

# The New Data Center

## Consolidated, Converged, Virtualized & Automated

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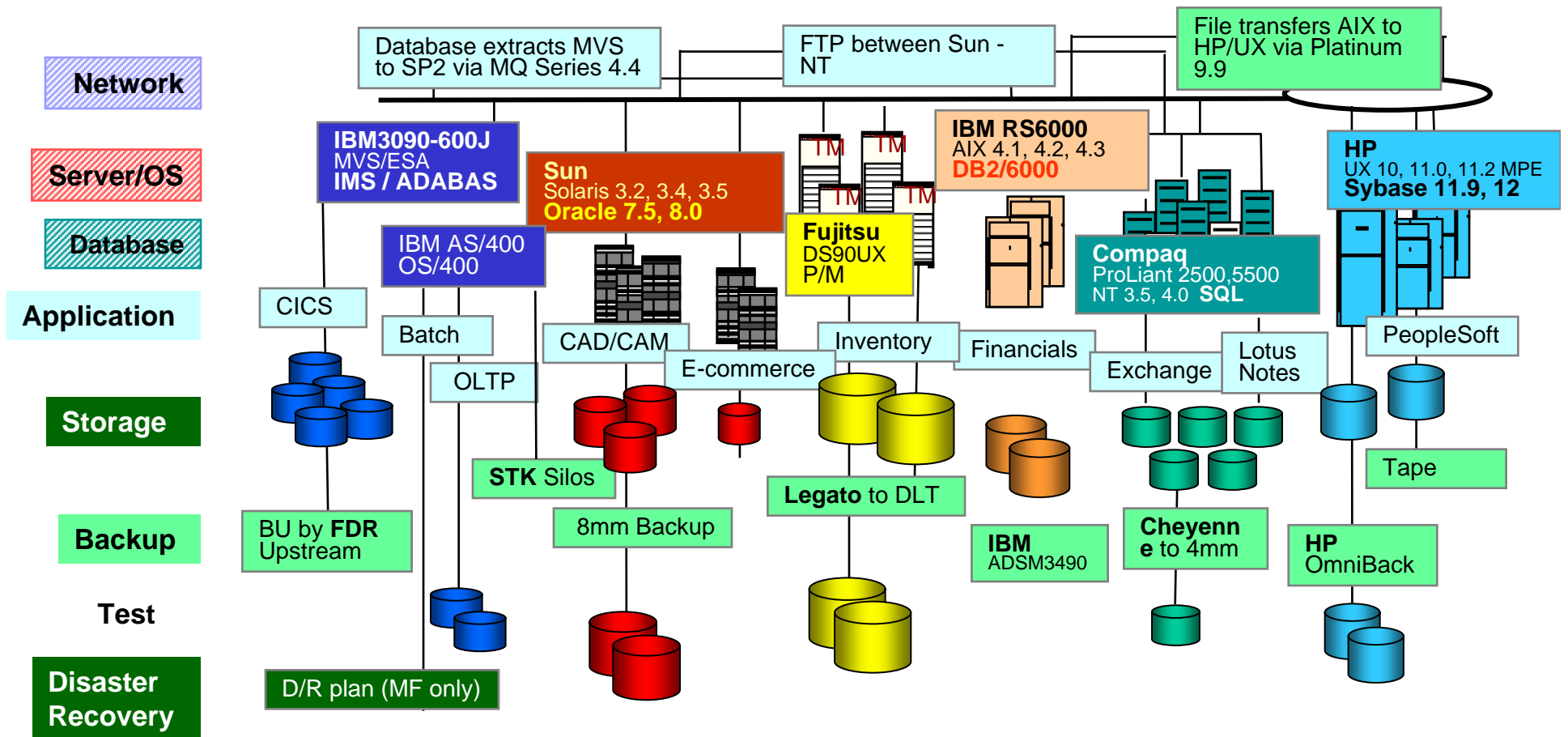
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# **Agenda**

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- **State of Existing Data Centers – Issues**
- **Cost & Technology Trends for the New Data Center**
- **Technologies/Metrics to follow**
- **Implementing a Dynamic Data Center**
- **Consolidate, Converge, Virtualize & Automate**
- **Recommendations**

# ► Chaos in the Enterprise . . .



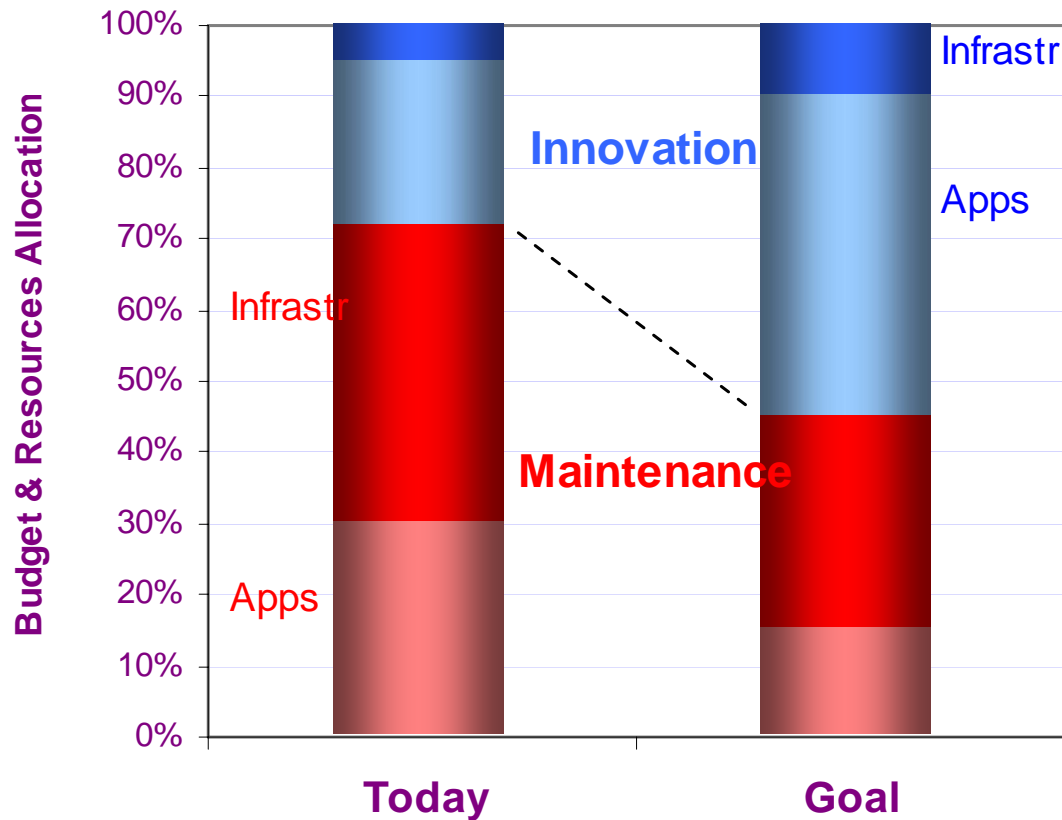
(1) Scales poorly (2) Difficult to manage (3) Reliability is questionable (4) Management costs out of control

# ► CIOs Pressures/Dilemma > Data Center

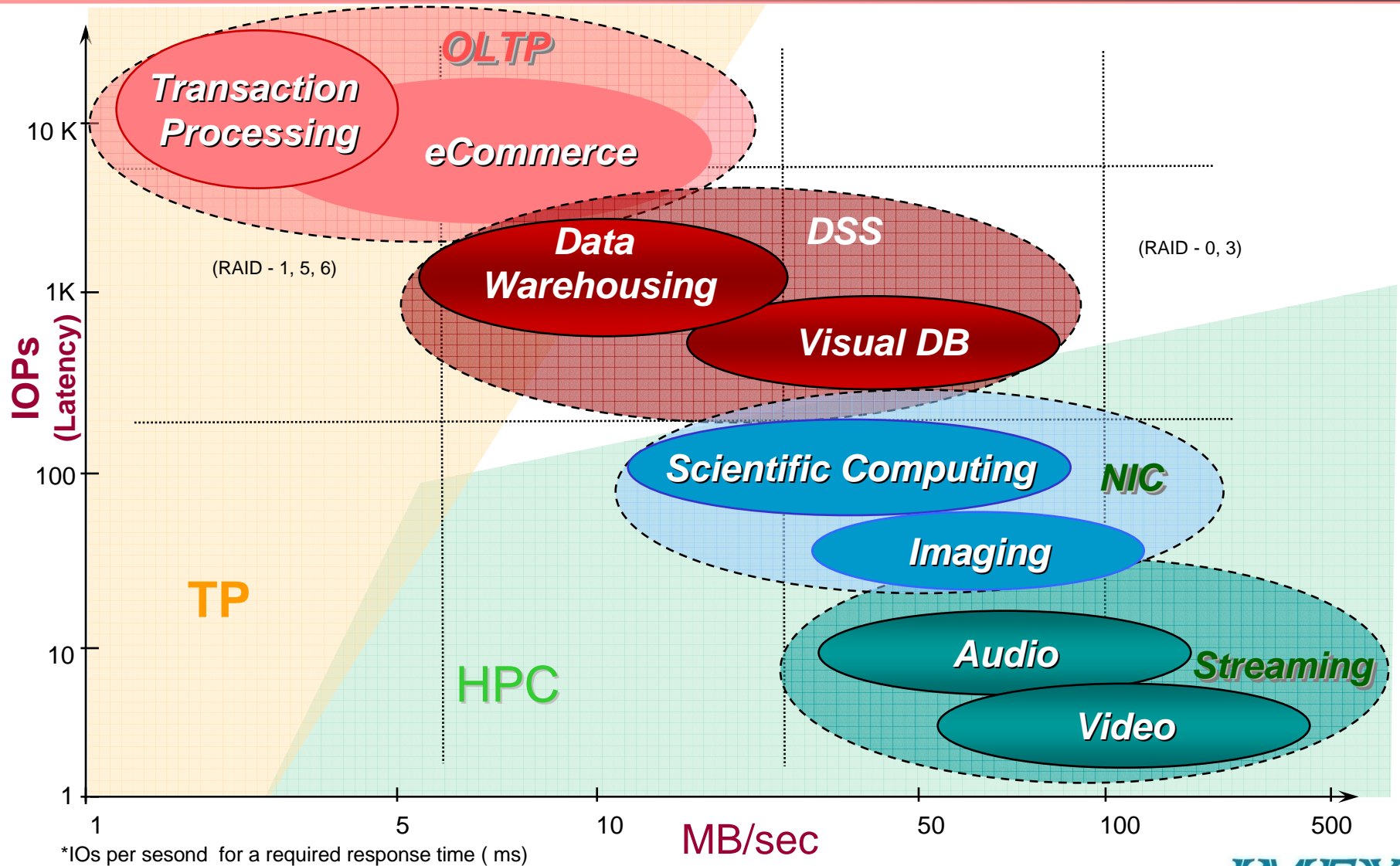


# ► *NDC – Aligning IT w Business Goals*

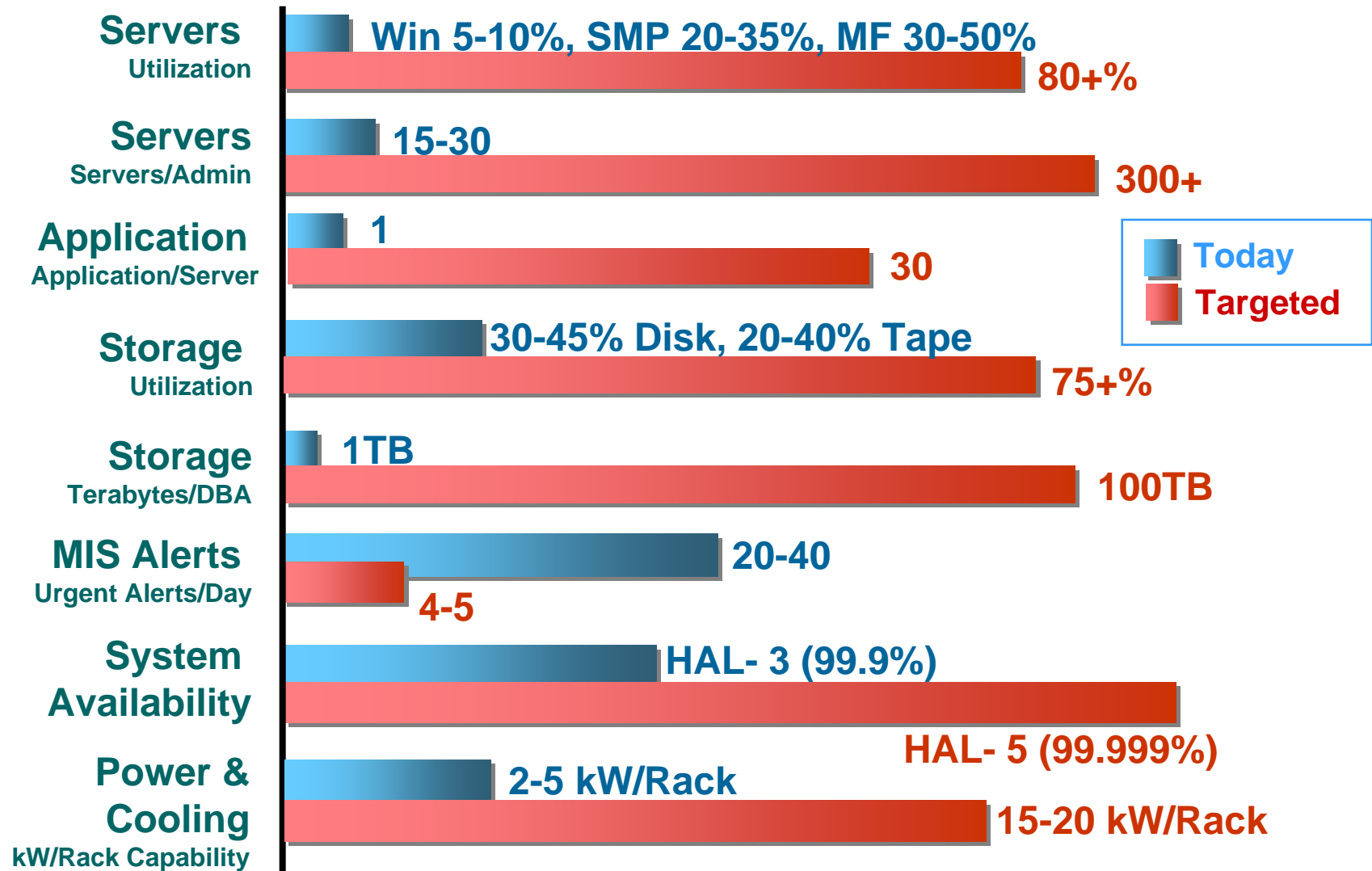
## From Maintenance FireFighting to Aligning IT with Business Goals



# Application Aware Virtualization



# ► CIO Goals - DC Infrastructure



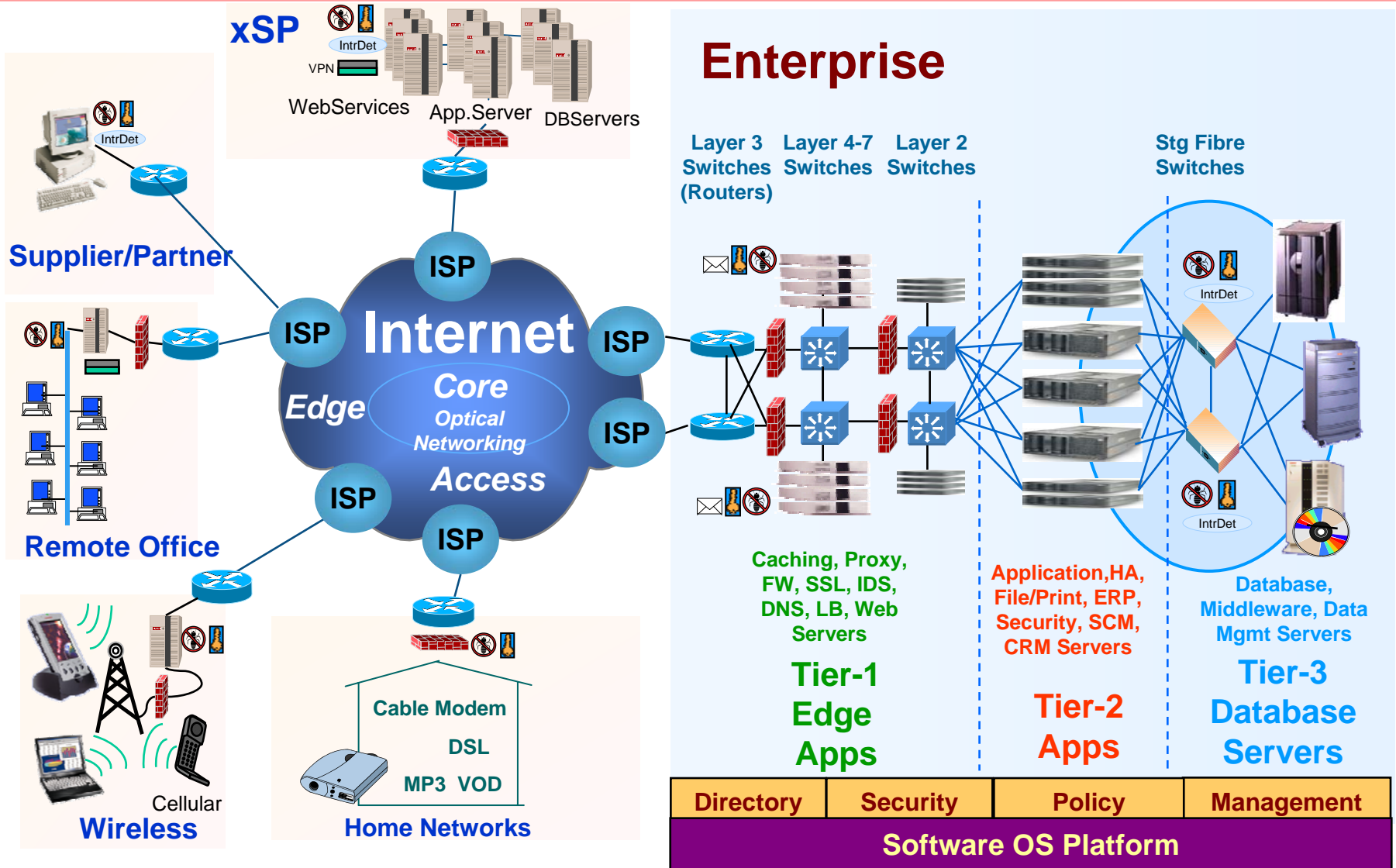
# ► **Data Center – Cost & Tech Trends**

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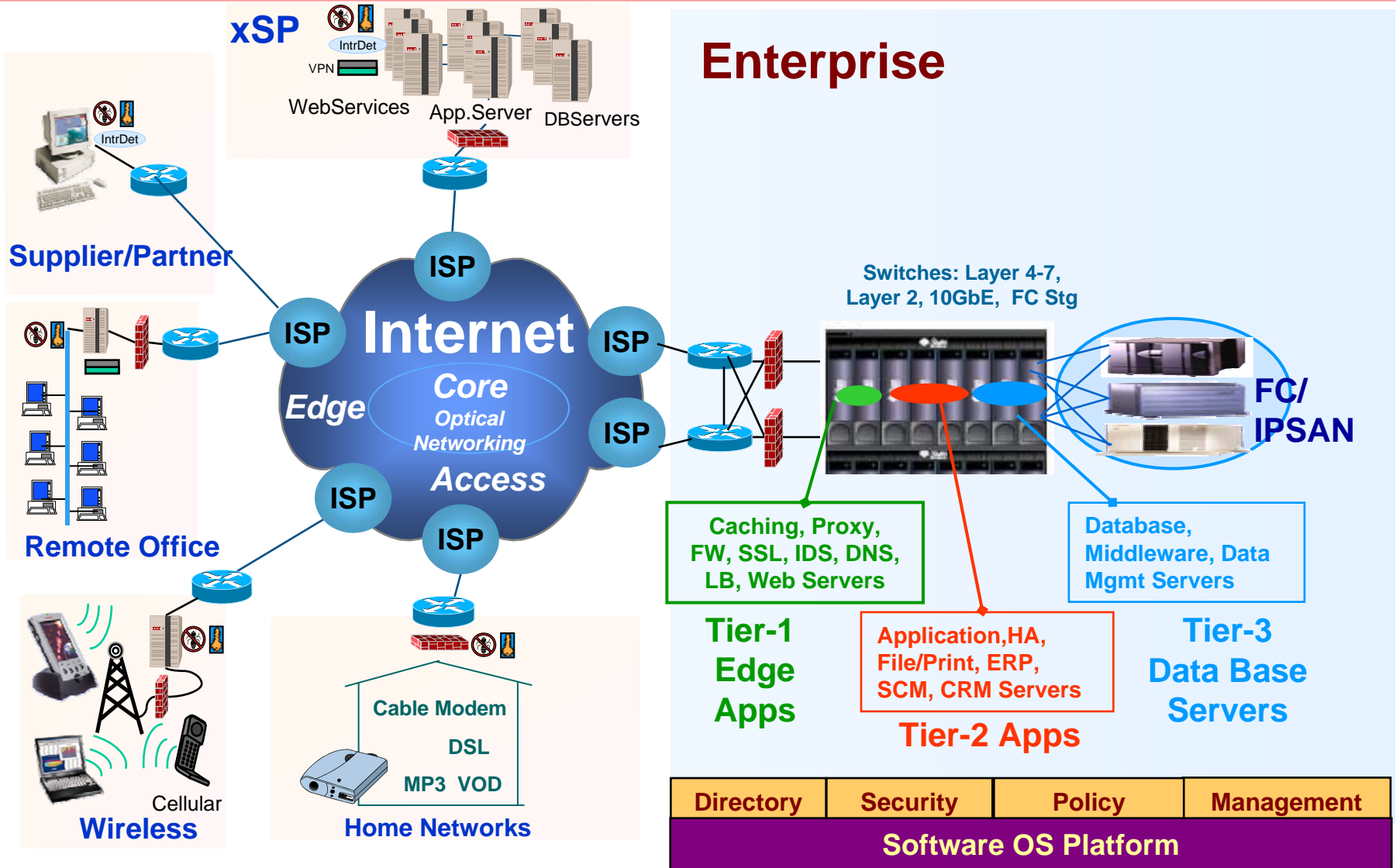
- **WW 5.1 million data centers, Costs \$100-175M to build a large DC**  
2007
  - ~\$1005/Sqft, \$40,000/Rack, \$2,500/Server, 2.5U
  - 82% of installed equipment (Srvr,Stg,Ntwk) has only 10% utilization
  - For every \$1 invested in new IT infrastructure, \$7 spent to maintain
  - For every \$1 in new Server spending, 42c spent on Power & Cooling /2006
  - Virtual Servers growth > Physical servers by 50% > Managing VM Sprawl
  - Blades increasing Power/Rack by 10x Need Power/Cooling,
- **Consolidation in Enterprises & Service Providers**
  - IT in Mega Data Centers, Data & Video Info Vaults at SPs
- **Remote Offices, Global Reach, Always On**
  - 66% of Enterprise workforce has remote location independent capability
  - Always On 24/7, Continuous Availability Mandatory
- **New Technologies Necessary - a Competitive Weapon**
  - Computing: Hi Density Blades, Multicore CPUs, Linux/Windows, TB Disks,
  - Networks: 10GbE, MPLS; Global Reach
  - Convergence (Voice Video, Data): Unified Communications, VoIP, Web 2.0
  - Mobility & Wireless (Location based Search/eCommerce)



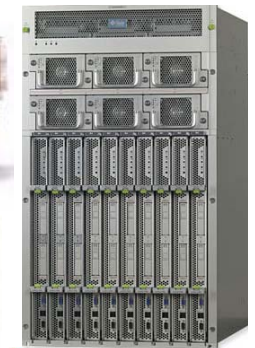
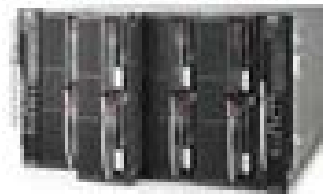
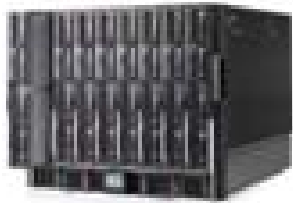
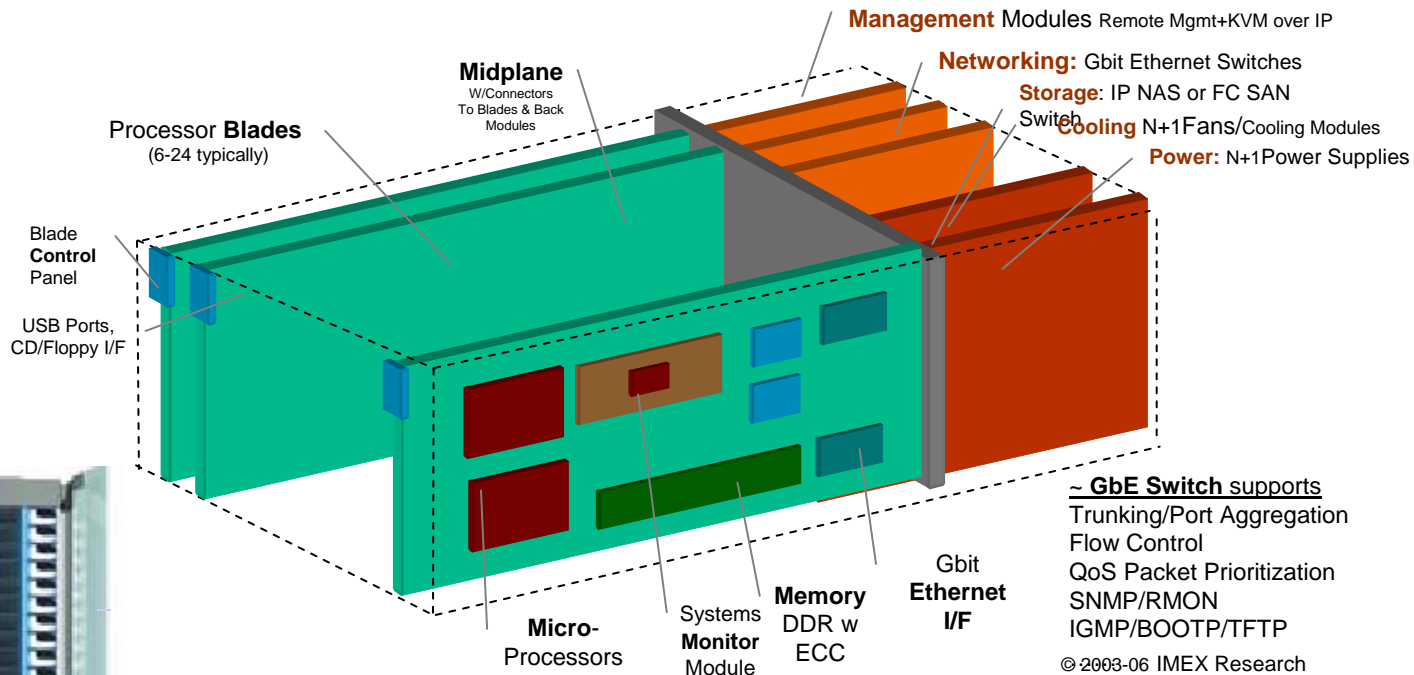
# E2E IT Infrastructure with HA & Security



# IT Infrastructure Consolidation *with HA & Security*



# Blade Infrastructure: Local Area Grid (LAG<sup>®</sup>)



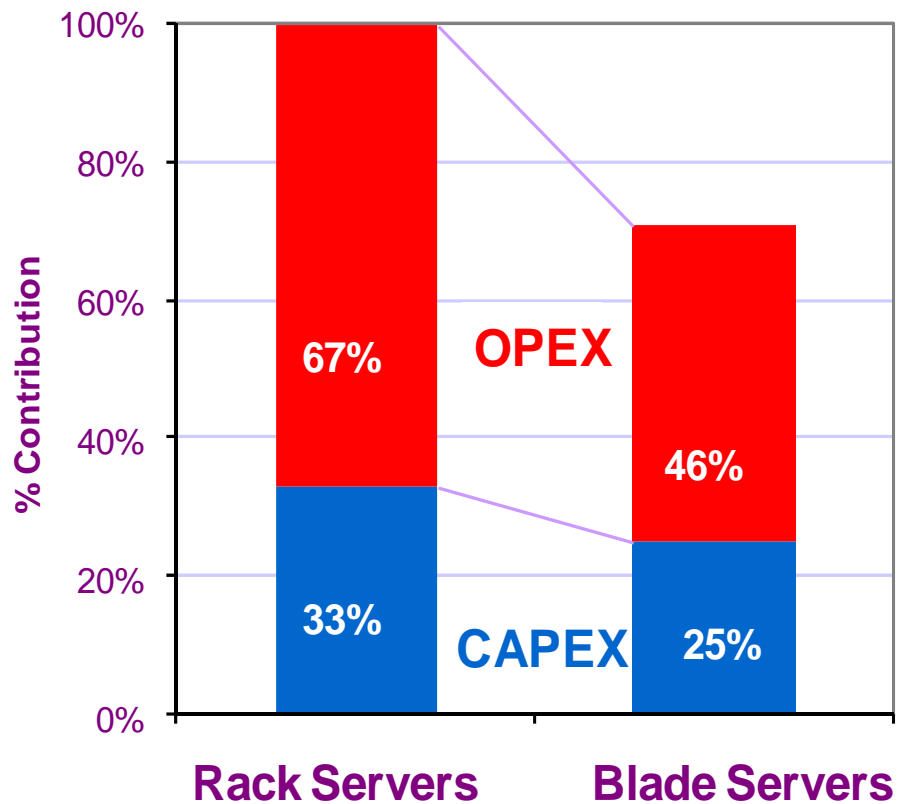
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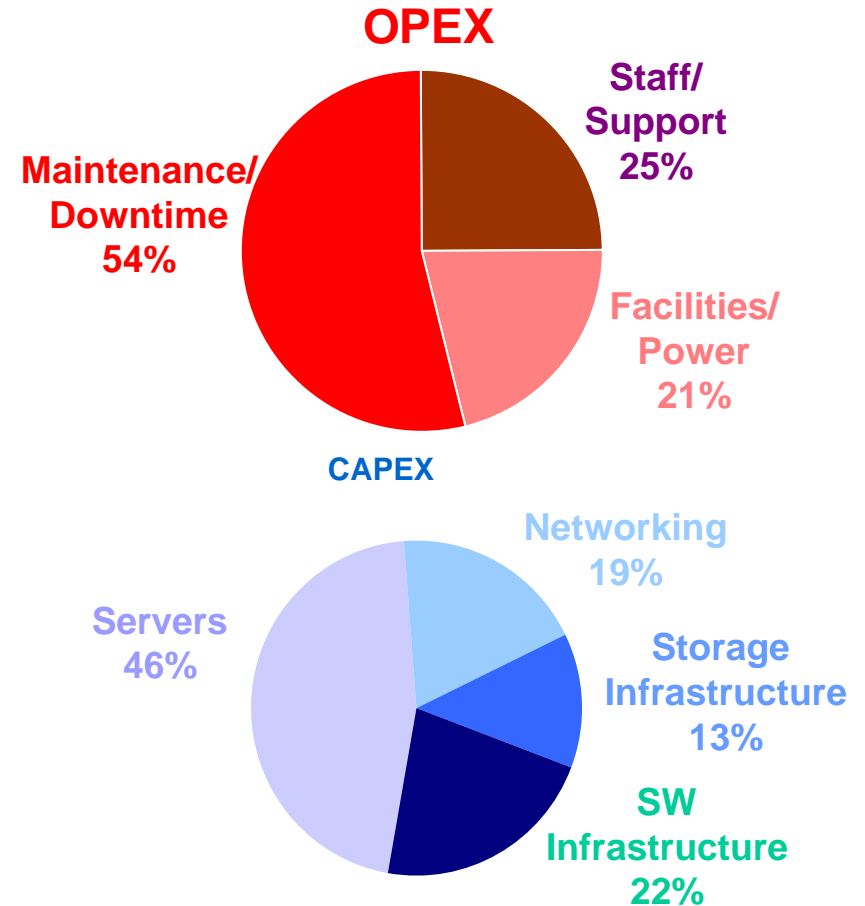


# Blades - TCO Savings & ROI

## 3 Year TCO Savings Rack vs. Blade Servers

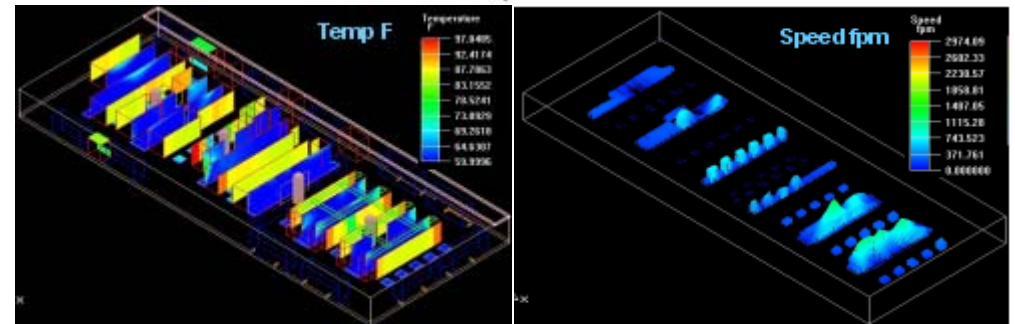
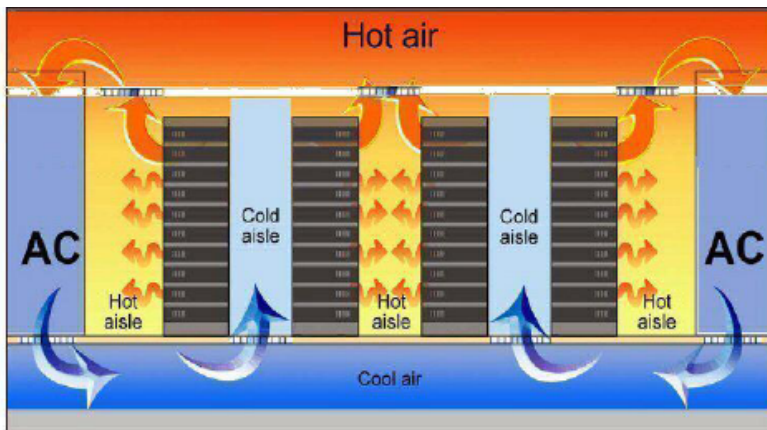
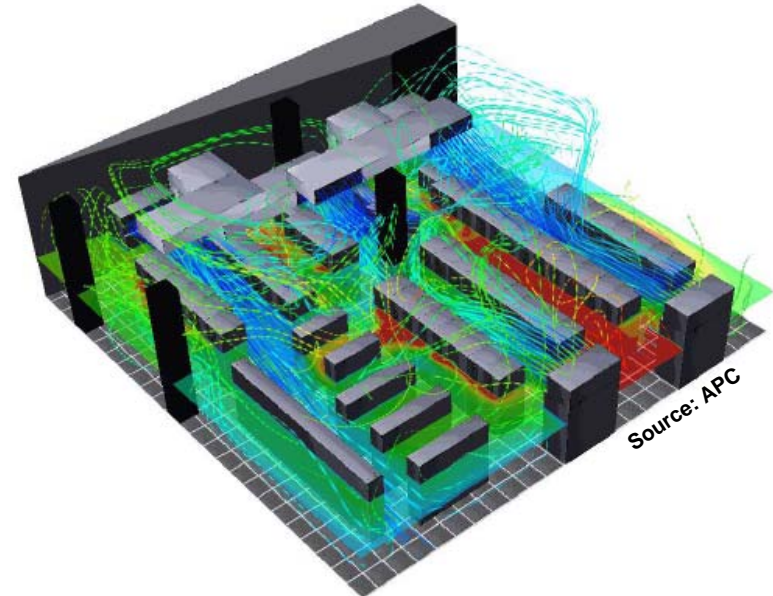
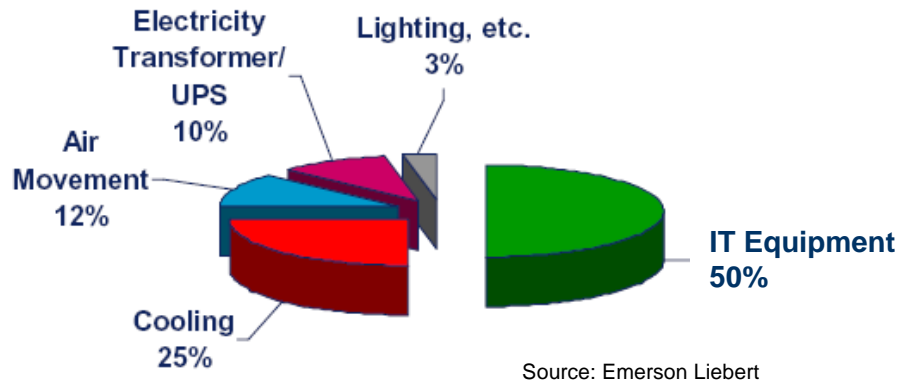


## TCO Savings in..



# ► Data Center Cooling

Where does the power go in Data Centers ?



Many techniques, methodologies and equipments from air cooling to liquid assisted cooling available form a variety of vendors and Consultants ....  
 (Email [imex@imexresearch.com](mailto:imex@imexresearch.com) for more info and Assessment of competitive vendor products, consultants I data center power & cooling integrators)

Computer Simulation using widely available software (e.g. Fluent Airpack Ansys CFD ...) to verify Cooling Designed is the most cost effective before committing to final implementation.

Source: IBM 2005

# ▶ *Implementing a Dynamic Data Center*

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## ▶ **Automation**

Automatically Maintains App  
Service Level Objectives using  
Policy Based ILM

## ▶ **Virtualization**

Pooled Resources, Optimally Provisioned  
per Application for Optimal Business  
Service Delivery, Monitored Usage

## ▶ **Convergence**

Web 2.0 – Convergence of Computing with IP  
Telecom/Unified Networks to support  
eCommerce, Social Networking

## ▶ **Consolidation**

**Standardization** - Reduce CAPEX via using  
Industry Standard Infrastructure, Shrink Wrap  
Apps. Reduced OPEX w/Automation

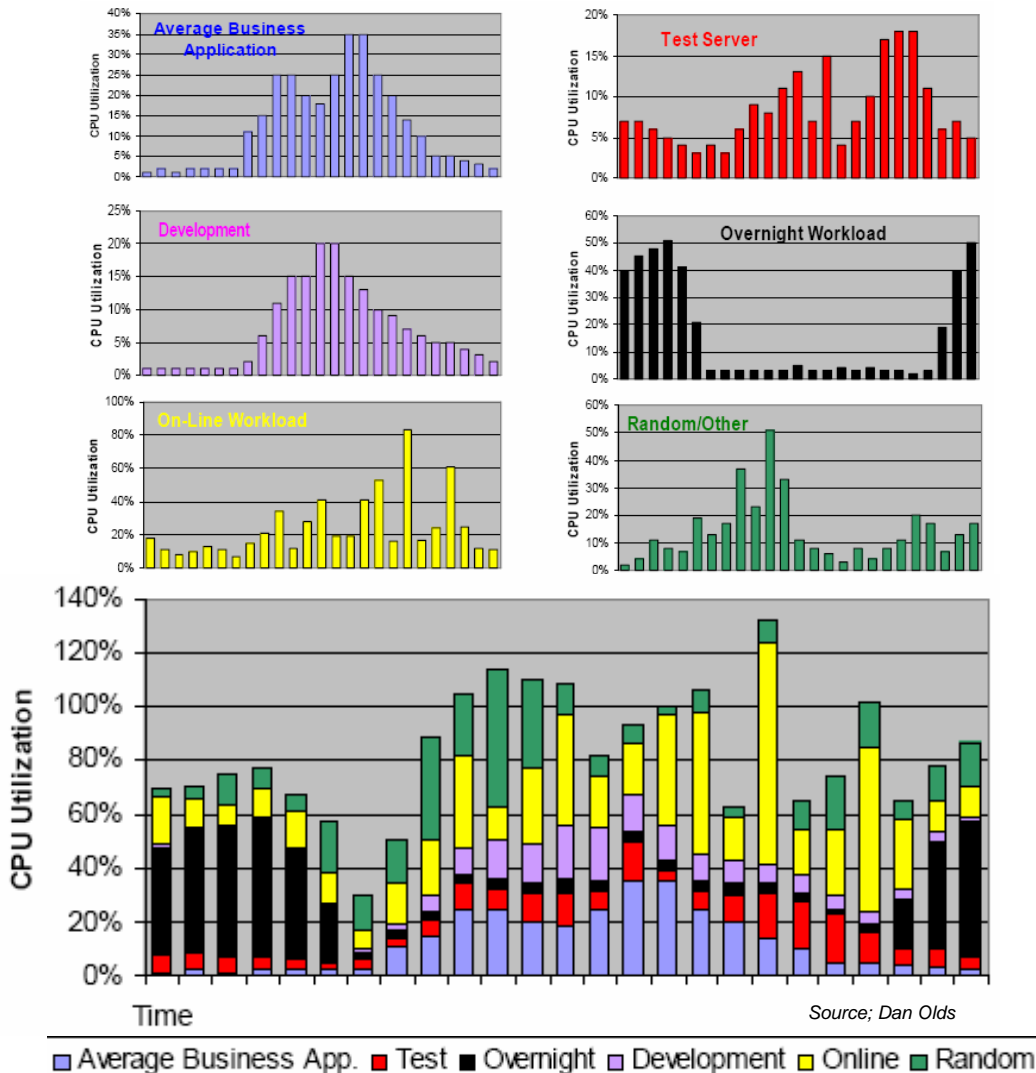
**Integration** - Integrated Bladed infrastructure and  
low latency, high BW interconnect fabric

## **New Data Center**

<b>Consolidate</b>	<b>Standardize – HW/Blades, OS, Interfaces, SW, Apps</b> <b>Integrate – Servers/Storage/Networking Fabric</b> <b>Energy Efficient DC Facilities</b>
<b>Converge</b>	<b>Web 2.0 Applications</b> <b>Converge Computing/IP Telecom/VoIP...</b> <b>Unified Networking</b>
<b>Virtualize</b>	<b>Data Centers, Branch Offices, Desktops</b> <b>Virtual Infrastructure</b> (Create Resources Pools) <b>Dynamically balance computing resources</b> <b>HA/No Downtime</b> (Live Migration w VMotion/DRS) <b>Intelligent Resources Allocation w Predefined Rules</b>
<b>Automate</b>	<b>Bus Continuity (HA/CDP/VMotion FO)</b> <b>Capacity On Demand</b> <b>Automating Patching of Hosts &amp; VMs</b> <b>Minimize Power Usage/Consolidate Servers Shut down inactive</b>



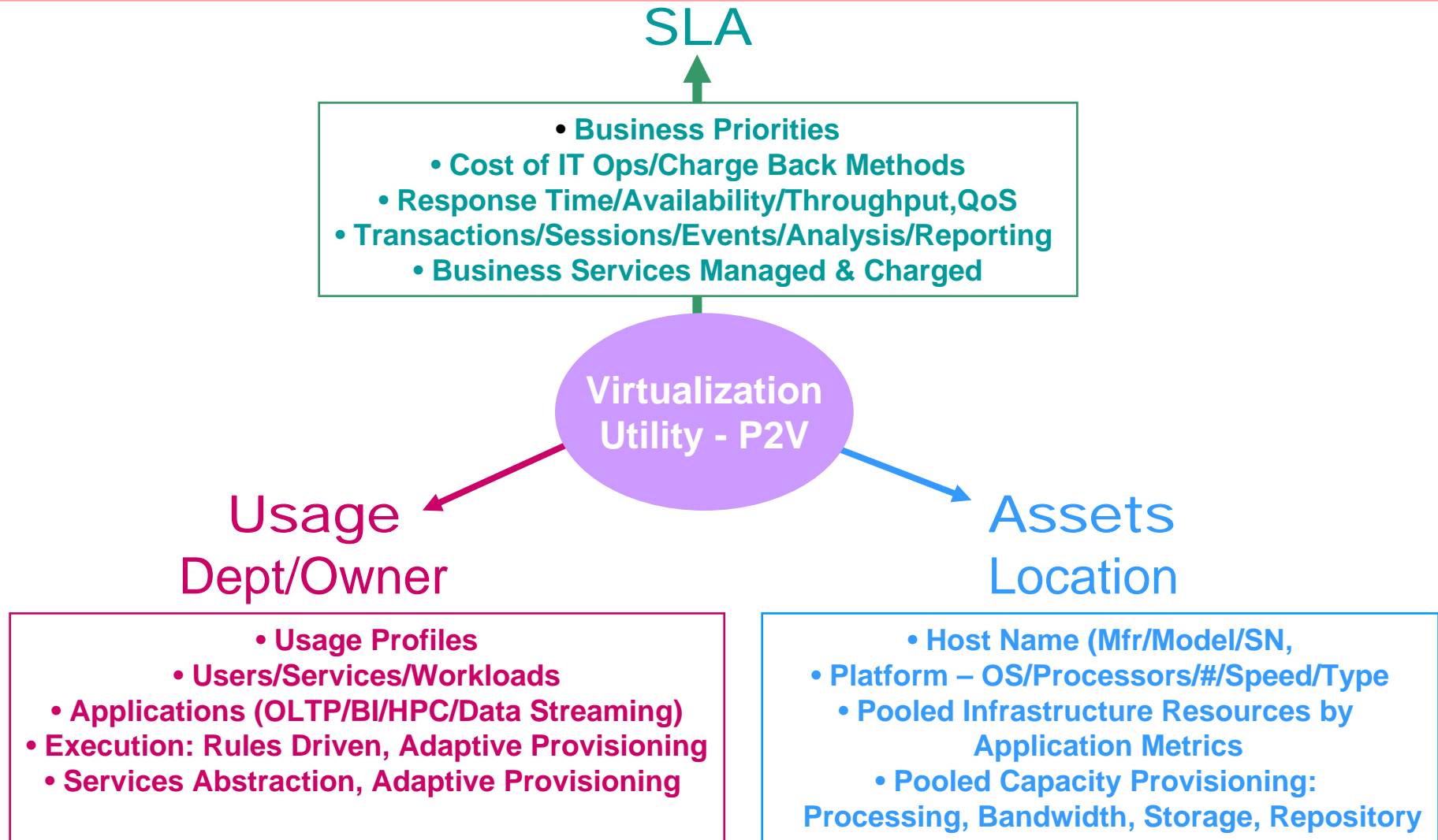
# Workloads Consolidation using VZ



- A single server 1.5x larger than standard 2-way server will handle consolidated load of 6 servers.
- VZ manages the workloads + important apps get the compute resources they need automatically w/o operator intervention.
- Physical consolidation of 15-20:1 is easily possible
- Reasonable goal for VZ x86 servers – 40-50% utilization on large systems (>4way), rising as dual/quad core processors becomes available
- Savings result in Real Estate, Power & Cooling, High Availability, Hardware, Management



# ▶ Virtualizing your IT Infrastructure



## ► **Available Solutions**

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### **Major Virtualization Vendors - VMWare / Microsoft / Xen**

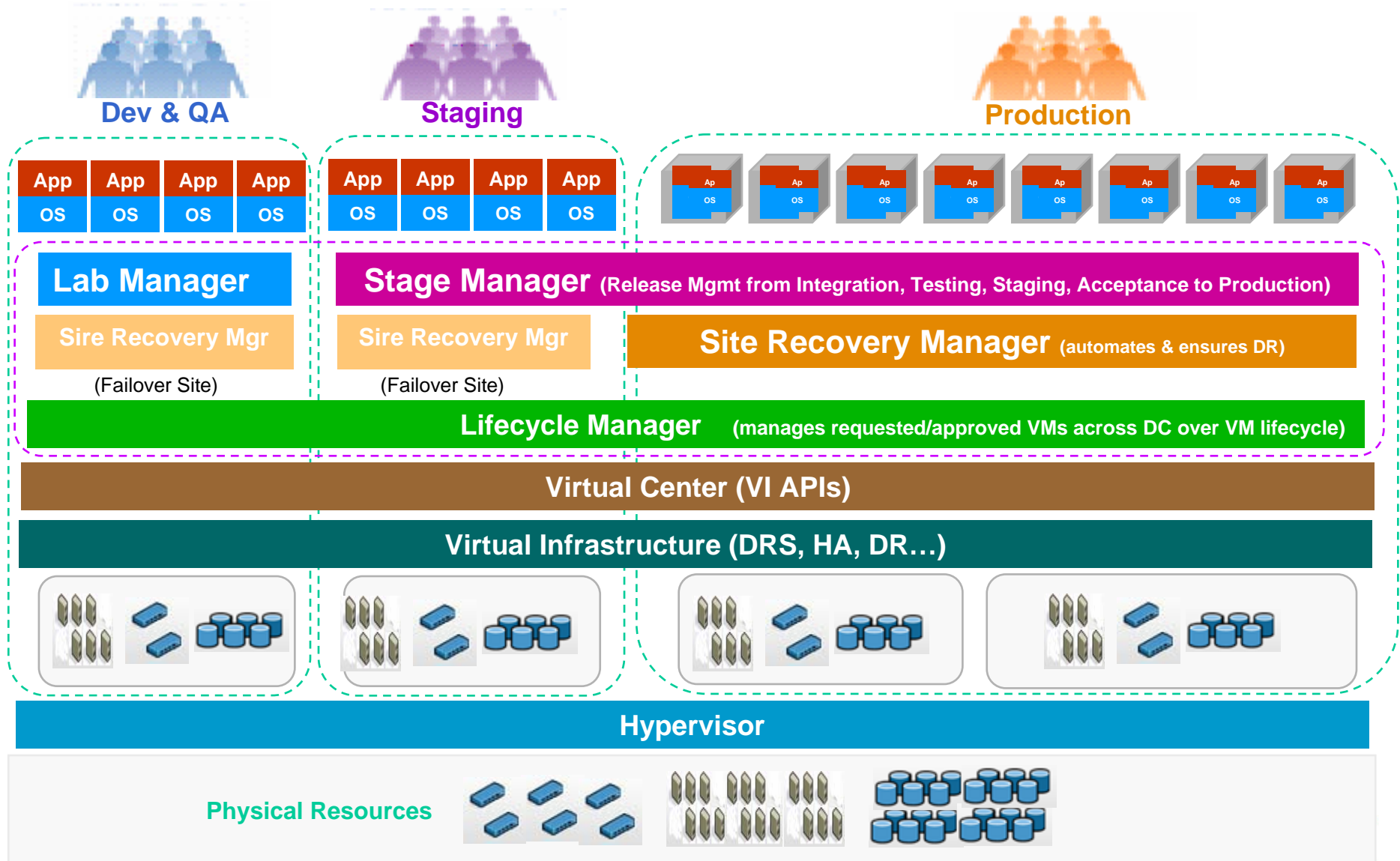
#### **VMWare Solutions & Products**

- **Application QoS – *DRS, DPM***
- **Resources Deployment to Apps in Realtime – *DRS, DPM\****
- **Fast Recovery from HW & SW Failures – *HA, VMotion***
- **Proactively Avoid Planned Downtime – *VMotion***
- **Failover of entire DC – *Site Recovery Mgr***
- **Security - *VMSafe***
- **Automating Application Delivery From Dev/Test through Staging to Production - *Lifecycle Mgr/Staging Mgr/Lab Mgr***

\*DRS – Distributed Resource Scheduler, DPM – Distributed Power Mgmt

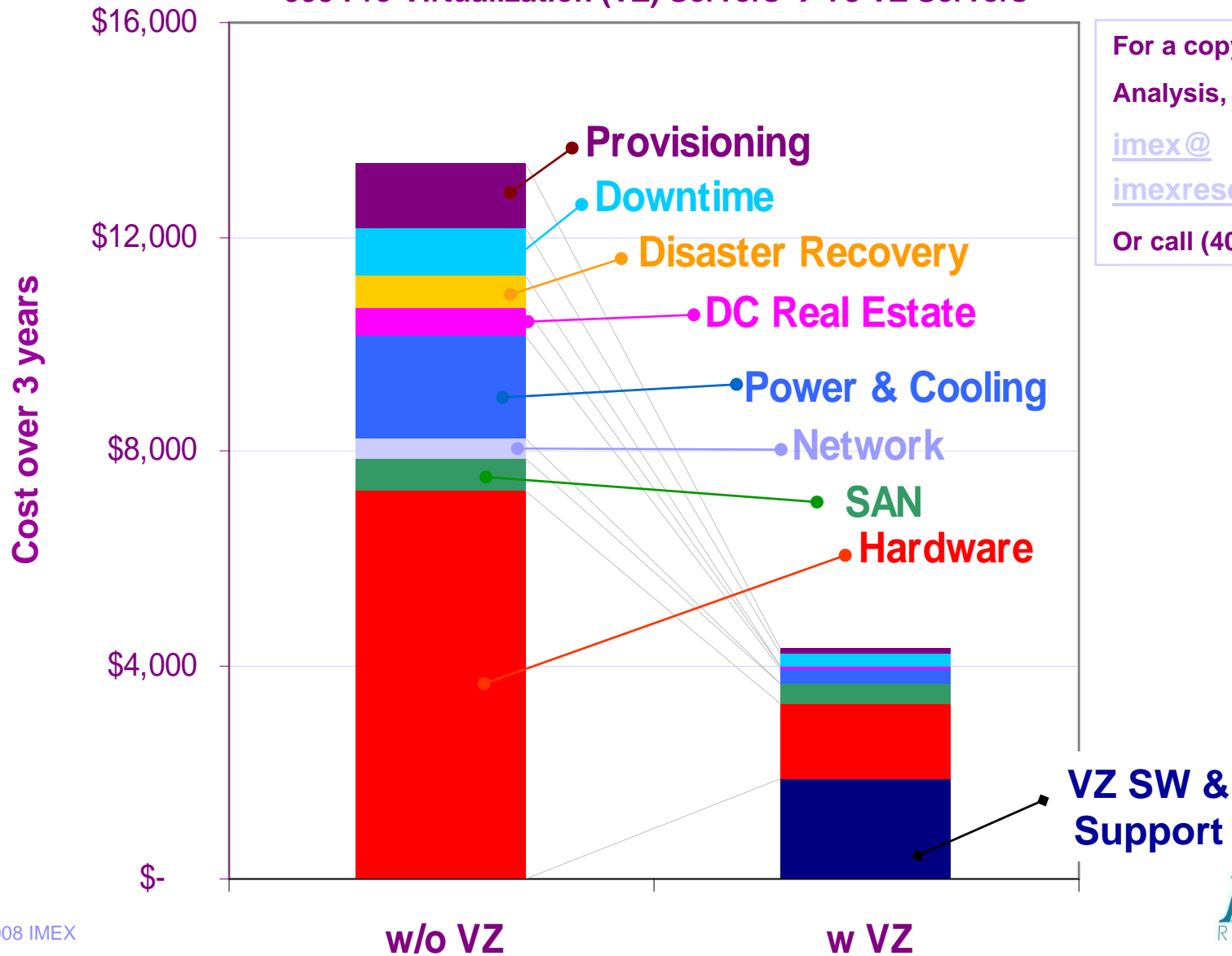
# ► Datacenter Automation

Source: VMWare



# ► TCO Savings with Virtualization

995 Pre-Virtualization (VZ) Servers → 78 VZ Servers



For a copy of TCO Analysis, Email: [imex@imexresearch.com](mailto:imex@imexresearch.com)  
Or call (408) 268-0800

## ► *Summary Implementing New DC*

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- **Virtualization (VZ) now a mainstream technology**
  - VZ turning DC core infrastructure upside down, DC Professionals very happy with its future use
  - VZ means “Doing More for Less” (finally making CFOs get off your back)
- **Follow SICVA in executing your DC strategy**
  - **Standardize** (Windows/Linux, GbE, IP Storage/iSCSI,SATA..)
  - **Integrate** (Blades, Management Tools..)
  - **Converge** Computing w Web 2.0/IP Telecom Infrastructure
  - **Virtualize** (Infrastructure-uP,Servers, Storage, Networks,Clients w P2V tools)
  - **Automate** (Provide important Apps required resources automatically w/o intervention to ↓OPEX costs)

## ► *Summary Implementing New DC*

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- **Create VZ Justification: TCO Reduction of 60-70% over 3 years, ROI >58%**
  - Combined with VZ, Consolidation can reduce cost by 70%
  - Key advantages: Increased utilization, HA/BC/DR
- **Focus**
  - Focus on IT Services and not IT Resources or Infrastructure
  - Keep an eye on Rise of Cloud Computing / SaaS, SOA

# ► *Summary Implementing New DC*

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- **Issues to be Resolved**

- VMs exploding – Managing them a nightmare
- Database Performance
- Security

- **Follow Virtualization in 3 phases**

- ① Consolidation & Resource Sharing
- ② HA/BC/DR, Workload Balancing
- ③ Automation. Consolidate through VZ and Workload Management,
- Reduce # systems Footprints & OS instances  
(Reduces OS Licensing Costs, Reduces Mgmt Admin Costs)
- Create Workload Mgmt based on Business Policies  
Mission Critical, & DB Workloads...

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