Pohled do nitra virtuálních desktopů

Tomáš Horák, CCIE #11783
Systems Engineer, Collaboration & Data Center

Email/XMPP: tohorak@cisco.com
Video: tohorak@jabber.com
Program

• Desktop Virtualization Overview
• Cisco VXI Vision
• VXC Clients & Deployment
• WAN Optimization
• Conclusion
Desktop Virtualization Overview
Computing Architecture Choices
Where is computation happening?

- Virtual Desktop Streaming
  - Apps
  - WinXP
  - Synchronized Desktop

- Hosted Virtual Desktop
  - Display Protocol

- Application Streaming
  - WinXP

- Client-Based Computing

- Hosted Virtual Application
  - Server-Based Computing
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

Connections:
- Connect to Connection Broker
- Identify target VM
- Query for user policy
- Start target VM
- Return VM to endpoint
- Connect VM to endpoint
- Successful connection

Components:
- Connection Broker
- Active Directory
- Virtual Infrastructure Management
- Virtual Infrastructure

Authentication:
- Display Protocol
Citrix XenDesktop and ICA/HDX

- Latest release: XenDesktop 5.5 – Improved HDX for WAN, better management

- Basic Characteristics
  - 64 Virtual Channels
  - TCP based protocol
  - Encryption/Compression

- 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
VMware View with PCoIP

• PCoIP is a high-performance remote display protocol provided by VMware.

• PCoIP can compensate for an increase in latency or a reduction in bandwidth, to ensure that end users can remain productive regardless of network conditions. PCoIP provides the following features:
  
  - Supports up to 4 monitors and adjust the resolution up to 2560 x 1600
  - PCoIP supports 32-bit color
  - PCoIP supports 128-bit encryption
  - PCoIP supports Advanced Encryption Standard (AES) encryption, which is turned on by default

• PCoIP uses the User Datagram Protocol (UDP) for streaming audio and video. Security servers support only TCP.
Microsoft RDP

- Remote Desktop Protocol is the same protocol many people already use to access their work computer from their home computer. RDP provides access to all the applications, files, and network resources on a remote computer. Microsoft RDP provides the following features:
  
  You can use multiple monitors in span mode
  RDP supports 32-bit color
  RDP supports 128-bit encryption
  You can use this protocol for making secure, encrypted connections to a View security server in the corporate DMZ
  RDP uses TCP port 3389
Borderless Network
Decoding the VDI Protocol Stack

Application
- VMware View
  - PCoIP 4172
  - UDP
- Microsoft RDS
  - RDP 3389
  - TCP
- Citrix Xen
  - ICA 2598/1494

Underlying Protocols

Deployment Considerations
- VMware View
  - Client-side hardware “strongly recommended” for optimal experience
  - Can increase acquisition costs and TCO
- Microsoft RDS
  - No Client-side hardware dependency
  - Standards-based encryption model
- Citrix Xen
  - No client-side or server-side hardware dependency
  - Standards-based as well as proprietary encryption models
Cisco VXI Vision
Cisco Virtualized Experience Infrastructure

- Data security & compliance
- Business continuity / agility
- Reduced TCO
- Standardized IT experience, customizable user experience

- Voice, Video, IM, Conference
- Presence
- Mobility
- Real time
- Range of devices
Virtualization Experience Clients
Voice, Video, Virtual Desktop Challenge
Hairpin Effect

- Voice/Video embedded in the display protocol
- Media flow goes all the way back to data center and back
- Heavy processing on virtual desktop in data center
- Bandwidth explosion
- Latency and jitter
- Display protocol and possible endpoint become unstable
Voice, Video, Virtual Desktop Zero Clients
Cisco Unified Communications using desk phone control

- UC media “voice/video” (RTP) flows outside the display protocol
- Signaling of Cisco UC Client back to Unified CM remains inside the display protocol
- QoS can be used on media
- Path is optimized
- Location Awareness and 911, Codec selection, CAC, SRST, Reference, Time Zone, Dial-Plan
# Collaboration

## Citrix XenDesktop and RDP

<table>
<thead>
<tr>
<th></th>
<th>Phone Integrated</th>
<th>Stand Alone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td>VXC-2112</td>
<td>VXC-2212</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>ICA 11.x, RDP 6.x (No View 4 support)</td>
<td></td>
</tr>
<tr>
<td><strong>I/O</strong></td>
<td>4 x USB 2.0</td>
<td>4 x USB 2.0</td>
</tr>
<tr>
<td></td>
<td>1 x DVI-D</td>
<td>1 x DVI-D</td>
</tr>
<tr>
<td></td>
<td>1 x VGA (1920x1200)</td>
<td>1 x VGA (1920x1200)</td>
</tr>
<tr>
<td></td>
<td>1 x Analog Audio</td>
<td>1 x RJ45, 1 x Analog Audio</td>
</tr>
<tr>
<td><strong>Network</strong></td>
<td>89XX/99XX Phone</td>
<td>Ethernet</td>
</tr>
<tr>
<td></td>
<td>Phone Ethernet</td>
<td>(No WiFi)</td>
</tr>
<tr>
<td></td>
<td>(No WiFi)</td>
<td></td>
</tr>
<tr>
<td><strong>Power Over Ethernet</strong></td>
<td>802.3AT supports Phone with No Camera</td>
<td>1 Display – 802.3AF Optional Power Brick</td>
</tr>
<tr>
<td></td>
<td>All other configurations require a Power Brick</td>
<td></td>
</tr>
</tbody>
</table>
# Collaboration
## VMware View PCoIP

<table>
<thead>
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<th></th>
<th>Phone Integrated</th>
<th>Stand Alone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td>V XC-2111</td>
<td>V XC-2211</td>
</tr>
<tr>
<td><strong>I/O</strong></td>
<td>4 x USB1.1</td>
<td>4 x USB1.1</td>
</tr>
<tr>
<td></td>
<td>2 x DVI-I (1920x1200)</td>
<td>2 x DVI-I (1920x1200)</td>
</tr>
<tr>
<td></td>
<td>1 x Analog Audio</td>
<td>1 x RJ45, 1 x Analog Audio</td>
</tr>
<tr>
<td><strong>Network</strong></td>
<td>89XX/99XX Phone Phone Ethernet (No WiFi)</td>
<td>Ethernet (No WiFi)</td>
</tr>
<tr>
<td><strong>Power Over Ethernet</strong></td>
<td>802.3AT supports Phone with No Camera All other configurations require a Power Cube</td>
<td>1 Display – 802.3AF 2 Displays – 802.3AT Optional Power Cube</td>
</tr>
</tbody>
</table>
Convergence of VDI, Video, and Voice
VXC 6215
Cisco VXC 6215

- A thin client that unifies voice, video, and virtual desktop in one device
- Supports high quality, scalable voice and video, delivering optimal user experience
- Introduces unique voice and video processing capabilities that efficiently use network and data center CPU resources, eliminating the hairpin effect
- Linux based platform supports VDI deployment only with HDX/ICA, PCoIP, & RDP
Cisco Virtualization Experience Client (VXC) 6215

Front View
- Power On/Off Switch
- Mini-jack Headphone and Microphone Port
- Two USB 2.0 Ports

Rear View
- DVI-I Monitor Port
- Display Port Monitor Port
- Two USB 2.0 Ports
- Two USB 3.0 Ports
- Ethernet Port (No PoE)
- Kensington Lock
- Power Supply
VXC Software Appliance Virtual Desktop (VDI) Interaction

Data Center

HVD – User 1

Cisco Client
(Unified Personal Communicator or UC Integration™ for Microsoft Lync)

VXC 6215 – User 1

Citrix Receiver

SIP

VXC Software Appliance

VXC Software Appliance Plugin

9971 – User 2

Unified Presence

Unified CM

Virtual Channel Broker

HVD Agent

SIP Line

CTI Manager

XMPP Signaling

CTI Signaling

SIP Signaling

RTP Media (Voice, Video)

Display Protocol API / Virtual Channel
Collaboration
VXC 6215 Software Stack

VXC 4000 for Linux

- HVD Broker
- UI (Video Render/SRST/EM)
- OAM&P/Serviceability
- CSF2G
  - Enhanced Call Control
  - SIPPC, CC API, Media Engine
  - Accessories Manager

Applications

- Citrix Receiver
- RDP Client
- VmWare View
- HVD Agent (Virtual channel Interface)

Platform

- A/V Device Manager
- AnyConnect VPN
- EnergyWise Client
- MediaNet Client Framework

Operating System

- Blue Tooth
- USB
- CDP
- LLDP
- IPv4
- IPv6

Hardware

- GT56N Dual Core 1.6GHz
- Dual Display, PoE

OEM
Cisco VXC 4000 Release 1

- Enables UC voice only capabilities for repurposed windows PCs for virtual desktops
- Introduces unique voice processing capabilities that efficiently use network and data center CPU resources, eliminating the hairpin effect
- Supports Citrix XenDesktop and VMware View
- Based on Cisco IP Communicator
- OS support: Windows XP, Windows 7
Cisco VXC 4000 Release 1
Unified Personal Communicator
Cisco CIUS

Enterprise tablet that combines voice, video, collaboration, and VDI

Supports external Bluetooth/USB mouse & keyboard when docked

Supports external display in “mirror mode”

Supports Citrix Receiver, VMware View Client and Wyse PocketCloud
## VXC Feature Comparison

<table>
<thead>
<tr>
<th></th>
<th>VXC 2100 Series</th>
<th>VXC 2200 Series</th>
<th>VXC 4000*</th>
<th>VXC 6215*</th>
<th>Cisco Cius</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form Factor</strong></td>
<td>“Backpack”</td>
<td>“Tower”</td>
<td>PC Software</td>
<td>“Tower”</td>
<td>Enterprise Tablet</td>
</tr>
<tr>
<td></td>
<td>Integrated</td>
<td>Standalone</td>
<td></td>
<td>Standalone</td>
<td></td>
</tr>
<tr>
<td><strong>Availability</strong></td>
<td>Shipping</td>
<td>Shipping</td>
<td>Shipping</td>
<td>Shipping</td>
<td>Shipping</td>
</tr>
<tr>
<td><strong>Platform</strong></td>
<td>Zero Client</td>
<td>Zero Client</td>
<td>Win7, XP</td>
<td>Linux</td>
<td>Android (x86)</td>
</tr>
<tr>
<td><strong>HVD Protocol Support</strong></td>
<td>2111 – PCoIP</td>
<td>2211 – PCoIP</td>
<td>Citrix XenDesktop, VMware View</td>
<td>Citrix XenDesktop, VMware View</td>
<td>Citrix XenDesktop, VMware View</td>
</tr>
<tr>
<td></td>
<td>2112 – HDX, RDP</td>
<td>2212 – HDX, RDP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>UC Protocol Support</strong></td>
<td>N/A</td>
<td>N/A</td>
<td>Software Appliance</td>
<td>HDX, RDP</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PCoIP</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>UC Client Support</strong></td>
<td>CUPC, Connect</td>
<td>CUPC, Connect</td>
<td>CUPC, CUCILync</td>
<td>CUPC, CUCILync</td>
<td>Native</td>
</tr>
<tr>
<td><strong>Voice</strong></td>
<td>IP Phone 8961, 9951, 9971</td>
<td>N/A, can be used with IP Phone</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Video</strong></td>
<td>IP Phone 9971, 9951</td>
<td>N/A, can be used with IP Video Phone</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Monitor Support</strong></td>
<td>Single or Dual, 1920x1200</td>
<td>Single or Dual, 1920x1200</td>
<td>Varies based on underlying HW</td>
<td>Single:2560x1600</td>
<td>Single Mirror, 1024x600 (on the roadmap for dual monitor support)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dual:1920x1200</td>
<td></td>
</tr>
<tr>
<td><strong>PoE</strong></td>
<td>PoE</td>
<td>PoE</td>
<td>N/A</td>
<td>No</td>
<td>PoE</td>
</tr>
<tr>
<td><strong>Encoding &amp; Decoding</strong></td>
<td>Via IP Phone</td>
<td>Via IP Phone</td>
<td>Audio only. Video on the roadmap.</td>
<td>Standard Video HD Capable*</td>
<td>HD Capable (720p)</td>
</tr>
</tbody>
</table>
Cisco VXC Naming Framework

- **Cisco**
  - Brand
- **Virtualization Experience Client**
  - Family
- **Series**
  - 2000

2 2 1 2 w

Series Form Factor HW Generation Qualifier Optional: Wifi

- **Series**: Zero (2), Soft (4), Thin (6), Not Applicable (0)
- **Form Factor**: Integrated (1); Standalone (2); Not Applicable (0)
- **HW Generation**: Gen 1 (1); Gen 2 (2); Not Applicable (0)
- **Qualifier**: PCoIP (1); ICA (2); Multi-protocol (5), Not Applicable (0)
- **Optional**: Wifi (w)

2000 Series – Zero Client
4000 Series – Software Appliance
6000 Series – Thin Client
VXC Deployment
Communications Manager

• VXI leverages existing CUCM implementation
• Support for CUCM 7.1(5), 8.0.x, 8.5.x, 8.6.x
• 89xx and 99xx handsets managed as normal
• Cius registered and managed as a handset
• VXC 4000 & 6215 Endpoint managed as a handset
Presence Server

- As with CUCM, VXI leverages existing Presence Server infrastructure
- Support for CUPS 8.5.x, 8.6.x
- VXC 2x00 & 4000 operate in desk phone control mode
- 6215 leverage special version of client for HVD deployment
- Hosted option available with Jabber
Jabber and CUPC

- CUPC 8.03 introduced support for XD and View
- Jabber 9.0 will support XD and View at FCS
- Jabber 9.0 will support XenApp at FCS
Cisco VXC Software Appliance

Unified CM Device Configuration

Phone Type

Product Type: Cisco Virtual Experience Client (VXC)
Device Protocol: SIP

Installed using VXC Device Type COP file on earlier Unified CM versions

VXC Software Appliance

VXC 6215
Cisco VXC 6215

Device Selector

Headsets currently tested and supported
- Plantronics USB headset Blackwire C420 82632-01
- Plantronics USB headset Blackwire C610 81964-41
- Plantronics USB headset Blackwire C620 81966-41
- Plantronics USB headset Savi Office WO200 79957-01
- Plantronics USB headset Savi Office WO300 81794-02
- Plantronics USB headset Savi 3in1 W740 83542-01
- Plantronics USB headset VoyagerPro UC V2 B230 38885-01
- Plantronics USB headset VoyagerPro UC 38667-01
- Plantronics USB adaptor DA DA45 77559-41
- Jabra USB headset GN2000 20001-495
- Jabra USB headset GN2000 20001-435

Cameras currently tested and supported
- Cisco USB Camera VT III
- Cisco USB Camera VT II
- Cisco USB PrecisionHD*
- Logitech USB Camera Quickcam Pro 9000
- Microsoft USB Camera Lifecam Cinema
WAN Optimization
WAN’s effects on Users Experience

End-users see pixelization as media is rendered from the data center.

Increasing bandwidth might not help.

End-users experience no pixelization on LAN.

Video processed on HVD causing bandwidth and server compute overload.
Protocols in the virtual desktop environment appear “monochrome” to QoS

Lack of flow differentiation prevents prioritization within a display protocol stream

Video stream competes with other flows in class – (e.g.: P2P)
QoS in VXI

End User Workspace

Network Printer

Virtual Desktop Display Protocols (ICA, RDP, PCoIP)

Locally Attached Printer

Cisco Unified Communications Endpoint (SCCP, SIP, RTP, SRTP)

Campus or WAN Network

Network Print Traffic

Desktop Display Protocol (ICA, PCoIP, RDP)

Telephony Signaling (SCCP, SIP)

Telephony Media (RTP, sRTP)

Data Center

Cisco UCM

Cisco UCS with Service VMs (like print server)

VMWare/Citrix

Cisco UCS with Virtual Desktops

Local DC flows (Storage, Hypervisor management, etc) not shown

<table>
<thead>
<tr>
<th>Protocol</th>
<th>TCP/UDP Port</th>
<th>DSCP/CoS Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDP 7</td>
<td>TCP 3389</td>
<td>DSCP af21 and CoS2</td>
</tr>
<tr>
<td>ICA</td>
<td>TCP 1494</td>
<td>DSCP af21 and CoS 2</td>
</tr>
<tr>
<td>PC over IP (PCoIP)</td>
<td>TCP &amp; UDP 4172</td>
<td>DSCP af21 and CoS 2</td>
</tr>
<tr>
<td>SCCP</td>
<td>TCP 2000</td>
<td>DSCP cs3 and CoS 3</td>
</tr>
<tr>
<td>SIP</td>
<td>TCP 5060</td>
<td>DSCP cs3 and CoS 3</td>
</tr>
<tr>
<td>CTI</td>
<td>TCP 2748</td>
<td>DSCP cs3 and CoS 3</td>
</tr>
<tr>
<td>Media (RTP, sRTP)</td>
<td>UDP 16384 to 32767</td>
<td>DSCP ef (audio only), DSCP af41 (audio/video) and CoS 5</td>
</tr>
</tbody>
</table>

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## 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>
</tr>
</thead>
<tbody>
<tr>
<td>Remote Desktop Protocol (RDP)</td>
<td>Microsoft</td>
<td>TCP 3389</td>
<td>1.5 Mbps</td>
<td>384 Kbps</td>
<td>96 Kbps</td>
</tr>
<tr>
<td>Independent Computing Architecture (ICA)</td>
<td>Citrix XenDesktop op 4.0/5.0</td>
<td>TCP 2598 CGP TCP 1494</td>
<td>967 Kbps</td>
<td>120 Kbps</td>
<td>60 Kbps</td>
</tr>
<tr>
<td>PC over IP (PCoIP)</td>
<td>Teradici / VMware 4.6</td>
<td>Media – UDP 50002/4172 Control – TCP 50002/4172</td>
<td>1.5 Mbps</td>
<td>192 Kbps</td>
<td>192 Kbps</td>
</tr>
</tbody>
</table>

Note: PCoIP can’t be optimized by WAAS
WAAS 4.5 optimization with Citrix ICA AO

WAAS will optimize encrypted and compressed ICA desktop session traffic (no changes required on ICA client, HVD, or DC infrastructure) for all versions of XenDesktop and XenApp.

Includes WAAS 4.4 Application aware DRE feature for unidirectional caching of desktop session traffic which improves the scalability and Application performance.
Cisco WAAS Optimized for Citrix Operational Flow

Transparent insertion into encrypted ICA/CGP (Common Gateway Protocol) communication.

WAAS applies TCP flow optimization to maximize bandwidth usage and mitigate packet loss.

WAAS applies an inline compression algorithm over the optimized data, maximizing savings.

WAAS delvers multi-user Context-Aware Data Redundancy that removes redundant data from across all end user connections.

Up to 70% Faster

Up to 2X+ More Users

Response Time

Bandwidth Consumption

Response Time: 0, 10, 20, 30, 40, 50, 60 seconds

Bandwidth Consumption: 0, 20, 40, 60, 80, 100, 120, 140 Kbps

70% faster

60% savings

2x users
Conclusion
Conclusion

- Cisco VXI Virtualized End-to-End System
- VXC & User Experience
- WAN Optimization
Odkazy

• VXI Page
  http://www.cisco.com/go/vxi

• VXC Clients
  http://www.cisco.com/go/vxc

• VXI Design Zone
Otázky a odpovědi

- Twitter  [www.twitter.com/CiscoCZ](http://www.twitter.com/CiscoCZ)
- Talk2Cisco  [www.talk2cisco.cz/dotazy](http://www.talk2cisco.cz/dotazy)
- SMS  721 994 600

- Zveřejňujeme Vás na Ptali jste se… v sále LEO
  1.den 17:45 – 18:30
  2.den 16:30 – 17:00