Network – The Strategic Platform in Data Center

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Cisco Systems APAC
Agenda

- The Challenge
- The Vision
- The Solutions
Percent of Total IT Budget Spent in the Data Center

Percentage Data Center Spend
Percent

Example IT spending allocations – Financial Services Customers

Customer A:
Capex only
40% Storage
35% Networking
15% Servers
10% Applications
60-70% of IT CapEx budget in data center
Significant amount of internal application development not included

Customer B:
Capex and opex
55% Staff expense
45% Infrastructure spend
- 10% Networking (hardware and bandwidth)
- 8% Facilities
- 27% Other infrastructure
  - Servers
  - Storage
  - Applications
  - Middleware

* - IDC, Infonetics, Cisco Internal
The Data Center is Evolving (again)

- **Mainframe**
  - CENTRALIZED
  - Monolithic Infrastructure
  - Proprietary Platforms
  - Tightly Coupled App’s
  - Direct Attached Storage

- **Client Server**
  - DECENTRALIZED
  - Distributed Infrastructure
  - Server Proliferation
  - Web Facing Applications
  - Storage Aggregation

- **Web/n-Tier**
  - DECENTRALIZED

- **Service-Oriented**
  - RE-CENTRALIZED
  - Virtualized Infrastructure
  - Assembly from ‘Pools’
  - Standard Components
  - Service-Oriented App’s

- **Autonomic**

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**Server-Centric**

New DC Infrastructure Requirements

**Service-Centric**
The Typical Enterprise Data Center

Enterprise Data Center
- Engineering Services
- NAS Filers
- Finance, HR, Payroll and EDI
- Mainframe Systems
- NCR DB Server
- Tape Backup
- IP Services
- DNS
- RADIUS
- LDAP
- Multiple 2-Tier ERP Instances
- Traditional Voice PBX
- E-Mail
- E-Mail Appliances
- E-Mail Appliances
- Tape Backup
- JBOD
- Supply-Chain Management
- NCR DB Server
- Data Warehousing
- In-House Developed Apps
- 2-Tier CRM Application
- Operations Center

Internet Data Center
- Public Web Site
- 100s of Servers with Integrated Storage
- E-Commerce Application
- 4-Tier Application
- App. Server
- Internet Data Center
- Supply-Chain Management
- 2-Tier CRM Application
- In-House Developed Apps
- 2-Tier CRM Application
- Internet Data Center
- 2-Tier CRM Application
- In-House Developed Apps
- 2-Tier CRM Application

Lack of Agility
- Isolated Application Silos

Rigid Infrastructure Silos

Low Resiliency
- Inconsistent Security
- Inconsistent BC/DR

Expensive
- Under-utilized Resources
- Operational Complexity and Inefficiency
Key Data Center Infrastructure Challenges and Trends

Current Data Center

Lack of Agility

Low Resiliency

Expensive

Business Challenges

Controlling Costs

Application Service Levels

Business Responsiveness

Compliance and Resilience

Information Management

Service-Oriented Data Center

Agile

SOA

Dynamic Provisioning

Resilient

Integrated, Multi-layer Security

Tiered Storage & Business Continuance

Cost-Effective

Highly-utilized Pooled Resources

Standard Operating Environment
What Role Does the Network Play?

- Storage
- Network
- Clients
- Servers
- Business Applications
- Collaboration Applications
- Databases
- Middleware
What Role Does the Network Play?

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Why the Network?
Intelligence Migration Is Part of a Natural Evolution

The Network:
- Pervasive
- Transparent
- Scaleable
- Promote Standards
- Protect Investment

Applications:
- Firewall
- SBC
- File Management
- Email
- ERP
- Voice Mail
- WAES

OS and Middleware:
- Disk Management
- I/O Load Balancing
- Web Virtualization

The NETWORK
Aligning Virtual Compute Resources to Business Application

- Massive proliferation of server resources

- Server manager configures pools of compute, storage and I/O

- Based on application, process, or business objectives

**Intelligent Interconnect Fabric**

**Resource Pool**

- CRM
- ERP
- SCM
- Stand-By

Virtual Server

Applications

Server Processing

I/O

Storage

Massive proliferation of server resources

Server manager configures pools of compute, storage and I/O

Based on application, process, or business objectives
Cisco Data Center Product Families

Data Center Switching
- Catalyst 6500 Series
- Catalyst 4948 Top-of-Rack
- Catalyst Blade Server Switches

Storage
- MDS 9500 Storage Directors
- MDS 91xx/90xx Fabric Switches
- Storage Service Modules

Data Center Security
- Firewall Services Module
- Intrusion Detection Module
- CSA Server Security Agent

Compute Clustering
- SFS 7000 High-Density Infiniband Compute Fabric Switch
- SFS 3000 Infiniband Gateway

Application Network Services
- ACE Application Control Services Module
- Wide-Area Application Services
- SSL Termination
- GSS Global Server Balancing

Data Center Provisioning
- VFrame Server/Service Provisioning System

Data Center Management
- Fabric Manager – Topology Discovery/Visualization and Transport Provisioning
- ANM– Advanced L4-7 Services Module Management
Data Center Networking Trend

**AUTOMATION**
Dynamic Provisioning to Enable Business Agility

**VIRTUALIZATION**
Resource Management to Increase Utilization, Efficiency, Flexibility

**CONSOLIDATION**
Centralization & Standardization to Lower Costs, Improve Efficiency, Uptime

- Compute
- Network
- Storage

- LAN
- MAN
- WAN
- SAN
- HPC Cluster
- GRID
- Intelligent Information Network

- Enterprise Applications
- Data Network
- Storage Network
- Server Fabric Network
Data Center Architectural Trend

Data Center Consolidation

MPLS/DWDM
Design Goals:

- Fewer local servers / no storage + backup
- Continued LAN-level performance
- Preserve services of existing network
- Fully “business-enable” branch employees
Branch Consolidation & Application Acceleration (WAAS)

Design Goals Achieved
✓ Fewer local servers / no storage
✓ 2X – 100X response time improvements
✓ 80% decrease in bandwidth requirements
✓ Keep existing Accounting information, QOS, monitoring and security policy
LAN-Like Access to Various Applications

File Services:
- Save 5-MB PowerPoint
- Download of 8MB MS SMS Package

SharePoint:
- Open 500KB Word Doc
- Save 1MB Word Doc

Mail - Exchange:
- Native
- WAAS – Exchange 2003
- WAAS – Exchange 2000

Data Protection:
- SnapMirror Op of 1GB; T3/80
- Backup Op of 83MB; T1/80
- Restore Op of 83MB; T1/80

Production Customer: Sabre, RS&H
**Case Study: Caisse D’Epargne**

**Problem:**
Consolidate data from five locations into a centralized data center without significant cost incurred to upgrade WAN bandwidth

**Project:**
Build centralized file and data-access system based on Cisco WAFS solution. Leverage virtualized SAN environment to provide centralized data archiving and backup

**Results:**
- 50% cost saving on WAN infrastructure
- Improves data-access across several locations built on flexible and reliable WAN
- Centralized management of files and data with consistent security and backup policy

“The Cisco technology and architecture means that we have all the lower cost and data management efficiency benefits of centralized data control”

David Gosselin, Tech Director
Business Continuance / Disaster Recovery

Products Used

<table>
<thead>
<tr>
<th>Product</th>
<th>Feature</th>
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<tbody>
<tr>
<td>MDS 9500</td>
<td>Synchronous Mirroring &amp; Asynchronous Replication</td>
</tr>
<tr>
<td>Catalyst 6500</td>
<td>High Performance xWDM and 10Gb Ethernet</td>
</tr>
<tr>
<td>ONS</td>
<td>High performance SAN Extension between data centers</td>
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<tr>
<td>Global Site Selector</td>
<td>Continuous Access with Automatic Site Selection</td>
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</tbody>
</table>

Reference Customers

ExxonMobil, State Farm, BCBS of Florida, Medtronic, Shell Oil, Kimberly-Clark, Nissan, Washington Mutual, Microsoft, USAA

Cisco IT

Cisco synchronously replicates between data centers within San Jose, and asynchronously between San Jose & RTP for true fault-tolerant disaster recovery.
Data Center Networking Trend
SAN Consolidation and Virtualization

Exponential data volume growth

Storage Consolidation &
Virtualization benefits

Easier to manage
Better data sharing
Reduce data management
Facilitate backup & restoration

Drive Storage utilization from 40% to 70%

Reduce Storage infrastructure TCO
and increase data availability!
# Case Study: Cisco on Cisco

**Problem:** Explosive growth in data storage requirements

**Project:** Consolidate storage networking infrastructure in data centers worldwide

**Results:**

**Payback Period for Investment:** Roughly One Year

## Financials

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>Total (Current USD)</th>
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<tbody>
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<td>Tangible Benefits (NPV)</td>
<td>$3.886M</td>
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<td>Intangible Benefits (NPV)</td>
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<td>Tangible Costs</td>
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<tr>
<td>Intangible Costs</td>
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<tr>
<td>Overall Benefit</td>
<td>$8.531M</td>
<td>$7.617M</td>
<td>$6.801M</td>
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<td>$14.580M</td>
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Data Center Networking Trend

Services Virtualization

Application ‘stovepipes’ per department

Separate Firewalls

Separate Load balancers

Separate Application Offload
Data Center Networking Trend

Services Virtualization

Virtualization

Cisco Data Center module provides industry leading throughput

Unique Application Virtualisation of up to 250 customer contexts

Resource Reservation per Context

Rapid Provisioning
Today’s Enterprise Service Provisioning
*A Scale-Out Automation Example*

- **SysAdmin racks new server**
- **Loads O/S and Applications**
- **NetOps ensures Branch connectivity/ Routable Subnet**
- **SecOps checks security policy, expands FW Port Range**
- **SLB Admin Adds Server to Pool**
- **NetOps connects Ethernet cabling, configures VLAN/Port Config**
- **SysAdmin racks new server**
- **Loads O/S and Applications**
- **StorageOps configures LUN, maps to Server**
- **StorageOps provisions disk volume and resources**

Assume you just want to add one server to a web-farm…

Co-ordination Delay. Scale Out Computing takes enterprises 90 days.

New service turn-ups, after the application has been developed, often take 180+ days.

VFrame eliminate these delays and automate the service provisioning.
VFrame Enabling Provisioning Automation

- VFrame Provisions Routable Subnet
- VFrame configures Virtual FW Instance on FWSM
- VFrame adds server to SLB Pool
- VFrame configures port, VLAN, and switch policy
- VFrame net-boots the server to an appropriate LUN/Image
- VFrame provisions LUN and WWN
- VFrame provisions storage volume and boot-image
Cisco Value Proposition

Business Continuance
Agility
Resiliency
Cost Effective

“Cisco Takes 80% Modular Switching Marketshare”
“Fastest Growing Director Class SAN Switches”
Cisco #1 in Carrier and Enterprise Routing
“Cisco #1 in Infiniband and Server Fabric Switches”
“Cisco #1 in Data Center Firewalls and Security”
“Cisco is the ONLY Company that can service and support an end-to-end data center”
Summary: Next Generation Datacenters

- **SECURE LAN SWITCHING**
  - SSL
  - VPN
  - FW
  - IDS
  - SLB

- **INTELLIGENT SERVER SWITCHING**
  - Blade Servers
  - Web, E-mail Servers
  - DB Servers

- **INTELLIGENT SAN SWITCHING**
  - Volume Mgmt.
  - Backup Assist
  - Replication
  - NAS

**Virtual “Backplane” Between All Resources**

- Networking Pool
- Processor Pool
- Storage Pool

**Network as the Platform**