

Blade Servers & Virtualization

State of the Industry 2007

Industry Keynote

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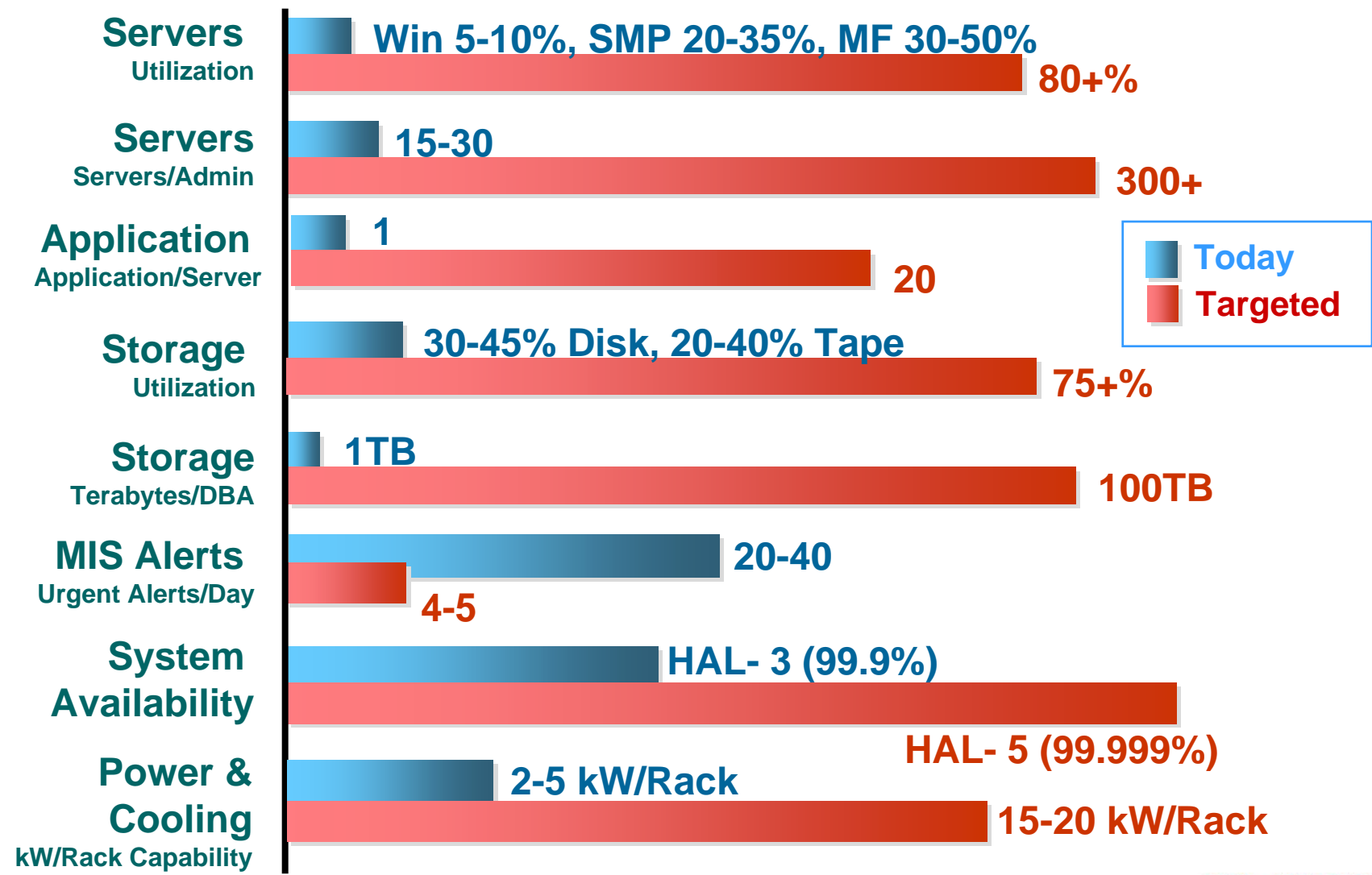
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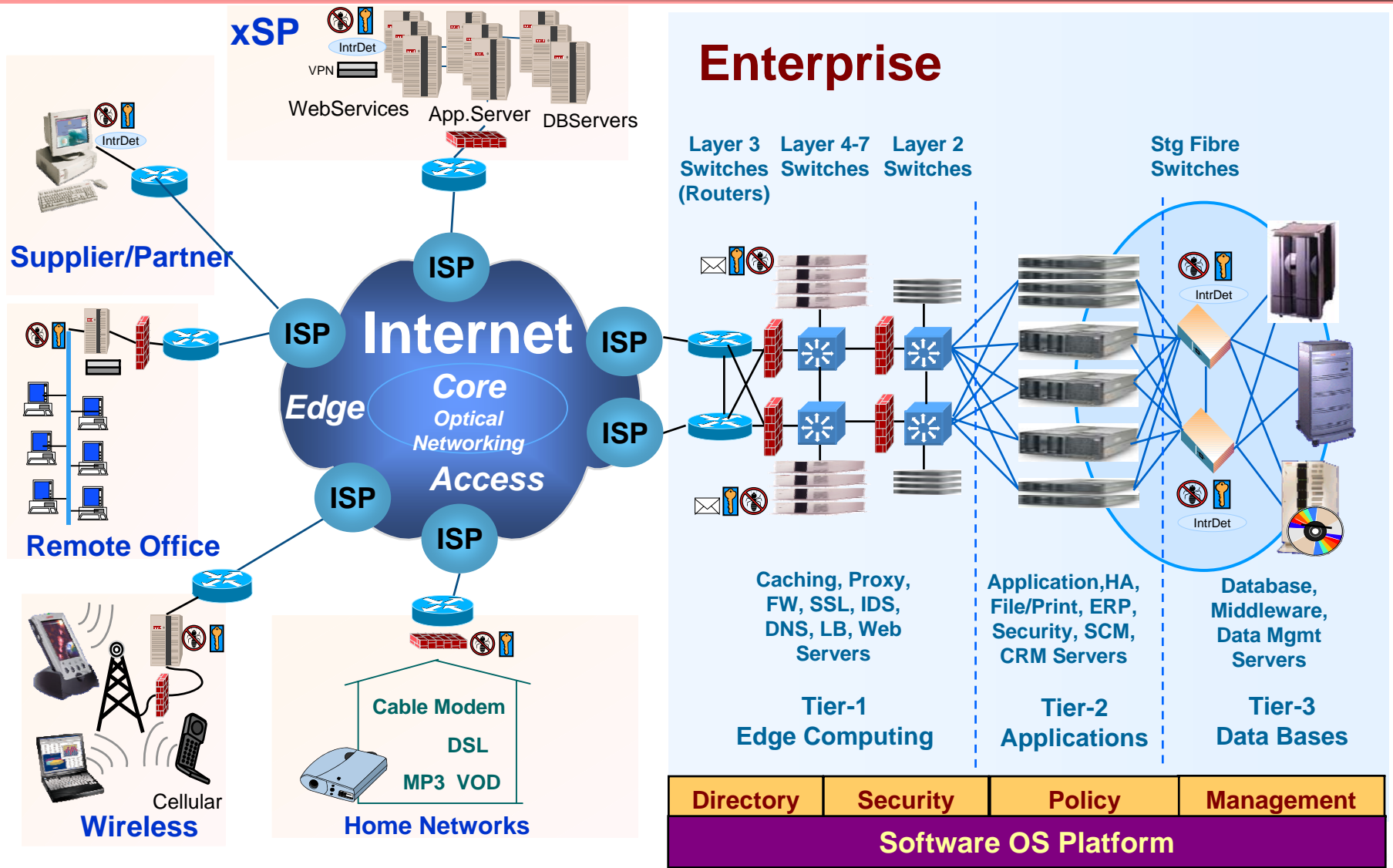
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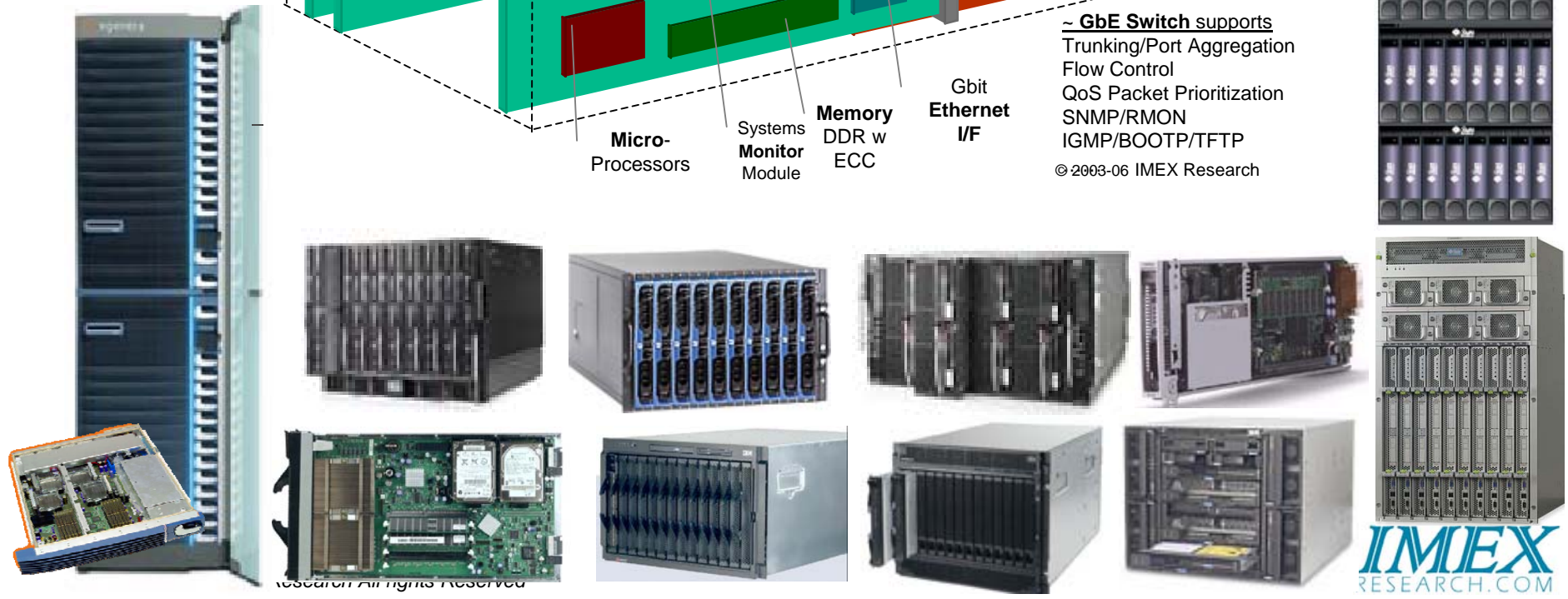
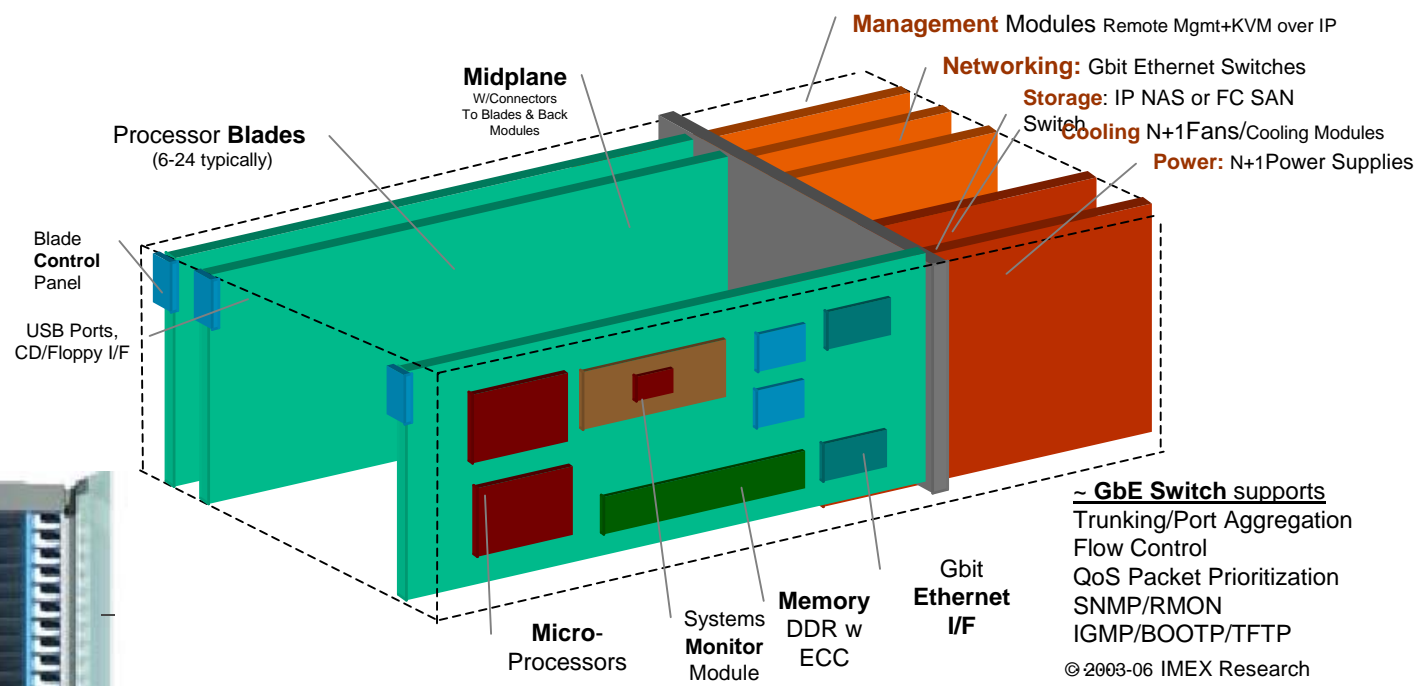
▶ DC Infrastructure Nightmares Driving CIOs



End to End IT Infrastructure with HA & Security

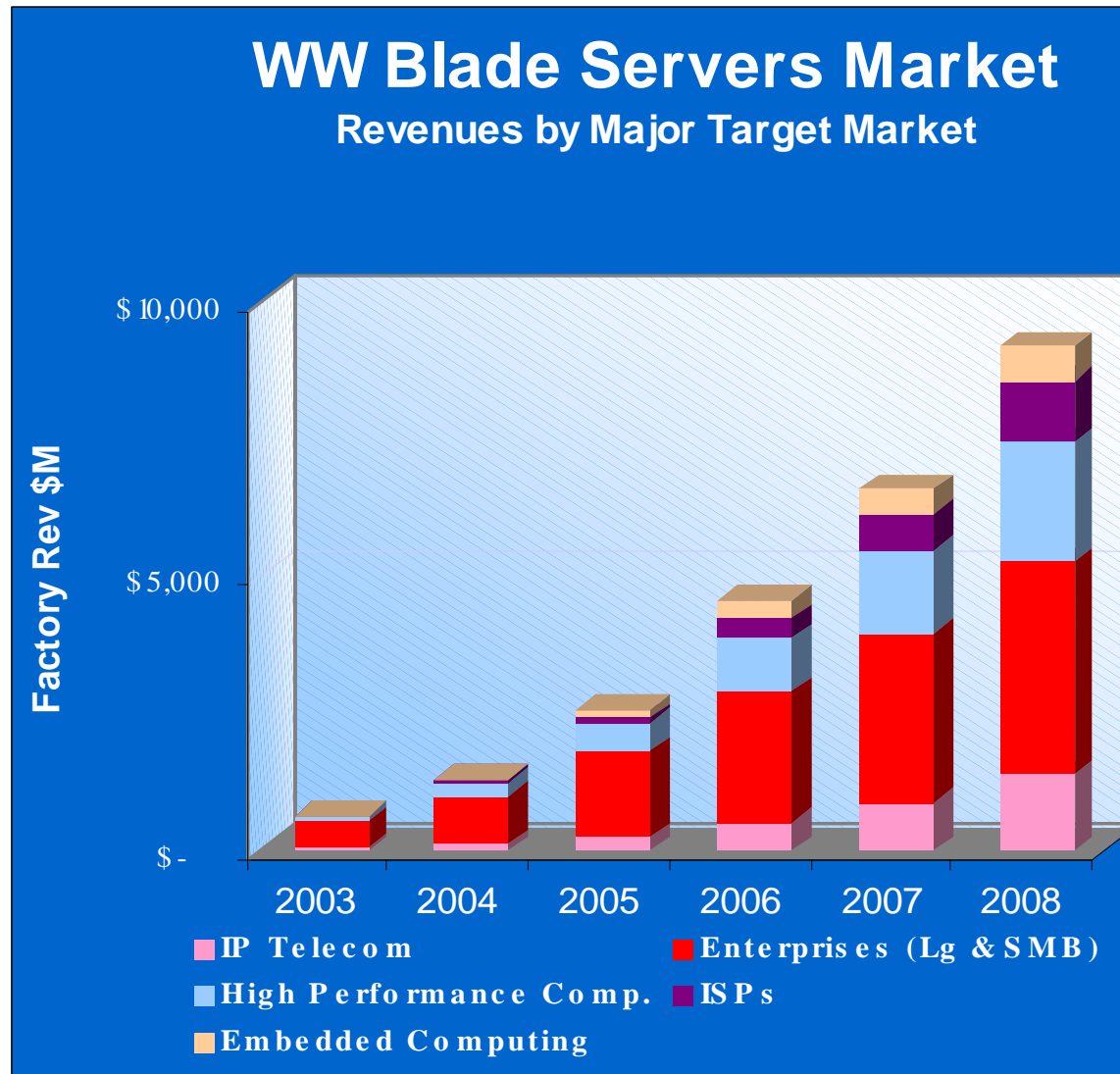


Blade Infrastructure: Local Area Grid (LAG)

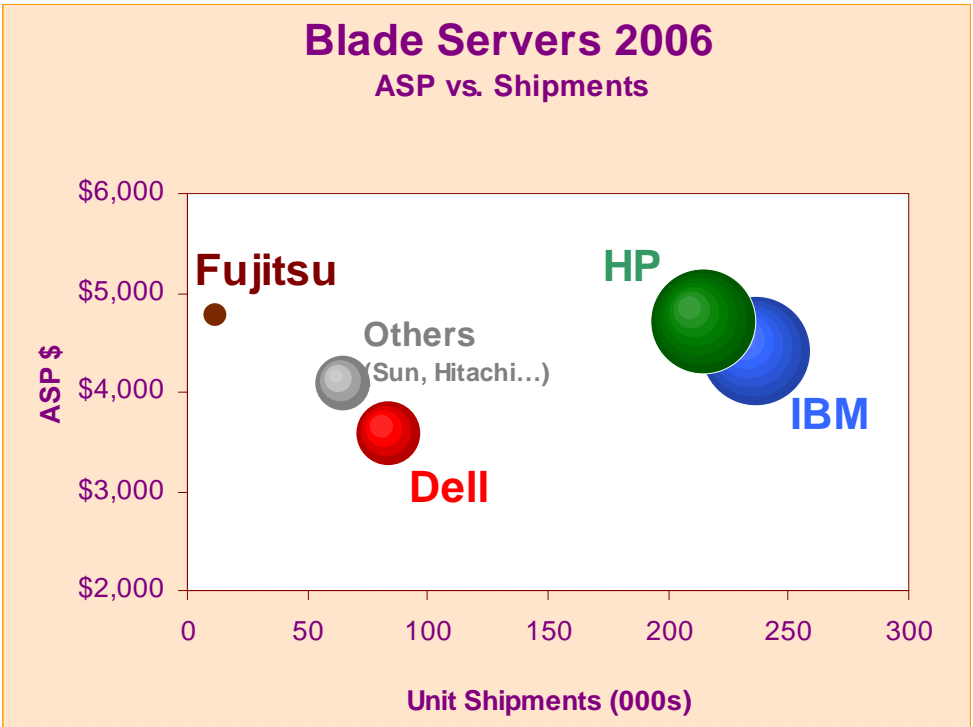
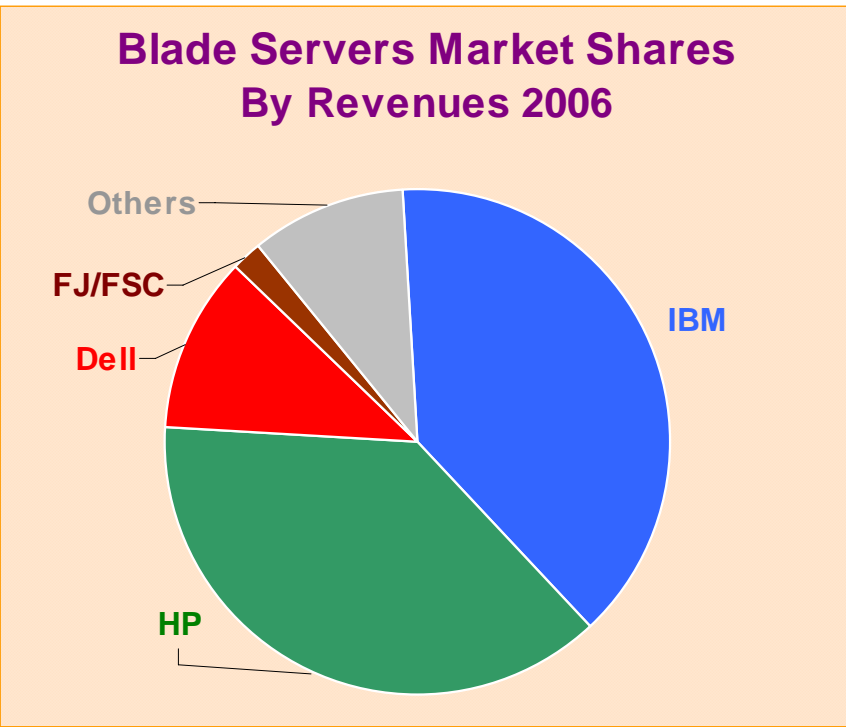


Blade Servers by Market Segments

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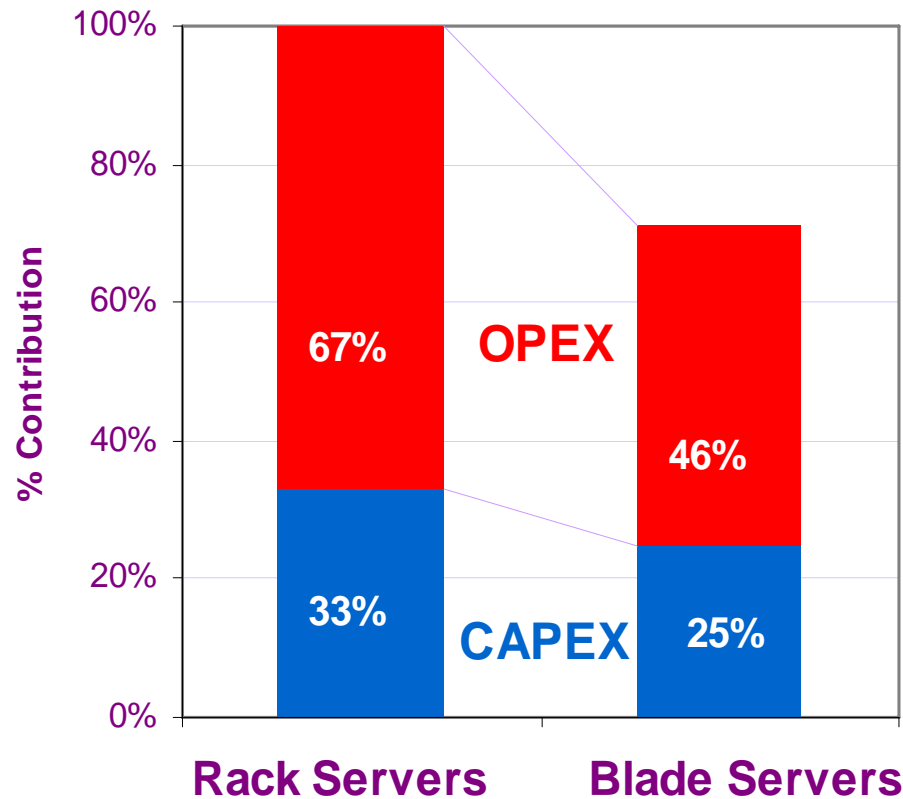
State-of-the-BladeSystems Vendors 2006



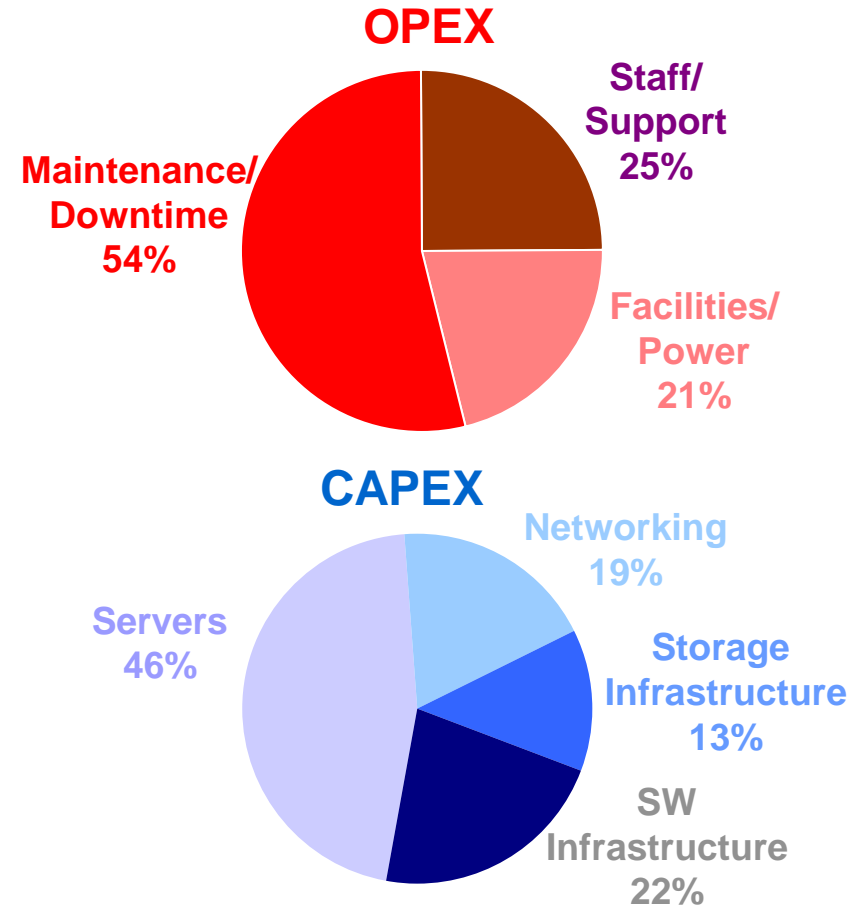
Blades - TCO Savings & ROI

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3 Year TCO Savings Rack vs. Blade Servers



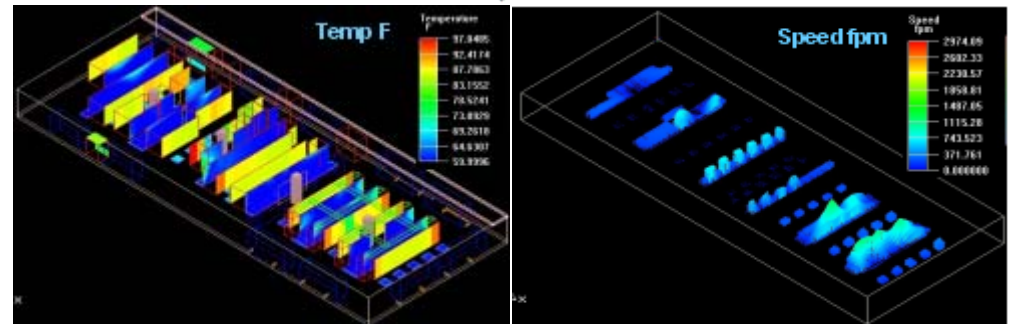
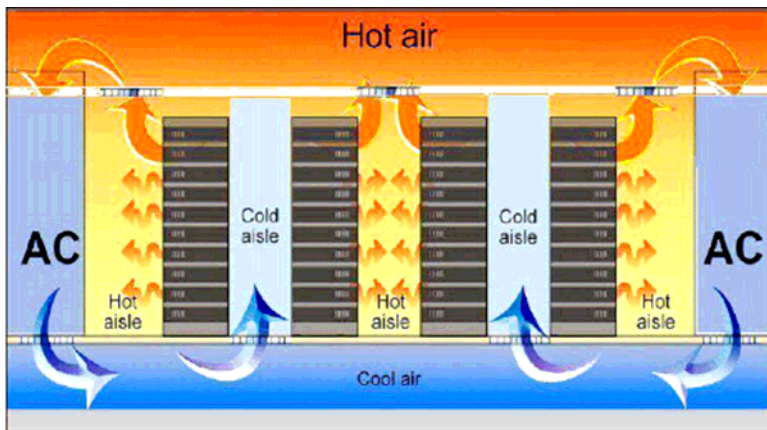
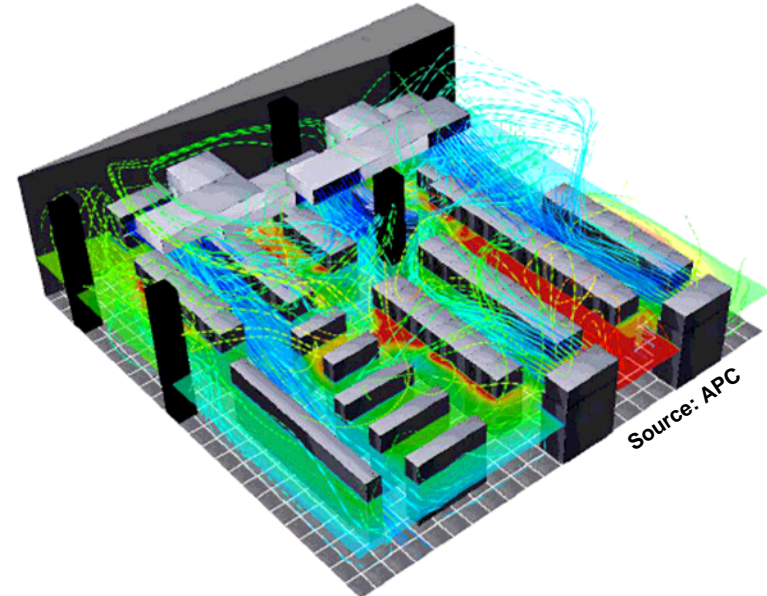
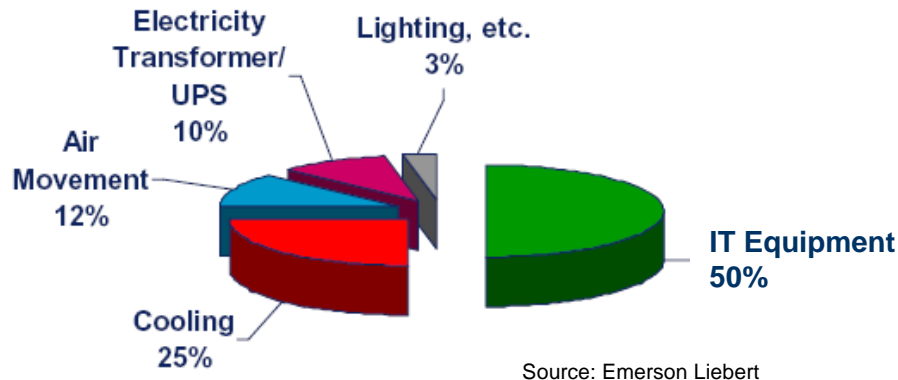
TCO Savings in..



► Data Center Cooling

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Where does the power go in Data Centers ?

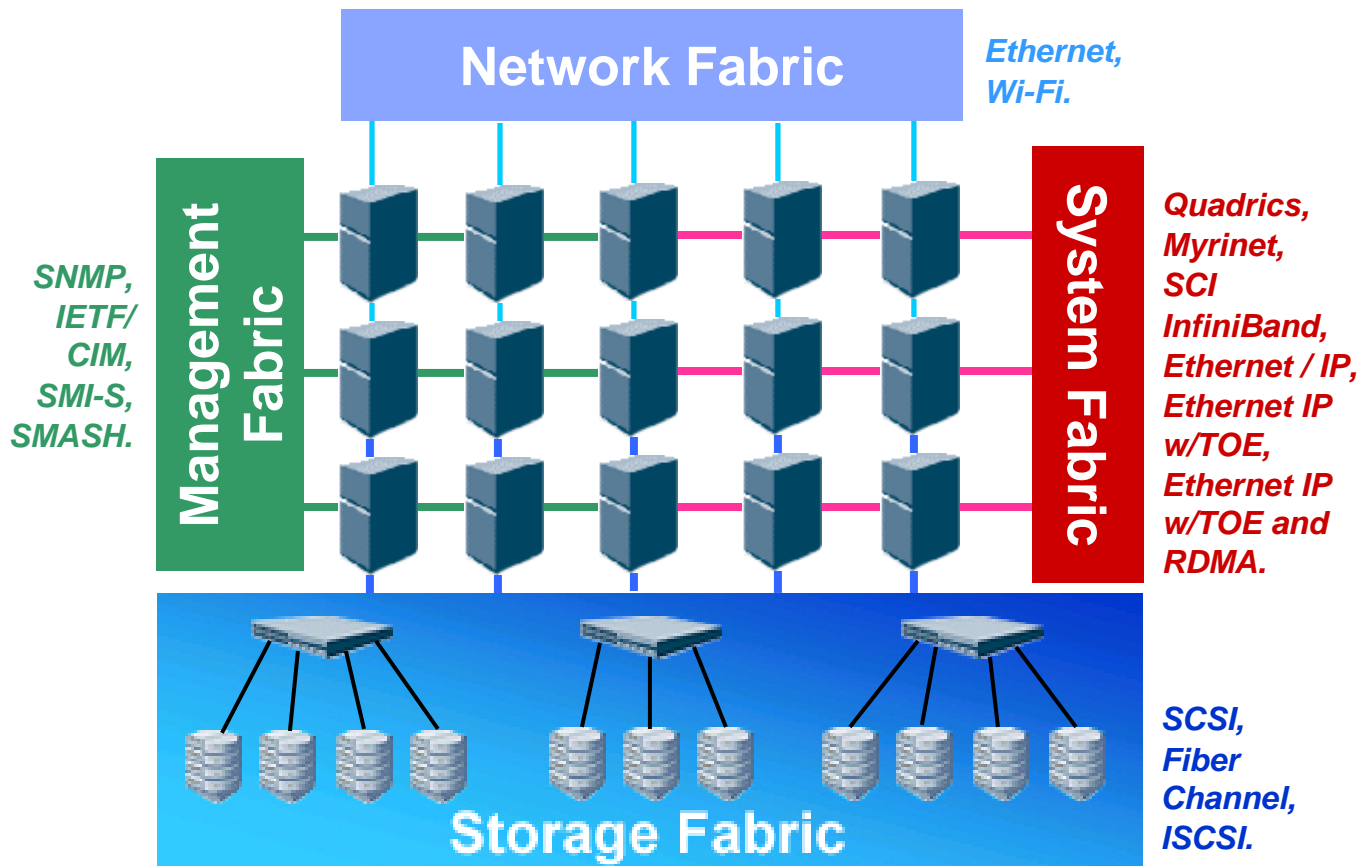


Many techniques, methodologies and equipments from air cooling to liquid assisted cooling available form a variety of vendors and Consultants
(Email imex@imexresearch.com for more info and Assessment of competitive vendor products, consultants | data center power & cooling integrators)

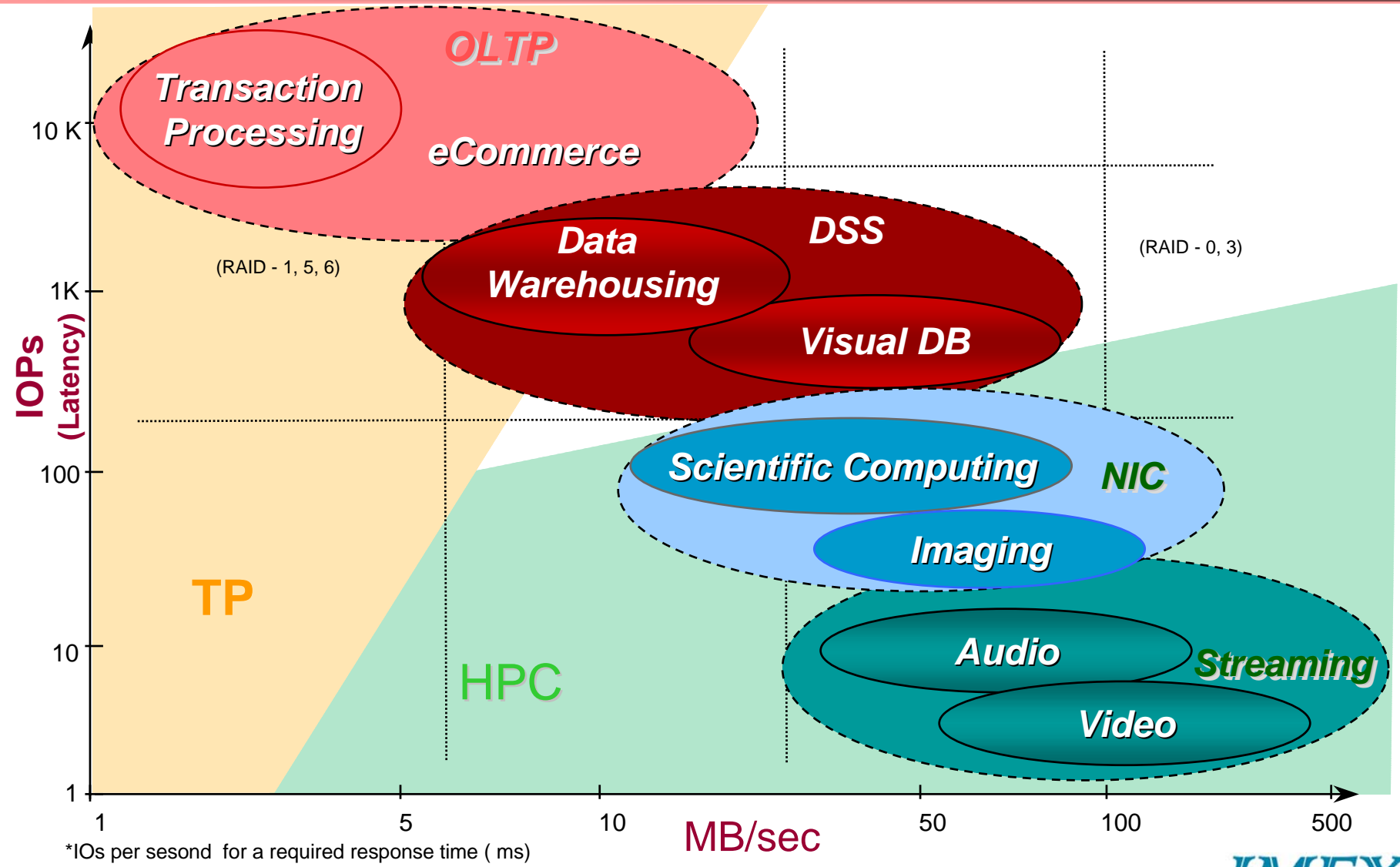
Computer Simulation using widely available software (e.g. Fluent Airpack Ansys CFD ...) to verify Cooling Designed is the most cost effective before committing to final implementation.

Source: IBM 2005

▶ Key to Integration: Interconnect Fabrics



Market Segments by Applications

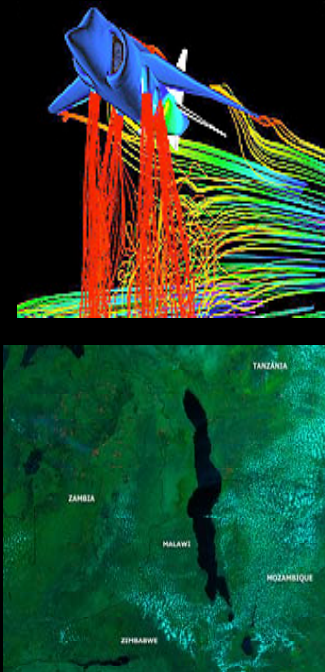


*I/Os per second for a required response time (ms)

HPC – From Academia to Wall St. to Hollywood

Data: IMEX Research & Panasas

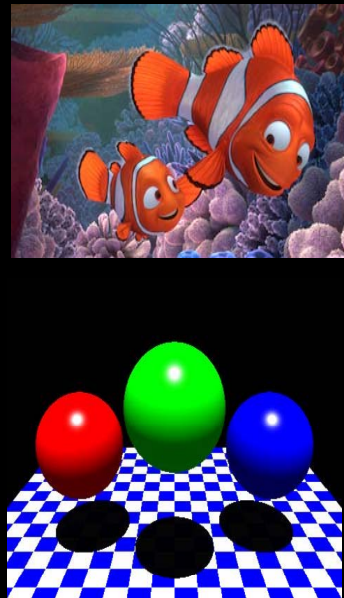
High Performance Computing



▶ 100+ Teraflops

▶ Throughput = 100 GB/s

Commercial Visualization



▶ Rendering (Texture & Polygons)

▶ Throughput = 1.2 GB/s

Bioinformatics Decision-Support Systems



▶ Data rate & capacity

▶ Throughput : DSL/Cable

Entertainment Audio/Video OnDemand



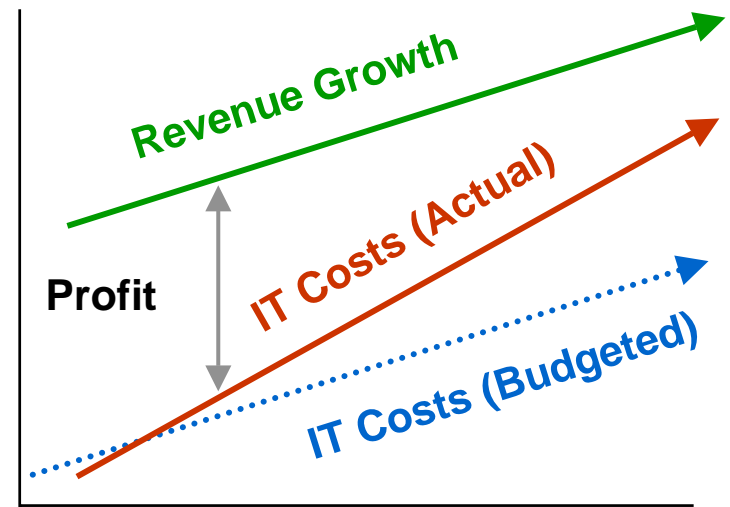
► Genesis of Virtualization & Grid Computing

CFO vs. CIO - Shocking Observations

- IT Infrastructure Investments yet to achieve TCO/ROI Financial Objectives
- Expected Boost in Corporate Productivity not Visible
- Post 2000 Dictum: Do More with Less

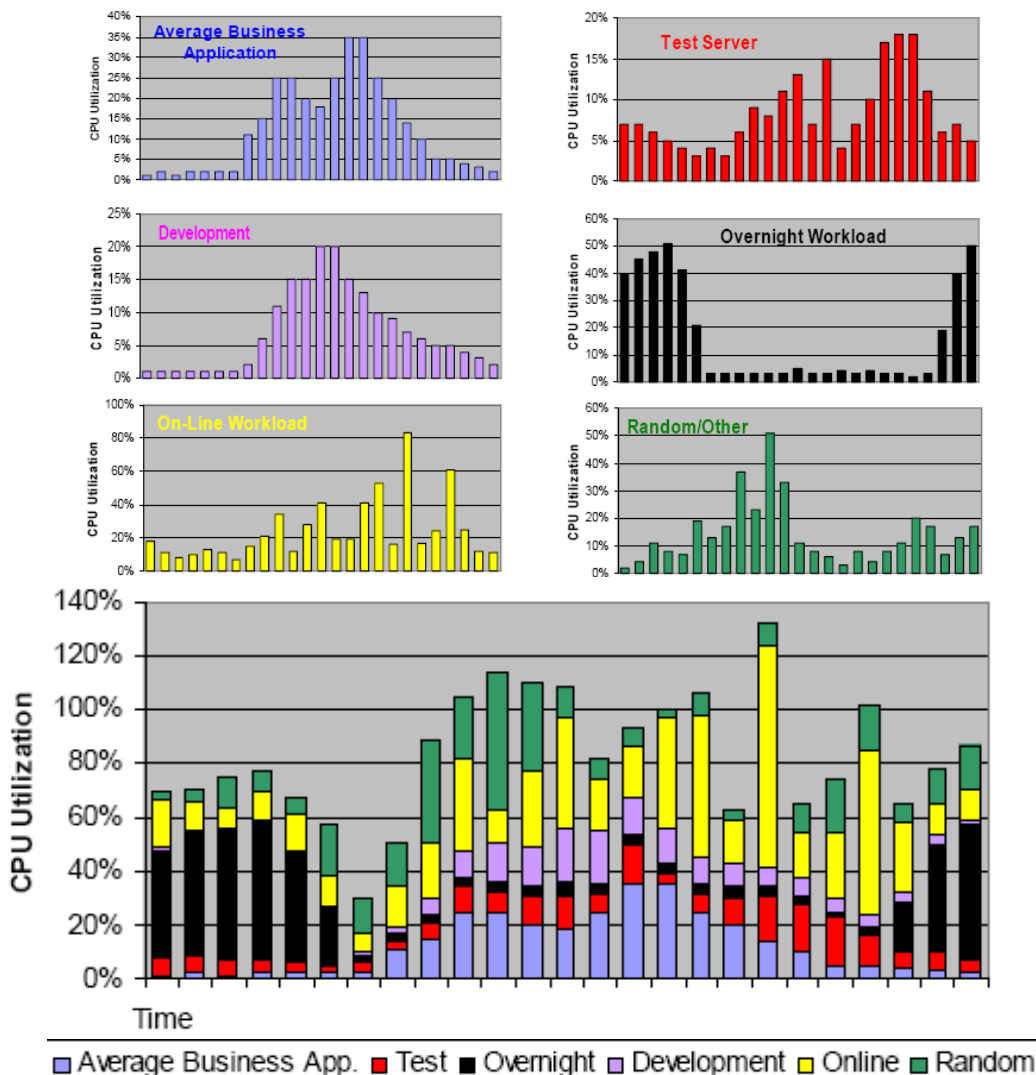
Reason – IT Spiral

- **Web Growth** > **New Apps Mushroom**
> **Lo Cost Windows Servers Sprawl** (Tier-1)
- **Business Growth** > **More Computing Power**
> **Applications/DB Servers Sprawl** (Tier-2,3)
- **More Servers** > **↑ Storage** > **↑ DC Facilities** > **↑ IT Support** > **↑ IT Staff**
- **More Low Cost Servers** > **5% Utilization** > **Scale Out Infrastructure**
- **IT Costs** \neq **Business Growth**





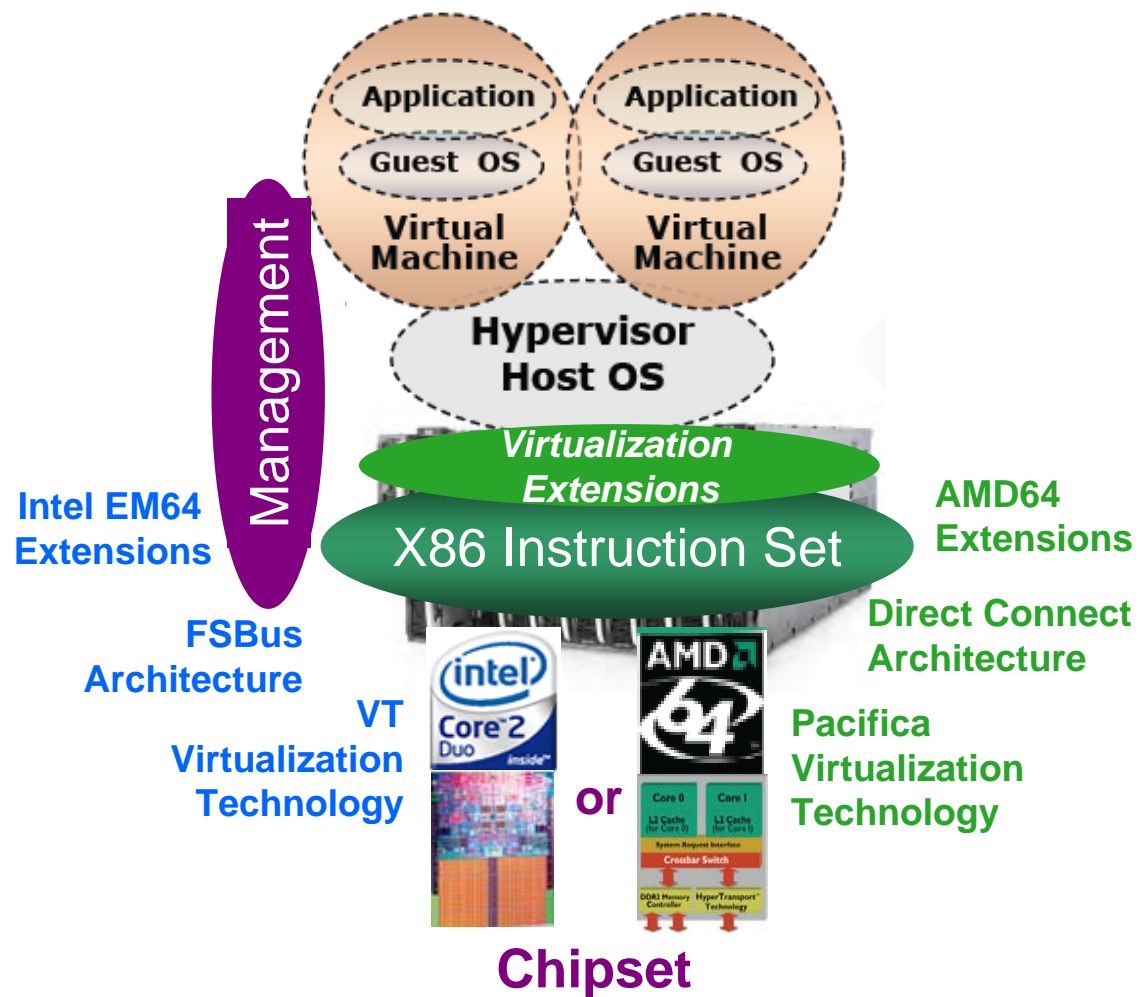
Workloads Consolidation using VZ



- 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

Source: Dan Olds

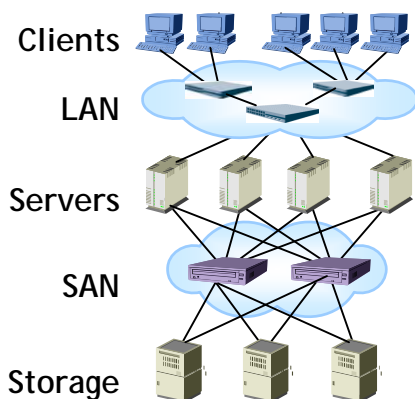
▶ HW Assisted Virtualization



VZ Extensions at Processor

- Guest OS's run unmodified for a larger base of virtualization software
- Increased isolation to improve security of virtual machines
- Offers architectural enhancements to improve efficiency of switching between hypervisor and the guest OS's
- Implemented primarily in I/O bridges and other system core logic
- Enables virtualization software to map devices directly to virtual machines

► Storage Virtualization – Desired Features

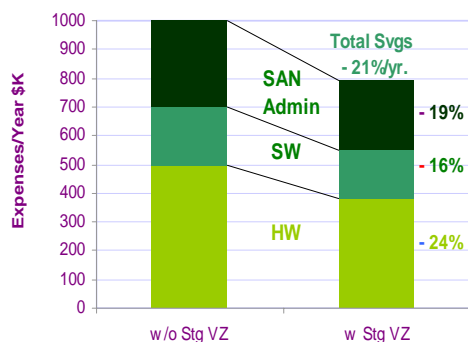


Storage VZ - Must Have Features

Scale Non-Disruptively in Capacity

- **Snapshot Point-In-Time** across Stg.devices
- **Remote Replication** across Heterogeneous Stg. Devices
- **Policy Based Non-Disruptive Data Migration** between Heterogeneous Stg Systems & **Between Stg Tiers**
- **Centralized Mgmt** of all Stg.VZ under Single Image
- **Support Tiered Storage**
- **Volume Management** for Multivendor Stg. Systems
- **Common Set of Tools:** Provisioning, Mgmt & Replication

Savings achieved through Storage Virtualization



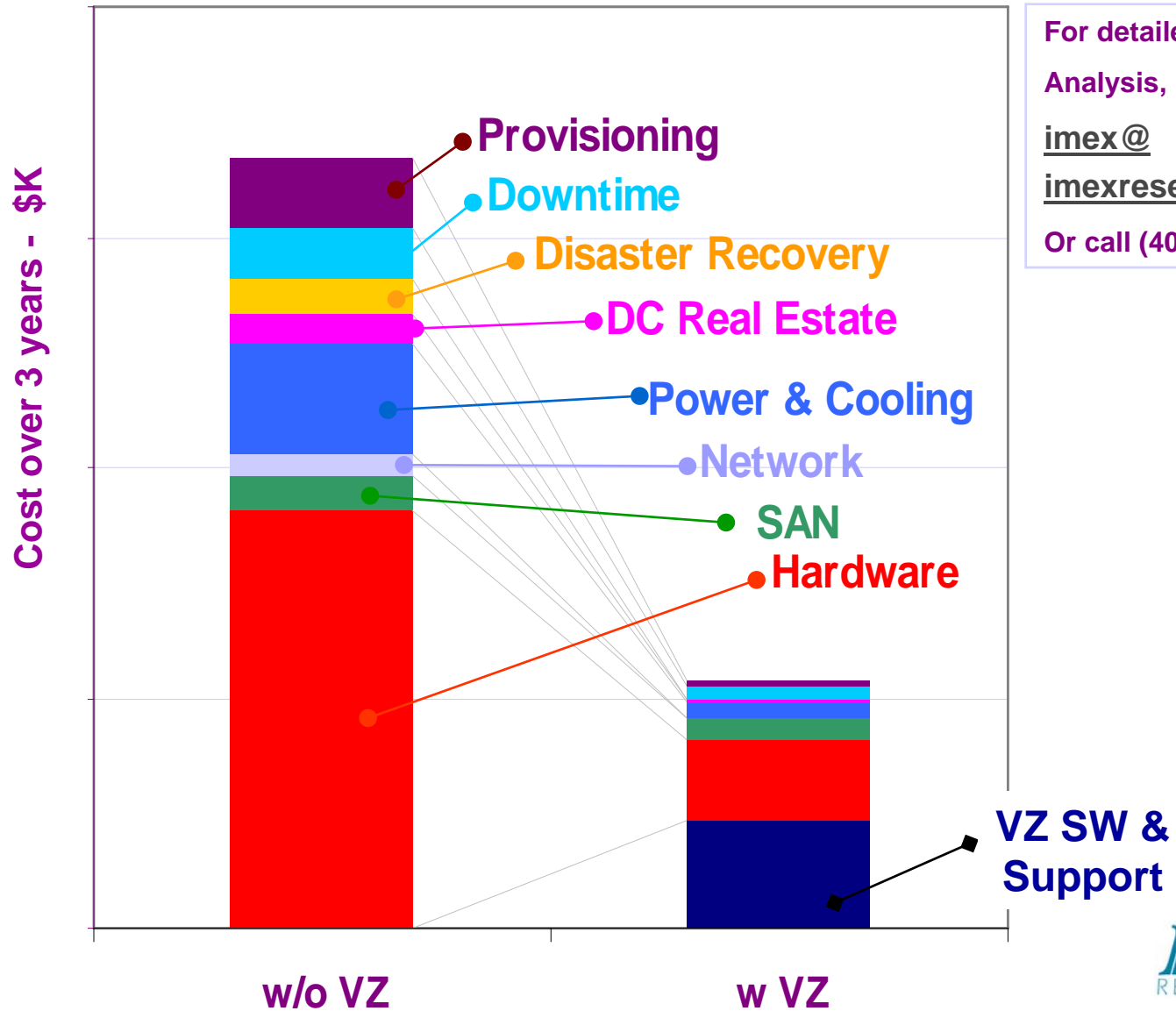
Storage VZ - Vendors

- **Cloverleaf, Datacore, EMC**
- **FalconStor, Fujitsu Computer Systems**
- **Hitachi Data Systems**
- **IBM, Network Appliance**
- **StorageAge, Sun**
- **Symantec/Veritas ...**

► TCO Savings with Virtualization

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

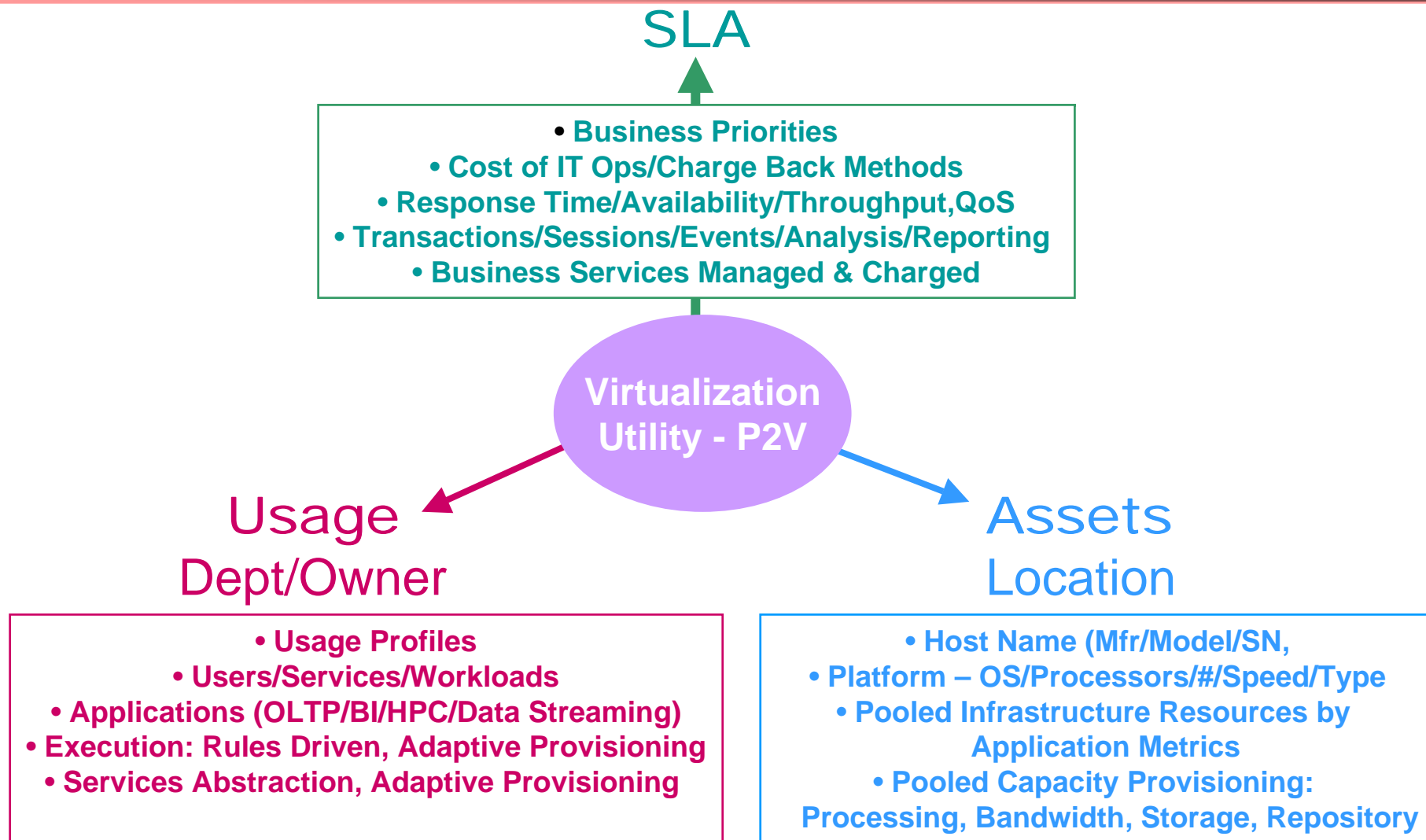


For detailed TCO Analysis, Email: imex@imexresearch.com
Or call (408) 268-0800

► *Virtualization Players by Category*

App VZ	OS	Processor	PC	Servers	Storage	Tools
Appistrv	Fedora	AMD	Altiris	Akimbi Svste	Cloverleaf	Acronis Sun

▶ Virtualizing your IT Infrastructure



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