“Sales of smartphones and tablets are now greater than all PCs, including notebooks.”

“90% of enterprises have begun or plan Bring Your Own Device initiatives” IDC

“15% of professional PCs will be managed under a hosted virtual desktop model by 2014” Gartner

“One third of corporations say they are using video at least once per week.”

“The number of shipped tablets is set to jump to 147.2 million in 2015.” Forrester

“By 2013, over 90% of network data traffic will be video.”
Vision for the New Virtual Workspace

Mobility

Any Device

Voice and Video

Security

Enterprise, desktop and web/SaaS applications, content/data, voice and video collaboration
What is Desktop Virtualization?

- Refers to the separation of the physical endpoint from the logical desktop
- Endpoints may be variety of devices; applications are hosted wherever the best user experience is offered (locally at endpoint or data center)
- Access from the endpoint to the logical desktop is delivered through the network
Cisco VXI: Delivering the New Workspace
Unified Virtual Desktop, Voice and Video

Virtual Desktop

Secure

Flexible

Cisco VXI

Data Center Virtualization

Uncompromised

Data

App

Device

Media

Borderless Networks

Location

Virtual Workspace

Collaboration

Video

Voice
VXI is More than Desktop Virtualization

VXI is the ideal platform for desktop virtualization...

Virtual Desktops

- More scalable
- More secure
- Higher performance
- Simplified deployment
- Reduced costs

Virtual Workspaces

- Rich Media, Voice, Video
- Unified Communications
- Network-Optimization
- End-to-End Security
- Fully integrated solution

…and delivers the solution for virtual workspaces
Cisco VXI
Virtualized End-to-End Solution

Virtualized Data Center
- Cisco Collaboration Applications
- MS Office
- Desktop Virtualization Software
  - Citrix
  - VMware
  - Microsoft

Virtualized Data Center (continued)
- Nexus 1000v
- ASA
- ACE
- Unified CM
- WAAS
- Virtual Security Gateway

Virtualization-Aware Borderless Network
- Cisco® Identity Services Engine
- UCS
- AnyConnect
- Quad
- PoE
- Routing
- Switching

Virtualized Collaborative Workspace
- Cisco Virtualization Experience Clients
  - AnyConnect
  - Cisco VX 6215 Thin Client
  - Cisco VX 4000 PC Client
  - Cisco VX 22xx & 21xx Zero Client
  - Cius Business Tablet

Virtualized Collaborative Workspace (continued)
- EMC²
- NetApp

End-to-End Management and Optimization
- AppSense
- Atlantis
- Liquidware Labs
- umidesk

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## Cisco VXI User Workgroup Categories

<table>
<thead>
<tr>
<th>Task Workers</th>
<th>Remote Workers</th>
<th>Office Workers</th>
<th>Guest Workers</th>
<th>Mobile Workers</th>
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</thead>
</table>
| • Factory worker  
• Retail clerk  
• Bank teller  
• Credit card call center | • Offshore workers  
• Outsourcers, contractors  
• Branch offices  
• Teleworkers | • Finance  
• Operations  
• Marketing  
• Administration | • University computer lab  
• Training center | • Sales  
• Executives  
• Field service |

### Benefits
- **Knowledge Workers**
  - Secured access and control
  - Rich PC experience
  - Offline access
- **Task Workers**
  - Simple
  - Locked down
  - Limited application
- **Remote Workers**
  - Secured access and control
  - Location and device flexibility
  - Diverse applications and users
- **Office Workers**
  - Rich PC experience
  - Personal
  - Instant resets
- **Guest Workers**
  - Rich PC experience
  - Standard application set
- **Mobile Workers**
  - Secure
  - Diverse applications and users
Fundamentals of Desktop Virtualization
Computing Architecture Choices

Where is computation happening?

- Virtual Desktop Streaming
  - Apps
  - WinXP
  - Synchronized Desktop
- Hosted Virtual Desktop
- Application Streaming
  - WinXP
- Hosted Virtual Application
- Client-Based Computing
- Server-Based Computing

Used VMware Hypervisor as an example. Could use any flavor of Hypervisor.
Common Components of Desktop Virtualization

1. Connect to Connection Broker
2. Identify target VM
3. Query for user policy
4. Start target VM
5. Return VM to endpoint
6. Connect VM to endpoint
7. Successful connection

Thin Client
Smartphone/iPad
Thick Client

Connection Broker
Active Directory
Virtual Infrastructure
Virtual Infrastructure Management

Authentication
Display Protocol
Citrix XenDesktop and ICA/HDX

- Latest release: XenDestion 5.5 – Improved HDX for WAN, better management
- HDX MediaStream and Adaptive Orchestration
  - Leverage client-side resources
  - Better server scalability
  - More simultaneous users over WAN (Controlling Bandwidth Explosion)
  - Handle changing network conditions
- HDX Flash Redirection
  - Now can handle 300 ms RTL
  - Linux now supported
  - Fallback to Server-side rendering adaptively
- HDX VoIP-Over-ICA
  - Inline with Cisco VXI approach of separating media
  - SDKs for VOIP providers
  - Multi-Stream ICA
  - Larger Audio Jitter buffers
- Basic Characteristics
  - 64 Virtual Channels
  - TCP based protocol
  - Encryption/Compression
### Description

- New optimization controls to reduce bandwidth
  - Client Side Caching
  - Lossless CODEC
  - Build to Lossless GPO
- Customize to reduce bandwidth usage on both the LAN and WAN
- Optimization Controls available in GPO

### Benefits

- Up to 75% reduction in bandwidth usage
- Improve scalability on WAN links
- Increase user density on WAN
- Configure by user case, user expectation and network requirements

---

**Power User**

- Build to lossless (default)
- Direct CPU/GPU to endpoint mapping
- Superior image quality

**Task Worker**

- Disable build to lossless
- Client side caching
- Best performance on constrained WAN

**Office Worker**

- Dynamic network management
- Correct codec for each media type
- Best image quality on available network bandwidth

**View 5.0**

All use cases = UDP, Secure, future proof, OS & application independent, session resilience

---

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Cisco VXI User Experience and Collaboration – Creating the Virtual Workspace
Virtualization Experience Client (VXC) Portfolio

New Client Additions in v2.5

Zero Clients
- VXC 2100 Series
- Shipping

Zero Clients
- VXC 2200 Series
- Shipping

Software Appliance
- VXC 4000
- Available Q4 CY11

Thin Client
- VXC 6215
- Available Q4 2011/Q1 2012

Enterprise Tablet
- Cisco Cius
- Shipping

VXC on VTG CEC page http://www.in.cisco.com/voice/products/vxc/index.shtml#tab=0
Any Device, Anywhere
Fixed and Mobile

Corporate Owned
- Zero Clients
- Zero Clients
- Software Appliance
- Thin Client
- Enterprise Tablet

Cisco VXC
Cisco Cius

BYoD
- PCs & Macs
- Smartphones
- Tablets

Desktop
Virtualization
Clients:
- Citrix Receiver
- VMware View

Communications Clients:
- Cisco Jabber
Cisco VXC Addresses Most Common VDI User Types*

- **Task Workers** (basic productivity apps)
  - **VXC 2000** (zero client)

- **Campus Workers** (office professional, variety of apps, personalization, rich media)
  - **VXC 6215** (thin client)

- **Mobile Workers** (mobile desktop access, variety of apps, personalization, rich media)
  - **CIUS** (tablet)

- **Remote Workers** (wide variety)
  - **CIUS** (tablet)
  - **VXC 2000** (zero client)
  - **VXC 6215** (thin client)

**VXC 4000** (PC software) enables Windows PCs for Contractors, Work-at-home employees, BYOD use cases
Voice, Video, Virtual Desktop Challenge

- Unusable experience
  - Hairpin effect
- Increased cost and resource utilization
  - Bandwidth explosion
  - Heavy virtual machine processing in data center
Rich Media UE (User Experience) restored by VXC 2x00 & VXI

- Desktop Virtualization S/W
  - VMWare
  - Citrix

- Hypervisor
  - VMWare/Citrix

- Desktop O/S

VXC

Media Flow Outside of Display Protocol

PCoIP, ICA/RDP

Signalling

Unified CM and Unified Presence Server

Connection Broker

Data Center

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Rich Media UE restored by VXC 6215/4000 & VXI

- Video & Voice Support
- Linux based endpoint
- Monitors
  - Single: 2560x1600
  - Dual: 1920x1200
- No PoE

- Software Appliance on XP and Windows 7
- Voice Support only
- Enables VXI Collaboration for refurbished PCs

End User

VXC 6215

Signalling

ICA

VXC 4000

Signalling

PCoIP, ICA/RDP

Data Center

Media Flow outside of Display Protocol

Desktop O/S

Desktop Virtualization S/W VMWare/Citrix

Hypervisor VMWare/Citrix

Unified CM and Unified Presence Server

Connection Broker

App

App

Data
Cisco VXI Powers the New Virtual Workspace

Before

After

Provides uncompromised user experience
Challenges of Desktop Virtualization over WAN

- Hairpinning
- WAN’s effects on Users Experience
- Display Protocol Opaque to the Network

End-users see pixelization and bad UE without WAN Optimization/Acceleration

Increasing bandwidth might not help

End-users experience no pixelization on LAN

Video processed on HVD causing bandwidth and server compute overload
# Bandwidth Reduction with WAAS*

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Vendor</th>
<th>Transport</th>
<th>Bandwidth without WAAS (Approx) Cisco KW+</th>
<th>Bandwidth without WAAS (Approx) Task Worker</th>
<th>Bandwidth with WAAS (Approx) Task Worker</th>
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</thead>
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<tr>
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<td>TCP 3389</td>
<td>1.5 Mbps</td>
<td>384 Kbps</td>
<td>96 Kbps</td>
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<tr>
<td>Independent Computing Architecture (ICA)</td>
<td>Citrix XenDesktop 4.0/5.0/5.5</td>
<td>TCP 2598 CGP TCP 1494</td>
<td>967 Kbps</td>
<td>120 Kbps</td>
<td>60 Kbps</td>
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<tr>
<td>PC over IP (PCoIP)</td>
<td>Teradici / VMware</td>
<td>Media – UDP 50002/4172 Control – TCP 50002/4172</td>
<td>1.5 Mbps</td>
<td>192 Kbps</td>
<td>192 Kbps</td>
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</tbody>
</table>

*Some Caveats apply, refer to Cisco VXI CVDs for more details

Note: PCoIP can’t be optimized by WAAS

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Cisco VXI Virtual Workspace with UPOE

**VXI Workspace with UPoE**

- Integrated Display Client
- High availability (Power Backup)
- Minimize workspace clutter
- Power Efficiency/Management
- EnergyWise Management
- Low TCO

**Today’s Workspace with PoE+**

- Multiple Power Management Points
- Cabling Overhead
- Desktop Clutter
- High Availability only for phone
- Obsolete equipment management
- High TCO
Cisco VXI End-End Security
Secure access for Teleworker, Home users and Small branches

- **Cisco Virtual Office**
  - VXI ACLs to allow only Display traffic
  - VXC 2112, 2212, 4000, 6215 supported using 802.1x, MAB and Auth Proxy
  - Ports with VXI ACL opened for VXC 2111 and 2211
  - WiFi support for mobile endpoints

- **Roundtable VXC VPN**
  - Supported with 89xx and 99xx phones with Phone load 9.2.3 and CUCM 9.0
  - Requires ASA to terminate two tunnels
  - Two SSL VPN licenses consumed on the ASA
  - Unified communication traffic prioritized over VXI traffic
  - Computer port on the phone protected by VXI ACL and MAC address authentication
  - VX2200 endpoints will work but are not officially supported
Secure Remote Connectivity with AnyConnect 3.0

• Anyconnect has the largest footprint of supported devices
  ▪ Thick endpoints: Windows, Mac and Linux
  ▪ Apple iOS 4 - Including iPhone
  ▪ Cisco VXC endpoints not supported today
  ▪ iPad and CIUS support Anyconnect 2.5 only

• Always On or On-Demand VPN
• Auto Re-Connect (Persistence)
• Built-In Digital Cert Support
• Optimal Gateway Selection
• Support for VDI Applications/Receiver Support
Secure Remote Access with VXI

- AnyConnect on Mobile Client allows secure remote connections to corporate network and Virtual Desktops.
- Split tunneling and ScanSafe allow secure remote access to Internet from local browser on the endpoint or from within Virtual Desktop.
- Web traffic is inspected by WSA at HQ or in the ScanSafe Cloud.
- VXI traffic is forwarded to the DataCenter.
- Remote HVD access using Cisco VPN technology allows access to both VXI and non-VXI applications while still using a single, and in most cases existing, infrastructure.

**Diagram:**
- **Inside network:** 192.168.225.0
- **Outside network:** 172.21.61.125
- **Internet Traffic:** Red dashed line
- **Split Tunnel:** Blue dashed line
- **SSL VPN Client:** 192.168.11.1
- **Tunnel IP:** 192.168.11.0
- **Mobile Consultant:**

**Table:**

<table>
<thead>
<tr>
<th>Pool Name</th>
<th>Starting Address</th>
<th>Ending Address/Number of Addresses</th>
<th>Subnet Mask/Prefix Length</th>
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Anti-Virus in VXI

- Virus scan is an essential component of Virtual desktop environments
- VXI offers choices from an ecosystem of validated AV solutions optimized for Desktop Virtualization
- Traditional AV software, even when optimized, impact HVD densities and hence the TCO

<table>
<thead>
<tr>
<th>Workload Profile</th>
<th>AV Scan Policy</th>
<th>HVD Density</th>
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<tbody>
<tr>
<td>KW only</td>
<td>N/A</td>
<td>110/110</td>
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<tr>
<td>KW with MoveAV 1.5</td>
<td>Default</td>
<td>90/90</td>
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</table>

18% impact on HVD Density
XenDesktop 5/ ESXi 4.1, Win 7 32b/1.5G/20G
Optimizations done based on Citrix/VMware recommendations

- Trend Micro Anti-Virus solution has been added to VXI Phase 2.5 along with McAfee MOVE-AV 1.5
- Storage IOPS requirements and Login/Boot/AV Storms should be considered in the design apart from HVD density impact
- Licensing and Support directly from AV vendor
Scaling VXI
Scaling Cisco VXI: UCS Extended Memory

Increase performance and capacity for demanding virtualization workloads

Cisco UCS Servers

= >

Higher HVD Density

Cisco UCS With Extended Memory

48 DIMMs
Max 384GB
Higher Performance
<table>
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<tr>
<th>Item</th>
<th>Memory Slots</th>
<th>C200M2</th>
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</table>
Scaling Cisco VXI: PCoIP Offload Card

Offloads PCoIP image processing to reduce CPU load, enable more users per server

APEX 2800 PCoIP Offload Card

- Insures consistent, reliable user experience regardless of server demand
- Reduces server CPU utilization up to 50%; adapts to fluctuating workloads
- Supports up to 64 displays

Cisco UCS C Series

- Validated with Cisco UCS C Series Rack Mount Servers
- Offload card plugs directly into server
- Can increase user density, enable existing users to run intensive apps
## Scaling Cisco VXI: Hypervisor Tuning

### VMware vSphere 5.0
- vSphere 5.0 adjusts default settings for advanced, hard-to-change parameters that impact HVD density and throughput
- Now optimized for hosting dense HVD workloads
- Cisco VXI validating the impact of these changes on desktop density with UCS.

### Microsoft Hyper-V R2 FP1
- Dynamically distributes memory across multiple VMs
- Memory can be reallocated automatically on running VMs (no power off)
- Responds to changes in workload or application
- Increased memory efficiency intended to support more VMs per server
Scaling Cisco VXI: Storage Optimization to Reduce IOPS

- Caches non-persistent files on local disk; VMs deployed as thin copies of master image; cached locally on host.
- No-charge feature embedded in Citrix XenServer; also requires XenDesktop with Machine Creation Services.
- Read and write caching reduces shared storage requirements; real-time inline deduplication of IO traffic increases desktop performance; accelerates performance by moving virtual desktop disk to local memory.
- Can be deployed on each server (as shown) or top-of-rack.
Scaling Cisco VXI: Cisco ACE and Cisco WAAS

Load Balancing

- Minimizes impact of logon storms
- Offloads SSL processing from connection brokers
- One-armed mode suggested when not using SSL offload
- Supports virtual contexts

Bandwidth Optimization

- Cisco WAAS delivers advanced compression and application optimization
- In-path, off-path, VM-based deployment options
- Cisco vWAAS provides VM-based optimization with mobility awareness
- On-demand deployment with minimal configuration
General Design Considerations, Best Practices & Caveats

- PCoIP and ICA have comparable blade density performance. RDP performance is typically higher.

- ICA adapts and performs significantly better than PCoIP or RDP using VXI KW+ workload in VMware View 4.5. PCoIP in View 5.0 performance is expected to match or exceed – Under Validation.

- 30 IOPS per HVD is recommended for best performance even under peak conditions.

- Max Acceptable Disk Latency before user experience is impacted is 50ms.

- Storage Optimization technologies can leverage the local SSD drives for its cache or the extended memory available on UCS B and C-series.

- Atlantis ILIO provides both Read and Write IO caching; Intellicache provides Read cache only.
Cisco Unified Data Center
The Foundation for VXI

Core Elements
- Unified Computing System (UCS)
- Unified Fabric
- Unified Management
- Storage Partners
- Hypervisor Partners
- Virtual Desktop Software Partners
- Integrated, tested and validated

Solution Partners:
- VMware
- Citrix
- EMC
- NetApp

Open / Standards | App. Performance | Energy Efficiency | Security | Continuity | Workload Mobility

Unified Fabric | Unified Computing | Unified Management

Nexus 5000 | MDS 9500 | Nexus 1000V | UCS
Over 350 UCS Desktop Virtualization Customers in production

- A year since solution launch
- Key Sectors are Financial Services, Healthcare, Public Sector / Education
- A number of customers running 10k+ seats
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Industry Awards / Recognition for VDI / Virtualization

- Citrix 2011 Citrix Ready Solution of the Year
- VMware: Best of vmworld 2010 Hardware for Virtualization
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- VMware: Best of VMworld 2010 Hardware for Virtualization

Broad Ecosystem of technology partners

- Over 20 technology / integration partners for delivery
Validated Designs and Reference Architectures
End-to-end reference architectures reduce risk for optimized stack

Flexibility and Bandwidth for Converged Multiple Networks
Unified ports and 80G burst b/w allow for convergence with performance

Prioritization of Desktop Pools
UCS QoS and bandwidth controls deliver prioritization to desktop pools

Networking Visibility and Security to the Desktops
Nexus 1000V with VSG and VM-FEX provide VM level controls

Rapid Provisioning of Desktops
Service profile templates for rapid provisioning of desktop pools

Desktop Density and Scalability
Great virtual desktop density with linear performance scalability
Efficient Scaling of Desktop Virtualization
Optimizing Memory for Desktop Virtualization

Classic

- Xeon 5600
- 12 DIMMs, Max 96GB
- Higher Performance

OR

- Xeon 5600
- 18 DIMMs, Max 144GB
- Lower Performance

Cisco UCS with Extended Memory

- Xeon 5600
- 48 DIMMs
- Max 384GB
- Higher Performance
Data Center Optimizations for Virtual Desktops

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**Validated Designs and Reference Architectures**
End-to-end reference architectures reduce risk for optimized stack.
Typical Blade architectures
- plenty of components to configure, managed and fail

Redundant LAN Switches per enclosure
Redundant SAN Switches per enclosure
Enclosure management system (typically a SPoF)
Redundant top of the rack / end of the row LAN Switches
Redundant top of the rack / end of the row LAN Switches
Redundant System management servers
Complex to configure and to extend without (changing FC Zoning .....)

Complex application specific cluster solution

SAP Licence keys still bound to physical hardware
Cisco UCS reduce complexity
what's not there must not be managed and can’t fail

- Cisco architecture eliminates complete layers
  - Integrated LAN/SAN ports extended down to the enclosure – “one hop” switching
  - Fabric-Switches manage the whole row

- Extreme easy to extend without changing the FC Zoning using Service profiles
  - 15 minutes to add Chassis or Blades (UCSM auto-discovery)
  - 10 minutes to configure up to 56 virtual NICs and HBAs per blade
  - 10 minutes to add an ESX server using Templates & PXE Boot
  - 10 minutes to add an SAP App server using Tidal

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Server role depends on actual requirements

Daily:
- Web Tier: 6 servers
- SAP ERP PRD: 8 servers
- Reporting: 2 servers
- Test/Dev: 4 servers

Nightly:
- Web Tier: 4 servers
- SAP ERP PRD: 6 servers
- Test/Dev: 6 servers
- Batch Apps: 4 servers
- SAP QA: 4 servers

Monthly:
- Web Tier: 4 servers
- SAP ERP PRD: 10 servers
- Reporting: 4 servers
- Test/Dev: 2 servers
- Batch Apps: 6 servers
- SAP QA: 4 servers
- Spares: 6 servers
- Spares: 4 servers
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Networking Visibility via Cisco VIC

- Higher performance with hypervisor by-pass (VM-FEX)
- Statistics/Monitoring of VMs
- Debugging/SPAN of VM traffic
- Network policy mgmt - QoS, B/W

Server Blade

VMware vSphere

Cisco VIC

FEX 2200

FI 6200

Debugging/vSPAN of XenApp VM
Securing Virtual Desktops in the Data Center

Network Attacks

Rogue VM: Send ARP to Announce VM Location

Rogue VM: Change/Add MAC Address

Rogue VM: Change/Add IP Address

Rogue DHCP Server

VMotion
Cisco Integrated Security Features

Mitigates Network Attacks

Rogue VM: Send ARP to Announce VM Location

Port Security
Rogue VM: Change/Add MAC Address

IP Source Guard
Rogue VM: Change/Add IP Address

Rogue DHCP Server

VM
VM
VM
VM

VM
VM
VM
VM

VM
VM
VM
VM

VM
VM
VM
VM

VMotion

Dynamic ARP Inspection

DHCP Snooping
VSG Deployment for VDI

Server Zones
- Portal
- Records
- Database
- Application

Virtual Security Gateway (VSG)

HVD Zones
- IT Admin
- Assistant
- Doctor
- Guest

Network

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Prioritization and QoS Pools

- QoS controls for tuning Storage & Network flows—Platinum, Gold, Silver, Bronze, best effort, FC QoS Classes
- Multi-cast optimizations
- Bandwidth controls
- Lossless Ethernet—drop/no drop
- Burst size controls

- Platinum Pool
  - 50% Bandwidth
  - Lossless Ethernet NFS
  - Max burst 64K

- Silver Pool
  - 30% Bandwidth
  - FC with max burst 32k

- Bronze Pool
  - 20% Bandwidth
  - FC with max burst of 16K
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Dynamic Convergence Ports with Intelligence

- Configure protocol support (Ethernet / FCoE and native Fibre Channel) on the same port dynamically
- Flexible LAN & storage convergence
- Multi-protocol optimizations—iSCSI, NFS/CIFS, FC, FCoE
- Remove specific protocol bandwidth bottlenecks
Wire for Bandwidth, Not for Connectivity

- 2x 1 Link: 20 Gbps per Chassis
- 2x 2 Link: 40 Gbps per Chassis
- 2x 4 Link: 80 Gbps per Chassis
- 2x 8 Links: 160 Gbps per Chassis

<table>
<thead>
<tr>
<th>I/O On-Demand via Service Profile</th>
<th>Wire Once Architecture</th>
<th>Policy-Driven Bandwidth Allocation</th>
<th>Virtual Interface Granularity</th>
</tr>
</thead>
</table>
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Cisco Virtualized Multi-Tenant Data Center

This flexible, modular design is a blueprint for cloud deployments.

Learn More

Converged Infrastructure

Virtualized Multi-Tenant Data Center

FlexPod
Secure Multi-Tenancy
Vblock

Data Center Interconnect

DCI with MPLS
DCI with Ethernet Transport
DCI with IP Transport
Workload Mobility

Network Infrastructure and Services

DC Networking
DC Infrastructure
Network Services
Virtual Switching System
WAAS

Server Networking
Data Center Blade Server Integration
VMware Infrastructure 3

Security

Security and Virtualization
Svc Module Design ACE, FWSM
Data Center Service Patterns
Server Farm Security
Security and Virtualization in the DC
DMZ Virtualization

Applications

VXI: Desktop Virtualization
Cisco Virtualization Experience Infrastructure
Citrix XenDesktop/NetApp
View 4.5 and EMC
View 4.5 and NetApp
Network Design for View

Business Applications
Microsoft
Microsoft Exchange Server 2007
Oracle
SAP

Cisco Partner Application Innovation Center

Service Provider
Data Center Service Delivery

Growing partner ecosystem including:

- Citrix XenDesktop
- VMware View

Increasing number of channel partners

- Partners transforming from traditional desktop to Virtual Workspace practice
Explore Cisco’s VXI TCO Calculator

- Designed to demonstrate the financial benefits of desktop virtualization compared to existing PC infrastructure
- Using an interactive financial analysis model to create custom business case and executive summary presentation for the customer

The TCO model includes:
- CAPEX: endpoints, servers, storage network ports, broker and hypervisor costs
- OPEX: desktop support, power & cooling, Microsoft VDA
- Ability to compare to HP or Dell

VXI TCO Calculator (Internal)

- Other tools to consider:
  Citrix: http://flexcast.citrix.com/analyzeandcompare.html
  Vmware: http://roitco.vmware.com/vmw/
Cisco VXI Key Value Drivers

- **Client Hardware & Software**
  - Lower cost client devices
  - Extend life of desktops

- **Data Center Infrastructure (Investment)**
  - UCS virtual desktop density
  - UCS Unified fabric
  - End-to-end validated design

- **IT Operational Costs**
  - Lower deployment, administration and Help Desk costs

- **Utilities & Facilities**
  - Lower power consumption
  - Energy Management
  - Power over Ethernet benefits

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Cost Savings with VXI
Drive up to 25% savings in overall desktop and Video TCO

Annual TCO Per User ($)

Total: -24%
Desktop: -17%
Voice: -30%+

Drive up to 25% savings in overall desktop and Video TCO
Summary

• Cisco VXI enables businesses to deliver a New Virtual Workspace solution that is flexible, secure and uncompromised

• New Cisco Collaboration endpoints unify virtual desktop, voice and video

• Cisco Data Center enhancements provide scaling and simplified Virtual Desktop deployment, lowering TCO

• Security, access and compliance enabled seamlessly with Cisco Borderless Network
Cisco Intelligent Automation for Cloud - CIAC

Cloud Automation Pack

- Service Catalog and Self-Service Portal
  - Cisco Cloud Portal Suite
- Global Orchestration and Reporting
  - Cisco Process Orchestrator
- Adapter Framework

Hardware Managers
- e.g., UCS Manager, Tivoli

Virtualization Managers
- e.g., VMWare vCenter

OS/Software Provisioning
- Cisco Server Provisioner

Billing/Chargeback
- CMDB
- IT Service Management Tools
- Monitoring and Governance

Compute Resources
Virtual Infrastructure
Network Resources
Storage Resources

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Problem definition
This message indicates an error in the port ASIC. The first [dec] is the module number. The second [dec] is the ASIC port number. This error message could possibly be due to either software or a hardware issue.

Problem definition (for SYS-3-PKTBUFFFAIL_ERRDIS)
This error message is caused because of a hardware problem (parity error) on one of the ASICs, where the disabled ports are directly connected. The errdisabling of the ports is a precautionary action of the switch after it receives a parity error message.

Impact
Network connectivity to the ports of the module will be lost until this error is resolved.

Troubleshooting steps
To recover the module or ports from coil ASIC errors, perform the following steps:
1. Disable and enable the ports; if the error is not resolved by re-enabling the ports then more testing is required on the whole module. Depending on module# and which ports are effected, use configuration mode and do the following:
   - Conf t
   - Interface range {module#}/[{intf start}] – [{intf end}]
   - Shut
   - No shut
2. Set the bootup online diagnostics level to complete using the configuration mode command:
   - Conf t
   - diagnostic bootup level complete
3. Soft-reset the module by issuing the following command:
   - hw-module module {module#} reset
4. Perform a Hard-reset of the module by physically reseating the card. Alternatively, issue the following global configuration commands:
   - conf t
   - no power enable module {module#}
   - power enable module {module#}
   NOTE: Remember to set the diagnostics level back to minimal by issuing the configuration mode command :
   - conf t
   - diagnostic bootup level minimal
5. If the above steps fail to recover the ports, consider replacing the faulty module.
For more information, see Troubleshooting Hardware and Common Issues on Catalyst 6000/6500 Series Switches Running Cisco IOS System Software.
VDI/VXI Solutions with CIAC
Delivering VXI Service – Faster
(with end-to-end Automation)

Multiple requests from user for:
ID, Desktop, Phone, Email, Applications etc.
InfoSec Creates ID
Server Admin Clone VM

Citrix Admin Configure PVS & DDC
Desktop Admin Install Applications
Communication Group provision Phone
Secure it

Manual Process take several days

Ready for use…

Before: Conventional VDI
• Manual provisioning
• Hard to control utilization
• High provisioning & ops cost
• Extended provisioning time
• Configuration risk

After: Automated VXI Solution
• Self-service; automated provisioning
• Elasticity (capacity-on-demand)
• Optimized provisioning & ops cost
• Rapid provisioning
• Increased Resiliency and Availability

Single request from user, using service catalogue
Approved by Manager
Cisco Cloud Portal order goes to CPO
CPO creates User ID
Configure Citrix PVS, DDC, CUCM, VMware, CUPS
Install Applications
Secure it
Ready for use…
Cisco's build, buy, and partner innovation model
Integrated Solutions
Power of the Ecosystem

Enterprise Apps
Databases
Business Analytics
Virtual Desktop
Vertical Applications

Applications
OS / Hypervisor
Management
Infrastructure

Enterprise Apps:
- Oracle
- PeopleSoft
- Siebel
- SAP
- Exchange
- MySQL

Databases:
- Oracle 11g
- HANA & BWA
- Greenplum

Business Analytics:
- Cap
- SQL Server

Virtual Desktop:
- Citrix
- VMware
- Microsoft

Vertical Applications:
- McKesson
- Distra
- Meditech

Applications

Management

Infrastructure

VBLOCK
FLEXPOD
HDS STORAGE REFERENCE ARCHITECTURE
Partnerships

Minimizing time to production by pre-tested best-of-breed Infrastructure building blocks

- Standardized „Compute blocks“ hide complexity
  - Integrated best of breed technology & support
  - Factory ready Vblock infrastructure
  - Highly scalable options
  - Fully optimized for SAP deployments
  - Save weeks of validation testing so you can get out of the lab and into production
The offer - THREE SOLUTION CONFIGURATIONS

- Vblock™ 300 EX with 3 Years Support
- VMWare View™ Premier with 3 Years Support
  View, vShield, ThinApp, vSphere, vCenter
- VCE deployment software

- 500 Users
  6 Blades
  24 TB
  8 Datastores

- 1000 Users
  12 Blades
  33 TB
  10 Datastores

- 1500 Users
  16 Blades
  36 TB
  12 Datastores
1) Supply the Gold Image to FastPath Wizard / or View Manager
2) Virtual Desktops Deployed!
3) All further management via VMware View Manager

It is that simple!!!
SP CloudVerse Whole Offer
Release Comparator

Cisco Services  Consumption models  Sales playbook

Support
Cloud Services
VPC

Cloud Services
VPC  HVD

Cloud Services
VPC  HVD  DR

Training
Platform Options
BMC CLM

Platform Options
BMC CLM  Flexpod

Platform Options
BMC CLM  Flexpod  CIAC

Pricing
Vblock 300

Platform Options
Vblock 300  Starter Kit

Platform Options
Vblock 300  Starter Kit  Overdrive

Financing
Vmware

Vmware

Vmware

Financing
Vmware

Vmware

Vmware

Operations  Service Creation  Validated Designs

Vblock 300  Vblock 700

Vblock 300  Vblock 700

Vblock 300  Vblock 700

Operations  Service Creation  Validated Designs

Vblock 300  Vblock 700

Vblock 300  Vblock 700

Operations  Service Creation  Validated Designs

Vblock 300  Vblock 700

Vblock 300  Vblock 700

Bring pre-packaged solution sets faster to market
Building Service Provider Cloud Solutions

A plethora of options

Orchestration
- Vcloud Director
- CIAC
- BMC CLM
- Cloud Stack
- Open Stack
- Custom Stack/API

Virtualization
- VMware
  - vCenter
  - vSphere
- Citrix
  - Xen hypervisor
- Microsoft
  - Hyper-V
- Red Hat
  - KVM (Rhel, SLES, Ubuntu, CentOS)
- Parallels
  - Parallels

Platform

Network

VMDC

IP NGN Network

An N x N puzzle