



# Cisco Virtualization eXperience Infrastructure (Cisco VXI)

## Desktop Virtualization Solution Overview

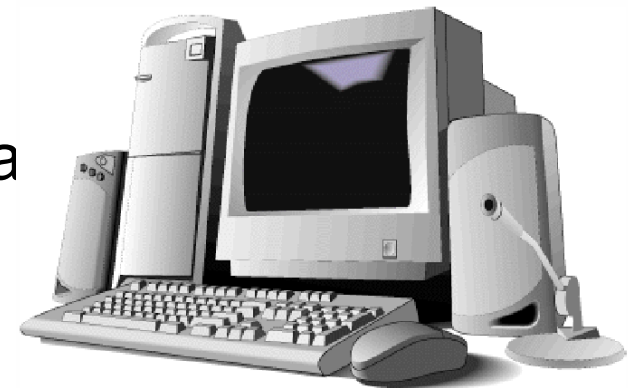
Ng Tock Hiong  
Director, Systems Engineering



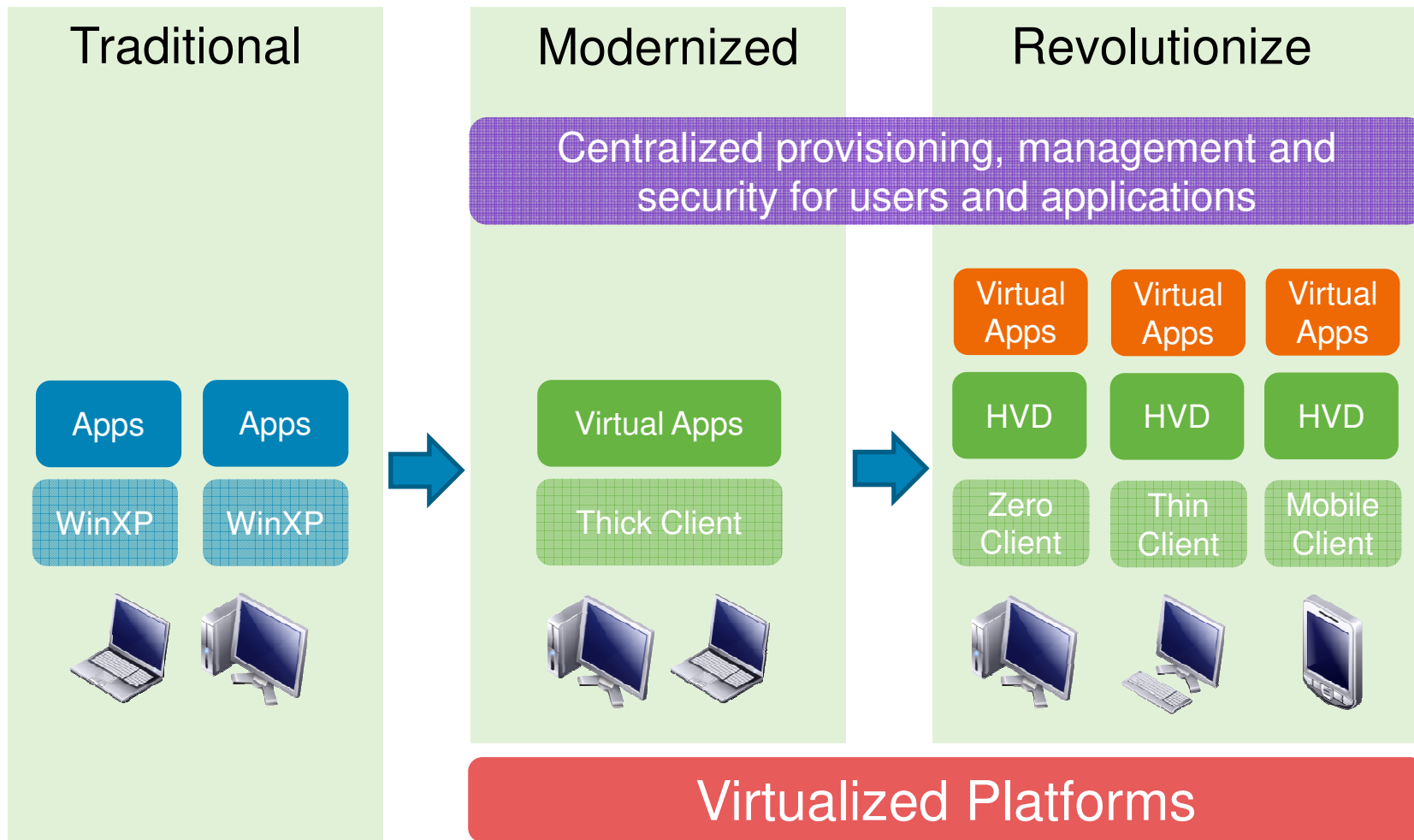
# What is the Challenge With Desktop Computing Today?

The “thick-client” PC has been the workhorse of desktop computing. It has offered the best available combination of price, performance, and capabilities. However, for many use cases thick-client PCs are less than an ideal solution. Among their drawbacks:

- Difficult to manage
- High total cost of ownership
- Difficult to protect and secure data
- Inefficient resource utilization



# The Transformation Of The Desktop



# Desktop Virtualization

## Application Scenarios / Drivers

### The Evolving Workplace Landscape

- Heterogeneous endpoint devices
- Mobile teleworkers
- Geographically dispersed resources
- Windows 7 migration
- Data leakage/loss prevention



### CIO

- Employee productivity
- Global competitiveness
- Strategic value through TCO



### IT - Server Manager

- Control / manageability and security
- Minimize new deployments / Datacenter sprawl
- Up-front and lifecycle costs



### IT - Desktop Manager

- Control / manageability and security
- Deployment speed and versatility, reduced costs
- Offer near-native full user experience

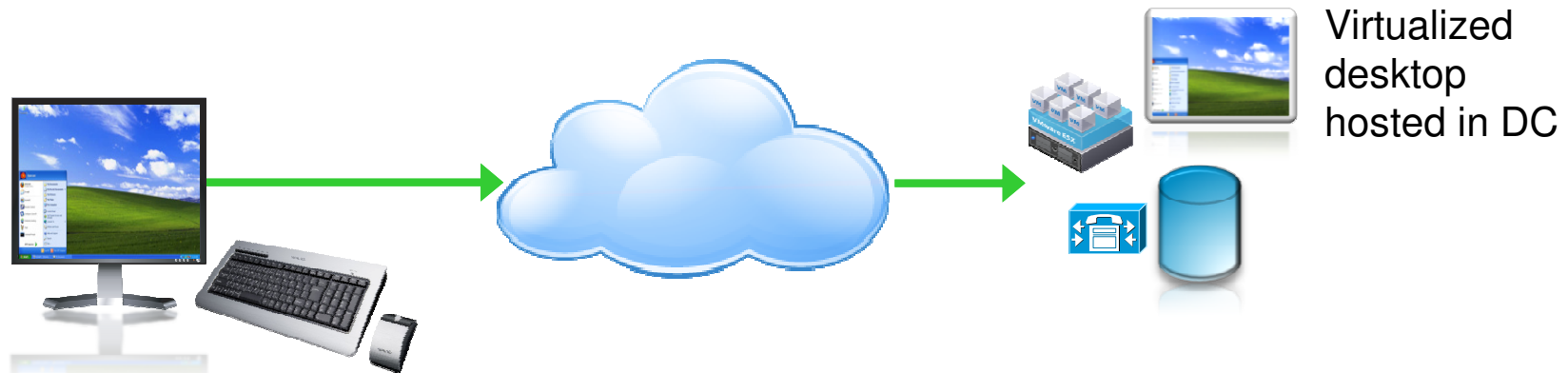


### End User

- Mobile users expect LAN performance
- Anywhere, Anytime, Any Device
- Alignment to existing desktop experience

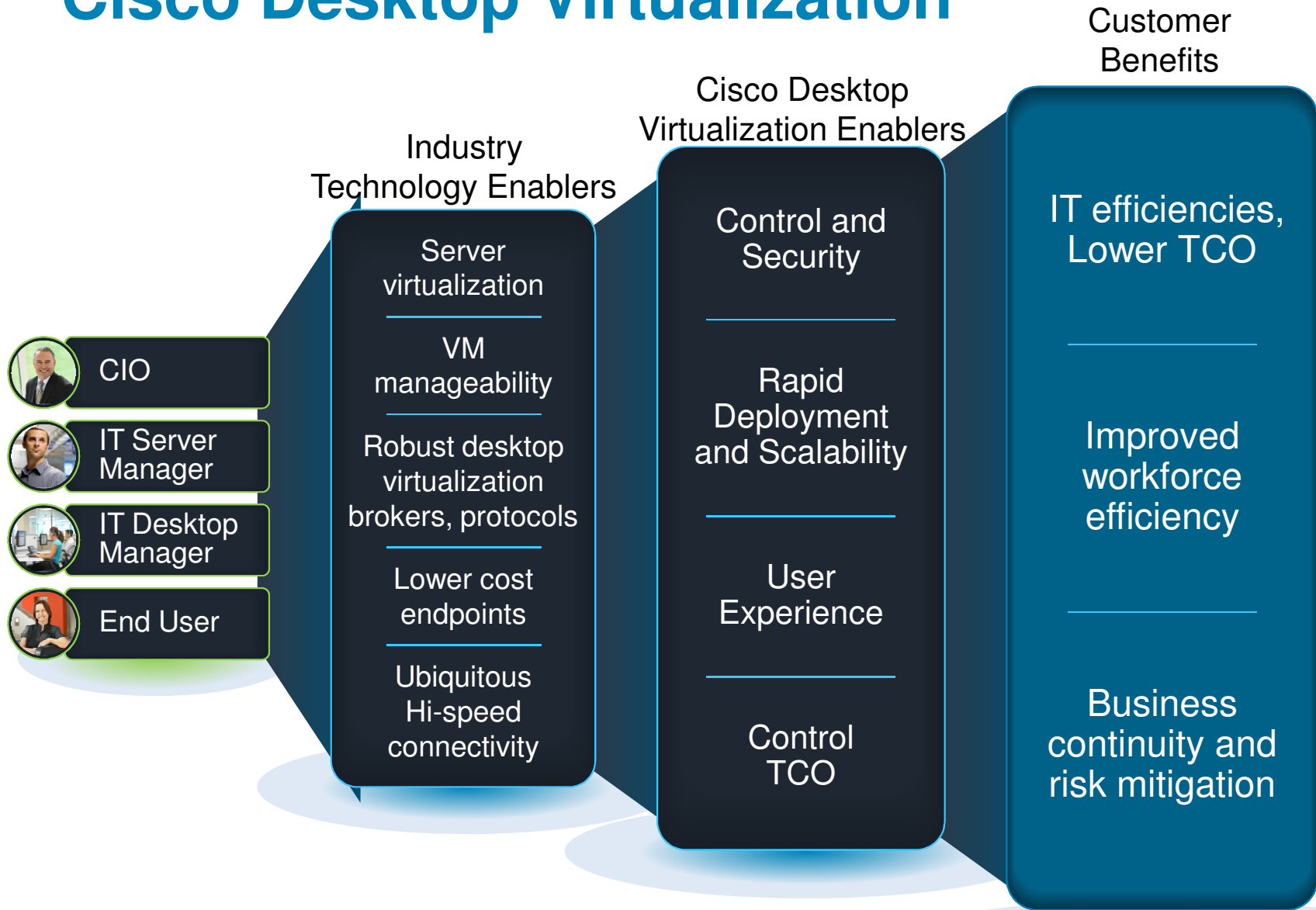
# What is on Desktop Virtualization?

- Desktop Virtualization (DV) - separates a “thick-client” PC desktop environment from a physical machine using a client server model of computing



- The model stores the "virtualized" desktop on a remote server, instead of on the local storage of a remote client
- Users work from their remote desktop “Endpoint”. All programs, applications, processing, and data usage are kept and run centrally in the “Data Center”

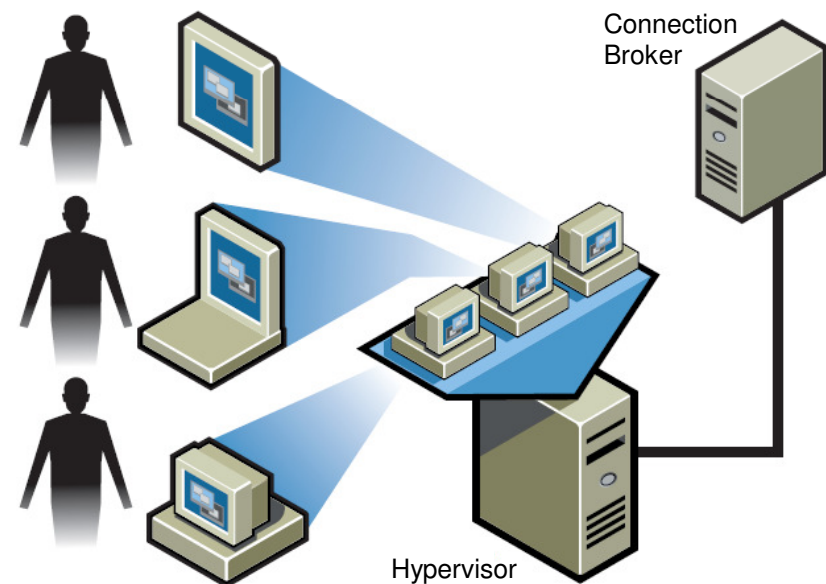
# Cisco Desktop Virtualization



# Benefits of a Desktop Virtualization (DV)

In principle, the business case is compelling. Desktop virtualization helps companies:

- Improved manageability
- Streamlined deployment
- Increased flexibility
- Improved data protection
- Better resource utilization
- Reduced costs



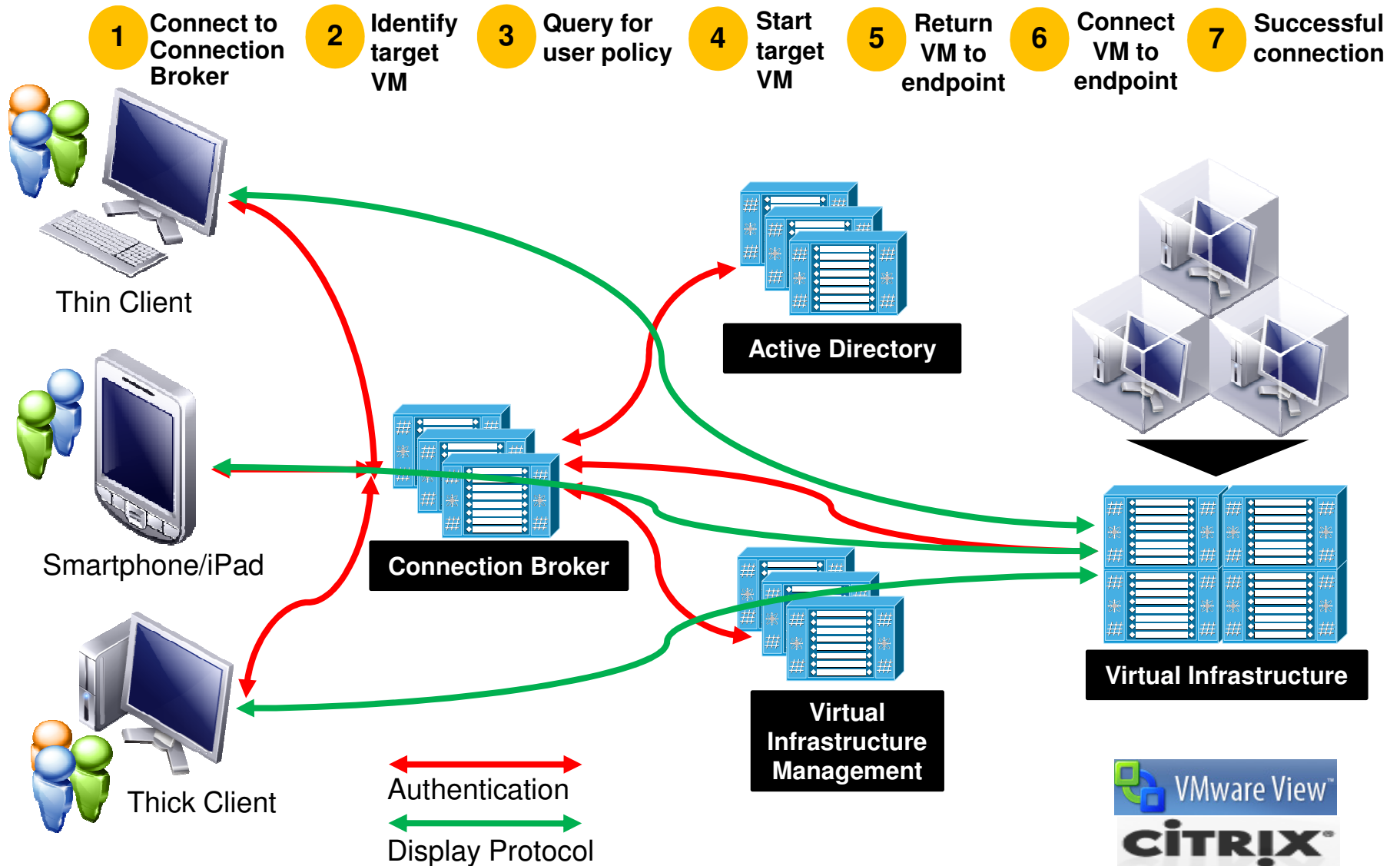
# Desktop Virtualization in a Nutshell

- Desktop virtualization delivers virtual desktops to users on any device. The user's virtual desktop environment is dynamically assembled and delivered using the network



- Different types of workers across the enterprise need different types of desktops. Some require simplicity and standardization, while others require high performance and personalization

# Components of Desktop Virtualization



# Challenges of a Desktop Virtualization

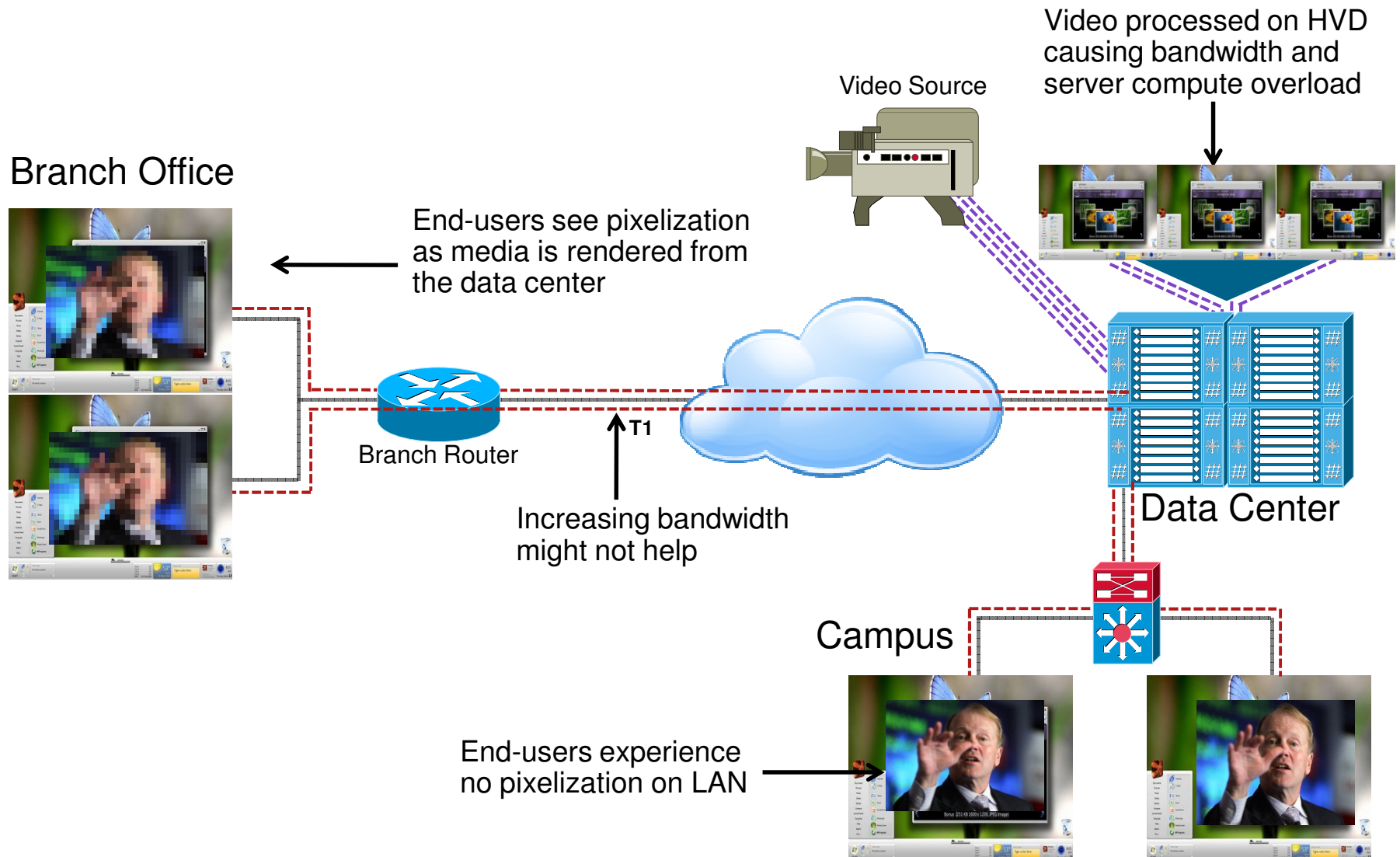
Desktop virtualization solves some of IT's most persistent problems. But it also moves "thick-client" PC into the datacenter. This places new demands on networks

- Key challenges of desktop virtualization
  - Improved user experience
  - Network latency tolerance
  - Effective provisioning and patch management
  - Agility and availability
  - Flexibility
  - Survivability

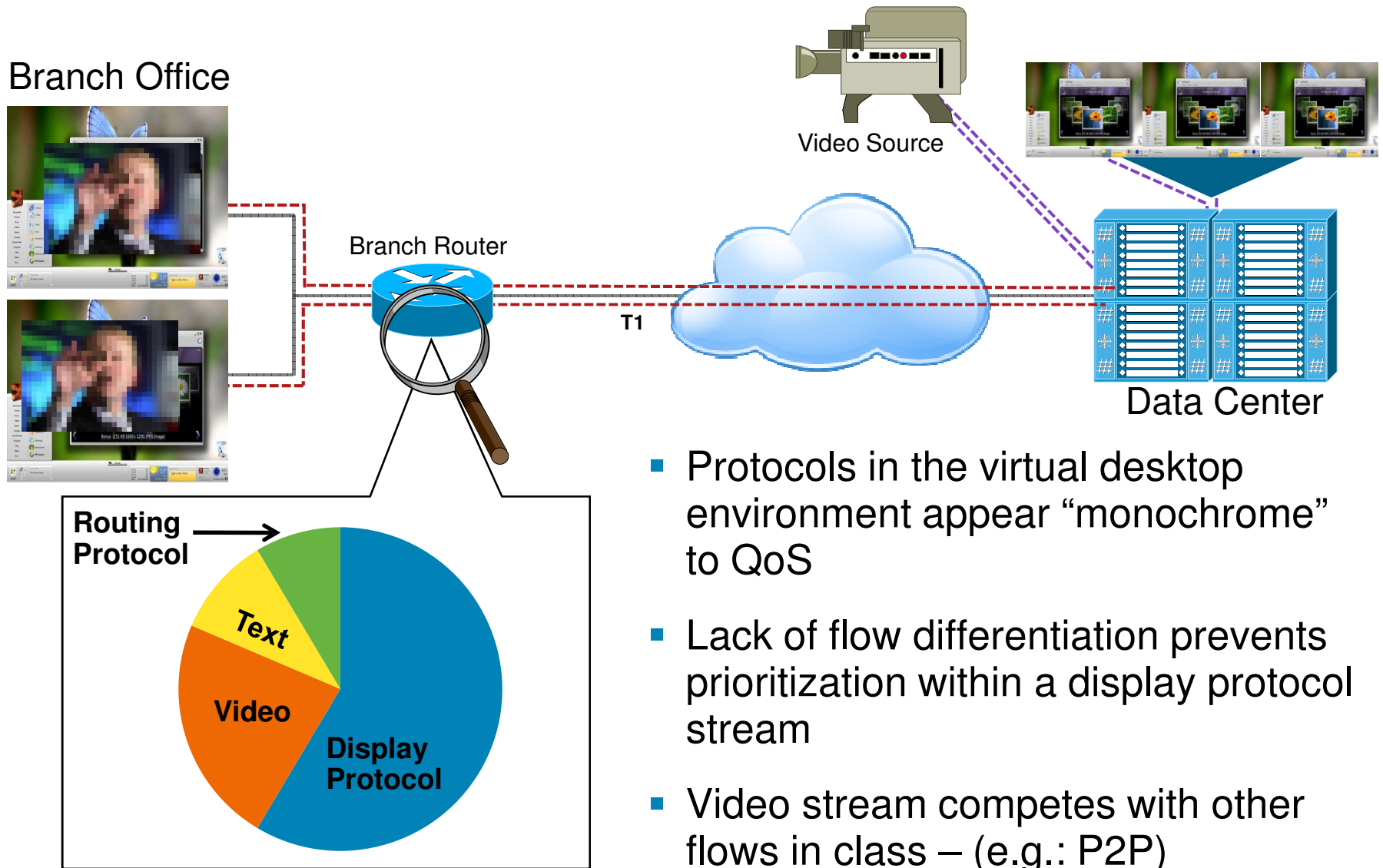


Source – Citrix Overcoming five real-world challenges

# WAN's effects on Users Experience



# Display Protocol Opaque to the Network



- 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)

# Solving Desktop Virtualization Challenges

- These new challenges can be overcome by **careful planning** and selection of an **experienced technology partner**
- With a decade's experience delivering high-performance networks to remote end-users, Cisco has helped many organizations identify and overcome the challenges of delivering application to end-users
- Introducing Cisco's **Virtualization Experience Infrastructure** (VXI) to interpret and addresses the key challenges of desktop virtualization





# Introduction to Cisco Virtualization Experience Infrastructure (Cisco VXi)

# Cisco VXi

## Solving Industry Challenges with VDI

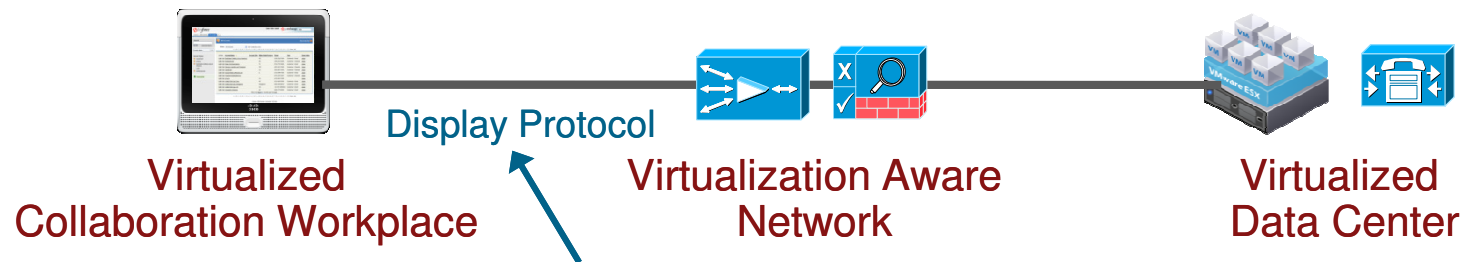
Quality of user experience – Phase One

- Rich media streaming, voice/video, remote access often less than optimal

Performance: Voice/Video cannot be prioritized by QoS

Jitter: Voice traffic must go round trip

- Bandwidth: Each “new” copy streamed for each additional DV client = branch WAN bandwidth overruns

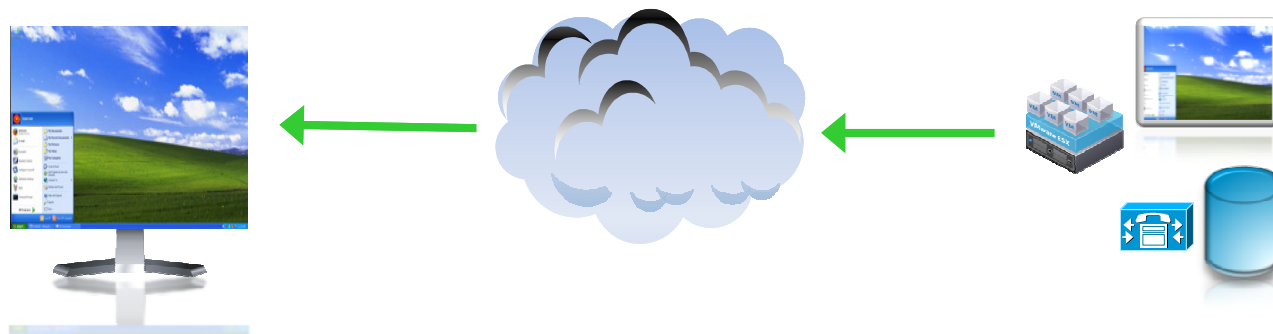


Current display protocols are opaque to network services  
The key to applying services is to separate the flows

# What Is Cisco Virtualization Experience Infrastructure (VXI)?

- Deliver a superior collaboration and rich media user experience with best in class ROI in a fully integrated, open and validated desktop virtualization
- Cisco VXI is an end-to-end system for desktop virtualization

Including virtualized data center, borderless network and endpoint with design guidance (CVD released) and end-to-end validation



**Desktop Virtualization + Optimized User Experience**

# Cisco VXI

## New Business and Technical Architecture

Business Imperatives



Applications



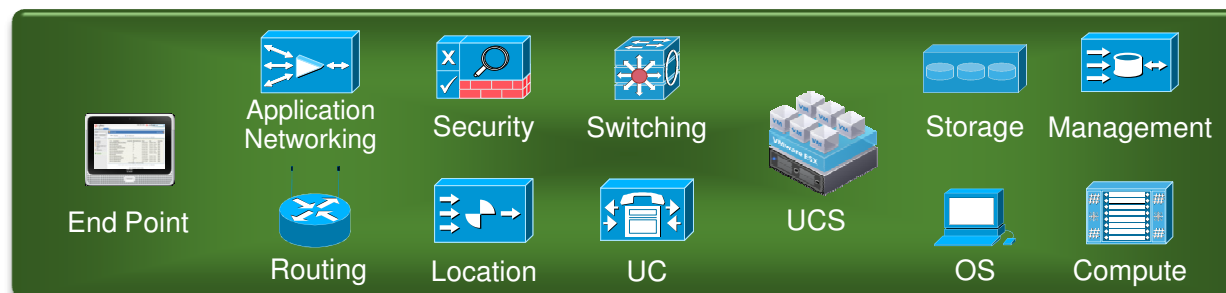
Collaboration, Borderless Network and Data Center Services



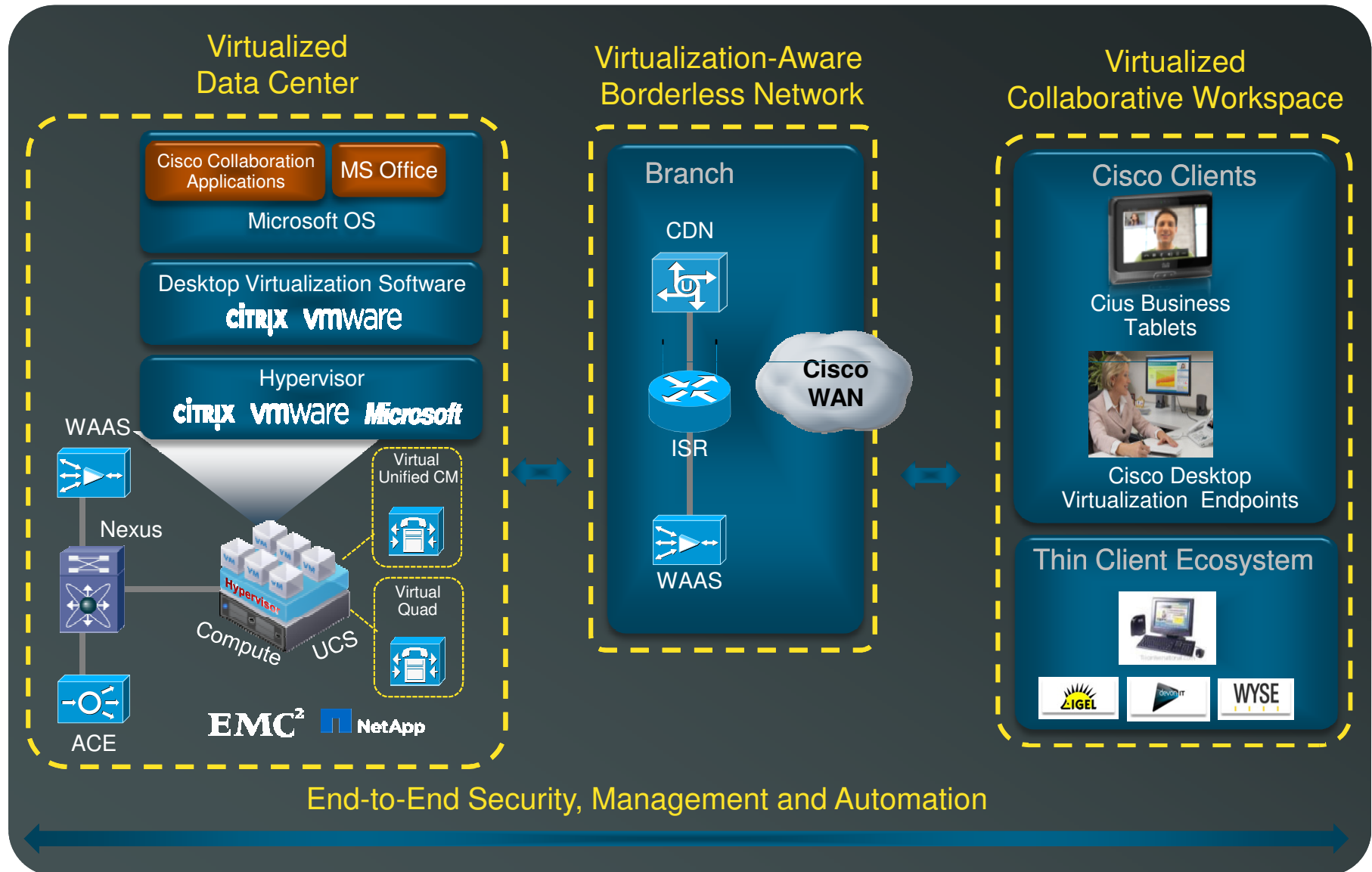
Virtualized End-to-End System



Technology Innovations



# Cisco VXI Virtualized End-to-End System



# Virtualized Data Center

Housing the Virtual Desktops in the Data Center

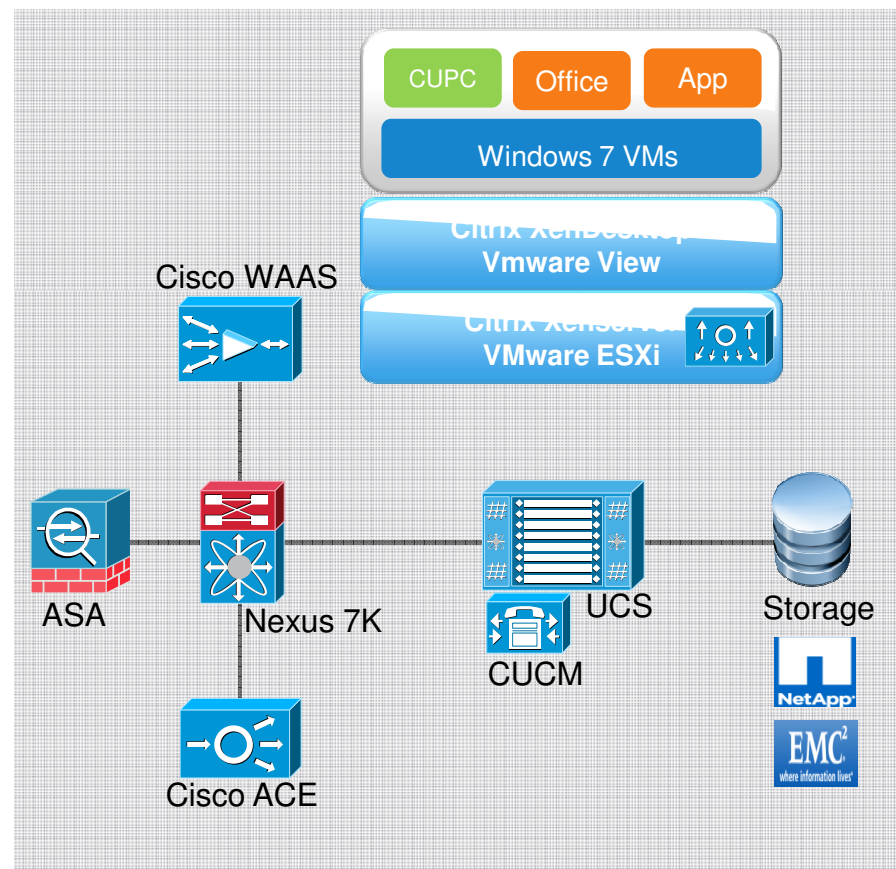
- Cisco VXI virtualized data center comprises **components** from both **Cisco** and **third-party technology partners**

- VXI data center configuration includes these **mandatory components**:

Compute (Cisco)

Hypervisor (Technology Partner)

VDI Desktop Software (Technology Partner)

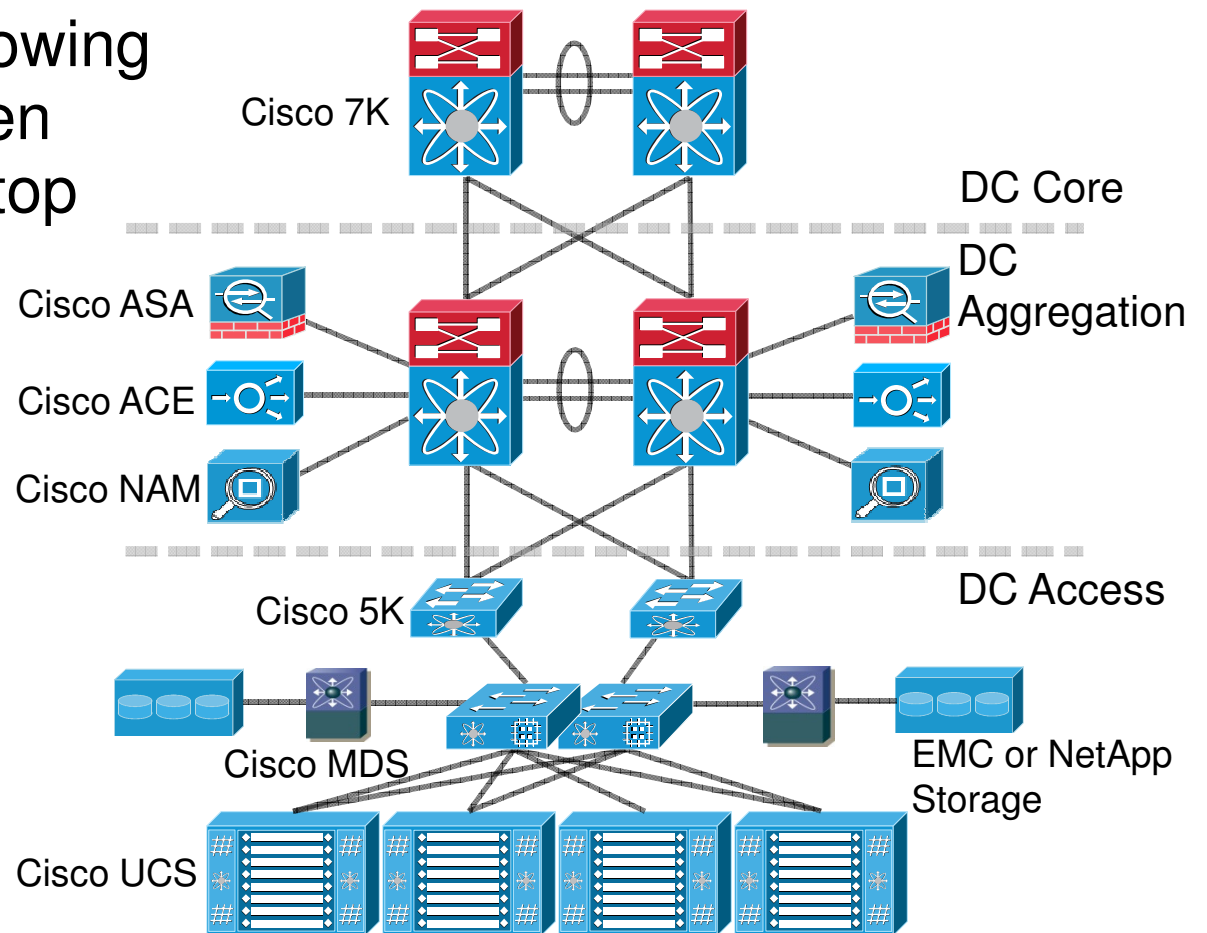


# Data Center Components for VXI Deployment

Robust and Scalable Environment for Desktop Virtualization

- VXI enabled data center address the following **challenges** when deploying Desktop Virtualization:

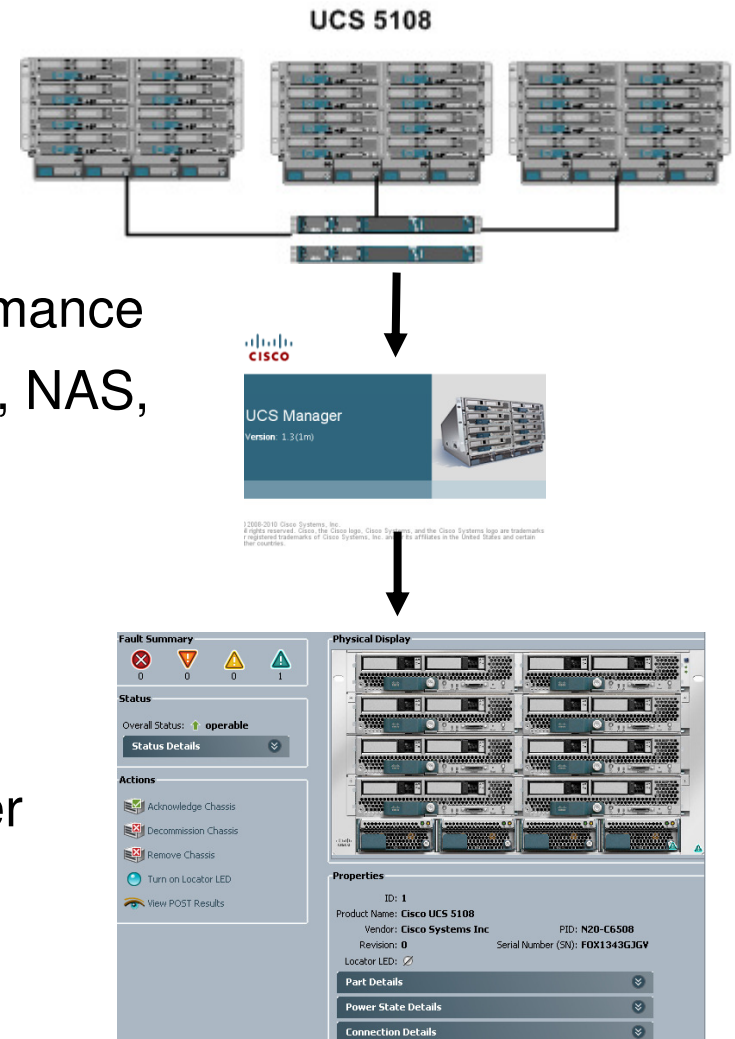
Scalability  
Manageability  
Security  
Availability



Source VXI Cisco Validated Design

# Compute – Cisco 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
  - Dynamic resource provisioning
  - Ability to integrate with broad partner ecosystem



# Cisco UCS for Desktop Virtualization

## Unique benefits due to key UCS technologies

### UCS Service Profiles

- UCS Manager construct pools, Templates and policies allows rapid server provisioning
- Various user type can be mapped to specific server pools based on user profiles
- Various policies like boot from SAN, makes provisioning OS simpler
- UCSM allows QoS policies to be set right from the server adapter

### UCS Extended Memory

- Windows 7 has a large memory footprint; scaling Win 7 requires large memory
- Larger memory footprint desktops makes B250-M2 ideal for VDI deployment
- UCS extended memory technology makes it possible for high bandwidth (1333MHz) memory access even with four times more DIMM slots on a two socket architecture

### Virtual Interface Card

- Cisco VIC simplifies network management in the hypervisor
- Using VN-Link in hardware the number of network management points can be reduced by an order of magnitude
- Provides low latency and high bandwidth for applications

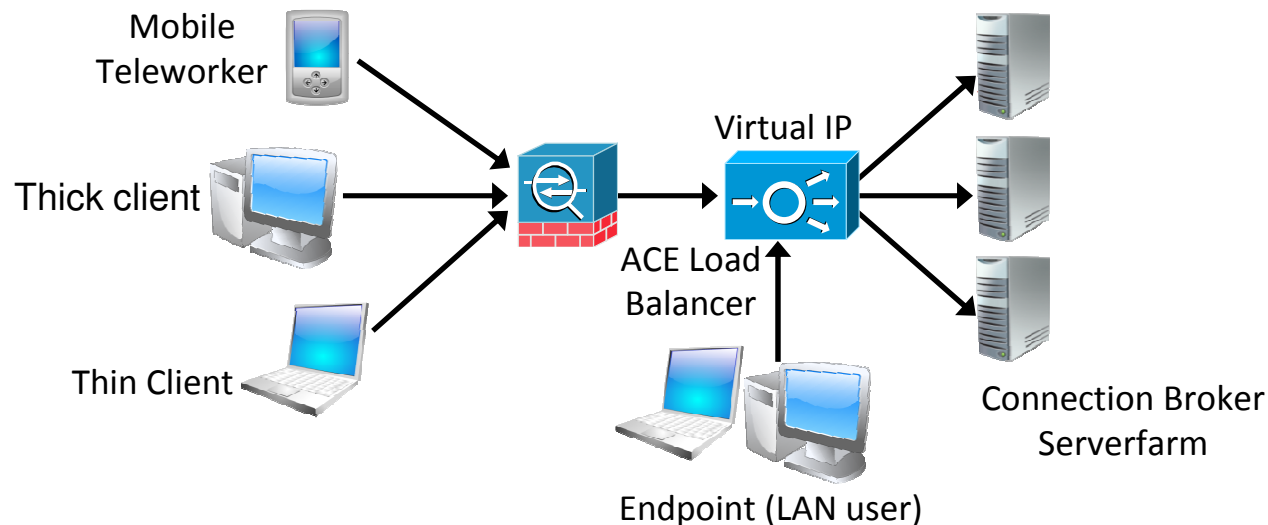
### Unified Fabric (FCoE)

- Unified Fabric with high I/O bandwidth helps in scaling data intensive work loads
- Wire once infrastructure for bandwidth and not for connectivity
- Eliminates multiple adapters, cables and switches to scale the infrastructure, reduces power in the Data Center

# Acceleration – Application Control Engine

## Scale Desktop Virtualization Software

- Cisco ACE provides detailed health monitoring and load balancing functions for the connection broker

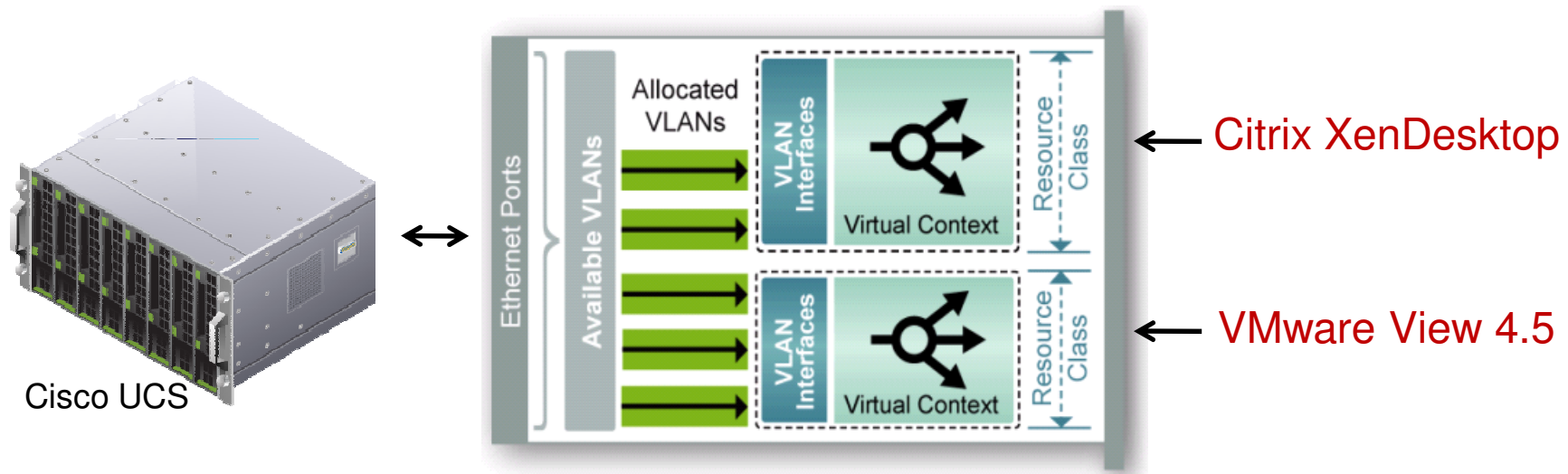


- Cisco ACE is capable of offloading SSL processing for the connection broker while also providing an HTTP 302 moved temporarily response to a endpoints HTTP GET or Head request

# Application Control Engine Virtualization

## Scale Desktop Virtualization Software

- The Cisco ACE supports device partitioning where a single physical load balancer is provisioned into multiple logical devices

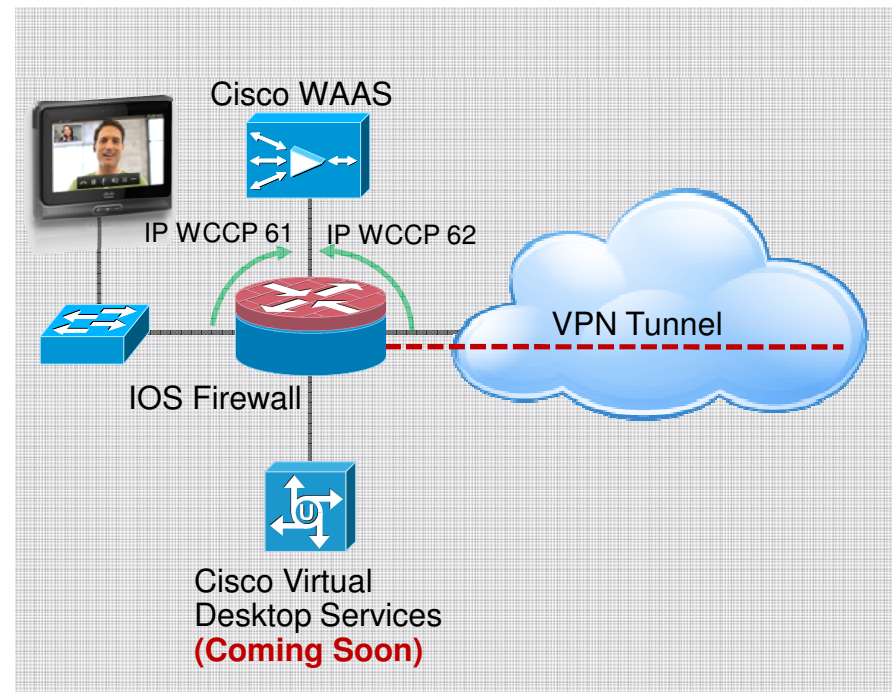


- This virtualization function allows system administrators to assign a single virtual Cisco ACE context for both Citrix and VMware

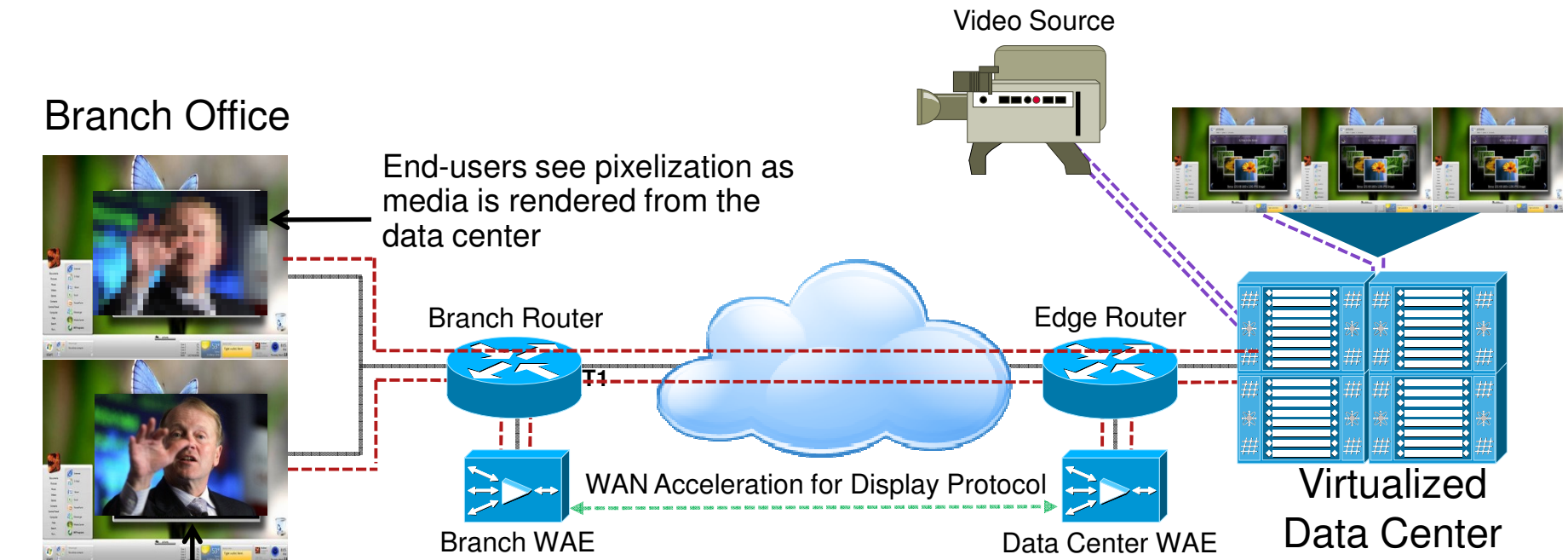
# Virtualized Aware Network

Securing and Optimizing the Network

- Cisco **Wide Area Appliance Services (WAAS)** accelerates virtual desktops to remote end-users, scales the number of users over the WAN, lowers IT cost, and improves rich media experience.”
- Using a **VPN solutions** to allow end-users to access virtual desktops from branch-offices, fixed and mobile teleworker locations **securely**



# Improving user experience through WAAS in Virtualization Aware Network



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

End-users experience no pixelization

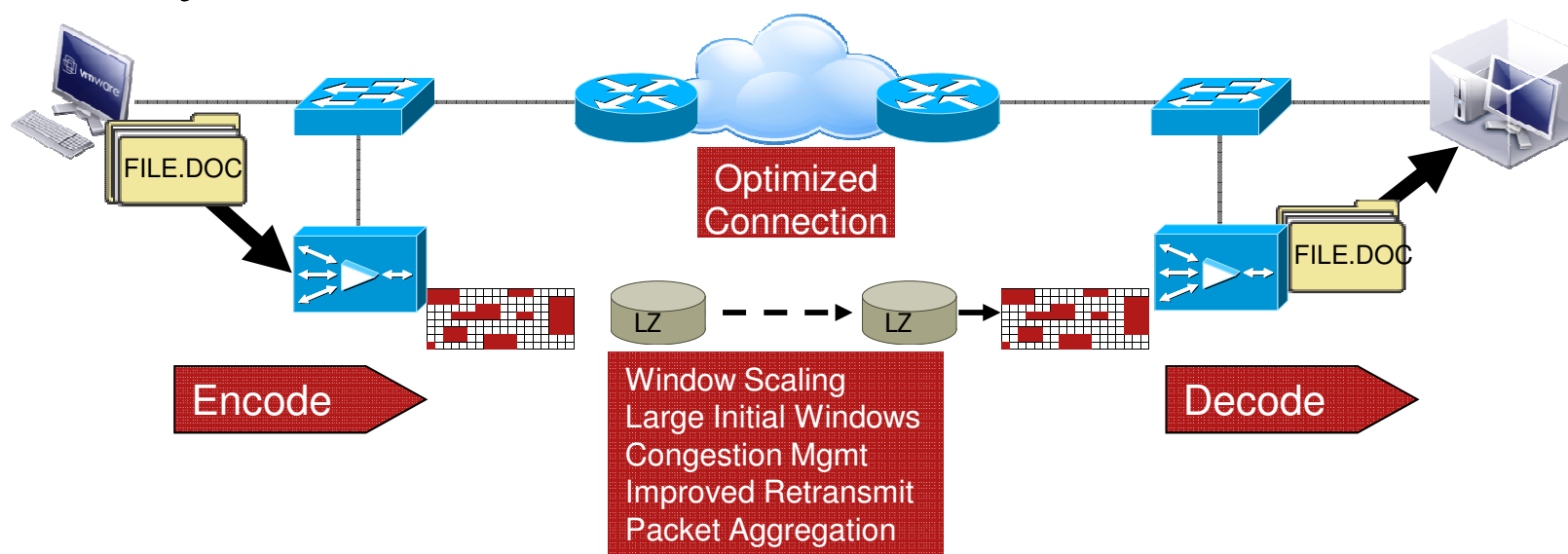
**Optimization of virtual desktop protocols – e.g Citrix ICA and RDP through**

- latency mitigation
- reduction of bandwidth,
- optimization for MMR and USB Redirect for rich media and USB peripherals (Printing)

# Cisco Wide-Area Application Services

## Bandwidth Reduction and Protocol Optimization

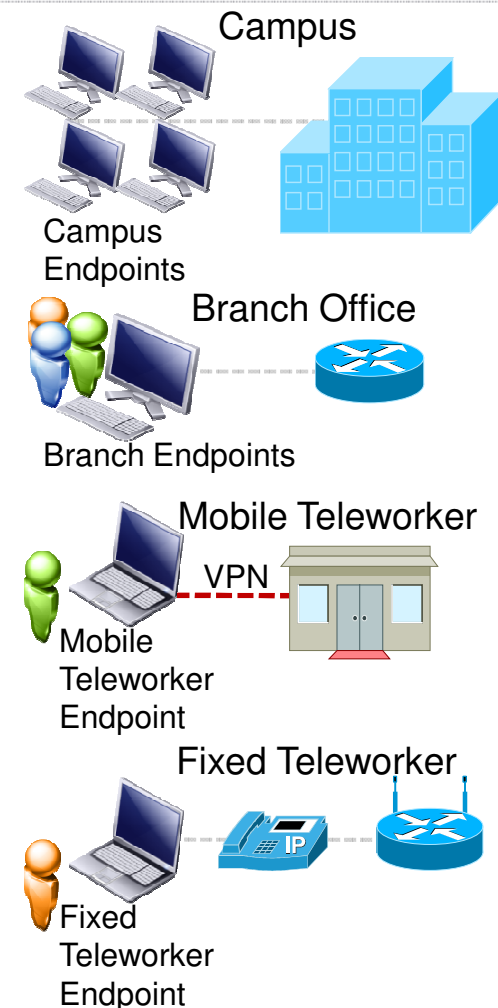
- Data Redundancy Elimination (DRE) provides advanced compression to eliminate redundancy from network flows
- LZ compression provides generic compression
- TCP Flow Optimization (TFO) fills the pipe over high latency links



# Virtualized Collaboration Workspace

- The VXI system provides a virtualized collaboration workspace allowing employees the flexibility to work from **any location securely**
- With solutions such as the Cisco ASA and the Cisco AnyConnect client, an end-user is able to **connect from any location** using an encrypted connection to the datacenter where their hosted virtual desktop resides

## Virtualized Collaborative Workspace



# Campus

## Deployment Models using Network Authentication

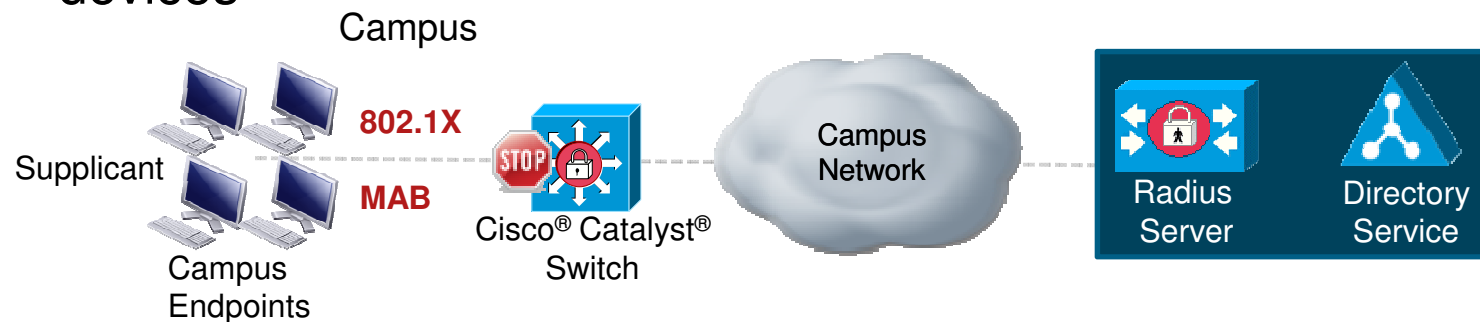
- Authenticating desktop virtualization endpoints with IEEE 802.1X

Standard for link layer authentication and access control

Uses Extensible Authentication Protocol (EAP)

- Provide location awareness in the network using MAC Authentication Bypass (MAB)

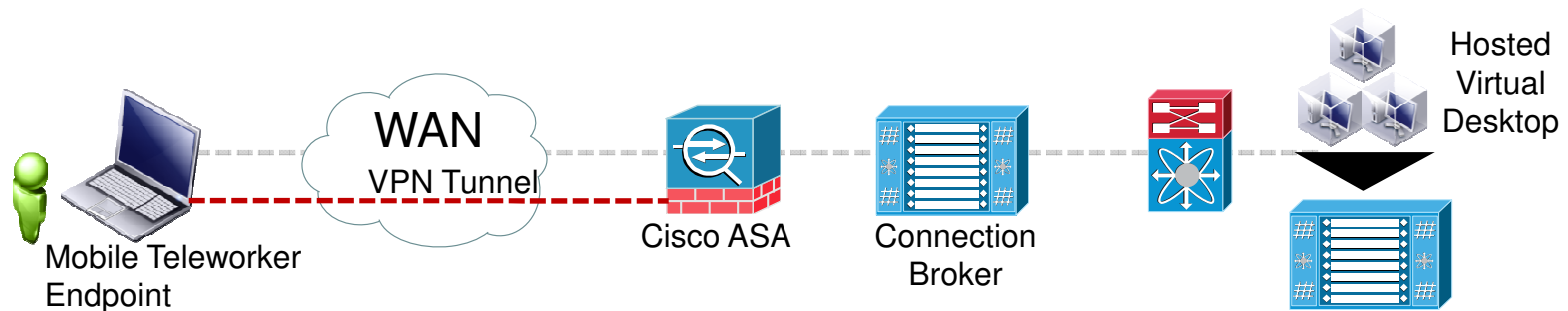
Fallback option for desktop virtualization endpoints that do not support 802.1X. Match MAC address with database for corporate devices



# Mobile Teleworker

## Deployment Models using AnyConnect Mobile Client

- Someone that can connect to their virtual desktop from any endpoint
- Mobile teleworkers are typically in **unsecure network locations**
- Advantages of Cisco VXi allows mobile teleworkers to connect securely using Cisco AnyConnect Client

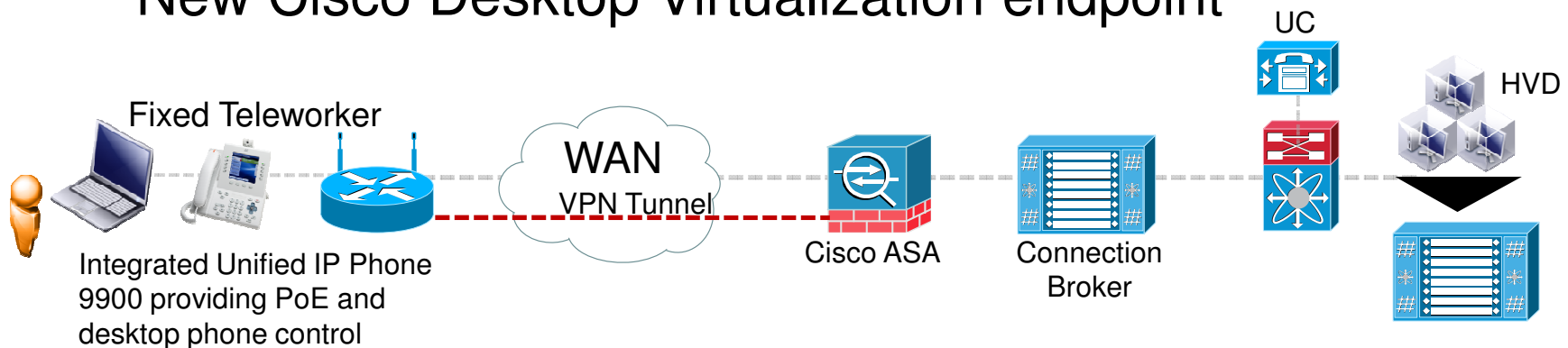


- Data is still secure, even if the endpoint is stolen, damaged or lost

# Fixed Teleworker

## Deployment Models using Cisco Virtual Office Solution

- Workers connecting securely from locations outside of the traditional corporate office
- Using the Cisco Integrated Services Router (ISR) to provide secure and rich network services
- Uses connect to their hosted virtual desktop using the New Cisco Desktop Virtualization endpoint



# Desktop Virtualization Endpoints Vendors

## Zero Clients vs. Thin Clients

- Endpoints used for desktop virtualization have been adapted from a prior generation of client hardware originally designed for terminal services and application virtualization
- Endpoints come in a wide range of hardware configurations. There are also hundreds of vendors in the desktop virtualization endpoint space. Wyse, IGEL and devonIT the clear leaders



# Zero Clients

- Zero clients are the simplest devices
- They have embedded operating systems that are not exposed to the user
- Zero clients have reduced local capabilities and depend on heavily on the resources available within the virtual desktop
- This class of devices is typically slated toward the task worker since it provides no enhancements for media streaming
- Because there is no exposed OS, there is no virus infection, making them a very secure endpoint



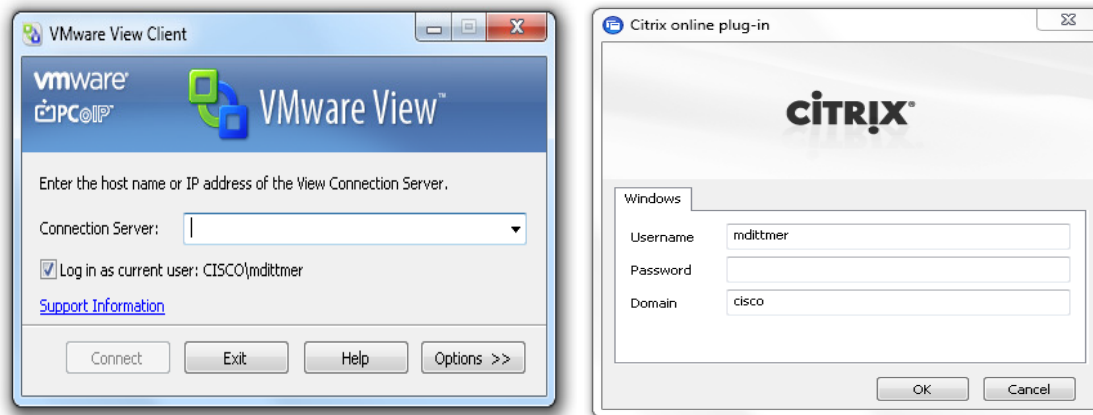
# Thin Clients



- Thin client devices usually contain more local capabilities and often have a customizable local embedded operating system (usually Linux or Windows)
- This class of endpoint provides greater flexibility
- They are generally customized by the system administrators and then locked down
- Thin clients are typically used by power users who need access not only to browsers, email clients and office automation tools, but also additional features such as streaming audio and video

# Thick Clients using DV Software Clients

- Thick client devices refer to standard PC or Laptops running a standard OS, but have similar software as the thin client, installed as an application

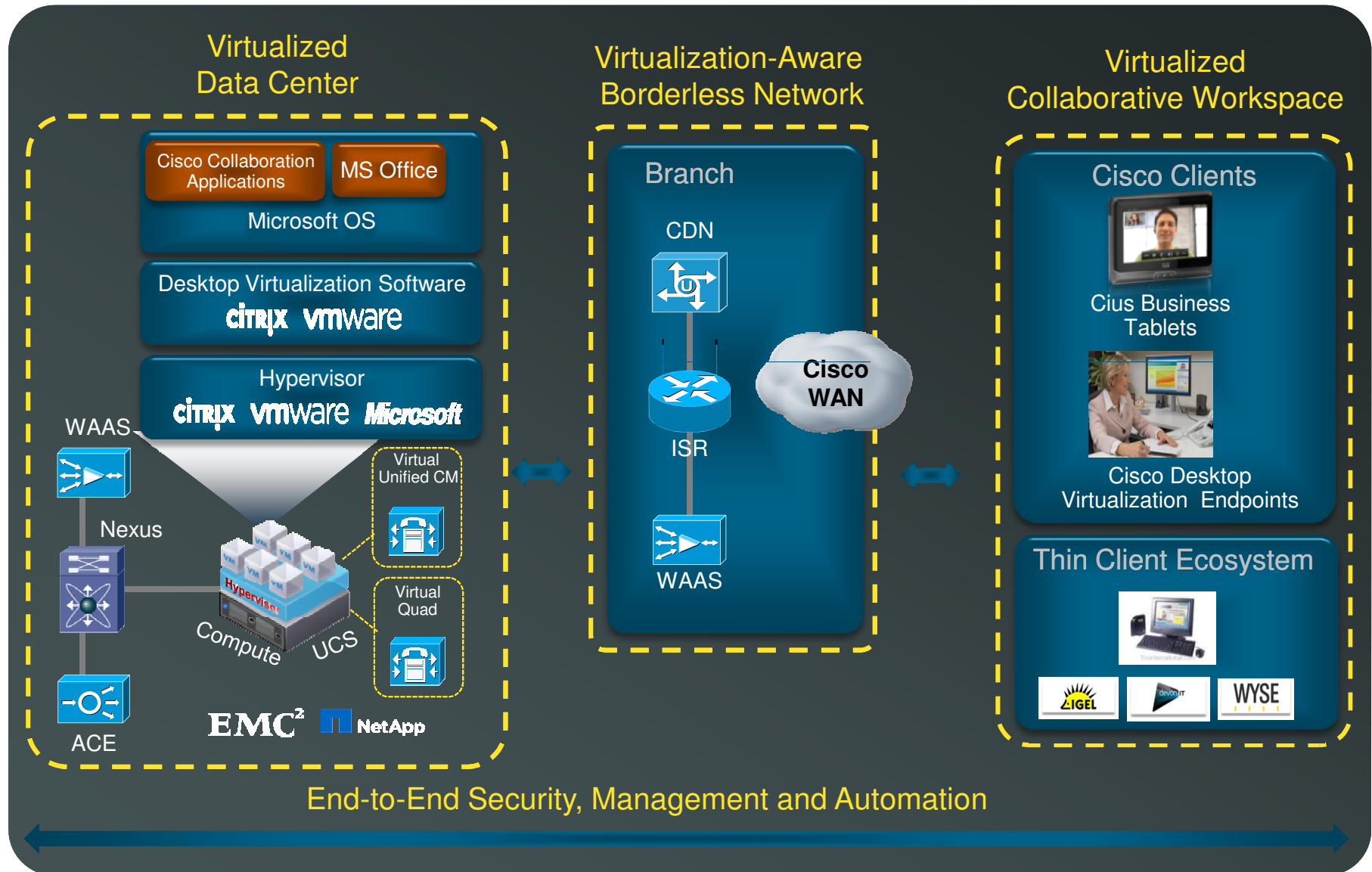


- Thick client devices allow users to work offline and are often the choice of the “Road Warrior” user



# Summary

# Cisco VXI Virtualized End-to-End System





**CISCO**