



Infrastructure for the Next Generation Virtualized Data Centre



Data Centres are at a Critical Juncture

Perfect Storm of Forces Impacting IT and the Business



Collaboration



Empowered User



SLA Metrics

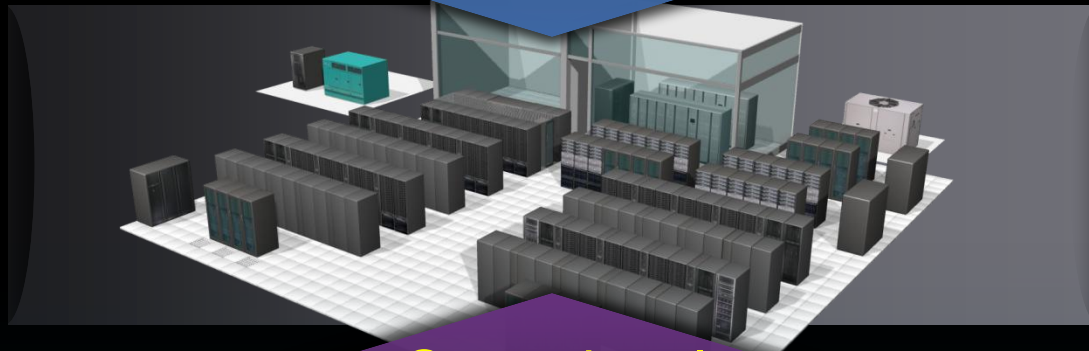


Global Availability



Reg. Compliance

New Business Pressures



Operational Limitations

Power & Cooling



Asset Utilization



Provisioning



Security Threats



Bus. Continuance



Status Quo is Not an Option

Current Trends will Overwhelm Traditional Infrastructures

- Storage growing at 40-70% per year ¹
- Utilization ~15-25% (Servers/Storage) ²
- Power & Cooling ~25-30% of total DC costs ²
- Operations taking another ~30% of total DC costs ²
- 54% of Network Downtime is due to Human Error ³
- New Applications can take 60-180 days to deploy

“50% of Enterprise Class data centres will be technologically obsolete within 24 months” - Gartner Group



- 1 = Gartner 2006
- 2 = IDC 2007
- 3 = Uptime Institute 2007
- 4 = Morgan Stanley 2006
- 5 = EBC feedback

Need Infrastructure for Today *and* Tomorrow

Start Tactically, Implement Strategically

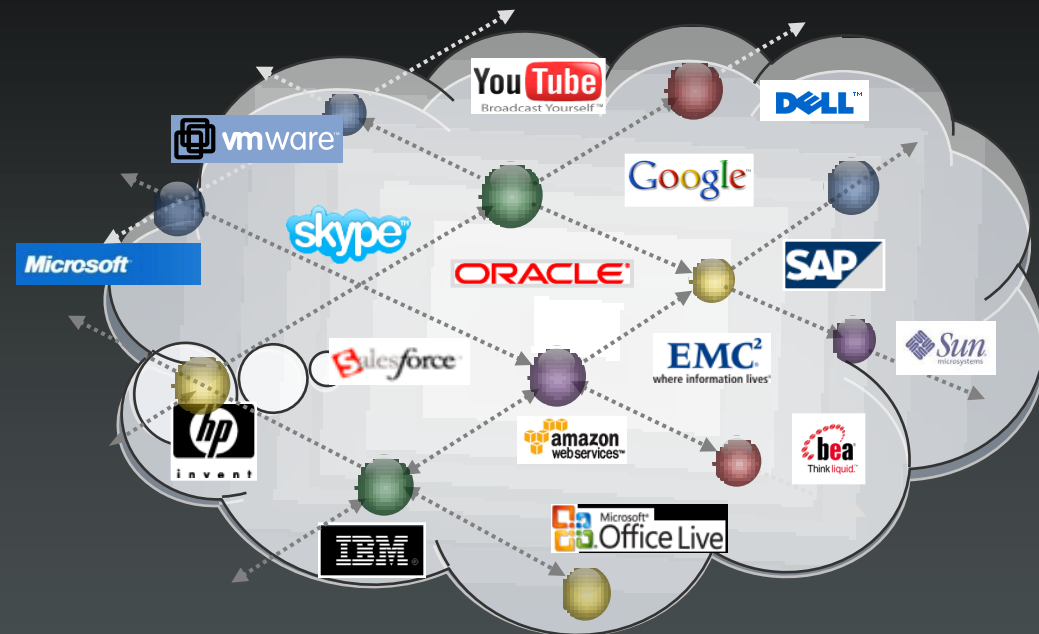
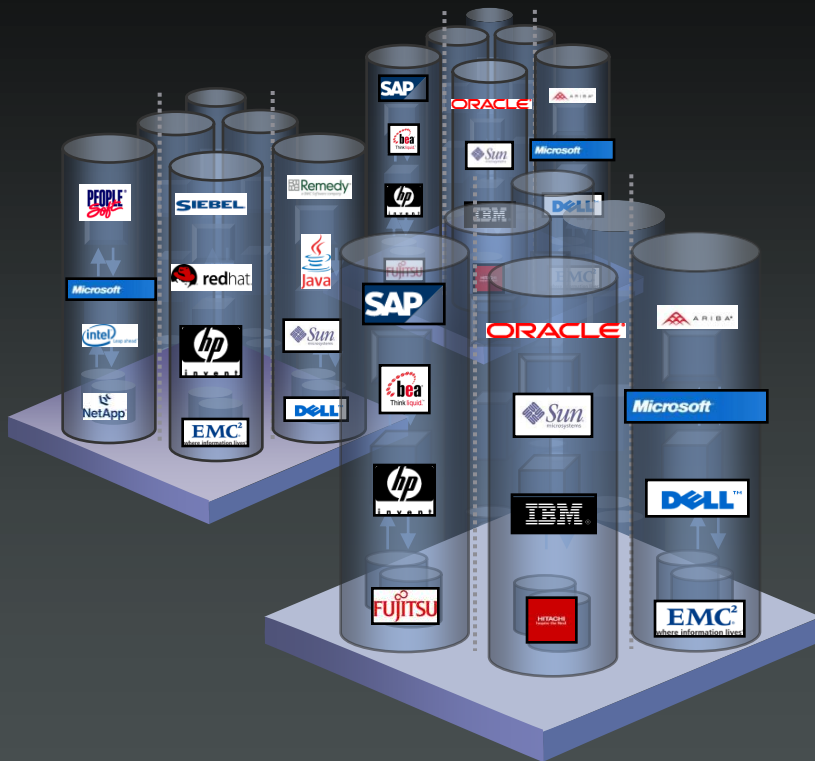
Current: 'Accidental Architecture'

- Non-optimized, bandwidth intensive
- Rigid, inflexible
- Branch offices 'mini data centres'



Emerging: Web 2.0 Model

- Clouds of virtualized services & resources
- Significant new resource demands
- Challenges with visibility, control, security



Virtualizing the Data Centre Infrastructure



Data Center 3.0 Evolution Path

Unified Computing

Location Freedom

HW Freedom

Provisioning Freedom

Consolidation

Virtualization

Automation

Utility

Cloud



Inter - Cloud

Enterprise Class Clouds

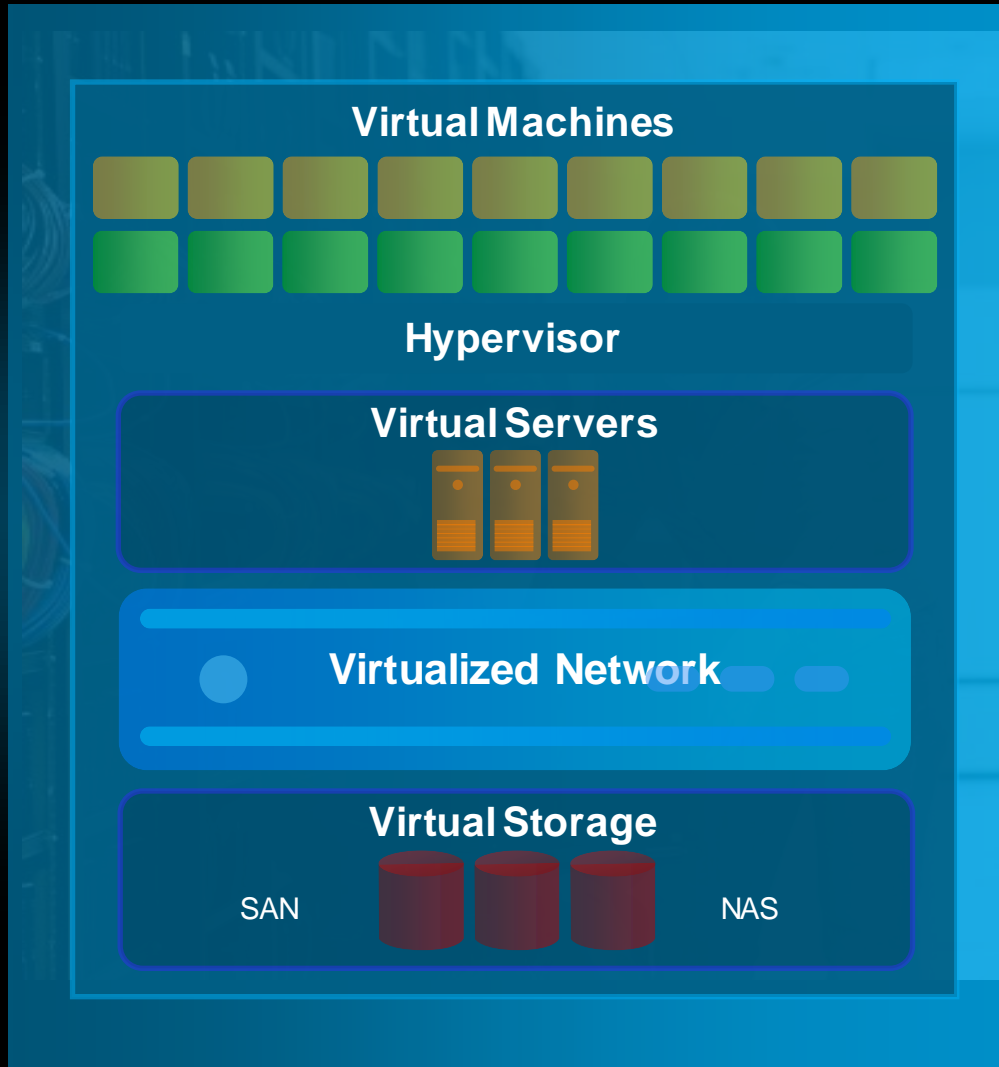
Unified Computing

Unified Fabric

Data Center Networking

Virtualisation Crosses the Platform

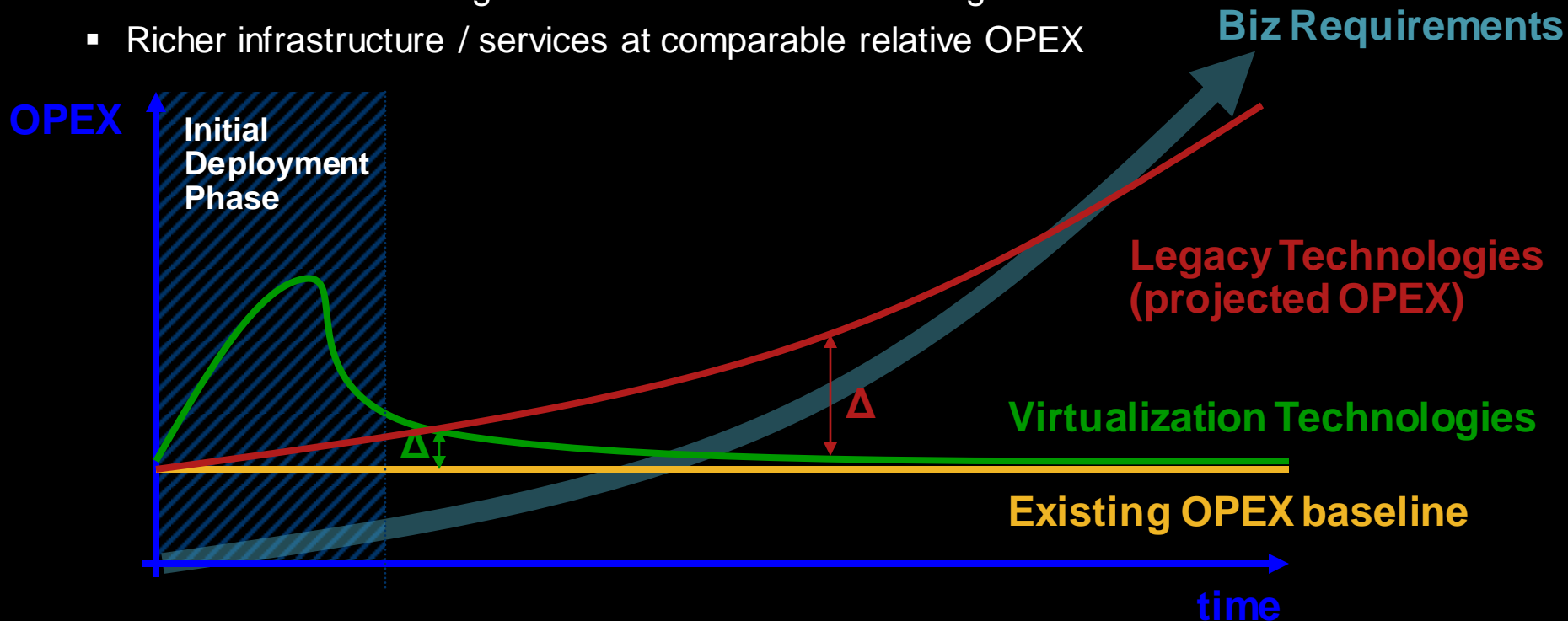
Key to Responsive, Resilient, Efficient IT



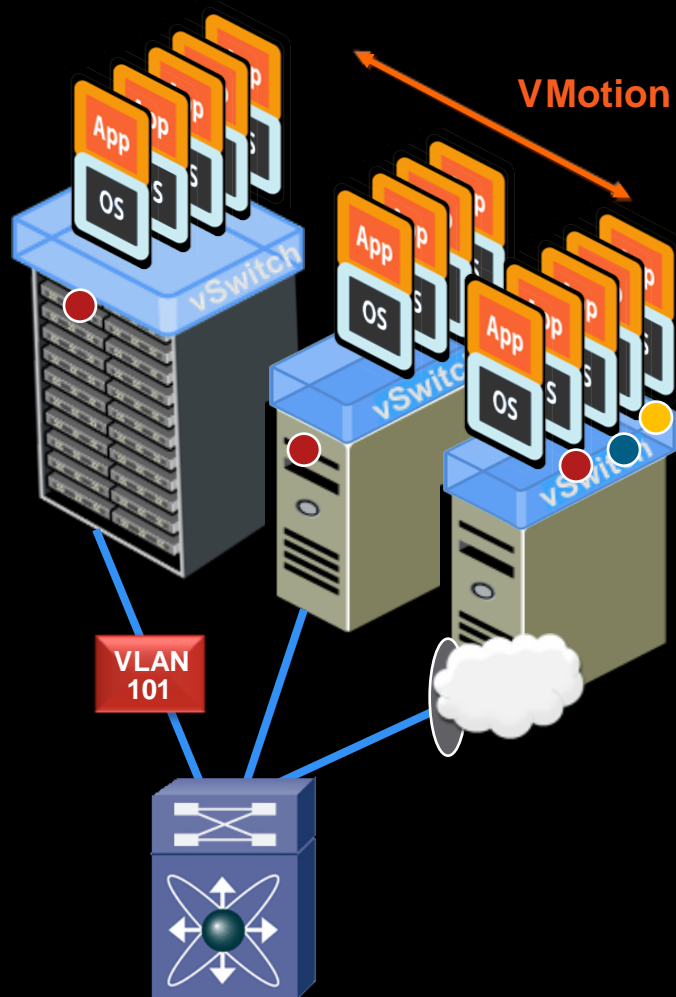
Virtualization

Business Need - minimal OPEX

- Ever increasing business requirements
 - Fulfillment with legacy technologies is too expensive (OPEX and CAPEX)
 - Next Generation technologies required as enablers
 - Technology enables Innovative Biz Processes and fosters Business creativity
- Virtualization technologies become baseline technologies over time
- Richer infrastructure / services at comparable relative OPEX



VN-Link Brings VM Level Granularity



Problems:

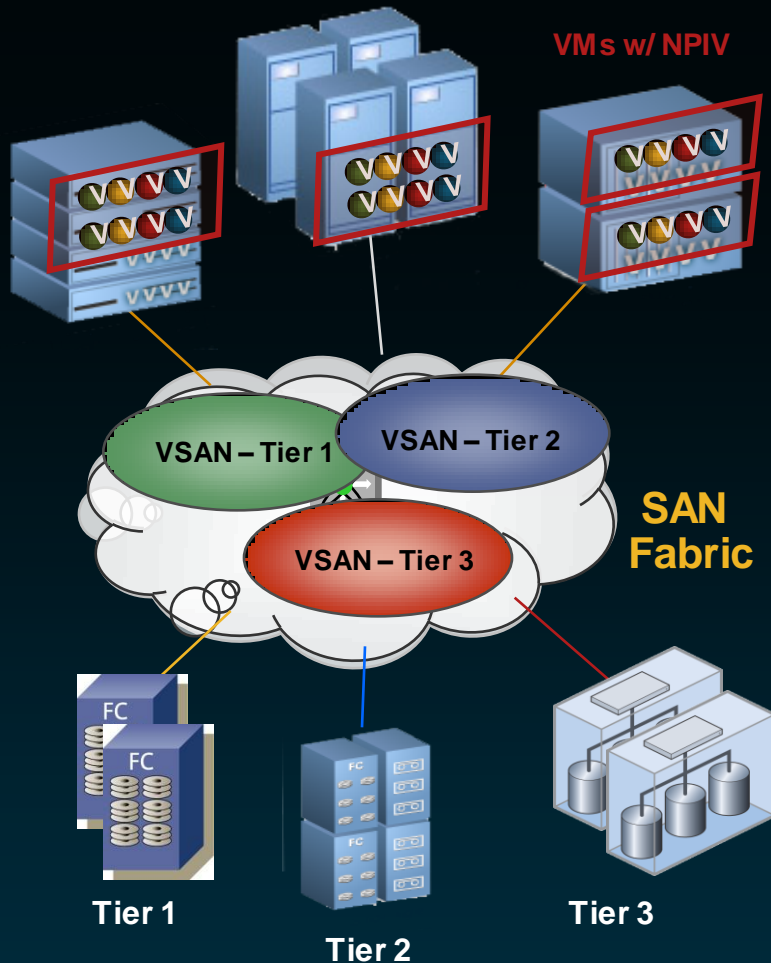
- VMotion may move VMs across physical ports—policy must follow
- Impossible to view or apply policy to locally switched traffic
- Cannot correlate traffic on physical links—from multiple VMs

VN-Link:

- Extends network to the VM
- Consistent services
- Coordinated, coherent management

Virtual Machine-Aware Storage Networks

Critical Element of 'Real World' VM Deployment



Fabric Scalability and Performance

Resilient, high performance fabric to support large, dense VM environments

Performance Monitoring and Trending

VM-granular management and troubleshooting

Quality of Service (QoS)

VM-granular policy provisioning

VSANs Isolate Fault Domains

Increase availability, simplify troubleshooting, improve security & compliance

Mobility with Security

Wire-speed encryption protects data in transit and VMs during migration

Virtual Interconnect: Unified DC Fabric

Reducing complexity, Foundation for VM Mobility



Complexity, Cost, Power



Efficient, Simpler Operations

Key Benefits of Unified Fabric

Reducing complexity, Foundation for VM Mobility



**Reduce overall DC power consumption by up to 8%.
Extend the lifecycle of current data center.**



Wire hosts once to connect to any network - SAN, LAN, HPC. Faster rollout of new apps and services.



**Every host will be able to mount any storage target.
Drive storage consolidation and improve utilization.**



Rack, Row, and X-Data Center VM portability become possible.

Unified Fabric Savings

Healthcare Customer Case Study

	Cisco LAN & WAN	Cisco Unified Fabric
Power Consumption	147 KW	63KW 57% Savings
Power & Cooling Costs	\$909,000	\$390,000 57% Savings
Qty of host Adapters (not including LOMs)	8,000	4,000 50% Savings
Qty of Cables	10,484	5,200 50.4% Savings
Qty of access ports	10,000	4,000 60% Savings

Desktop Virtualisation – Growing Interest

But not a “Free Lunch” for Infrastructure

Virtual Desktop Benefits

- Lower operating costs for desktops
- Business continuity – tighten desktop control
- Improve productivity – any desktop, any time



Virtual Desktop Challenges

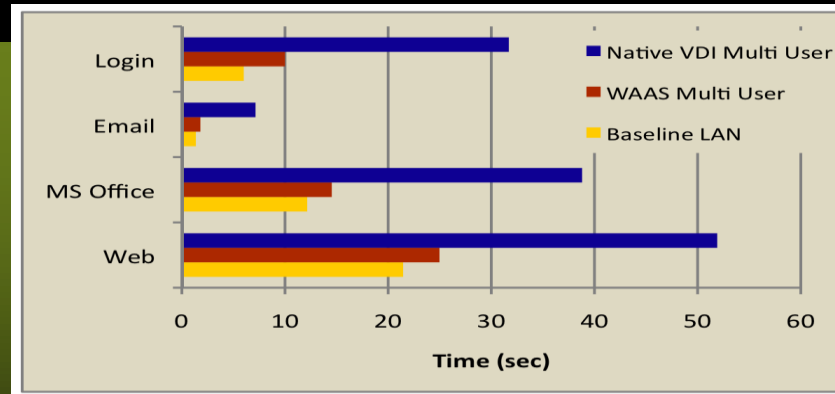
- High bandwidth consumption
- End-user performance and printing over the WAN
- Cost of scalable deployments



Solution: VDI Content Acceleration

Without WAN Optimisation

- Difficult to deliver desktop experience to multiple users
- Limited user scalability – 4-5x bandwidth consumption compared to VoIP



With WAN Optimisation

- Desktop-like performance across the WAN
 - Radically reduced bandwidth (60-70%)
- Optimized print services in branch

WAN optimization is key to extending reach of virtual desktops to remote branch

LANE ENDS



ENTERPRISE
DATA CENTRES

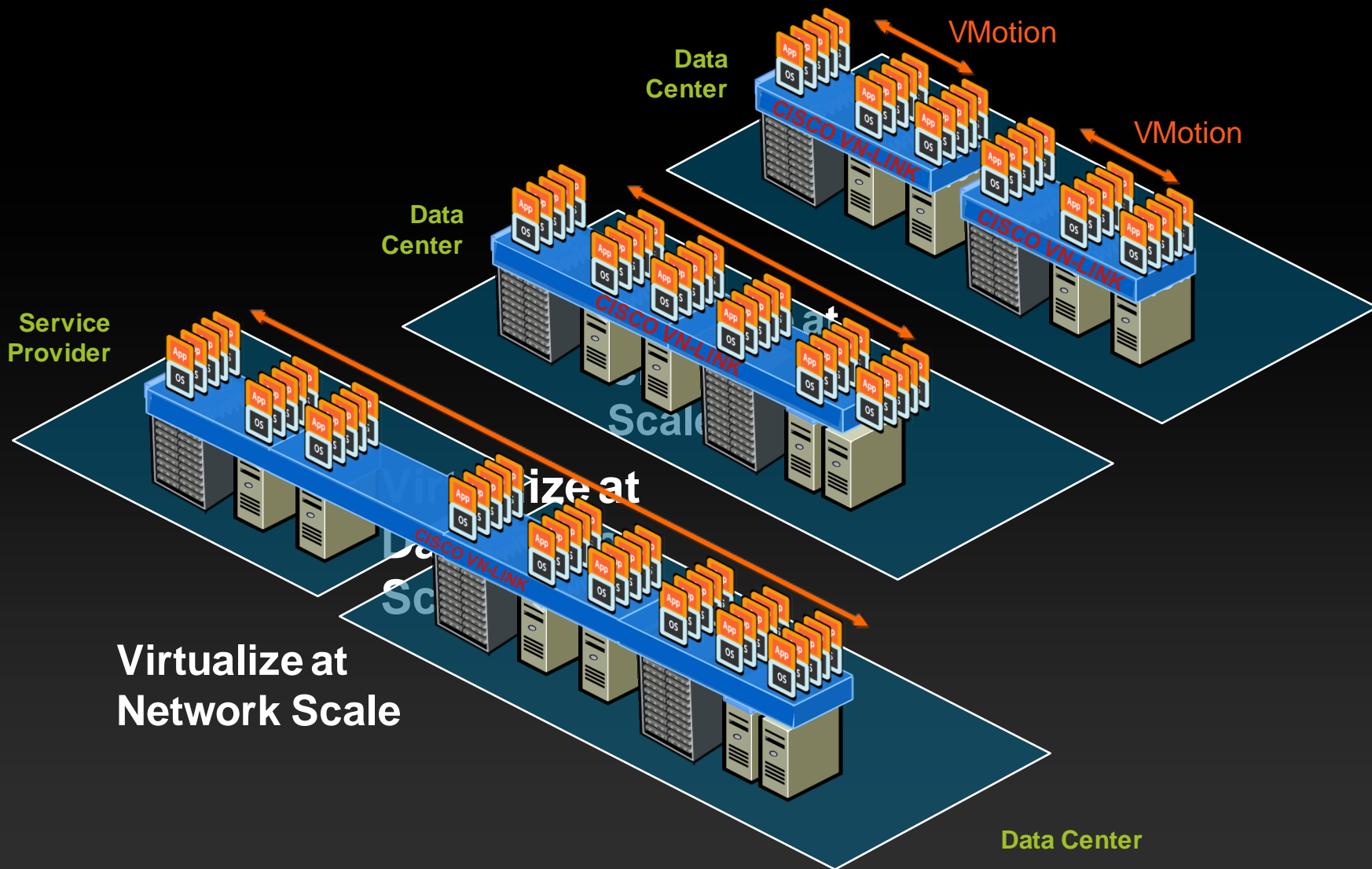


EVOLVING
CLOUDS



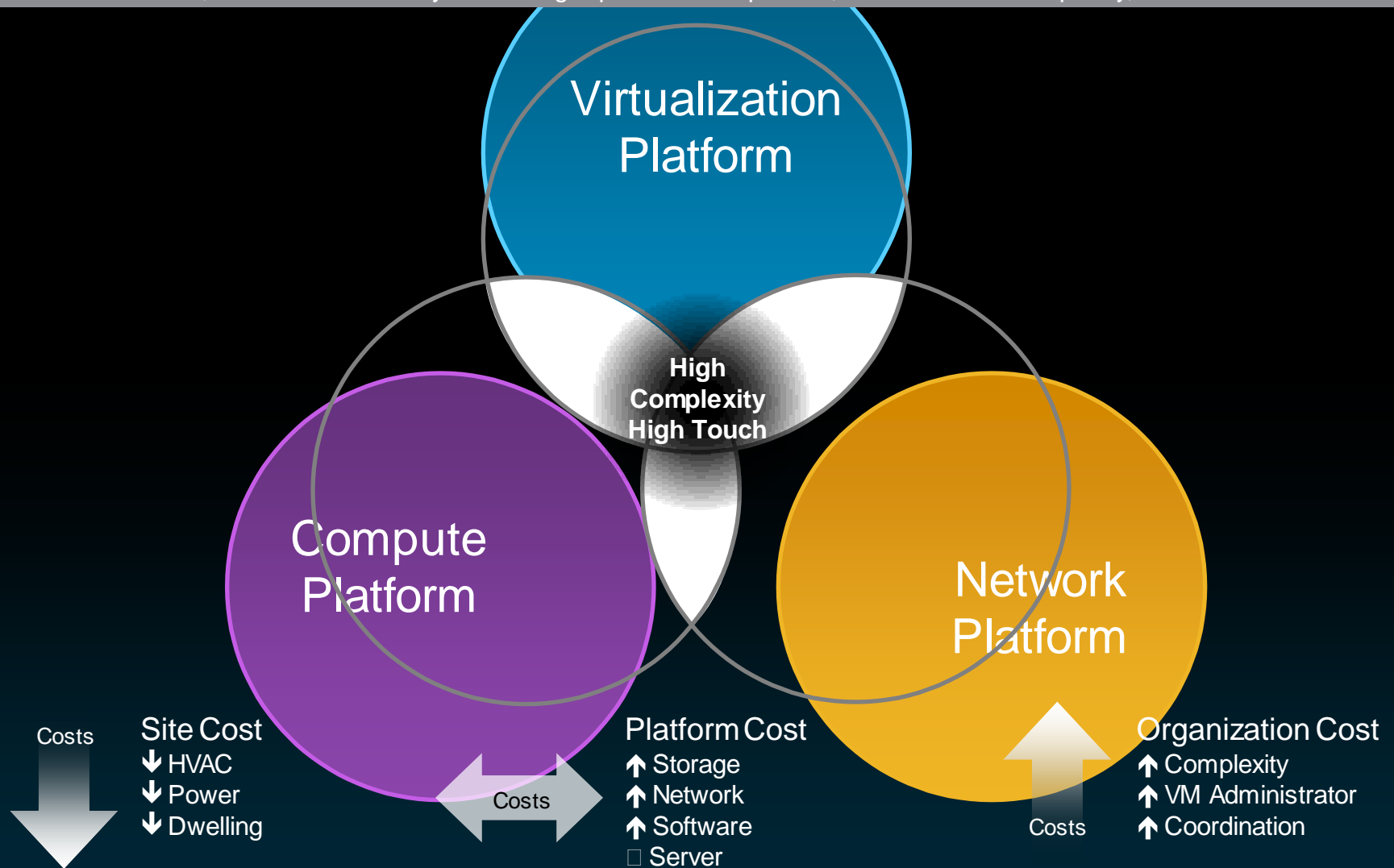
Internet Technology
Dynamically Scalable & Virtualized
Resources provided as a service
Combines SaaS & Web 2.0
Centralized or Distributed
Data & Software reside in Cloud

Scaling Virtualization Across & Between Data Centres, Public/Private Environments



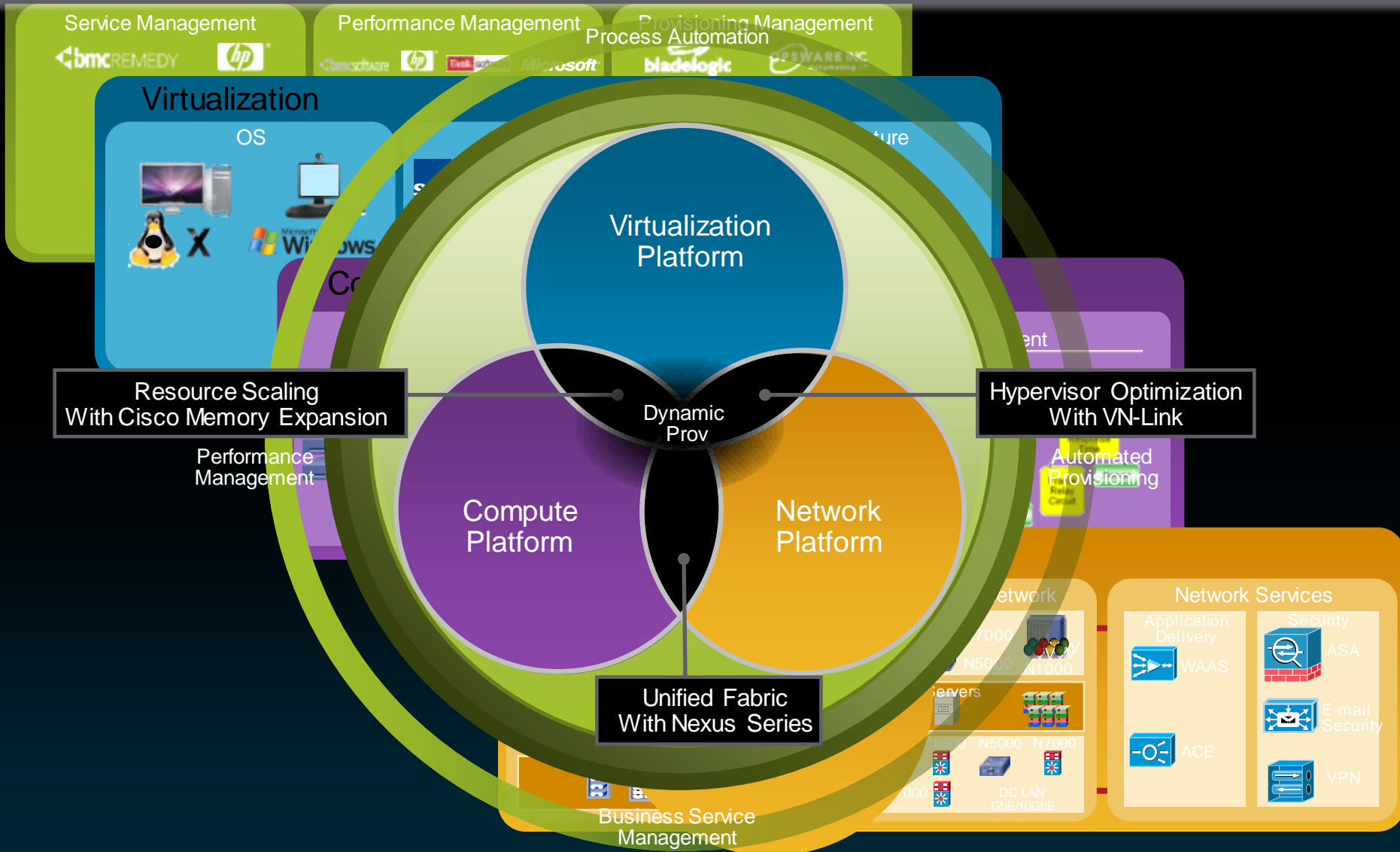
Data Center Virtualization Today

Virtualization Has Been Promised As the Answer. However, Virtualization Solutions to Date May Only Address Part of the Problem, but Has Done So by Increasing Operational Expenses, Infrastructure Complexity, and Risk.



Unified Computing Role in Data Center 3.0

Fully Integrated System That Brings Together the Network Fabric, Compute Resources, and Virtualization Software to Simplify Setup, Improve Business Metrics, and Enable Just in Time Provisioning for Business Transactions



Cisco Unified Computing System

The Cisco Unified Computing System is designed to dramatically reduce datacenter total cost of ownership while simultaneously increasing IT agility and responsiveness.

Process Automation (ITIL)

Automated Provisioning

- Embedded single point of management and provisioning
 - Visibility and control across technology silos
 - Ongoing management and compliance

Virtualized Services

- Fine-grained control, portability, and visibility of network, compute, and storage attributes
 - Increased Processor Efficiency with Hypervisor Bypass

Industry Standard Servers

- Intel Xeon Processor 5500 series.
- More than double the memory capacity of competing systems
- Blade Form Factor

Unified Fabric

- Wire once, low latency FC and Ethernet
- Virtualization aware
- Dramatic reduction in adapters, switches, pass thru modules

Up to 90% greater administrator efficiency, with faster changes and fewer incidents

performance via Cisco Hypervisor Bypass Technology

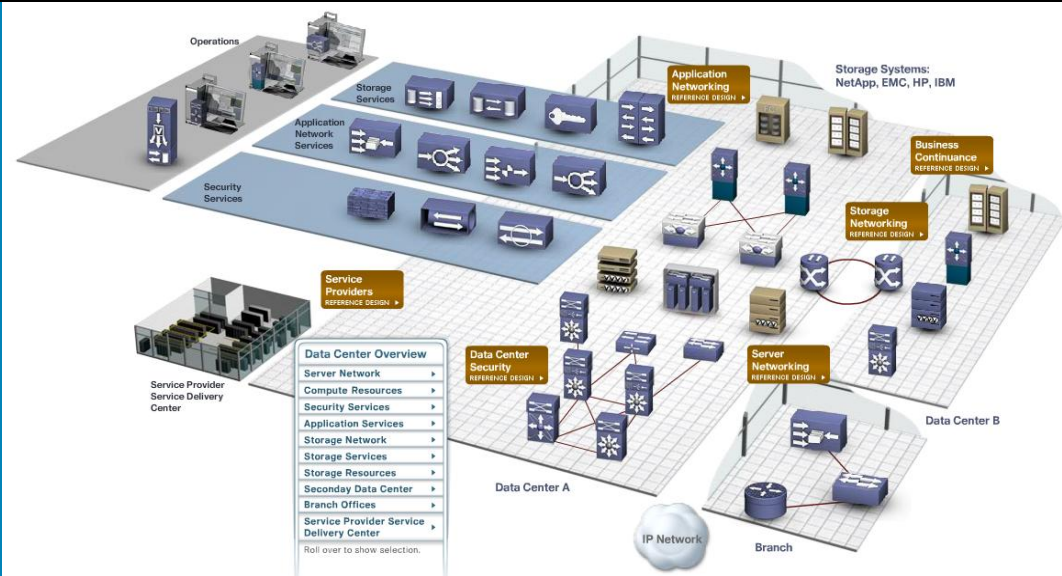
purchase, manage, power, and cool

Up to 30% lower memory and SW licensing costs via Cisco Extended Scalable Unified Memory Technology
up to 320 server nodes in a single system

Business Service Management

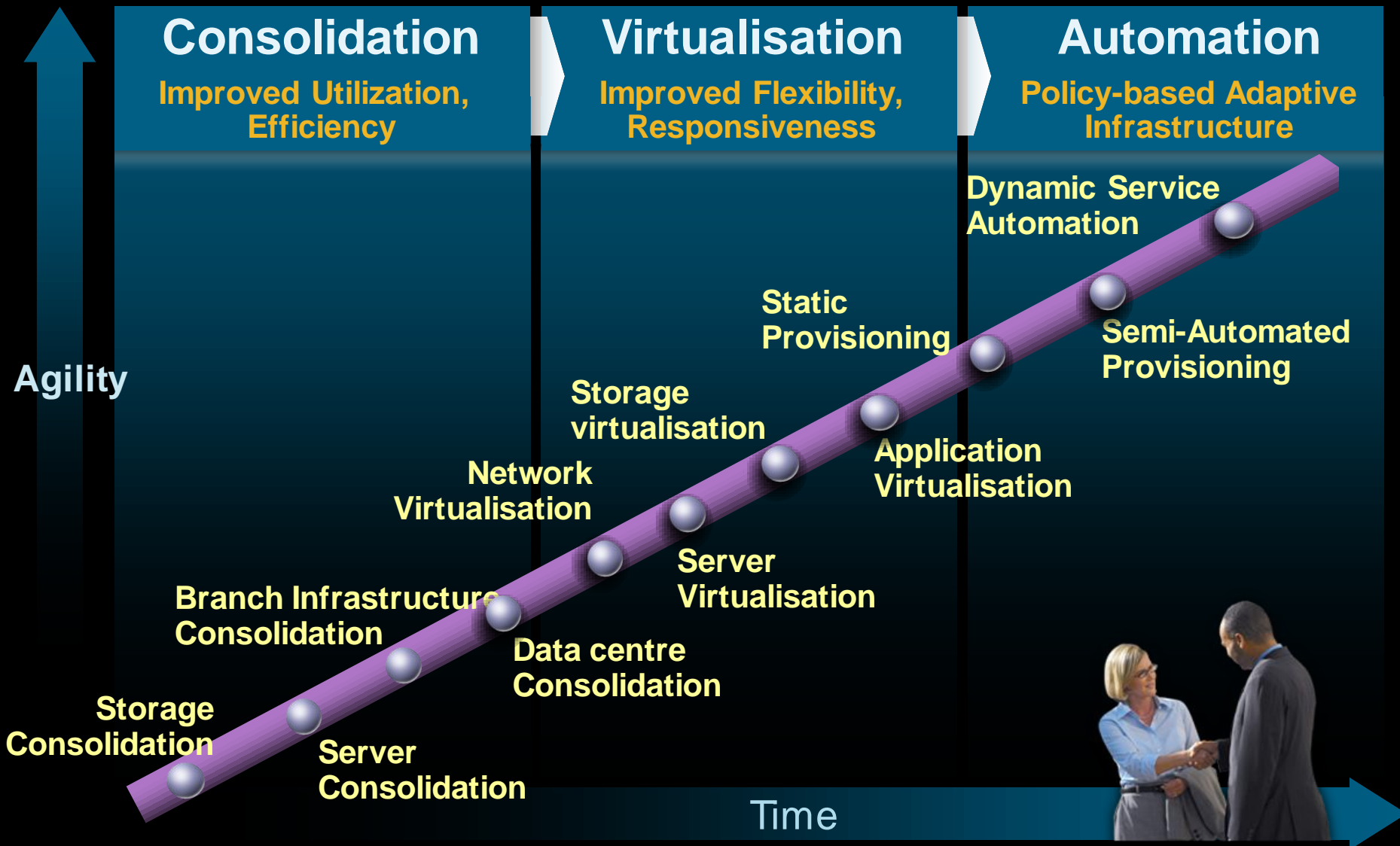
Operations and Support

Making the Journey – Pragmatic Adoption



Pragmatic Path to Next-Gen Infrastructure

Incremental, Low Risk Evolution via Best Practices

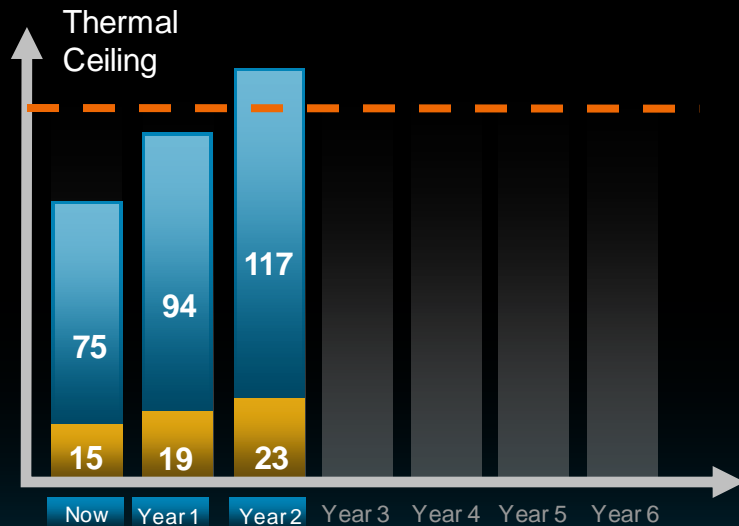


Payback on Improved Asset Utilization

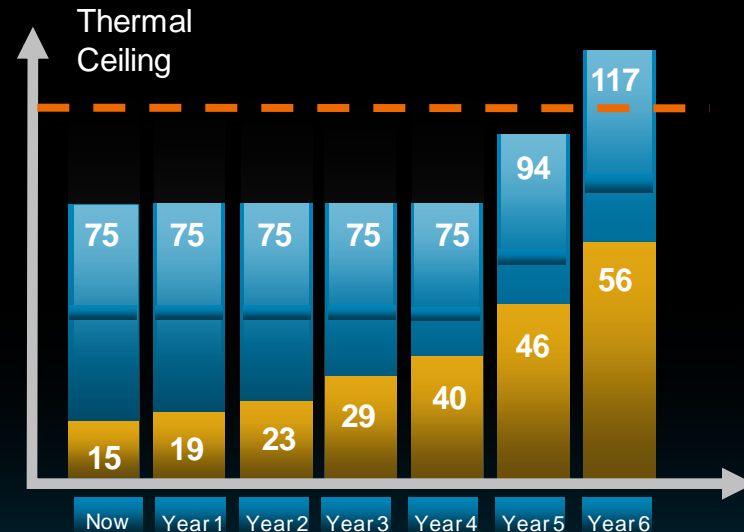
Extend useful asset life, Defer Capital, Attenuate P&C

\$250M New Data centre
\$25M/yr Opex

Savings: \$180M / 4.5 yrs
\$15M/yr Capital
\$25M/yr Opex



20% Efficiency



60% Efficiency



Total Capacity

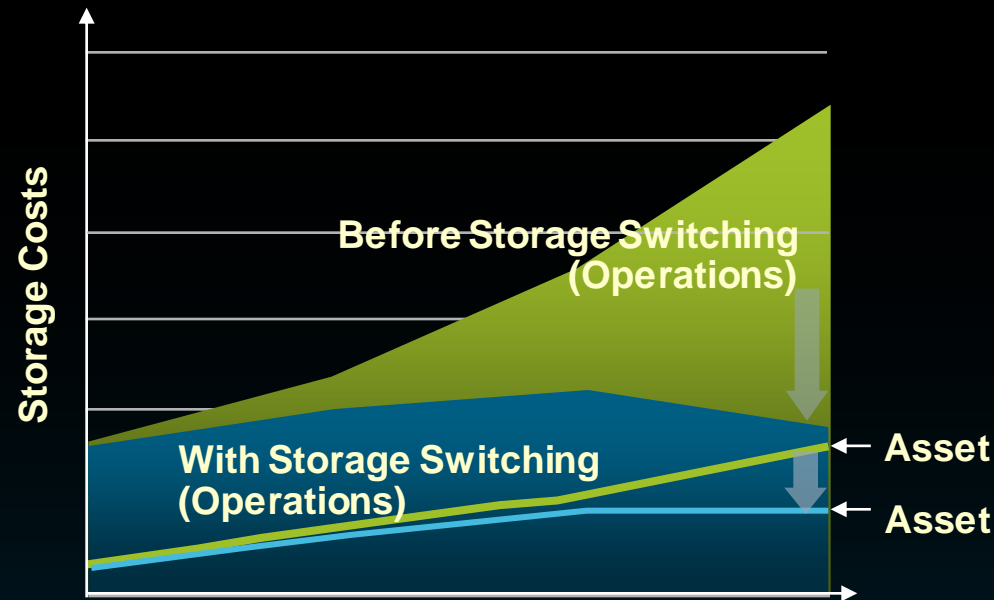


Utilized Capacity

Improved TCO, Operations, Responsiveness

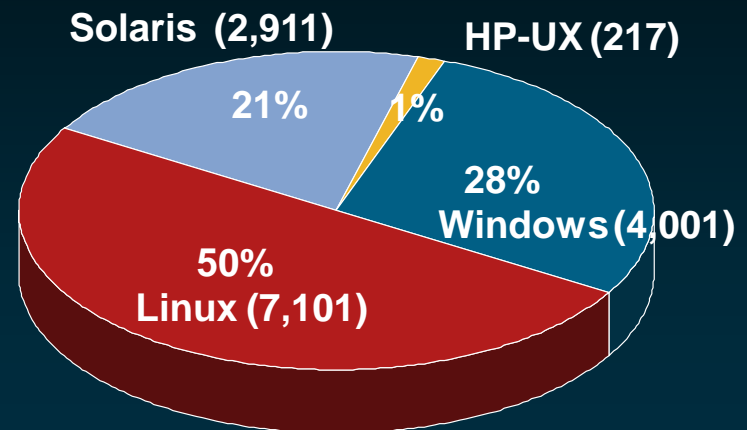
Storage

- 10+PB of storage, growing at ~50% per year
- TCO reduced from \$0.21/MB to \$0.01/MB over 6 years
- Managed storage per FTE increased from 25 TB to 600 TB
- Overall utilization increased from 20% to 68%
- \$71 Million in cost avoidance over last 4 years



Servers

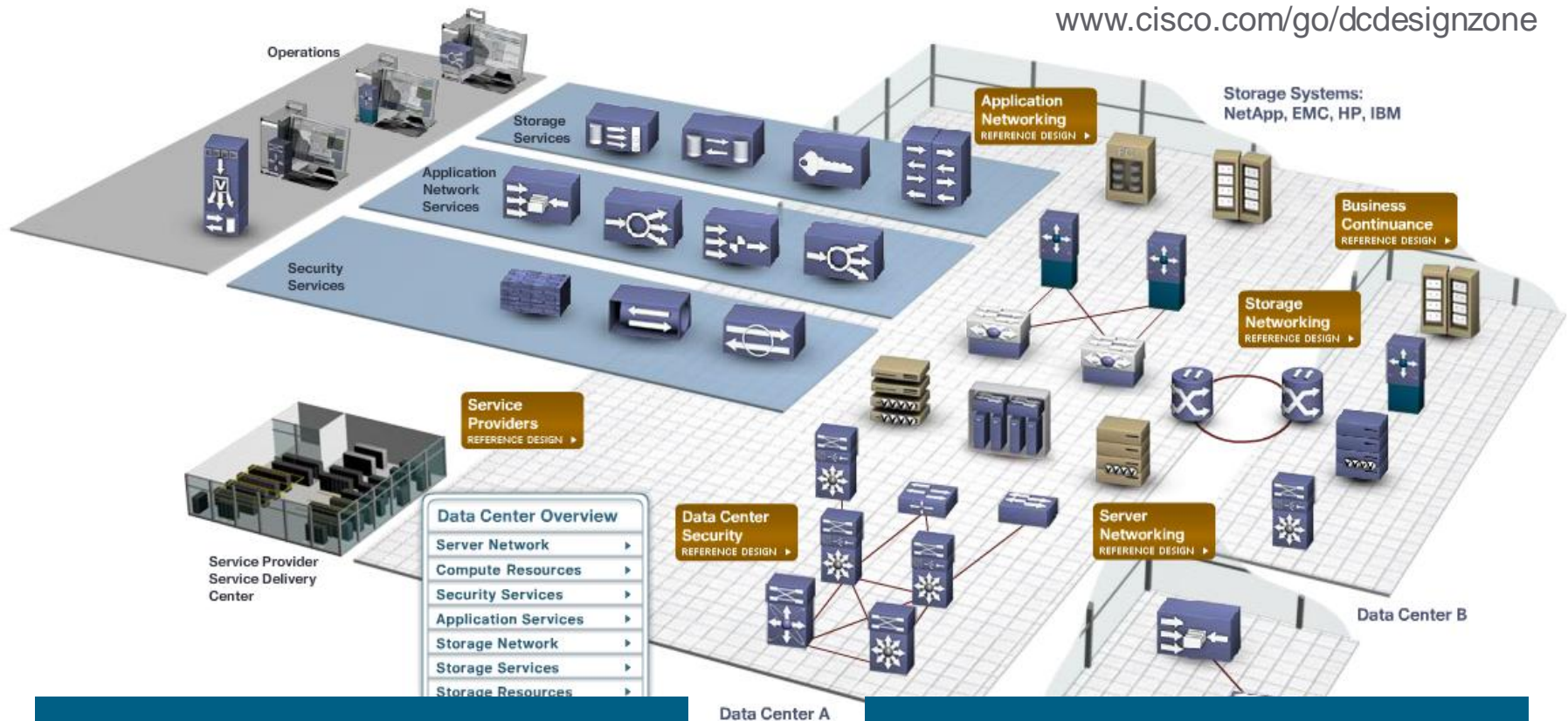
- 14,250 servers, 3,780 applications
- 50% of existing, 75% of all new server environments virtualized
- 2,720 VM's installed
- \$19+ Million in cost avoidance and reductions to date
- Deployment time reduced from 8-12 weeks to 3 days



Design Best Practices for Virtualized DC

Data Center Assurance Program 4.0

www.cisco.com/go/dcdesignzone



- End-to-end baseline implementations (System Assurance Guides)
- Optimized for ISV Appl'ns (Deployment Guides)
- Tested and Documented Designs (Cisco Validated Design Guides)

- App Networking, Blade Fabric Switches, Active-Active Configurations
- Oracle™ EBS®, Microsoft™ OCS®, SAP™, Tibco™ Rendezvous®
- Service Provider, Video and Mobility overlays

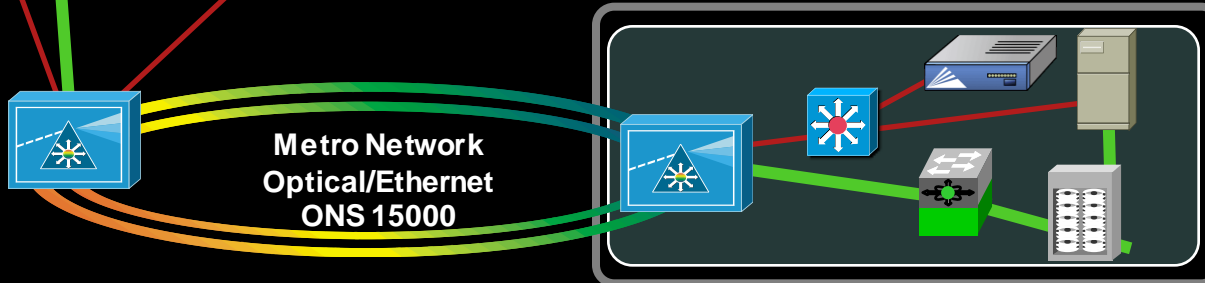
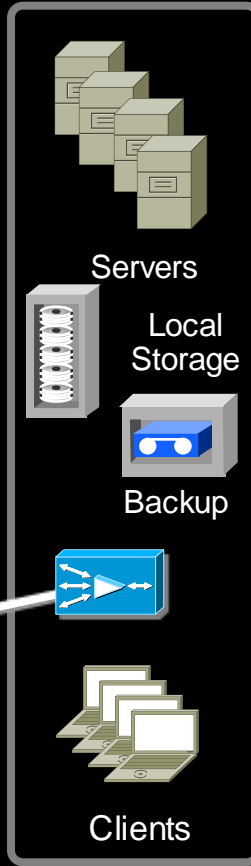
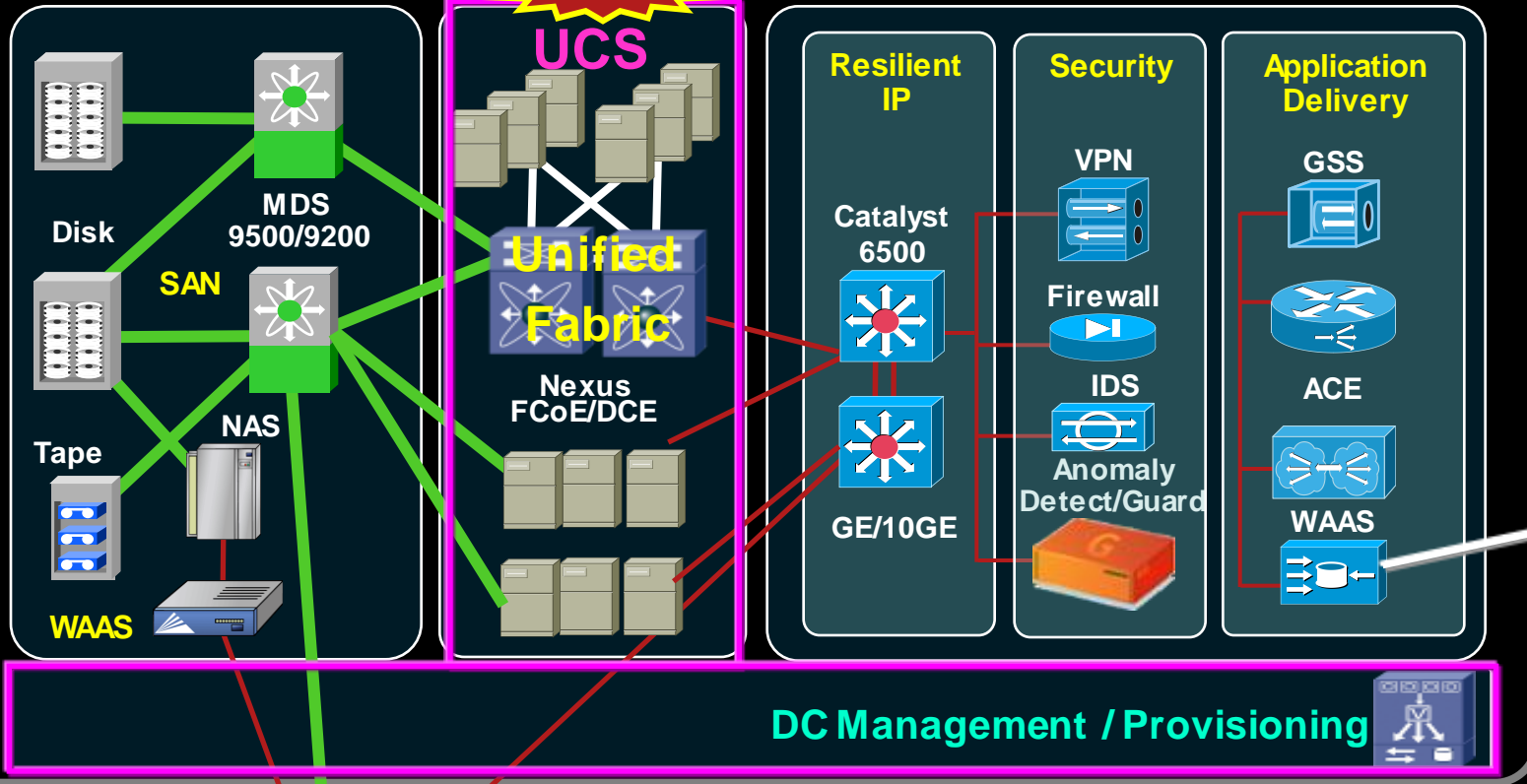
The Cisco Data Center Network

Primary Data Center

Branch

Storage Network

Front End Network



Remote / Backup Data Center

Cisco DC3.0

Objectives

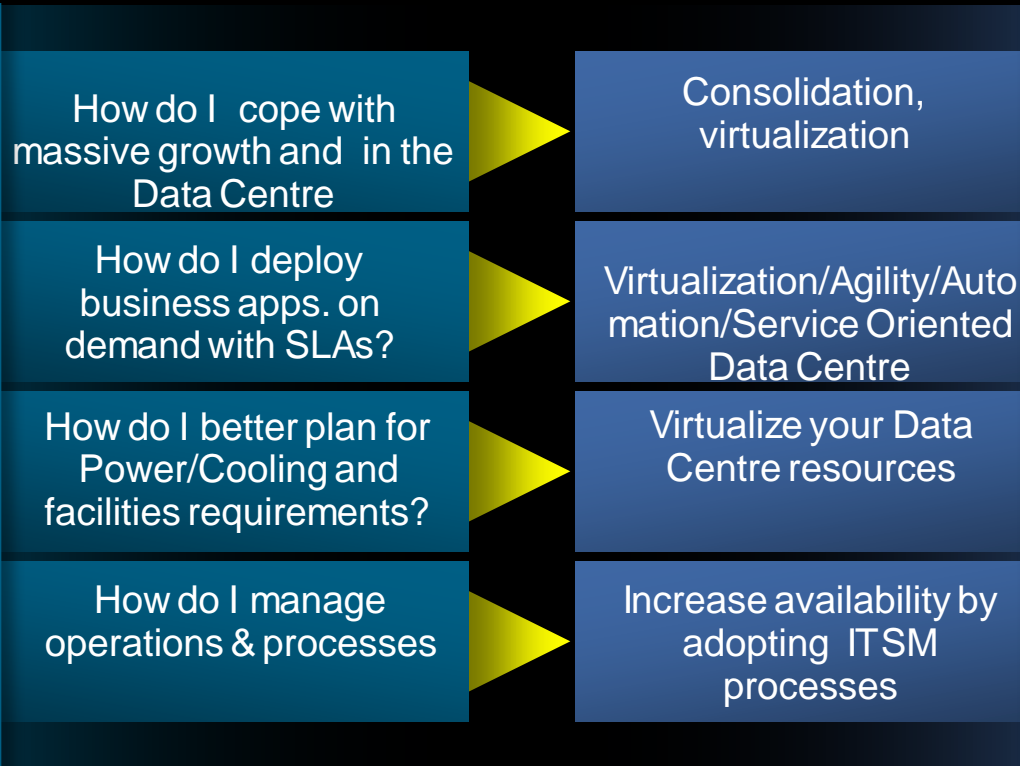
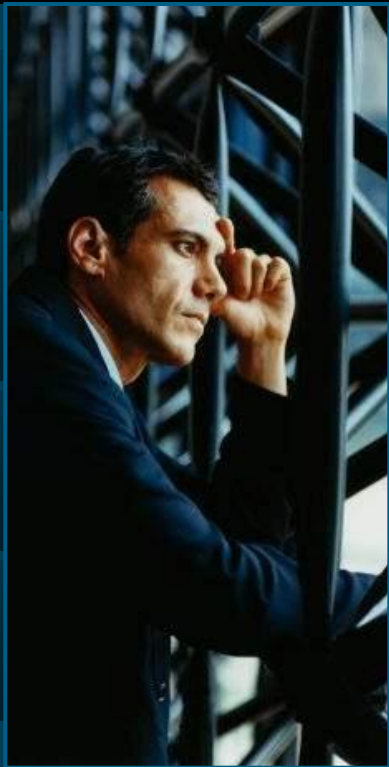
- Virtualization of all resources
- Single unified computing platform
- Single unified network fabric
- End to end provisioning
- Branch Office Consolidation

Benefits

- Optimal utilization of resources
- Scalability & Flexibility
- Rapid application provisioning
- Repeatable processes
- Energy efficient
- Business enabler



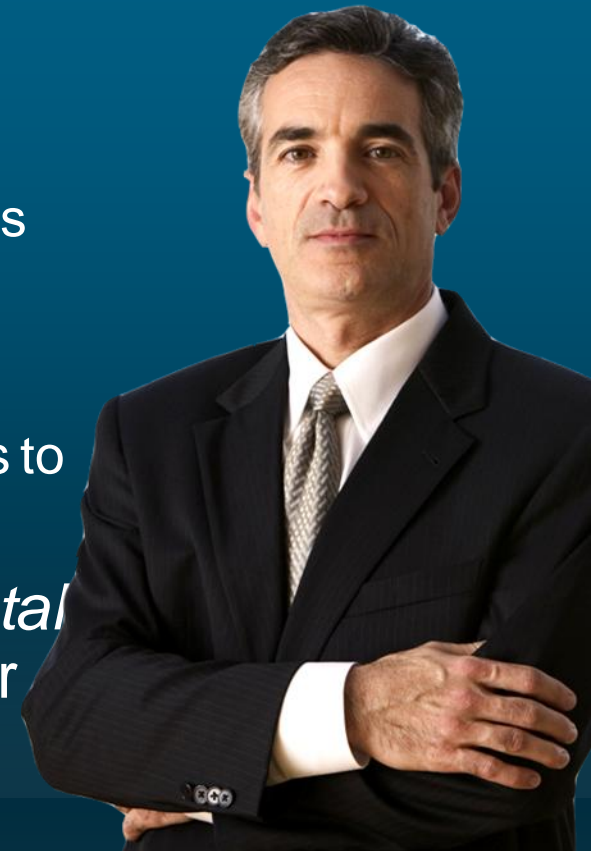
Green IT provides Business Agility



Architecting a „greener“ Data Centre
Less power, Less cooling, Less Cost

Summary

- The Next Generation Data centre will be virtualised across *all infrastructure*
- Cisco together with our partners provide:
 - *A Pragmatic Solution* to today's DC challenges
 - *An Architectural Foundation* based on best practices and proven designs
 - *A Roadmap of Innovations* to allow customers to take advantage of future Cloud models
- The approach allows a *proven, incremental, low risk adoption path* that leverages your existing IT investments





Increased IT Efficiency
Greater Business Agility

Increased IT Responsiveness
Greater Business Productivity

Increased IT Resilience
Greater Business Continuity



CISCO

Data centre 3.0

Five-Phase virtualisation Technology Plan

Network virtualisation



- Catalyst LAN Switching
- Security
- Application Networking

Storage virtualisation



- MDS Directors
- Intelligent Storage Apps
- Fabric SAN
- Branch WAN Optimization

Fabric virtualisation



- Nexus 7000
- Nexus 5000
- FCoE, DCE
- 10/40/100 GbE
- NX-OS

VM-Aware virtualisation



- In the Network
- Nexus 1000V
- VN-Link Per VM Services
- VM Mobility
- Network hosted Servers

Converged virtualisation



- All Resources Connect to a Unified Fabric
- Automated, Virtualized, Unified, Transparent



*The New Atomic
Unit for Tomorrow's
Data Centres!*

