Cisco Strategy & Directions for the Virtualized Data Center

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Virtualization – CxO view

70% of CIOs said they would increase spending on virtualization even if they had to cut back on IT spending

- Merrill Lynch
## Challenges In the Data Center Today

### Complex Problems That Require Innovative Solutions

- Underutilized server and storage assets
- Power and cooling issues
- Rising cost of DC real estate
- Increasingly complex provisioning of DC services
- Time-to-customer: lengthy application deployments
- Siloed technology areas and DC teams
- Heterogeneous platforms, high complexity, poor agility
Four Drivers Behind Virtualization
One case study we know: Cisco Data Centers

Total of 230,000 square feet, 21 MWatts

46 Data Centers 14 Business, 32 Development
Improved TCO, Operations, Responsiveness

Server Consolidation

- 14,250 servers, 3,780 applications
- 20% of existing, 75% of all new server environments virtualized
- 2,720 VM’s installed
- $22+ Million in cost avoidance and reductions to date
- Deployment time reduced from 8-12 weeks to 3 days – Goal is 15 mins
Business Return on Investment
Cisco IT Experience From Adopting Data Center 3.0

Storage
- $70+ million cost avoidance over 4 years
- TCO: $0.21/MB → $0.01/MB
- Managed storage increased from 25 TB to 600 TB per FTE (lower Opex)
- Overall utilization: 20% → 68%

Server
- $20+ Million cost avoidance
- 50% existing, 75% new servers virtualized
- Deployment: 8 weeks → 3 days

Unified Fabric
- 66% Reduction in Cabling: $2M savings
- 30% more Compute capacity: $50M savings
Market Driver: Virtualization

- Virtualization is creating a market transition
  - Servers are becoming fluid objects in the network
- Cisco has historically been successful in capitalizing on market transitions
  - Data, voice and video
  - Unified fabrics for LAN and SAN
- Cisco is innovating to lead this change
  - Unified Fabrics was the first step….

“Virtualization is the highest-impact issue changing infrastructure and operations through 2012.”

“It will change how you manage, how and what you buy, how you deploy, how you plan and how you charge. It will also shake up licensing, pricing and component management. Infrastructure is on an inevitable shift from components that are physically integrated by vendors (for example, monolithic servers) or manually integrated by users to logically composed “fabrics” of computing, I/O and storage components.”

Gartner 2008
A journey on the CISCO DataCenter 3.0
New Infrastructure
Server Virtualization Architecture today
Catalyst based

Data Center Aggregation Block

Network Services Block

SAN A

SAN B

Ethernet
Fiber Channel
Server OOB Mgmt.
Step 1: Consolidation of Network Fabrics
Nexus platform
Step 2: Transparency in the Eye of the Beholder

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

Virtual Network Link (VN-Link):
- Extends network to the VM
- Consistent services
- Coordinated, coherent management
- Continuum of deployment options
Extending the network to the Virtual Machine
VN-Link With the Cisco Nexus 1000V

Cisco Nexus 1000V
Software Based
- Industry’s first 3rd-party vNetwork Distributed Switch for VMware vSphere
- Built on Cisco NX-OS
- Compatible with all switching platforms
- Maintain vCenter provisioning model unmodified for server administration; allow network administration of virtual network via familiar Cisco NX-OS CLI

Policy-Based VM Connectivity
Mobility of Network & Security Properties
Non-Disruptive Operational Model
Step 3: Consolidation of Server Fabrics
Nexus with UCS
Cisco UCS wows

November 10, 2009

The truth is that truly revolutionary products are few and far between. That said, Cisco's Unified Computing System fits the bill.

http://www.infoworld.com/d/hardware/test-center-review-cisco-ucs-wows-603
Server Deployment Today

- Over the past 10 years
  - An evolution of size, not thinking
  - More servers & switches than ever
  - More switches per server
  - Management applied, not integrated

- An accidental architecture
  - Still a 1980’s PC model

- Result: Complexity
  - More points of management
  - More difficult to maintain policy coherence
  - More difficult to secure
  - More difficult to scale
Server Deployment Today

- Embed management
- Unify fabrics
- Optimize virtualization
- Remove unnecessary switches, adapters, management modules
- Less than 1/3rd the support infrastructure
Our Solution: Cisco UCS

- A single system that encompasses:
  - Network: Unified fabric
  - Compute: Industry standard x86
  - Virtualization optimized

- Unified management model
  - Dynamic resource provisioning

- Efficient Scale
  - Cisco network scale & services
  - Fewer servers with more memory

- Lower cost
  - Fewer servers, switches, adapters, cables
  - Lower power consumption
  - Fewer points of management
Building Blocks

UCS Manager
Embedded– manages entire system

UCS Fabric Interconnect
20 Port 10Gb FCoE
40 Port 10Gb FCoE

UCS Fabric Extender
Remote line card

UCS Blade Server Chassis
Flexible bay configurations

UCS Blade Server
Industry-standard architecture

UCS Virtual Adapters
Choice of multiple adapters
Unified Computing System Manager
Embedded Device Management versus Multiple “Point” Solutions

Existing Mgmt Architectures

- Disjointed Management
- Bare-Metal Provisioning
- Patching
- Software Distribution
- Scripts
- Inventory
- Auditing
- Chassis Config
- Address Mgmt

Multiple Management Solutions
Uncoordinated / Complex

UCS Manager Architecture

- Embedded Device Management
- Control Plane Integration
- Release Automation
- Provisioning
- Configuration Automation
- Network
- Storage Access
- Embedded S/W
- Change Impact Analysis
- Compliance
Service Profile

Storage Management
- LUN access
- SAN Troubleshooting
- Performance Management
- vSANs

Server Administration
- Server Identities
- Online Troubleshooting
- Resource Allocation
- Server Policies
- Server Connectivity

Network Management
- External Connectivity
- Network Troubleshooting
- QoS
- Security
- vLANs

Operations Management
- Hardware Setup
- Inventory
- Cabling
- Power
- Cooling
- Diagnostics
- Offline Troubleshooting
Integrated Stateless Computing

No Attributes tied to and Physical Resource
- Not just identity
- Seamless server mobility
- Within interconnect domain

Dynamic Provisioning
- Complete infrastructure repurposing
- Integrated with 3rd part tools
Seamless Management Integration
Flexible Resource Pool with Open API

XML API  Industry Standard API

SMASH CLP
WS-MAN
IPMI
Cisco CLI
...

EMC
cisco
vmware
bmcsoftware
Case for a Unified Data Center

From ad hoc and inconsistent...

...to structured, but siloed, complicated and costly...

...to simple, optimized and automated
# Sample Configuration – 8 Blades

<table>
<thead>
<tr>
<th><strong>Legacy System</strong></th>
<th><strong>Unified Computing System</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Blades</td>
<td>$45,528</td>
</tr>
<tr>
<td>• Adapters</td>
<td>$5,992</td>
</tr>
<tr>
<td><strong>Total Blade</strong></td>
<td><strong>$51,520</strong></td>
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<tr>
<td>• Chassis, Fan, PSUs</td>
<td>$8,713</td>
</tr>
<tr>
<td>• Networking</td>
<td></td>
</tr>
<tr>
<td>• 10Gb Eth Switch</td>
<td>$24,398</td>
</tr>
<tr>
<td>• 4Gb FC Switch</td>
<td>$18,998</td>
</tr>
<tr>
<td>• Management Software</td>
<td>$7,000</td>
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<tr>
<td><strong>Total Infrastructure</strong></td>
<td><strong>$59,109</strong></td>
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<tr>
<td><strong>Overall Total</strong></td>
<td><strong>$110,629</strong></td>
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</tbody>
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</tr>
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</tr>
<tr>
<td>• Management Software</td>
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<tr>
<td><strong>Total Infrastructure</strong></td>
</tr>
<tr>
<td><strong>Infrastructure Savings</strong></td>
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<td><strong>Savings</strong></td>
</tr>
<tr>
<td><strong>%</strong></td>
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# Sample Configuration – 320 Blades

## Savings at Scale – 1/3 the Infrastructure Cost

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<tr>
<td><strong>Blades</strong></td>
<td>$1,812,800</td>
</tr>
<tr>
<td><strong>Adapters</strong></td>
<td>$239,680</td>
</tr>
<tr>
<td><strong>Total Blade</strong></td>
<td>$2,060,800</td>
</tr>
<tr>
<td><strong>Chassis, Fan, PSUs</strong></td>
<td>$174,260</td>
</tr>
<tr>
<td><strong>Networking</strong></td>
<td></td>
</tr>
<tr>
<td><strong>10Gb Eth Switch</strong></td>
<td>$487,960</td>
</tr>
<tr>
<td><strong>4Gb FC Switch</strong></td>
<td>$379,960</td>
</tr>
<tr>
<td><strong>Management Software</strong></td>
<td>$554,400</td>
</tr>
<tr>
<td><strong>Total Infrastructure</strong></td>
<td>$1,596,580</td>
</tr>
</tbody>
</table>

| **Infrastructure Savings** | $1,130,598 |
| **%**                     | 71%         |

| Overall Total | $3,657,380 |

| **Blades**     | $1,821,120  |
| **Adapters**   | $239,680    |
| **Total Blade** | $2,060,800  |
| **Chassis, Fan, PSUs** | $174,260   |
| **Networking** |                          |
| **10Gb Eth Switch** | $487,960    |
| **4Gb FC Switch** | $379,960    |
| **Management Software** | $554,400   |
| **Total Infrastructure** | $1,596,580 |

| **Infrastructure Savings** | $1,138,918 |
| **%**                     | 31%         |

| Overall Total | $2,518,462 |

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Unified Computing System

A single system that unifies
- Compute: Industry standard x86
- Network: Unified fabric
- Virtualization: Control, scale, performance
- Storage Access: Wire once for SAN, NAS, iSCSI

Embedded management
- Increase scalability without added complexity
- Dynamic resource provisioning
- Ability to integrate with broad partner ecosystem

Energy efficient
- Fewer servers, switches, adapters, cables
- Lower power and cooling requirements
- Increase compute efficiency by removing I/O and memory bottlenecks
Cisco Systems Data Center 3.0
Technology Journey Leading To a Unified Data Center
Customer Choice: Dial In to Reduce Costs at Any Stage

Every IT organization is unique. Each is in a different place with workloads, environment, budget, and IT investment cycles. Customers have the flexibility and choice to deploy technology at whatever point makes sense for their environment.
What is Cisco’s Sustainable Differentiation?

- Build on Cisco’s core competence
  Networks, convergence of data, voice and video, virtualization
- It’s the right time to converge compute and networking with Unified Computing
  Cisco is best positioned to enable a new compute model, no legacy and new innovation in network services
- The network is what makes the data center virtual
- End to End Data Center solutions
  Networks, Compute, Storage Access, Branch and virtualization
- Cisco Advanced Services