



# Datacenter Transformation



**Juan Rodriguez – Business Development Manager**  
**Javier Sanz – Systems Engineer**

# AGENDA

- 9:30-10:15 DATACENTER TRENDS
- 10:15-11 VIRTUALIZATION
- 11-11:15 COFFEE BREAK
- 11:15-12 UNIFIED FABRIC
- 12-12:15 UNIFIED COMPUTING
- 12:15 Q&A



# Datacenter Trends



# Data Center Challenges

## Scaling Operations and Infrastructure



### ■ **By 2009:**

*Source: IDC 2008 and Cisco Survey*

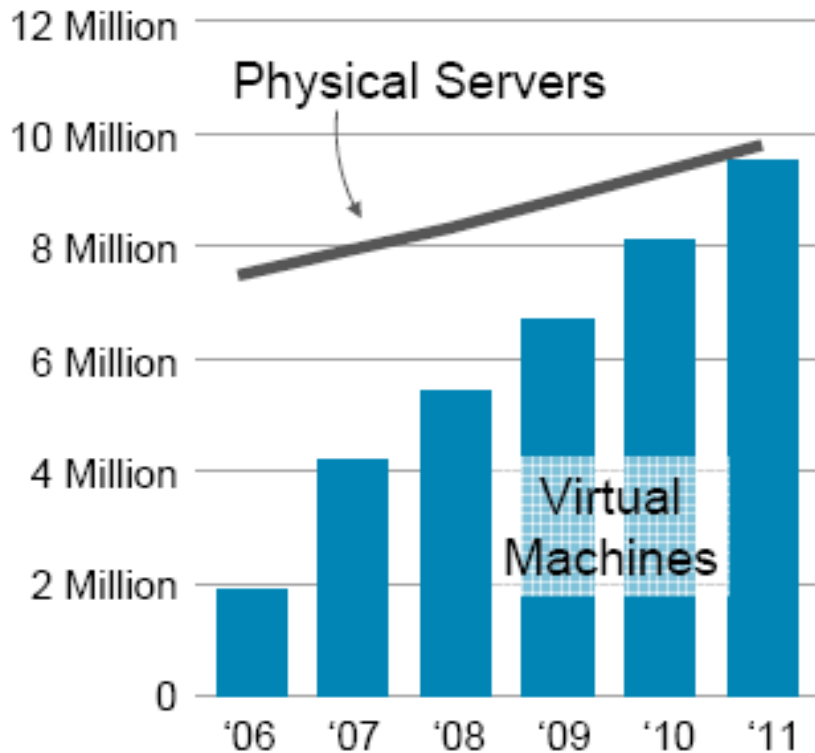
- 65% of enterprises will be using x86 server virtualization.
- 45% of x86 servers will be virtualized.
- The percentage of virtualized workloads will double each year
- through 2012.

### ■ **Moving Beyond Consolidation**

- VM portability, security, and visibility
- High availability and continuous operations
- “Anywhere” applications
- Cloud computing

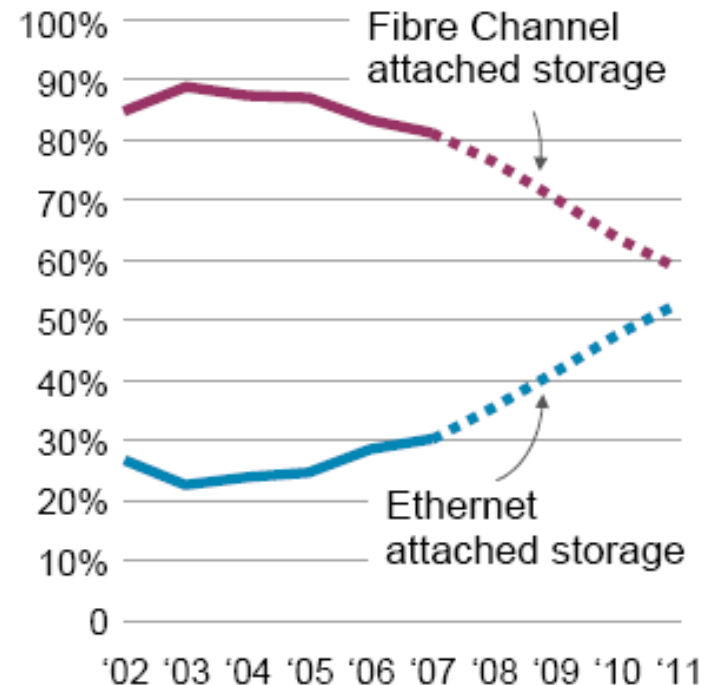
# Data Center Drivers

## Market Growth Virtual Machines & Physical Servers



Source: IDC Workloads 2007:  
Understanding System Deployment, Feb 08

## Fibre Channel vs Ethernet Share by Revenue



Source: IDC Worldwide Disk Storage Systems 2007–  
2011 Forecast Update, Doc#209490, Dec 07

# 10 GigE in the Datacenter

Servers moving to dense rack chassis\*

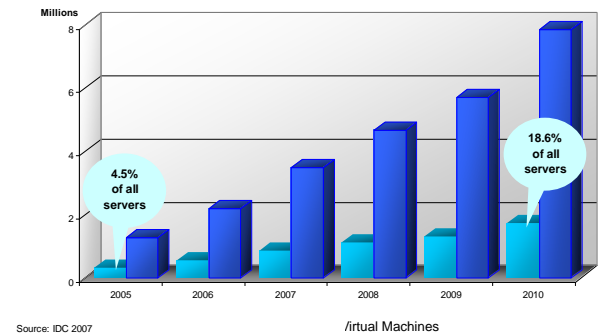
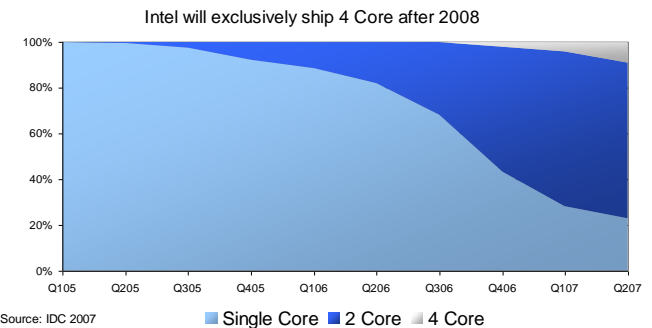
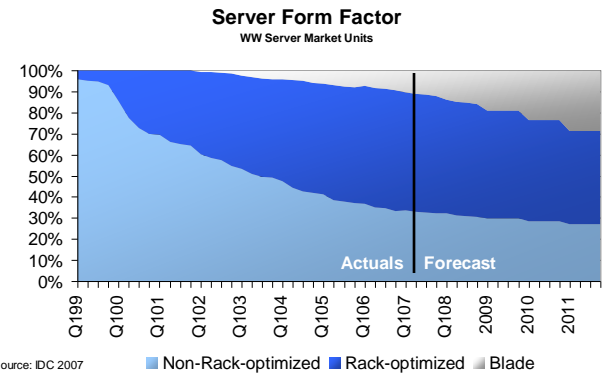
Rapid Adoption of multicore\*

Post 2008 Intel will ship exclusively  
4+ cores servers

Growth of virtualization exceeds growth  
of physical servers\*

All drives the need for more storage and  
network BW

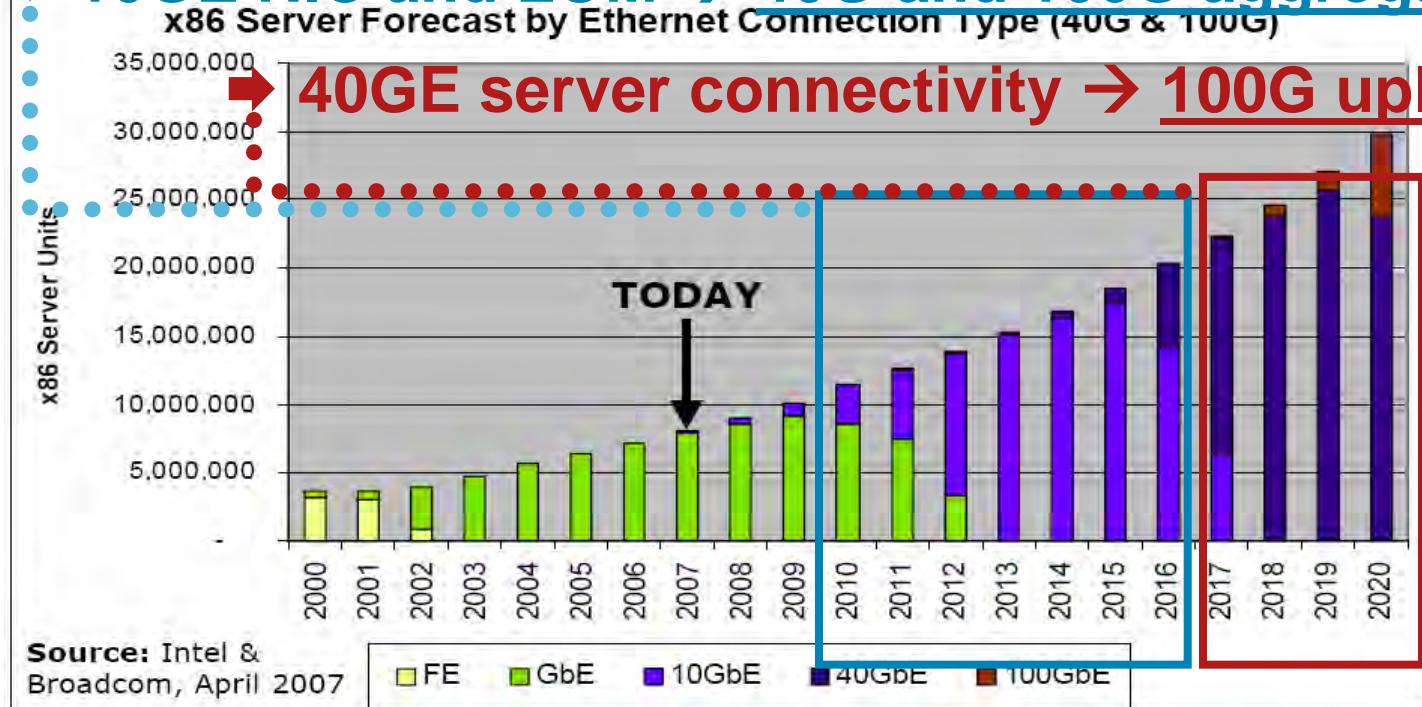
**Multi-Core CPUs and Server  
Virtualization driving  
the demand for higher bandwidth  
network connections**



# Server Ethernet Connection Evolution – Estimates from NIC vendors

## x86 Server Ethernet Connection Speeds with 40GbE & 100GbE

➔ 10GE NIC and LOM ➔ 40G and 100G aggregation



➔ 40GE server connectivity ➔ 100G uplinks



IEEE 802.3 HSSG April 2007 Interim Meeting



# The Case for 10GbE to the Server

**Multi-Core CPU architectures allowing bigger and multiple workloads on the same machine**

**Server virtualization driving the need for more I/O bandwidth per server**

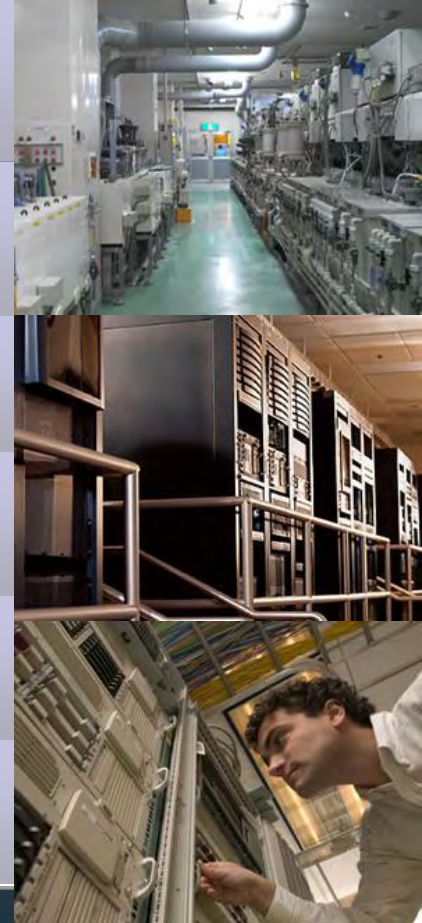
**Growing need for network storage driving the demand for higher network bandwidth to the server**

**10GE LAN on server Motherboards (LoM) beginning mid-2008** *(source: Broadcom)*

# Is the Data Center An Enabler Or An Inhibitor To Your Business?

- Hyper-growth of Storage at 40-70% per year
- Utilization ~15-25% (Servers/Storage)
- Power & Cooling ~25-30% of total DC costs
- Operations taking another ~30% of total DC costs
- Information Retention extending from 3 to 10 years
- New Applications can take 60-180 days to deploy

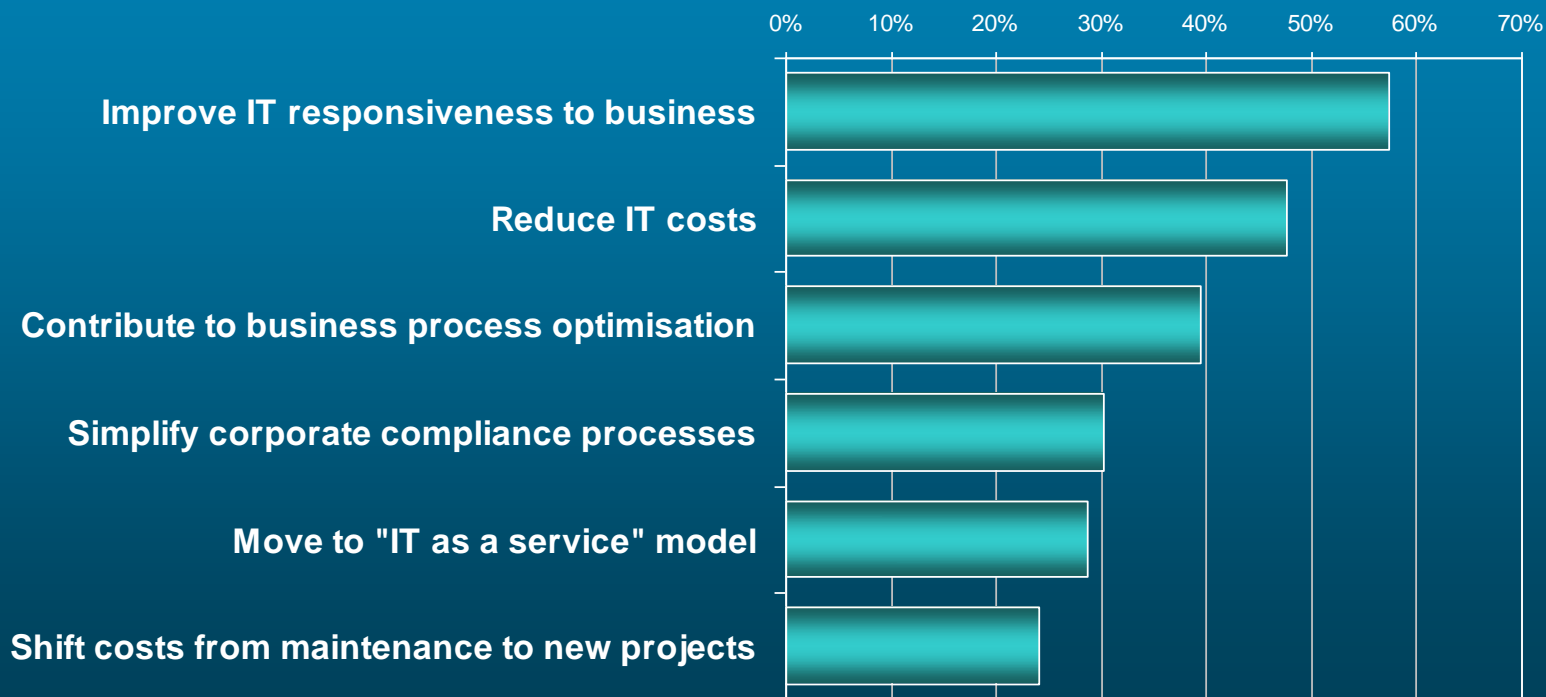
***“By 2008, 50% of today’s data centers will have insufficient power and cooling capacity to meet the demands of high-density equipment”***



Source: Gartner, 2008

# Responsiveness Is the #1 IT Goal, Not Cost Cutting

What are your IT organization's top objectives during 2008?



Source: Economist Intelligence Unit

# Next Generation Data Centers drivers

## Next Generation Drivers



### Server Farm Expandability

- Greater Port Density
- Greater Slot Density
- Greater HA
- Greater Performance
- Greater usable capacity
- Greater Multi-site support



### Automation Flexibility

- From Pod-wide VLANs to DC-wide VLANs
- No physically bound application areas
- Any application anywhere at anytime
- Ease of workload movement (application Mobility)



### Virtualization

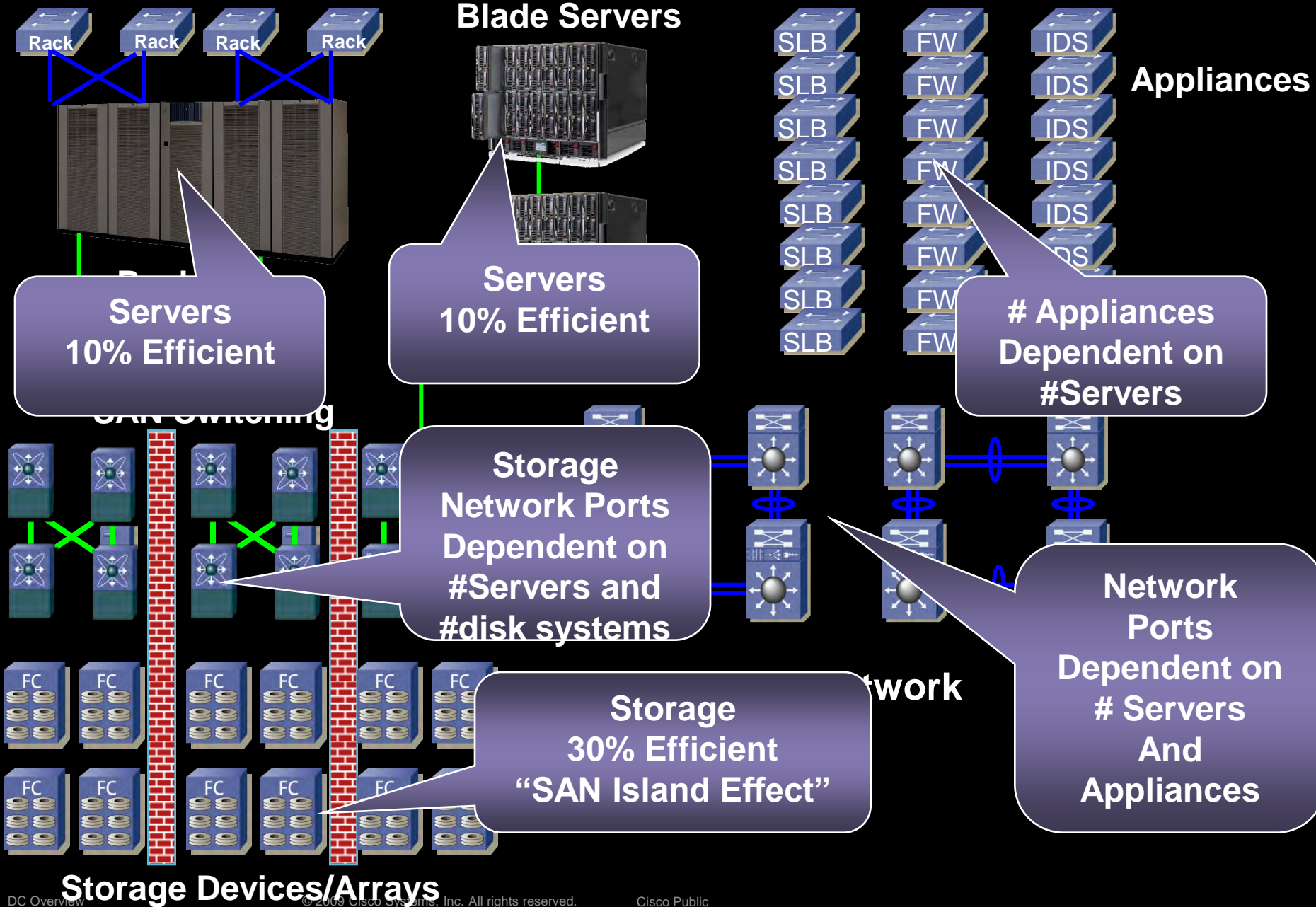
- Ease of Server Virtualization Integration
- Greater Network Service Virtualization Capabilities
- Aid in Efficient Use of Servers and Storage
- Consistent and Centralized Management of network policies (real or virtual instances)



### Technology Breadth

- Addressing fundamental requirements of multilayer DC architecture
- Addressing key DC services requirements
- Addressing DC access switching model requirements
- Addressing management and automation of DC network infrastructure

# Data Centre Efficiency Challenges

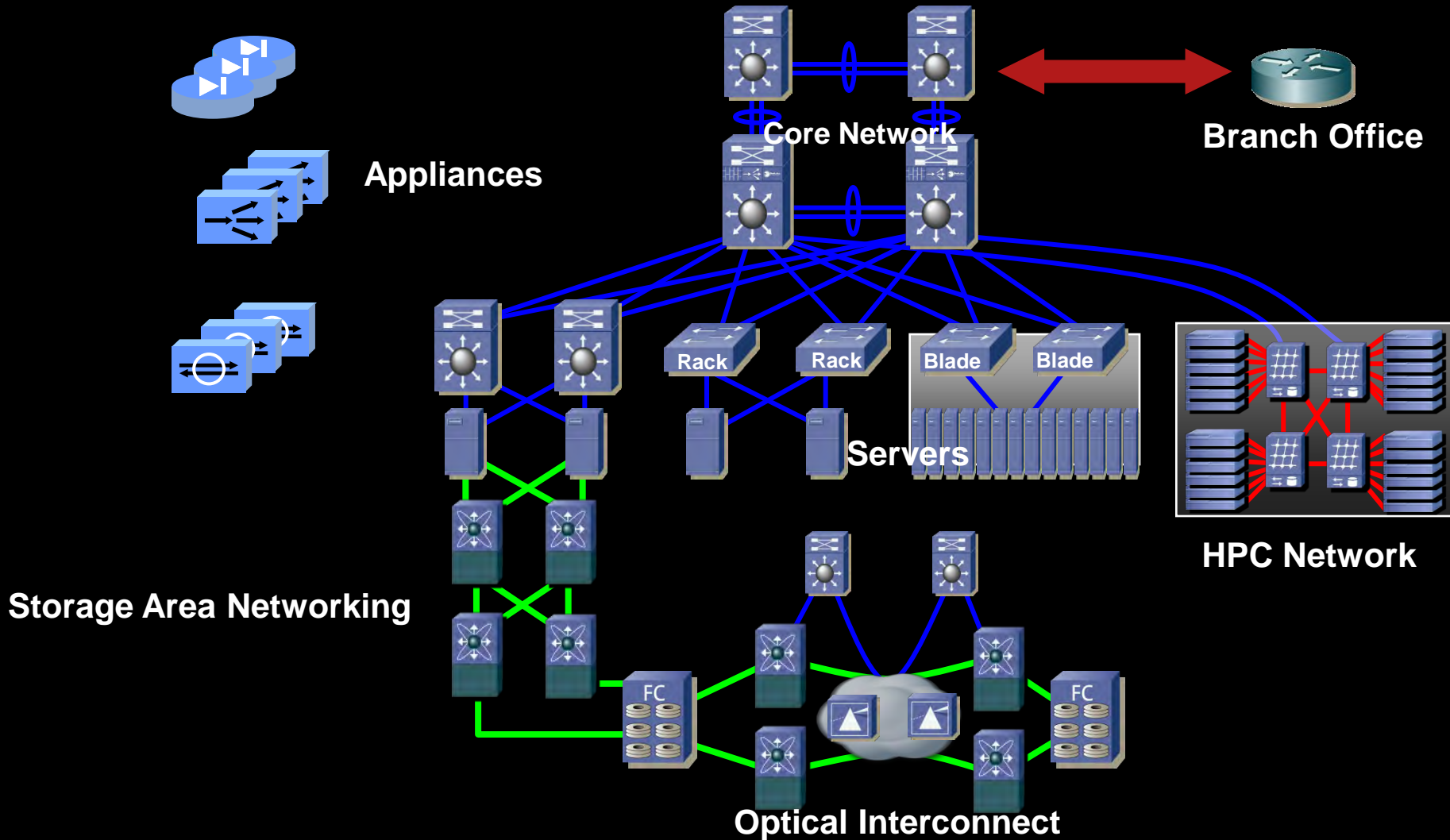


# Taking an Architecture Approach

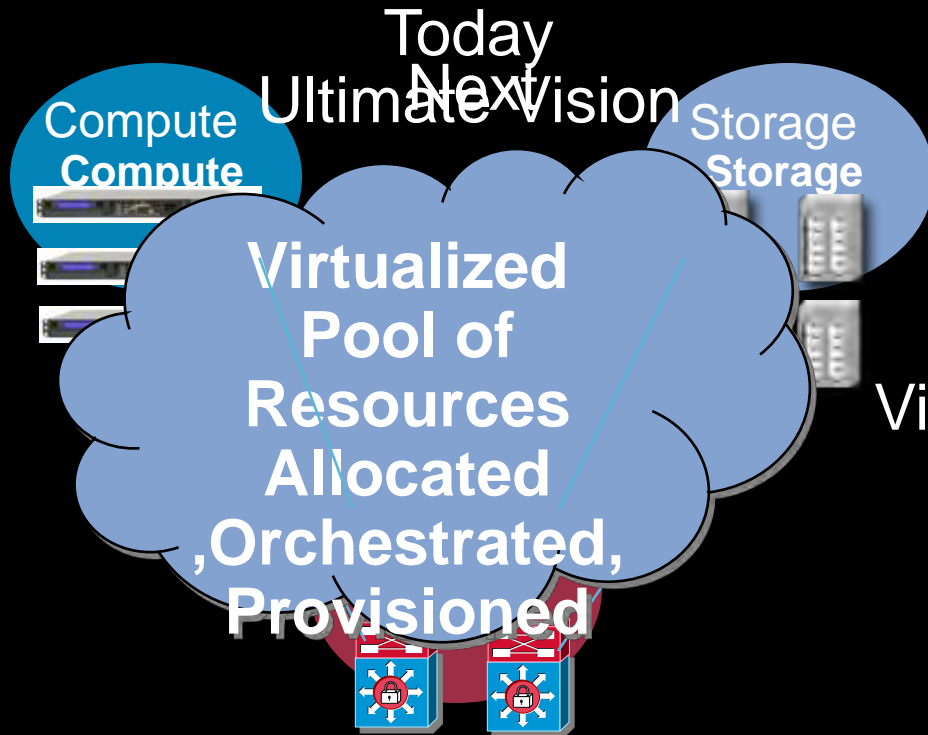


“If you continue doing what you’ve always done.....you will continue getting what you’ve always got....”

# Data Centre Network



# Data Center 3.0 Transformation



Google™

Microsoft®

vmware™

amazon.com

salesforce.com

Enterprise IT Performance  
Virtualization "Made Drive  
as Internally-Hosted  
Hosted "Cloud" Models  
Environment

Network

This New Enterprise

“Data Center as a Service” Model

# The Network becomes the Platform...

# Markets Transition to Meet New Needs

## Speed

10Mb

100Mb

1Gb

1/10Gb

Dense 10G and 40/100G

## Services

Switched

QoS  
L3 Switching

L4-7 Svcs

**NEXUS  
Unified Fabric**

Shared

VLANs

PoE

Data

st

## Platforms

Catalyst  
5000



Catalyst  
6500



1994

1999

2008+

# The Many Facets of Virtualization

## Server Virtualization

- Virtual Machines
- Increased Server Utilization

## Storage Services Virtualization

- ANS/WAAS
- File Virtualization
- De-Dup



## Network Virtualization

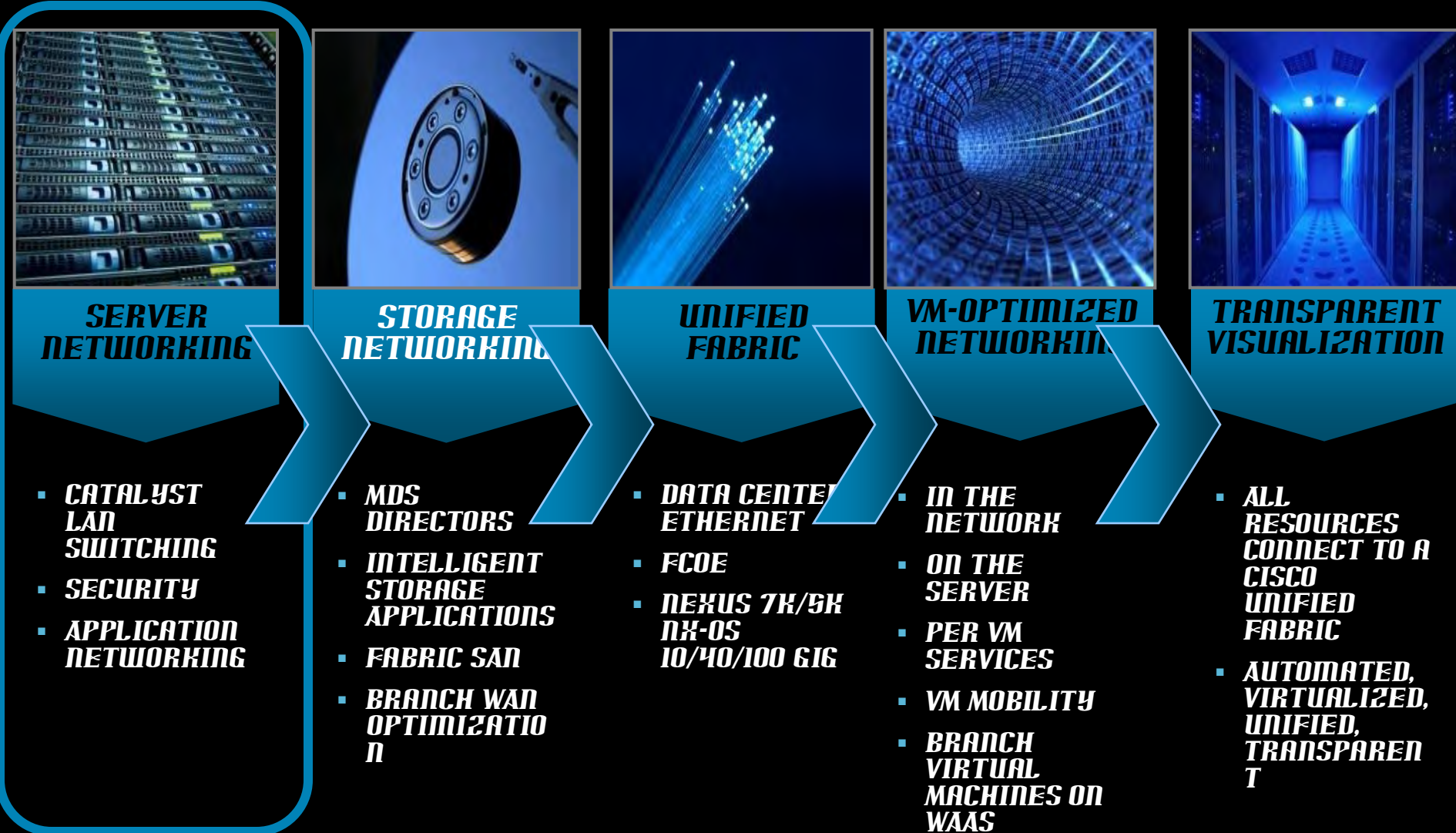
- Cisco Nexus/Catalyst
- DCE
- Vframe

## Emerging Architectures

- Application Virtualization
- Client in many modes
- HW: Thin Clients
- SW versions

# DATA CENTER 3.0

## VIRTUALIZATION ROADMAP



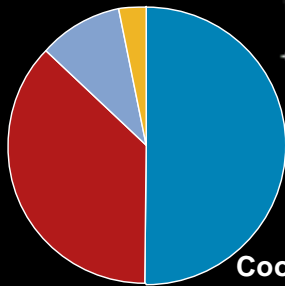
# Where does the Power Go?

*Network has a small footprint and can reduce overall power requirements*

Fewer the power supplies to support a service, fewer conversion losses

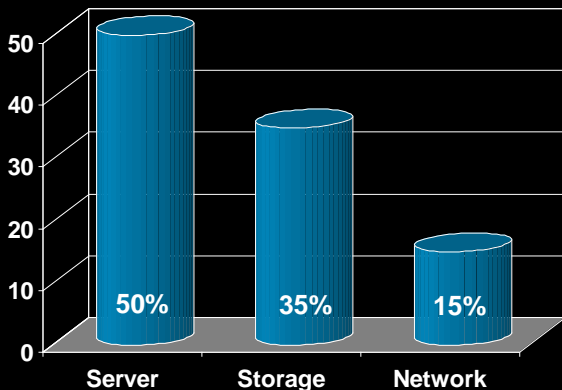
Conversion Loss 10%

Lighting 3%



ICT Infra 37%

Cooling 50%



Each watt consumed by IT infrastructure carries a "burden factor" of 1.8 to 2.5 for power consumption associated with cooling, conversion/distribution and lighting

Sources: EYP Mission Critical Facilities, Cisco IT, Network World, Customer Interviews, APC

# Data Center Growth Lifecycle Alignment

**Infrastructure Starting Capacity**

**Facilities- 80KW**

**Network - 400 Ports**

**Server - 200 Units**

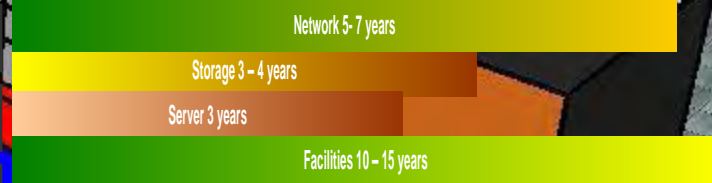
**Storage - 220 TB**

## Infrastructure Lifecycles (years)

Facilities	15
Network	4
Storage	5
Server	4

## Annual Growth Estimates











Facilities	10%
Network	6%
Storage	22%
Server	11%









**Business Growth?**

# Cisco Data Center Technology Strategy

## Next Generation Data Center Network

					
<p>Data Center Class OS</p>	<p>Unified Fabric</p>	<p>System Scalability</p>	<p>Pervasive Security</p>	<p>Unified Mgmt Architecture</p>	<p>Server Virtualization Switching</p>
<ul style="list-style-type: none"> <li>• Multi-Protocol</li> <li>• Modular Design</li> <li>• Continuous</li> <li>• Feature</li> </ul> 	<p>Modular Switching</p> <ul style="list-style-type: none"> <li>• Cisco DCE</li> <li>• FCoE</li> <li>• D</li> </ul>	<p>System Scalability</p> <ul style="list-style-type: none"> <li>• 10G Density</li> <li>• 40/100G</li> <li>• Readiness</li> <li>• Low Lat</li> <li>• Active -</li> <li>• Links (S</li> <li>• Eliminat</li> </ul> 	<p>Pervasive Security</p> <ul style="list-style-type: none"> <li>• Roles Based Access Control</li> <li>• Link Layer Encryption</li> <li>• Integrated Packet Analysis</li> </ul>	<p>Unified Mgmt Architecture</p> <ul style="list-style-type: none"> <li>• Open XML API for all CLI parameters</li> <li>• Consistent Network Policy (Physical or Virtual)</li> <li>• Col</li> <li>• Dev</li> <li>• Platform</li> <li>• DC wide service provis</li> </ul> 	<p>Server Virtualization Switching</p> <ul style="list-style-type: none"> <li>• Improved VM performance, reliability, &amp;</li> </ul> 

# Cisco Data Center Portfolio

Unified Switching	Ethernet Switching	Storage Networking	HPC Clustering	Data Center Security Services	Application Network Services
 <p>Cisco Nexus 7000 Modular</p> <p>Nexus 5000 TOR</p> <p>Nexus Blades</p> <p>Nexus VM Switch</p>	 <p>Catalyst 6500 Virtual Switching</p> <p>Catalyst 49XX Rack Switching</p> <p>Catalyst Blade Server Switches</p>	 <p>MDS 9500 Storage Directors</p> <p>MDS 91xx/90xx Fabric Switches</p> <p>Storage Service Modules</p> <p>MDS FC Blade Switch</p>	 <p>SFS Infiniband Solution</p> <p>Nexus DCE</p> <p>Catalyst 49XX</p>	 <p>Firewall Services Module</p> <p>TrustSec (CTS)</p>	 <p>ACE Application Control Engine</p> <p>Wide-Area Application Services</p> <p>ACE XG XML</p>

VFrame DC Service Orchestration



Data Center Management

DCNM – E2E DC Mgmt    FM – Storage Mgmt

ANM– L4-7 Mgmt