	15%
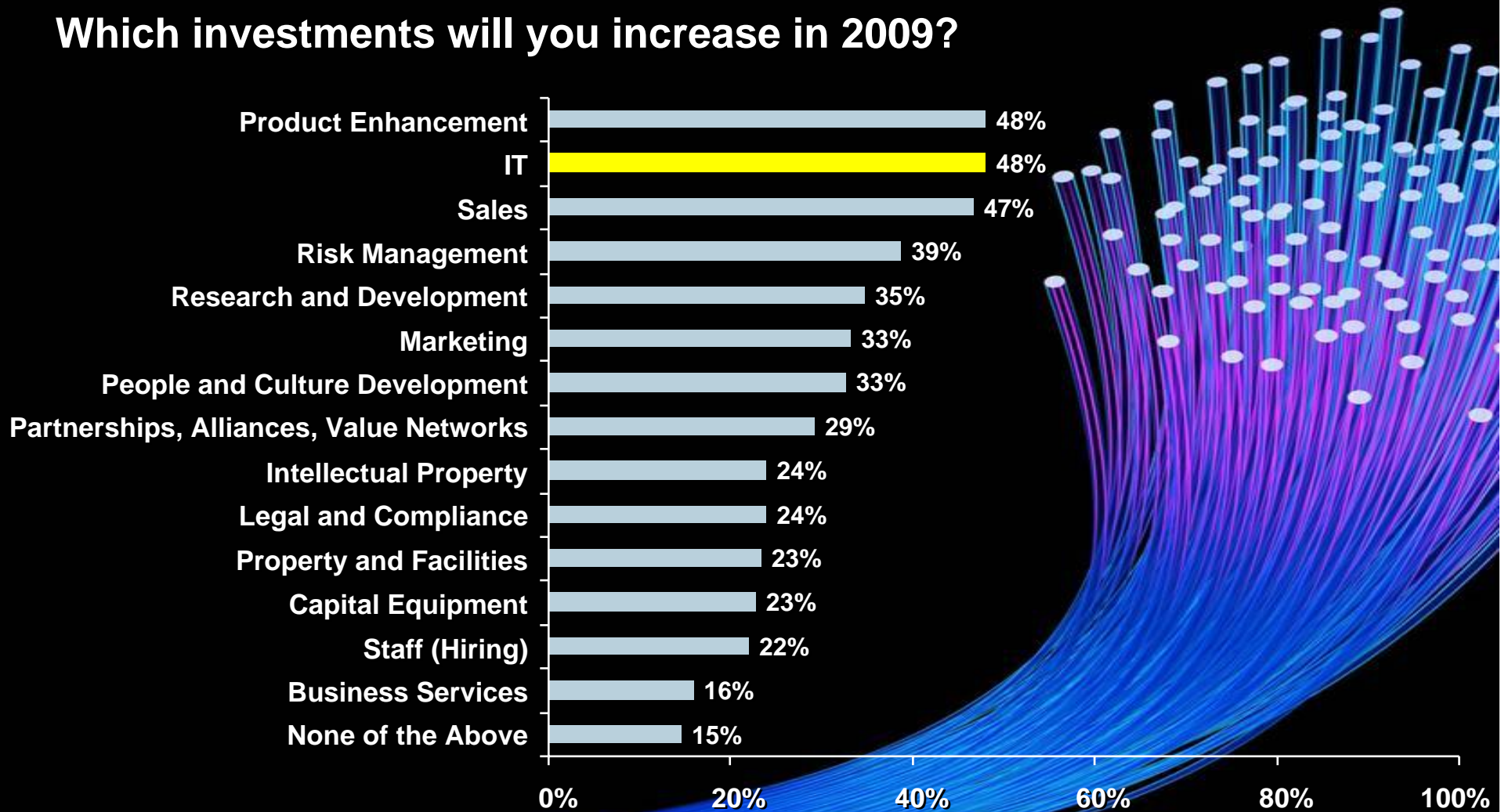
0%   20%   40%   60%   80%   100%

Gartner

A New Demand for Creative Business Change Will Cause a Fresh Look at the "IT Value Pipeline"

Cloud-based business
E-discovery
BPM
Sensor & smart grid optimization
Neuro-economics
Digital fabrication
Service robotics
Enterprise 2.0 (social)
Algorithmic pricing & trading
Sustainability management
Product cost management
Visibility & traceability
Location intelligence
m-commerce
Usage business models
BI & performance management
Mass customization
Process outsourcing
collaboration
Remote workforce
E-service
E-commerce
CRM

Innovation Trigger
Peak of Inflated Expectations
Trough of Disillusionment
Slope of Enlightenment
Plateau of Productivity

Gartner.

10 Trends to Watch — Carefully

	2009	2010	2011

1. **Virtualization** — 2009
2. **Data Deluge**
3. **Energy & Green IT** — Mid-2009
4. **Complex Resource Tracking** — 2009-2010
5. **Consumerization &Social Software**
6. **Unified Communications** — 2010
7. **Mobile & Wireless**
8. **System Density** — 2010-2011
9. **Mashups & Portals**
10. **Cloud Computing**

Gartner

Virtualization

Applications   **Infrastructure**

Dimensions of Virtualization

Server Virtualization

Storage Virtualization

Hardware Virtualization

Desktop Virtualization

Network Virtualization

How does it affect you?

- IT becomes one logical system.

- Changing how IT is used.

- Additional "power" on demand.

- Mgmt. Players: VMware, Microsoft Hyper-V, Citrix.

- Plays well with Green IT

- SMBs – ease of migration

Next Monday Morning

Review consolidation plans; can we do more? Do you have all the virtualization bases covered? Do we have a plan?

Critical Timeframe
Now

Cloud Computing

Cloud Computing

A style of computing where scalable and elastic IT-enabled capabilities are delivered as a service to customers using Internet technologies

How does it affect you?

- Common Services are available now – may reduce Opex.

- Private clouds improve agility and will dominate.

- Focus on Service Levels

- Ignore the Hype - focus on results.

Next Monday Morning

- Evaluate commodity services you provide and what can move to the cloud.

- Evaluate cloud delivery model for internal use.

- Categorize applications and services based on SLA's and risk before proceeding.

Critical Timeframe
2011-2013

Private Clouds

Through 2012, IT organizations will invest more on private cloud services than on external cloud providers.
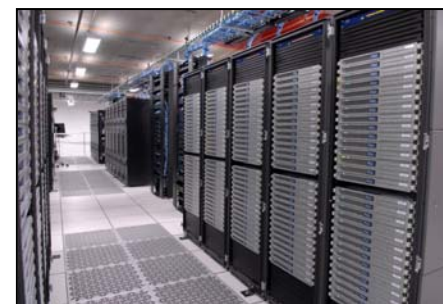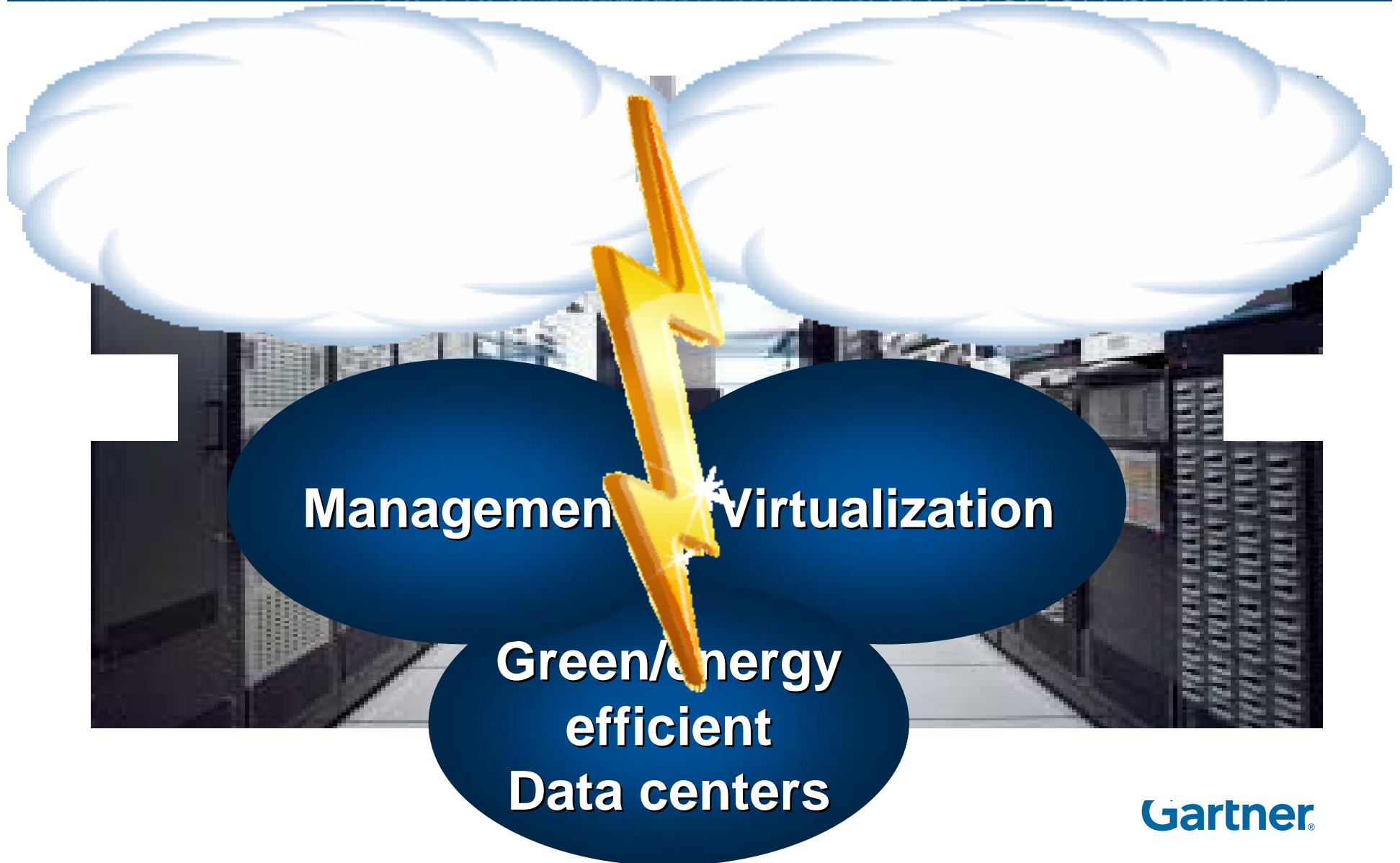

Reasons for Private Cloud

- Low barrier to entry
- Elastic and Scalable
- Lower cost and pay per use
- Increased agility (to customers)
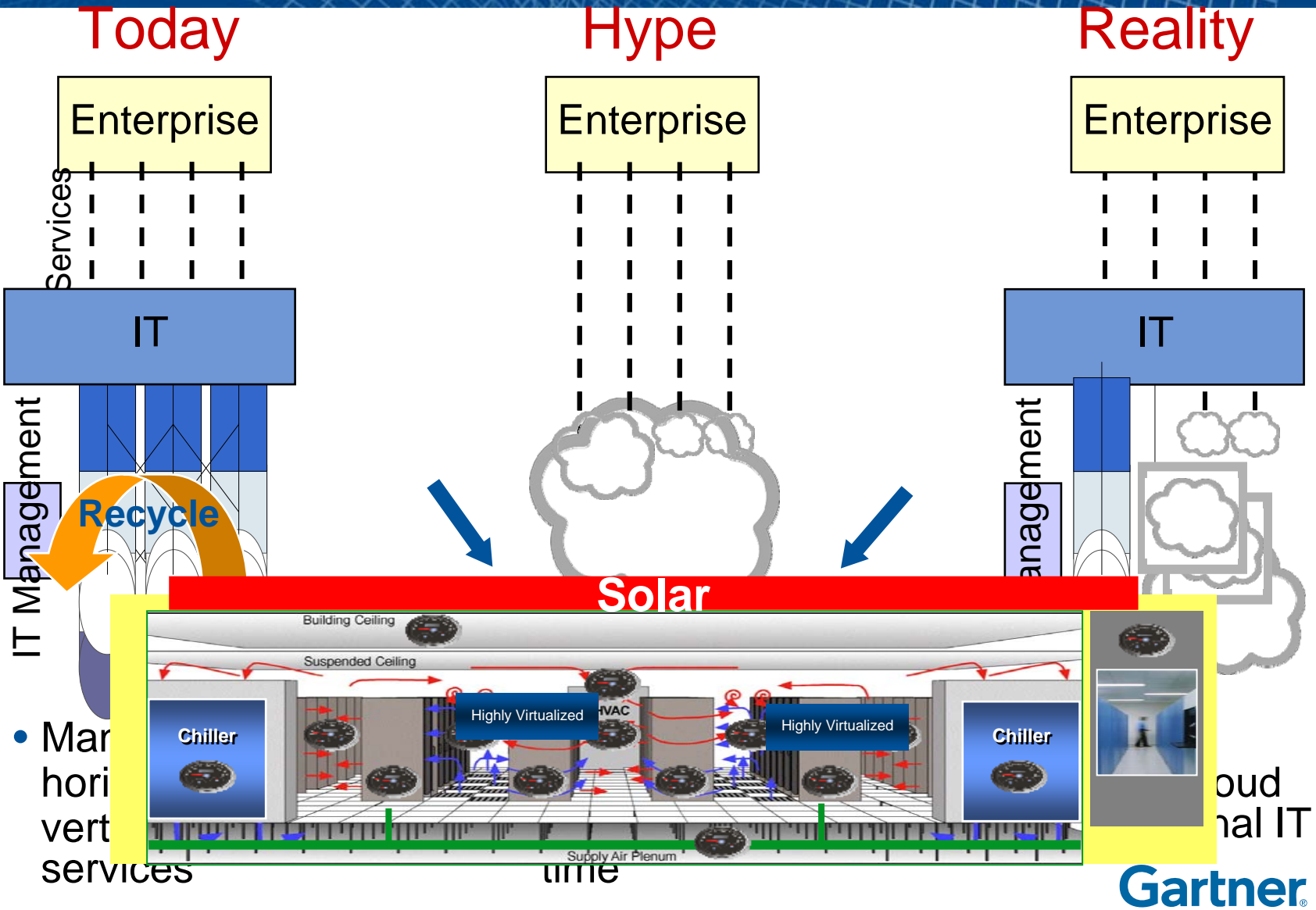- Ease of sourcing migations
- Many cloud benefits – reduced risk

Reasons for Public Cloud

- Scale on demand
- Increased agility and flexibility
- Pay per use
- Higher compute capacities
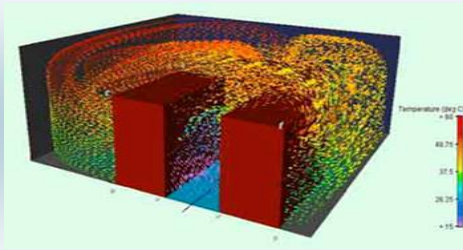- Elasticity
- Time to market

The Hype and Reality of Cloud Computing for Infrastructure and Operations

Today

Hype

Reality

Enterprise

Enterprise

Enterprise

Services

IT

IT

IT Management

Recycle

Management

Solar

- Mar...
 hori...
  vert...
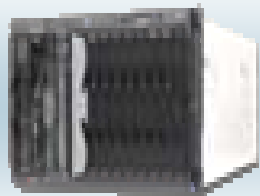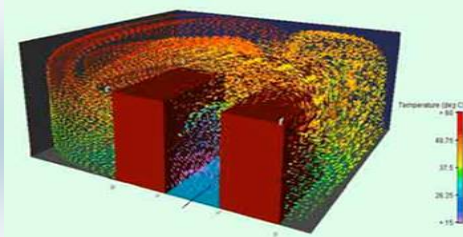 services

...oud
...nal IT

time

Discontinuities in the D/C Design Model: From Static to a Living Organism

- Mainframe characteristics determined data center design envelope
- Temperature range: 68 to 77 F
- Humidity: 50%
- Raised floor
- PDU, CRAC, HVAC, UPS and generators

- Client/server, Unix-based systems required
- Smaller envelope
- Created a static data center design envelope
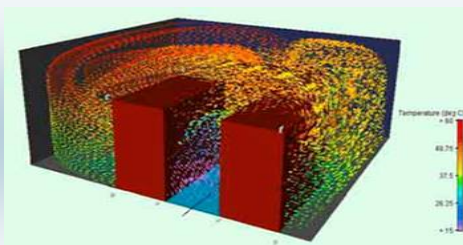
High-density equipment means that data centers need:
- Bigger design envelope
- Flexible (time, cost and topology) design envelope
- Modular build out and integration of competencies
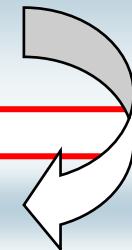
The data center is a living organism

Server Market is Weak Today, But Innovation Has Never Been Stronger

GDP growth vs Server unit vs Server revenue growth
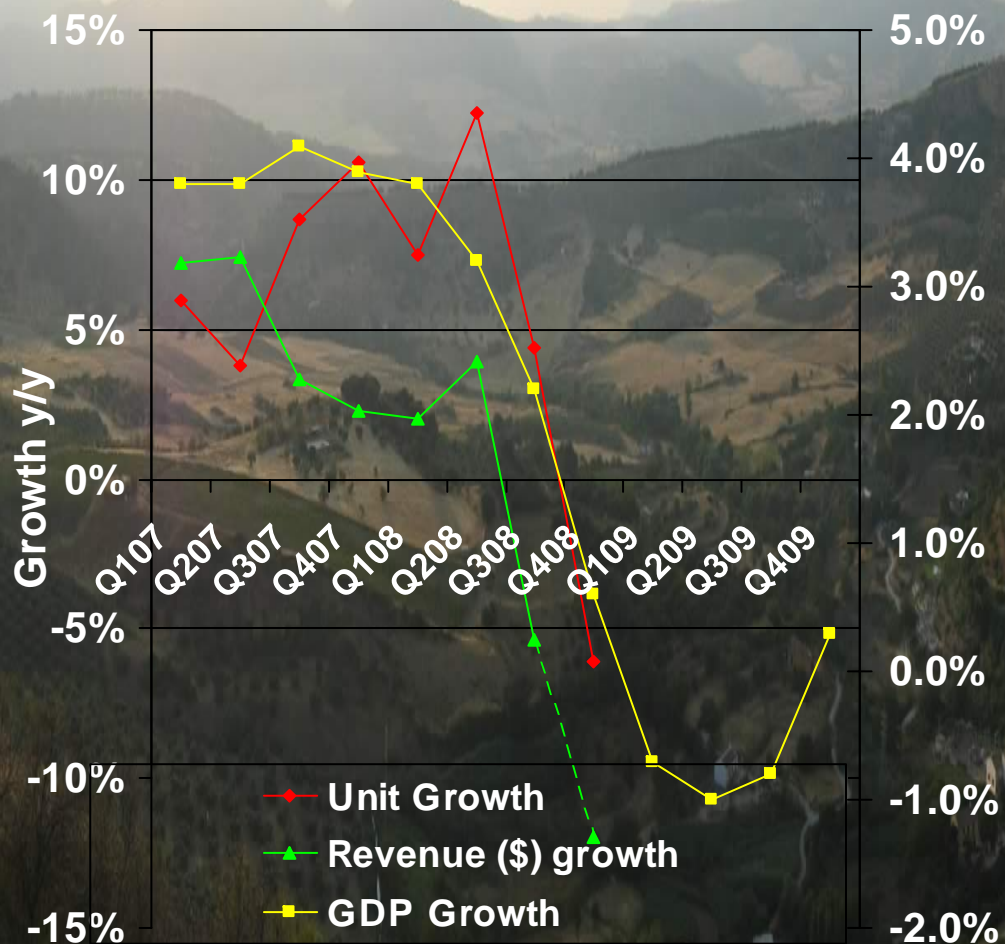
Datacenter Infrastructure is Evolving in Multiple (& Often Conflicting) Directions

"It is no longer possible to change one thing in my infrastructure — multiple dominos fall with each move…"

CIO — Fortune 500 Company

Use Portfolio Life Cycle Management to Map Server Technology Investment

Emerging | Developing | Early Mainstream | Mature Mainstream | Legacy

Commodity Phase
- Look for providers with repeatable offerings; drive out cost
- Develop substitutes or partner with those who will

Customized Phase
- Identify process or technology innovators
- Rapidly leverage provider IP

Customization

Fabric-Based Servers

Blades

Appliances

Unix servers

z/OS Mainframe

Non-IBM Mainframe

X86 Rack Optimized Servers

X86 Tower Servers

X86 Rack Mounted Servers

Technology/Market Maturity

Gartner

Still Alive and Kicking

"The rumors of my death have been greatly exaggerated."

— **Mark Twain**

Gartner.

IBM Mainframe Market: Quite a Story

- >400 ISVs and >2,500 applications for Linux on z

- Facilities are now a mainframe competitive strength

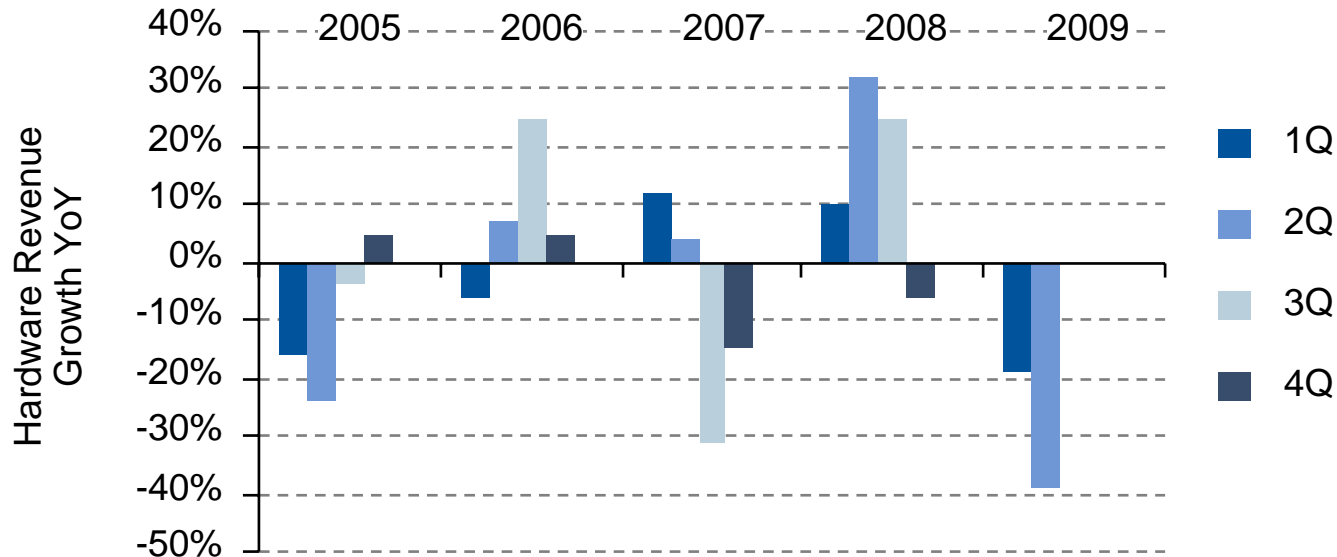- Academic initiatives — >500 universities

- Approximately 14 million IBM mainframe MIPS installed

- Linux on z — more than 20% of MIPS being shipped

- Specialty engines (MIPS) — now >15% of installed base

Revenue Growth Rates YoY

IBM's System z10: High-End and Midrange Systems

System Highlights

- 50% boost in processor performance
- 70% of the maximum system capacity of the z9
- Three times the maximum memory
- Chip frequency goes from 1.7GHz to 4.4GHz

Challenges

- Granularity
- Hardware pricing (from an absolute sense)
- Capacity planning

Potential Benefits

- Reduced IBM software costs
- Reduced hardware maintenance costs
- Special-purpose engine upgrades at no charge

System Highlights

- 40% boost in processor performance over z9 BC
- 50% of the maximum system capacity of the z9 BC
- Almost four times the maximum memory
- One model — 130 capacity settings
- Up to 5 CPS and 5 zAAP/zIIP, or up to 10 IFLs or CFs

Challenges

- Entry price is still about $100,000
- The price of cross-family upgrades will still be six digits
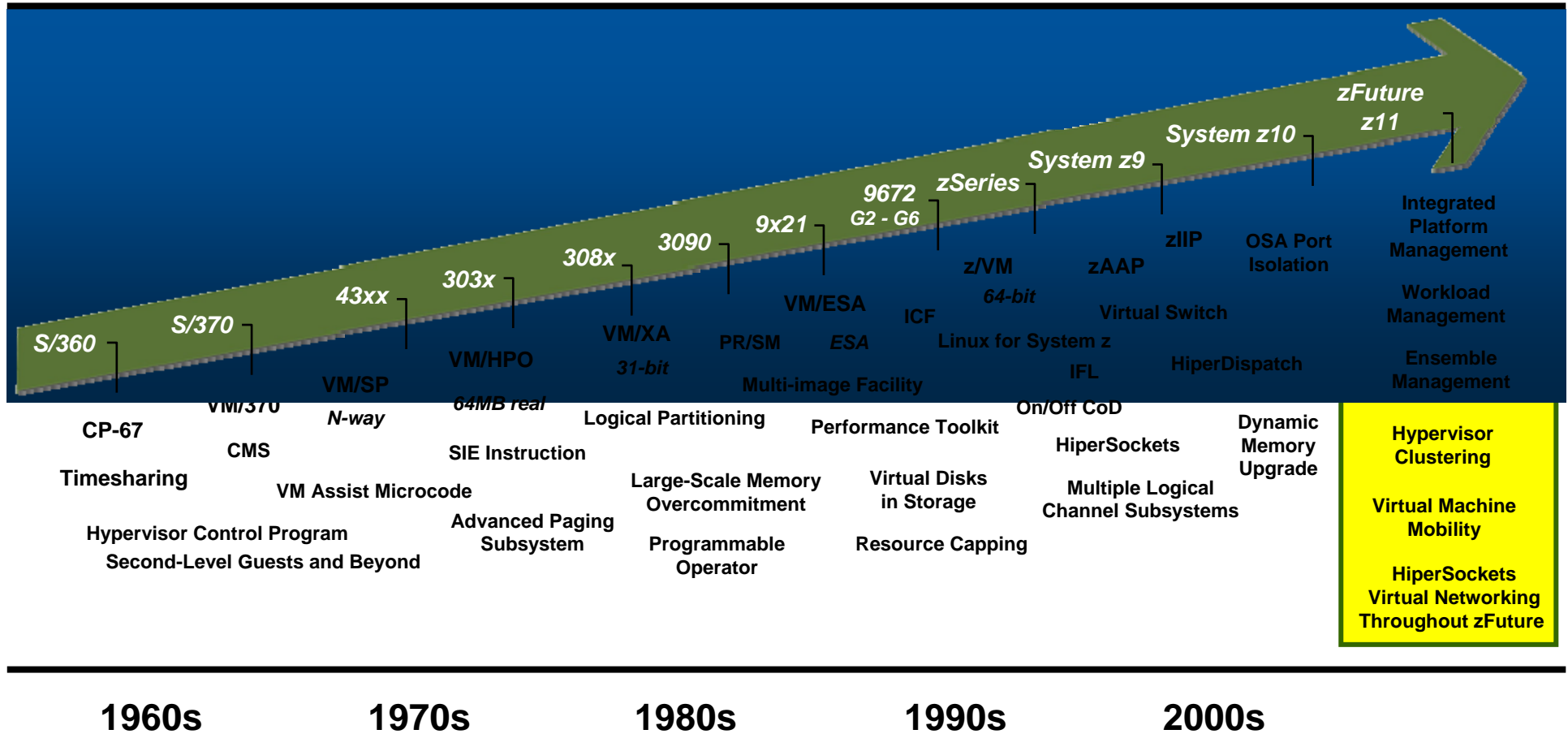- Capacity planning

Potential Benefits

- Reduced IBM software costs
- Special-purpose engine prices reduced 50%
- 60% lower memory costs associated with specialty engines (EC and BC)
- Dedicated machine for niche requirements of big shops

System z Virtualization Road Map

zFuture z11

System z10

System z9

zSeries

9672 G2 - G6

9x21

3090

308x

303x

43xx

S/370

S/360

Integrated Platform Management

Workload Management

Ensemble Management

zIIP

OSA Port Isolation

zAAP

z/VM *64-bit*

Virtual Switch

HiperDispatch

IFL

Linux for System z

ICF

VM/ESA

ESA

VM/XA *31-bit*

PR/SM

VM/HPO *64MB real*

VM/SP

N-way

VM/370

CMS

CP-67

Timesharing

Hypervisor Control Program

Second-Level Guests and Beyond

VM Assist Microcode

SIE Instruction

Advanced Paging Subsystem

Multi-image Facility

Logical Partitioning

Large-Scale Memory Overcommitment

Programmable Operator

Performance Toolkit

Virtual Disks in Storage

Resource Capping

On/Off CoD

HiperSockets

Multiple Logical Channel Subsystems

Dynamic Memory Upgrade

Hypervisor Clustering

Virtual Machine Mobility

HiperSockets Virtual Networking Throughout zFuture

1960s   1970s   1980s   1990s   2000s
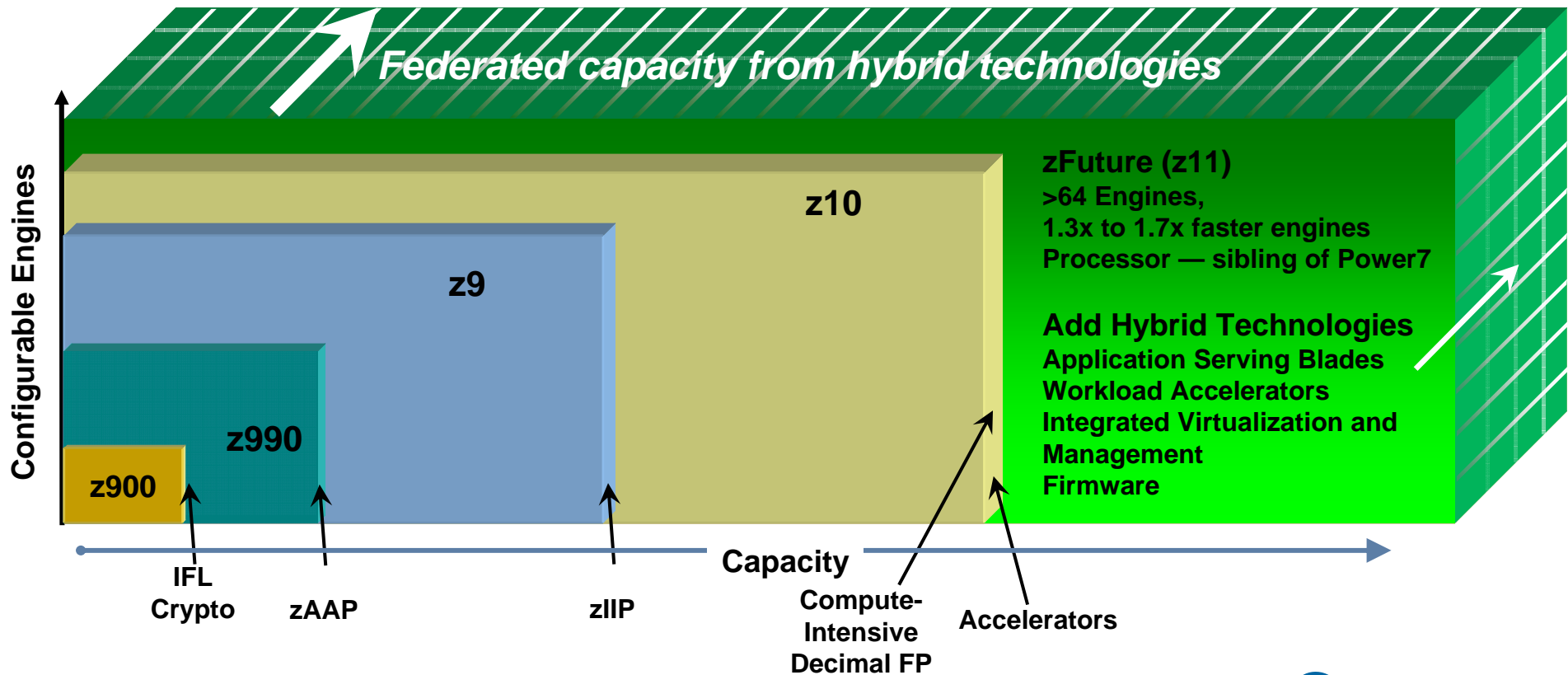
Source: IBM

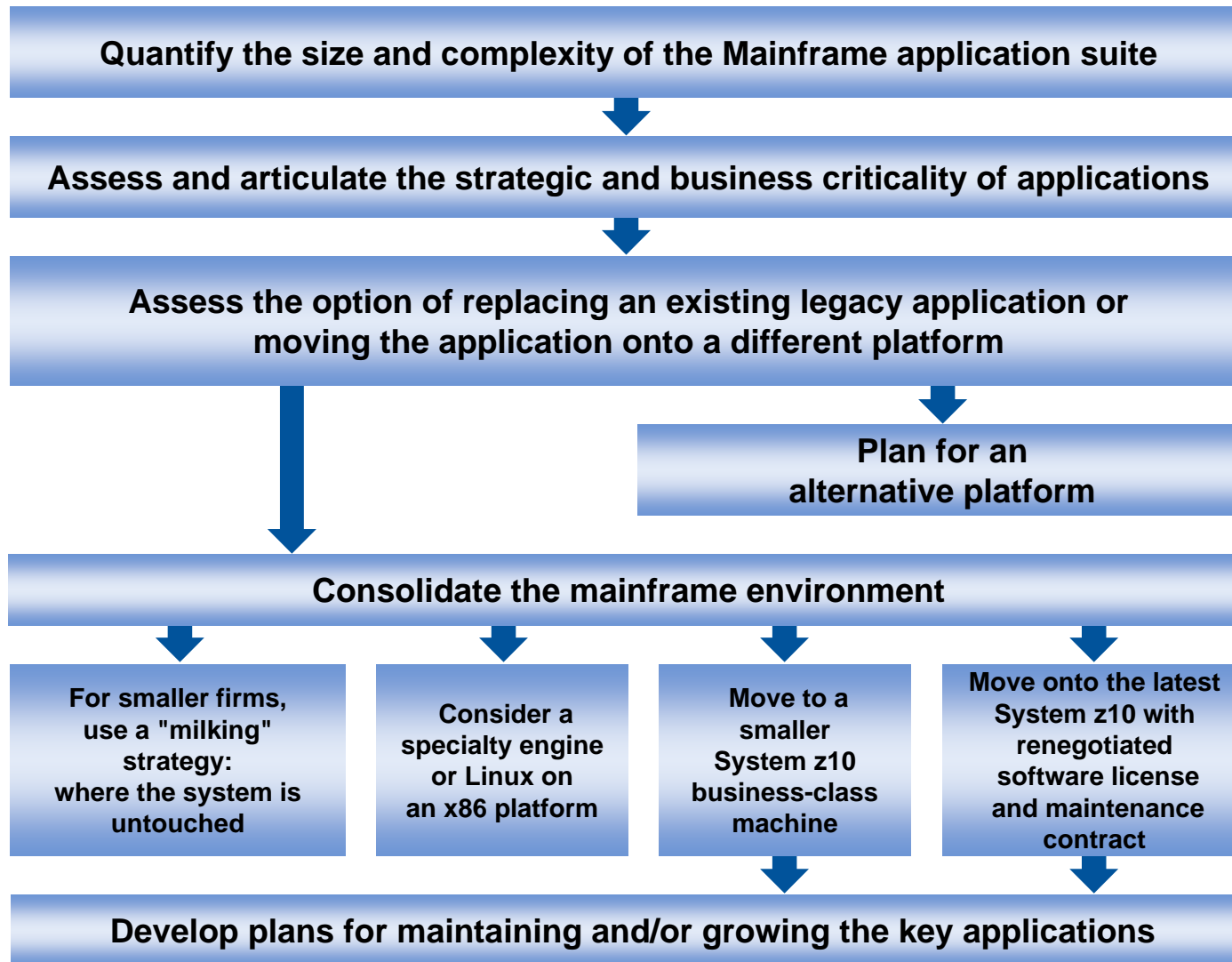**Gartner®**

System z — Next-Generation Architecture

New System Claims

- **Hybrid technologies increase overall capacity under control of system z**
- **Deploy optimized solutions across z/OS, specialty engines and blades**
- **System z management extended across end-to-end applications**

Federated capacity from hybrid technologies

Configurable Engines

z900

z990

z9

z10

zFuture (z11)
>64 Engines,
1.3x to 1.7x faster engines
Processor — sibling of Power7

Add Hybrid Technologies
Application Serving Blades
Workload Accelerators
Integrated Virtualization and
Management
Firmware

Capacity

IFL
Crypto

zAAP

zIIP

Compute-
Intensive
Decimal FP

Accelerators

Gartner.

Mainframe in Your Data Center: What's the Decision Process?

Quantify the size and complexity of the Mainframe application suite

↓

Assess and articulate the strategic and business criticality of applications

↓

Assess the option of replacing an existing legacy application or moving the application onto a different platform

→ Plan for an alternative platform

↓

Consolidate the mainframe environment

| For smaller firms, use a "milking" strategy: where the system is untouched | Consider a specialty engine or Linux on an x86 platform | Move to a smaller System z10 business-class machine | Move onto the latest System z10 with renegotiated software license and maintenance contract |

↓

Develop plans for maintaining and/or growing the key applications

Gartner.

Moving Off the Mainframe:
Who Can Help?
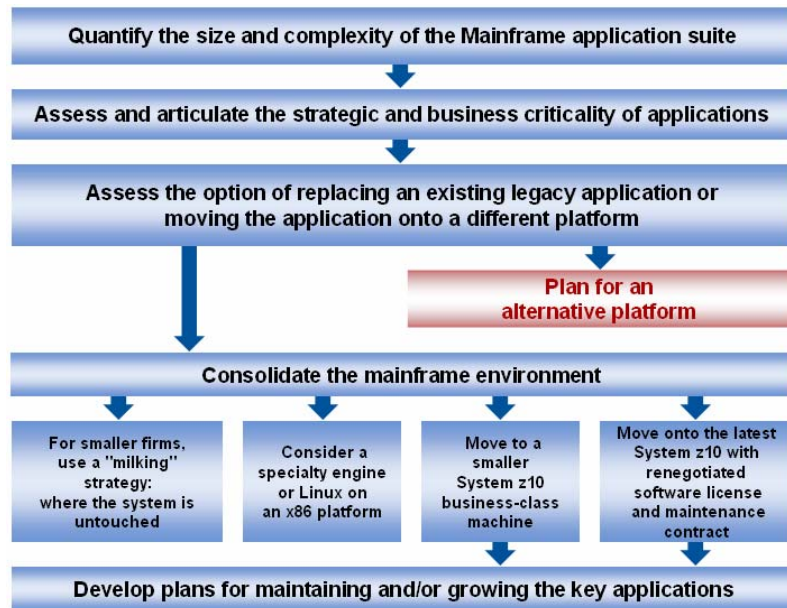
Sun Microsystems

Indian Service Companies — HCL, Wipro

Labor-driven

Limited success

Microsoft Mainframe Modernization

Partnership-driven

Limited appeal to mainstream mainframe customers

HP's Mainframe Alternative Program

Based in Madrid

Targets zO/S and VSE workloads

Typical migration to HP Integrity

HP claims to have moved 40 European customers

HP's value proposition

> *Move from closed to open systems*
>
> *Save costs*

HP claims single applications >10K MIPS have been migrated

Migrate to an alternative platform where security and availability are not compromised. Beware of vendor claims about actual costs and technical issues.

The Role of the Mainframe in Tomorrow's Enterprise

Rakesh L. Kumar

Vice President

Gartner.