The Virtual Data Center: Unified Fabric
Government Data Center Challenges

- Improve asset utilization to reduce or defer capital expenses
- Reduce power and cooling consumption to cut costs and align with green business practices
- Reduce time to implementation for infrastructure and applications
- Make data and resources available in real time to provide flexibility and alignment with current and future governmental needs
Top Concerns in the Data Center

Power and Cooling

Space

Complexity
Siloed IT infrastructure has led to...

- Underutilized resources
- Higher power & cooling costs
- Inability to scale
- Long provisioning times
- Higher CapEX and OpEx

and

Complexity
Speaking of complexity…
Power and Cooling
It’s not just about “being green”...

% of WW electricity usage for Data Centers (estimates vary) 0.8 – 3%

Total electricity consumption
US (2008) 4,581 Billion kWh

Cost of electricity
US Commercial Sector Avg (2008) $0.0957/kWh

Cost of powering Data Centers
Estimated, US only $2.9 – 10.9B

Each watt consumed by IT infrastructure carries a “burden factor” of 1.2 to 2.5 for power consumption associated with cooling, conversion/distribution, and lighting.

Sources: US DoE, EPA, APC, Cisco IT, Network World
Power and cooling constraints are limiting IT’s ability to utilize existing data center space.

Limiting Factor: Rack size  
Usable Space: 42U  

Weight: 39.5U

Power: 11.9U  
Cooling: 2.9U

Source: Cisco IT
Data Center Evolution

Centralized
- Mainframe

Decentralized
- Client-Server and Distributed Computing

Virtualized
- Service Oriented

Application Architecture Evolution

IT Agility and Control
Nexus 2000 Fabric Extender

• EoR/MoR logical architecture
  • Simplified logical topology and management
• ToR physical architecture
  • Leverage structured cabling model

Logical View
Unified Fabric with Nexus 2000

- Multiple points of management:
  - FC
  - Ethernet
  - Chassis
  - Blade switches
- High cable count

- Single point of management
- Reduced cables in and between racks
- Reduced power and cooling
Unified Fabric Architecture

Fabric Interconnects

Single Pane of Glass

Cisco UCS Manager

Single point of device management for the Cisco Bravius Unified Computing System.
VN-Link With Hypervisor Bypass
Cisco Extended Memory Technology
## Reduction in Memory Costs

Using 4GB DIMMs, you can configure a B250-M1 with 192GB for less than 96GB on any other manufacturer’s blade.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Other Systems</th>
<th>Cisco Extended Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Configuration</td>
<td>Cost</td>
</tr>
<tr>
<td>96 GB</td>
<td>12x 8GB</td>
<td>$11,640</td>
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<tr>
<td>144 GB</td>
<td>18x 8GB</td>
<td>$17,460</td>
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<tr>
<td>192 GB</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>384 GB</td>
<td>n/a</td>
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</tbody>
</table>
Stateless Server Deployment

Network Resources
- MACs
- IPs
- VLANs

Server Resources
- Physical compute nodes
- UUIDs

SAN Resources
- WWNs
- VSANs

Mgmt Resources
- KVM IP address

Service Profile

Rapid, stateless provisioning of computing resources.
Server Mobility with Service Profiles

Compute Node A is being upgraded.

Service Profile

Service Profile can be migrated to Compute Node B.
Server Farm Model

- Easy to create unique profiles with identical attributes:
  - Templates
  - Cloning
- Allows for rapid deployment of many similar logical servers
IT Transformation and Data Center 3.0

Four Steps

From:

Disparate Networks
Physical Assets
Box-Based Provisioning
Organizational Silos

To:

Unified Fabric
End-to-End Virtualization
Service Orchestration
Integrated Teams