Next Generation Data Centers – Are You Ready?

Michael Rau
Vice President
Enterprise Technical Strategy
Agenda

- Cisco Architectural History
- DC Trends
- Cisco and the Data Center - Data Center 3.0
- Organizational Implications
Why the Network?
Intelligence Migration Is Part of a Natural Evolution

APPLICATIONS
- Firewall
- SBC
- Call Logging
- Email
- ERP
- Voice Mail
- Wires
- Anti-Spam
- Patch Updates
- Replication
- Mobile Email
- KERB
- Wireless Mgmt

OS AND MIDDLEWARE
- Disk Management
- I/O Balancing
- Web Acceleration

IP NETWORK
Components of Cisco’s Overall Strategy

- Ethernet
- IP
- Network Intelligence
- Communications & Collaboration
- Virtualization
- Automation (Capacity, Efficiency, Security)
- Network Consolidation
- Standards
Pushing the Technology Curve

Innovation necessitates proprietary features, which in turn drives Standards.

Cisco Innovation to Industry Standard


HSRP RSRB DLSw VRRP Tag Switching MPLS Inline Power 802.3af

ISL EtherChannel CDP NetFlow PVST+ 802.1q 802.3ad LLDP IPFix 802.1w
Cisco and the Data Center
Key Cisco Goal: Delivering a Unified Architecture for the Virtualized Data Center
## Achieving Virtualization at Scale

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Complexities</th>
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<tbody>
<tr>
<td>Increased resource utilization</td>
<td>Policies</td>
</tr>
<tr>
<td>Decreased power and cooling</td>
<td>Management</td>
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<td>Faster provisioning</td>
<td>Security</td>
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<tr>
<td>Higher availability</td>
<td>Processes</td>
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<tr>
<td>Business continuity</td>
<td>Data center islands</td>
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</tbody>
</table>
Transparency and Balance to Virtualization
Servers - 1998

Servers - 2008

Virtual Machines

VM Mobility

- Network out of Balance with Server and I/O Performance
  - Hypervisor becoming predominant/preeminent and free
  - Network and Server becoming closer together than ever

Challenges: Addressing, Service Portability

Technologies: Unified Fabric, FCoE, VN-Link
Case for a Unified Data Center Fabric

- Complexity, Cost, Power
- Universal I/O Ubiquitous Connectivity
Key Benefits of Unified Fabric

30% increase in server workloads. 24-month lifecycle extension on existing DC assets.

Wire once to connect to any device- SAN, LAN, HPC. Universal I/O to map to Virtual Machines

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.
Virtualization Today: Data Center Platform “Islands”

- Compute Platform
- Virtualization Platform
- Network Platform
Unified Computing: Federating the Data Center Islands

Integrated architecture simplifies set-up, improves business metrics, and enables dynamic provisioning.
Unified Computing: At the Intersection

Virtualization Platform

Resource Scaling

Dynamic Provisioning

Computer Platform

Network Platform

Unified Fabric

Hypervisor Optimization
Unified Computing – What is It?

- Extends the Unified Fabric with Extended Virtual Machine Awareness
- Creates a framework that allows application of policy across Data Center islands
- A platform for increased standards creation
  - Multi-Vendor Interoperability
- Creates an environment that dynamically links network, storage, and servers to facilitate new cloud opportunities
Unified Computing Example
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
Virtualization at Scale Will Drive Cloud Adoption

Phased Evolution of Cloud:

**Standalone Clouds**
- External, Off-Premise
- Internal, On-Premise

**Enterprise-Class Clouds**

**Key challenges:**
- Control
- Security
- SLAs

**Inter-Cloud**

**Key challenges:**
- Federation
- Portability
- Market
Business Benefits of Cloud

- Reduced costs through economies of scale
- Faster turn-up of business applications and capacity
- Freedom of choice to run workload and applications in the most efficient and effective place possible
<table>
<thead>
<tr>
<th>Phase</th>
<th>Silos</th>
<th>Standardize</th>
<th>Production Virtualization</th>
<th>Dynamic Virtualization</th>
<th>Private Cloud, Resource Pools</th>
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</thead>
<tbody>
<tr>
<td>Definition</td>
<td>Applications deployed in silos. Very bespoke environment.</td>
<td>Homogenizing the infrastructure to simplify the operational model. Virtualization usually deployed in lab and test/development environments.</td>
<td>Scale-out of Virtualization to production systems</td>
<td>Virtual Machines move- for workload balancing, change-control, and application migration</td>
<td>Complete and transparent integration of virtualized resources</td>
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## Data Center 3.0 - Customer Journey

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<th>Phase</th>
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<tbody>
<tr>
<td></td>
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<td>Business Continuance / Disaster Recovery</td>
<td>Data Center Consolidation</td>
<td>10Gb Server Access</td>
<td>VN-Link for LAN, SAN and Unified Fabric</td>
<td>Workload Portability</td>
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<td>Life-cycle Upgrades</td>
<td>Server Consolidation</td>
<td>Unified Fabric</td>
<td>Storage Volume Virtualization</td>
<td>Policy Consistency</td>
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<td>Server Refresh</td>
<td>Branch Consolidation</td>
<td>Global SANs</td>
<td>Layer-2 Extensions</td>
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<td>Storage Area Networks</td>
<td>Virtualized Services</td>
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<td>10GbE Core</td>
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Unified Data Centers
People and Processes

- Collapsing Data Center Islands will drive need for Integrated DC Teams
  - Marriage of Storage, Network, and Compute Discipline
  - Data Center managed as a system (i.e. Mainframe Mentality)

- Cooperative partnerships with security function critical to exploiting new opportunities (VM Mobility, cloud)

- Potential for new approaches in procuring product and services in the Data Center