FROST & SULLIVAN

50 Years of Growth, Innovation and Leadership

Raising the Bar on Desktop Virtualization:
Understand the important considerations and use cases to make the most of your desktop virtualization initiative

The modern workplace continues to evolve with demands for improved work mobility, new bring-your-own-device (BYOD) initiatives and a need for an increasingly agile, productive and collaborative workforce. IT needs to balance these requirements with on-going concerns for data protection, compliance and security, as well as lower TCO and improved operational efficiency.

Cisco and Citrix have teamed up to deliver an end-to-end desktop and application virtualization solution that supports the disparate needs of different work-groups, while delivering an uncompromised user-experience that is collaborative, mobile and secure. The Cisco VXI Smart Solution with Citrix XenDesktop combines Cisco's data center, network and collaboration technologies together with Citrix industry-leading desktop and application virtualization technologies to deliver increase business efficiency, productivity and agility and enable an exceptionally flexible and secure workspace on any device in any location.

A
White Paper by
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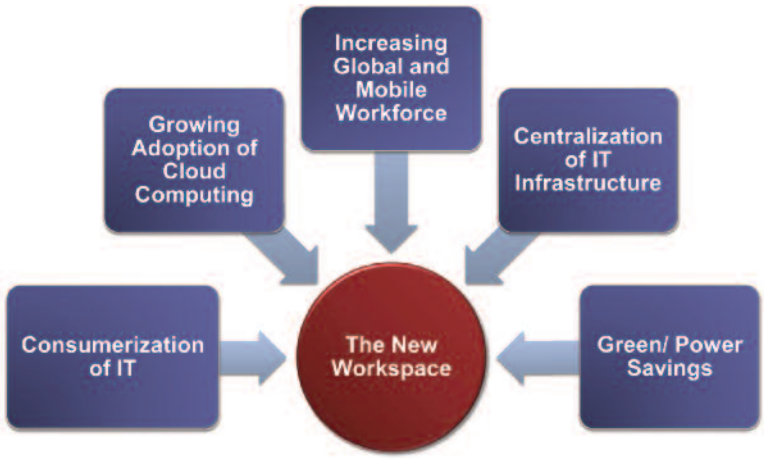
INTRODUCTION

In recent years, there has been a massive change in the way employees perform daily routine tasks. There is a pressing need for new workspace paradigms that better support how modern-day employees work using technologies such as remote meetings, social media, unified communications and collaboration that allows them to work from anywhere with anyone. New employee-owned devices coming into the workplace to augment or replace the traditional PC contribute to propel this workspace evolution. The very nature of our work is morphing. Work has now become more mobile, intimate and casual across a range of devices and locations. This is attributable to five key driving factors.

Figure 1 : Factors driving evolution of workspace in the post PC era



(Source: Frost & Sullivan)

Consumerization of IT: The proliferation of multiple end-user devices is fast proving to be a game changer, especially in accessing corporate IT resources. In addition to utilizing standard devices provided by the IT department, employees have a strong preference towards using personal endpoint devices such as notebooks, tablets and smart phones. For IT managers, the bring your own device (BYOD) trend that leads to multiple devices strategy and support, while presenting new opportunties, has exposed a potential minefield of complexities as they seek to align evolving user requirements with security and compliance demands.

Growing Adoption of Cloud Computing: Cloud services are experiencing increased momentum and gaining critical mass in a growing number of enterprises, creating new challenges for IT staff. IT managers are feeling increasing pressure from top management to adopt Cloud services, which can offer multi-fold benefits. Many IT departments view end user workspace and communications services as an early use case candidate for cloud service adoption.

Increasing Global and Mobile Workforce: Workforce mobility is proving attractive to businesses that believe that by freeing the worker from the constraints of the physical workplace they can attract the best talent and increase productivity irrespectively of location. Most users today are also demanding anywhere, anytime access to information, in line with the emergence of new work styles and an increasingly global and mobile workforce. These trends are driving IT to find secure, reliable ways to deliver a complete workplace environment.

Centralization of IT Infrastructure: Enterprise IT architectures are witnessing increased centralization. What originated primarily as a means to bring about cost efficiencies through a utility-based pricing model has evolved; this shift is now impacting the way IT is procured and delivered in organizations around the world today.

Green/Power Savings: Green IT is becoming an increasingly important consideration not only for businesses, but also for users. Enterprises today are highly focused on cost efficiencies and going green helps to reduce IT costs. Users are also becoming concerned about their impact on the environment.

Additionally, the rapid evolution of end-user preferences, usage patterns and disruptive technologies has translated the management of endpoints into a complex exercise for IT departments, giving rise to new challenges for IT managers.

Figure 2 : Challenges in managing today's endpoints

(Source: Frost & Sullivan)

The Virtualization Experience Infrastructure (VXI)Smart Solution

The Cisco VXI Smart Solution with Citrix XenDesktop is the first of its kind in the industry. With VXI, Cisco and Citrix are collaborating to help businesses accelerate successful adoption of virtual workspace strategies so they can realize the full potential business value. The combined solution addresses a common vision of the changing workplace and aims to deliver the software, end-to-end networking, and virtualization platform needed to empower IT departments to navigate today's rapidly changing business environment. Cisco VXI is a key pillar of Cisco's Unified Workspace strategy that provides a set of architectures and services that help IT deliver appropriate access to all applications, data, and communications services whether delivered virtually (as in VXI) or natively.

Building upon Cisco's capabilities in networking, datacenter and collaboration, and Citrix's capabilities in virtualization and the delivery of desktop and application virtualization, the combined solution helps businesses to easily and cost effectively deploy virtual workspaces to all the PCs, Macs, tablets, smart phones and thin clients owned by the organization or alternatively by employees and partners. The solution also raises the bar by expanding the set of use work-styles and workgroups that can be supported – from simple hosted virtual desktops, to more sophisticated virtual workspaces that also support rich media, voice and video. By bringing together virtual desktop and collaboration architectures not only can users experience a superior desktop experience, but also a superior voice, video and collaboration experience.

The Cisco VXI Smart Solution delivers a Flexible, Secure and Uncompromised desktop and application virtualization experience.

Figure 3: Key characteristics of Cisco VXI Smart Solution

(Source: Frost & Sullivan)

V (5) TOP-OF-MIND CONSIDERATIONS WHEN PLANNING FOR DESKTOP VIRTUALIZATION

Figure 4 : Five important considerations when planning desktop virtualization

End-to-End Solution

Desktop virtualization requires alignment across multiple technologies and associated IT domains. Coordinating these domains and putting together a solution from multiple vendors creates challenges at multiple levels - integration, compatability, lock-in, etc. Enterprises need to overcome these in order to put together a sustainable solution that meets their requirements for the long run. Instead of putting together a solution on a piecemeal basis, to reduce costs, deployment risks and time to delivery, choose a solution that offers the entire value chain of offerings, from infrastructure to software to related services and support, a solution that has demonstrated its capabilities and is able to offer the scale and flexibility required by the enterprises of today.

User Experience

Collaboration and employee empowerment are at the heart of a "knowledge economy". It is impossible for enterprises to remain in a "closed cocoon" in this information-centric world where ideas are generated everywhere. Powered by the entry of Gen-X and Gen-Y employees in the work force, an increasing number of employees expect rich media collaboration such as VoIP, video and social media. Desktop virtualization architectures have traditionally faced challenges supporting high quality communications, so enterprise architects need to plan for a more complete virtual workspace to ensure they can easily support growing demands for embedded collaboration.

Agile Infrastructure

Since the desktop operating system together with data and applications is going to run on the data center infrastructure, it is important to plan for a scalable, secure and simplified compute infrastructure. High memory density servers can offer better performance since memory I/O is faster than disk I/O and saves costs through efficient scaling. They ensure optimal application performance and minimize fine-tuning issues. It is equally critical to attain seamless integration between compute, network and virtualization resources to simplify management and provisioning and ensure uncompromised application delivery.

Optimized for All Networks

The promise of "LAN in a WAN" can only be delivered through an intelligent, robust network that can analyze and optimize application traffic. The network needs to not only support high throughput requirements but also be able to intelligently monitor, prioritize, secure and accelerate both traditional and virtual desktop traffic. With growing collaboration, the network should be capable of optimizing rich media traffic such as VoIP and video. Embedding virtual switches at the distributed hypervisor layer helps to meet the new network requirements of server virtualization and when combined with application acceleration solutions, can reduce latency and improve secuirty for both the data center and in the WAN.

Security and Compliance

While centralization of desktop infrastructure is bound to enhance security postures, it is equally important to ensure the security of the virtualization platform and data at rest and in motion. For example with "desktops" now residing in the data center itself, It is necessary to ensure the infrastructure hosting these desktops is isolated from infrastructure hosting mission critical applications and data. While traditional challenges of security such as patching, usage of anti-malware do not go away, they will become easier to manage due to centralization. Security postures need to be managed across the organization with equal emphasis on technology, people and processes.

X (10) COMMON DESKTOP VIRTUALIZATION USE CASES: BUSINESS AND TECHNOLOGY MOTIVATIONS FOR CONSIDERING A VIRTUAL DESKTOP STRATEGY

This section explores the ten common use cases of desktop virtualization to understand the challenges with traditional desktop environments and how desktop virtualization meets the demands of businesses, end-users and IT managers.

Use Case # 1 Ensuring secure access and compliance

Organizations face a variety of regulatory requirements to keep information private and confidential with controlled access. This is even more important today, in light of the recent instances of attacks on similar data stored with large global organizations and the trend towards use on non-corporate managed devices. Security is not limited to access of sensitive information; it also encapsulates malware that is highly prevalent today.

Compliance is an important necessity for businesses. Most businesses need to adhere to multiple local and international regulatory requirements – these may include industry, state, or country requirements.

Typical challenges and key considerations
As organizations look at desktop virtualization for secure access and compliance, IT executives should consider:

- Centralized user data translates into one point of failure for an external attack on the organization's IT systems. It is essential to have significant safety measures around this.

Desktop Virtualization drivers for secure access and compliance
In this scenario, desktop virtualization offers CIOs the ability to:

- **Enhance threat detection and isolation –** As all data resides centrally, it is easier to detect threats or malware and isolate it, eliminating the chances of expansion of the threat vector. Users are able to access only the content that is identified to be safe to use by the security solutions in place.
- **Complete control over end-points reduces risk –** Desktop virtualization shifts control of end-points to IT. With all data being tunneled through a secure network and the organization's firewall, the IT team can restrict usage and better manage potential security risks. In addition, the loss of data through physical drives is eliminated. Application activity monitoring can also be enabled through centralization of control. Network access for BYOD still needs to be carefully controlled to prevent associated risks.
- **Agile policy implementation –** Any changes in IT policies can be instantaneously implemented with desktop virtualization. The IT staff needs to replicate the policy across all the desktop templates and they assume immediate effect.
- **Ensure compliance –** With desktop virtualization, ensuring compliance is easier given that all systems are centralized in the data center. Applying controls and policies to ensure compliance can be centrally implemented on all end-point VMs. Furthermore, a robust data center infrastructure provides for data protection, business recovery and disaster recovery capabilities, essential for regulatory compliance.

Cisco and Citrix's Approach

Cisco and Citrix's Approach brings the following benefits that make the desktop virtualization proposition for secure access and compliance stronger.

- **Secure connectivity and multi-factor authentication –** Using Cisco VXI Smart Solution with Citrix XenDesktop, IT departments can prevent data from leaving the data center. Citrix XenDesktop aims to protect mission-critical data with secure connectivity and multi-factor authentication to ensure that only authorized users connect with specified applications and data. There is improved device, application and data security with validated smartcard solutions, Cisco ASA offers single sign on (SSO) for Citrix Receiver for simpler remote access.
- **Inter VM traffic is secured –** The Cisco Nexus 1000V and Cisco VSG secure inter VM traffic, and allow user desktop segmentation and isolation from mission-critical applications. This allows greater control of what different workgroups are allowed to access and gives increased protection from attacks.
- **Secure access, anytime, anywhere –** Cisco AnyConnect Secure Mobility and Cisco ASA provide 'always on' secure connectivity to virtual desktop environments, offering continuous, IT defined, policy control and enforcement.
- **Flexible policy enforcement –** Role-based access control with Cisco ISE provides the visibility across user identity, device type and posture to allow granular policy based control and enforcement for both virtual, native and BYOD devices
- **Single-instance management with XenDesktop -** This enables IT departments to separate the device, operating system, applications, data and user settings to maintain single master images of each. This capability dramatically reduces ongoing patching and maintenance efforts, with users running approved application and operating system images that have centrally approved patches and security settings.

Use Case # 2 Enabling BYOD (Bring Your Own Device) and IT Supported Devices

The concept of Bring Your Own Device (BYOD) is gathering pace as most organizations realize the potential benefits in terms of cost saving, productivity improvements and flexibility that can be gained by allowing employees to utilize self-owned devices such as tablets and smartphones for business purposes, in addition to the standard devices provided by IT. This transformation is often led by the senior management team, leaving the IT teams with little choice but to support the transformation. According to a Citrix Systems' Bring-Your-Own (BYO) Index, 92 percent of IT organizations are aware that employees are using their own devices in the workplace. 94 percent intend to have a formal BYO policy in place by mid-2013, up from 44 percent today.

Typical challenges and key considerations
As organizations look at desktop virtualization to enable BYOD, IT executives should consider**:**

- **Securing enterprise data -** Securing enterprise data is a key concern for IT teams when opening up their IT systems to access by multiple user-owned platforms.
- **Compatibility concerns -** With more users bringing their own devices, a larger number of disparate platforms are becoming part of the enterprise IT systems, creating a growing number of compatibility issues for IT staff to resolve.
- **Expansion of IT support:** Users expect the corporate IT teams to provide support for the devices that they may use for business purposes. With BYOD, the IT teams could be accountable for supporting a greater number of platforms and devices.
- **Process & People:** BYOD is as much about people and processes as it is about technology. Enterprises need to clearly understand the legal and business implications of the transition and have the right processes to underpin the initiative. People need to be adequately trained on the appropriate usage as well.

Cisco and Citrix's Approach

The VXI approach brings the following benefits for enterprises encouraging BYOD:

- **Cisco VXI with Citrix XenDesktop enables any device, anywhere strategy –** by supporting a mix of enterprise-owned and user-owned devices to access data and communications with the same superior user experience. The enterprise can support users with thin clients like the Cisco VXC and any combination of Android , Windows and Apple Mac or iOS mobile clients. In addition, workers can use their own laptops, tablets and smartphones.
- **Citrix Receiver, Cisco AnyConnect and Cisco Jabber support a multitude of devices -** to allow secure access to corporate desktops, applications and data on a range devices that include laptops, tablets and smart phones, irrespective of the platform they run on. Cisco has worked with Citrix to enable expanded Cisco Jabber support for Citrix XenDesktop that enables collaboration support for a greater number of devices.
- **Centralized management with XenDesktop -** When using XenDesktop, the device management functions are highly centralized. For example, if an application needs to be updated, administrators only need to update the servers and not every single client device, saving the organization valuable time and money. This also resolves software incompatibility issues as well as security concerns.
- **Cisco SecureX and Cisco Identity Services Engine (ISE) to Secure Access control for BYOD –** Cisco ISE provides full network access security and policy management by allowing only authorized and clean devices to access the network through end-point security policy enforcement and remediation support.

Desktop Virtualization drivers for BYOD
In this scenario, desktop virtualization offers IT executives:

- **A secure corporate only environment:** Virtualization allows enterprises to deliver desktops and applications to user devices straight from the datacenter. Since the data is stored in the datacenter and not on the client device, it enhances security and adheres to corporate governance.
- **Centralized management:** Virtual desktops allow centralized management and the fact that applications run independent of the client platform resolves a large portion of compatibility and device management issues for IT teams, helping enhance productivity. In addition, because desktop run centrally, IT can maintain the corporate desktop and leave the support of the BYODs to the users themselves.

Use Case # 3 Ensuring business continuity planning and disaster recovery

Driven by regulatory compliance and in the aftermath of natural disasters such as the Japanese earthquake and Queensland floods, business continuity planning has emerged as a key priority for IT executives. Providing access to corporate desktops, applications and services on a 24 x 7 x 365 basis, is a monumental challenge due to the complexity of IT environments and the likelihood of unforeseen disasters.

Typical challenges and key considerations
As enterprises look at desktop virtualization for ensuring business continuity planning and disaster recovery, here are a few considerations to be mindful of:

- While the importance of a robust data center infrastructure and DR plan is increased even further now that both enterprise and user applications and data reside there, desktop backup and recovery are much simpler and less costly than transactional enterprise apps. Organizations need to think about resilience of both application / data and communications services in order to ensure continued business productivity.
- Building a business case for Business Continuity Planning (BCP) and providing a solid ROI model can often be challenging for many organizations.
- In the case of an external service provider providing VDI as a service, issues of trust, compliance and data sovereignty assume high importance.

Desktop Virtualization drivers for business continuity
In this scenario, desktop virtualization offers IT executives the following ability:

- **"Always on" workspaces –** Centralization of desktops ensures that workspaces are available for use from anywhere. If the data center infrastructure is run in a redundant mode (with primary and backup centers), the IT resources are available to employees on an on-demand basis, from any device, even in case of disasters.
- **Adherence to compliance –** By making critical systems available on a continual basis, organizations will be able to comply with corporate governance guidelines pertaining to availability of critical infrastructure.
- **Continued productivity –** By ensuring continued access to applications, communications and data, businesses can be resilient during natural or man-made disruptions, thereby minimizing any potential loss of revenues. Desktop virtualization enables IT organizations to rapidly recover user desktop environments and get them up and running on a new device. In the case where transport is impacted or an office is closed, users can still access their work from a remote location.
- **Speedy recovery from disasters –** Organizations have an option of using a traditional approach to computing under normal circumstances and can leverage an external service provider during disasters. Such a hybrid approach will ensure access to workspace environments on an "as needed basis" while giving users access within a fraction of time access to the same desktop and applications that they are used to.

Cisco and Citrix's Approach

The VXI approach brings the following benefits for business continuity.

- **Platform and device independence –** Citrix and Cisco work with a wide variety of partners supporting diverse end-user devices, client operating systems and applications, thereby offering customers' flexibility in deployment and replacement of lost or stolen devices.
- **Delivering the "rich user experience" –** While most vendors tend to address the user experience from a workspace standpoint, Cisco VXI can deliver an end-to-end rich experience that embeds unified communications into desktop and application virtualization environments.. In case of a disaster, the users are empowered by having access to not only their compute environments but also to messaging, voice and video that allows them to collaborate and solve critical business issues.
- **On-demand desktop delivery with Citrix XenDesktop –** With FlexCast and Receiver, enterprises can deliver on-demand services that can be accessed from traditional PCs, Macs, thin clients, smart phones, and tablets. This ensures that desktops can be accessed from multiple locations and devices, enabling disaster recovery and business continuity.
- **Data Center Recovery –** In the case of data center disruptions – disaster recovery and data center interconnect technologies can help bring virtual desktops back on-line rapidly.
- **End-to-end Services and Support -** Cisco Allied Service for VXI provides customers with a single point of contact for technical support across the VXI solution set, including 3rd party products. The benefit of this service is that it saves the customer the hassle of troubleshooting and coordinating resolution of issues within their desktop virtualization infrastructure.

Use Case # 4 Empowering Mobile Workers and Enhancing User Productivity

Workspaces have changed significantly over the last decade. We no longer just work from our desks in a central office, but we also work from airport lounges, homes, and hotel rooms. Over 25% of the workforce in a typical enterprise can be defined as mobile (i.e. they spend more than one-fifth of their time outside the office).

The need to enable this workforce with the same set of tools and applications as if they were at the office becomes a key priority to ensure employee productivity and business agility. Many of the mobile workers are senior executives and sales teams for whom staying connected with the enterprise applications and collaboration tools is critical for the business.

IT executives need to be able to provide for the mobility needs of these users by enabling mobility of the complete workspace across devices and locations, and also, in some cases, manage and support the mobile devices themselves.

Typical challenges and key considerations
As enterprises look at desktop virtualization for mobile workers, IT should be mindful of:

- The need for a consistent mobile workspace experience across different corporate-owned and employee-owned devices.
- High latency or inability to use rich collaboration tools can become a major challenge.
- Mobile workers are used to quick response times for desktop applications, and hence latency in application access will become counter-productive for the users.
- IT executives need to consider the option of user-owned mobile device or enterprise-owned mobile device depending on the nature & frequency of mobile access. Enterprise-owned devices can be managed better and are more secure..

Cisco and Citrix's Approach

The VXI approach brings the following benefits that make the desktop virtualization proposition for mobile workers stronger.

- **Anywhere, Anytime, Any device access with Citrix XenDesktop and Receiver –** The Cisco VXI Smart Solution with Citrix XenDesktop provides desktops and applications as on-demand services that can be accessed from traditional PCs, Macs, thin clients, smart phones, and tablets. The solution enables user mobility and high employee productivity.
- **Cisco Collaboration solutions with Jabber –** Cisco's breadth of collaboration solutions are also available on a broad range of fixed and mobile end user devices. The ability to use tablets and smart phones for rich video collaboration sessions has become important for executives and sales teams. Cisco Jabber support for Citrix XenDesktop expands the range of devices that can be enabled through the solution.
- **Secure access with Citrix XenDesktop –** and Cisco AnyConnect and Cisco ASA can quickly and securely deliver individual applications or complete desktops to users leveraging mobile devices across different wireless networks.
- **Performance Optimization with Cisco WAAS –** Through partnership with Citrix, Cisco WAAS optimizes performance of the Citrix HDX protocol including support for MultiStream for mobile users through compression, caching and traffic prioritization.
- **Location-based Policy Control with Cisco ISE –** ensures that security and compliance rules can be applied based on device use and location.

Desktop Virtualization drivers for mobile workers

In this scenario, desktop virtualization is a good solution for mobile workers as it provides:

- **Consistent application experience –** As mobile workers toggle between their desktop/laptops to their mobile or tablet devices, desktop virtualization can ensure a consistent application and desktop experience for the users.
- **Secure access to applications –** Desktop virtualization enables applications to be accessed by the authorized user, and the security policies of the enterprise are enforced on any connecting device.
- **Virtual desktop anytime, anywhere –** Desktop virtualization allows users to access their desktop, applications and data anytime from anywhere. The users could be outside the office, at a remote location (such as a customer office, an airport lounge, home, or hotel room) and still access the same workspace experience.

Use Case # 5 Enhancing IT staff productivity, and simplifyinig IT management

IT staff within companies are usually divided into many disciplines such as server, desktop, communications network etc. As the size of an organization's infrastructure grows, so does its requirement for IT staff. This puts a strain on the organizational resources and makes day-to-day management complex. Organizations also need to keep IT staff productive through varying cycles of deployment and servicing requests.

Typical challenges and key considerations
As enterprises look at desktop virtualization for IT staff productivity, IT should be mindful of:

- Desktop virtualization changes the IT infrastructure significantly, and IT disciplines that were once distinct need to work much closer together to ensure better performance.
- While implementing desktop virtualization, IT staff may be required to learn new skills due to introduction of new concepts and the integration of multiple IT aspects.

Desktop Virtualization drivers for IT staff productivity
In this scenario, desktop virtualization offers IT executives the ability to:

- **Centralize support:** In a non-virtual environment, IT support staffs are usually located in each branch office to service requests from local users. A VXI environment reduces the need for local support staff by having a centralized architecture. This enables support staff sitting in the headquarters of a company to easily manage virtual desktop images and service requests at remote locations.
- **Centralize procurement:** Procurement of IT hardware and software is usually done according to the local or regional policies of each organization. This can sometimes be a challenge in terms of application or hardware compatibility and reduce efficiency of IT. With VXI, all IT requirements can be procured from a central location, thus increasing homogeneity and simplifying the procurement process.
- **Centralize maintenance:** With desktop virtualization, client hardware is drastically simplified while the software can be managed from a central location with much greater control and precision. This saves time and reduces the need to have a large IT staff to address multiple helpdesk calls. The saved time can be reassigned to activities that are more productive.

Cisco and Citrix's Approach

The VXI approach brings the following benefits that make the desktop virtualization proposition for IT staff productivity stronger.

- **Simplify infrastructure operations -** Cisco UCS delivers unified infrastructure management that streamlines server and virtual desktop provisioning – supporting up to 30,000 virtual desktops in a single management domain. It allows for quicker deployment of servers and virtual desktops. In addition the unified compute architecture results in much fewer servers, switches and cables to manage, again increasing operational efficiencies.
- **FlexCast allows IT departments to meet user demands with ease –** Citrix FlexCast delivery technology provides a range of desktop delivery options that can be tailored to meet the needs of specific users or groups of users, with differing performance and personalization requirement. With FlexCast technology, IT departments can deliver every type of virtual desktop and application, hosted or local, physical or virtual, each specifically tailored to meet the requirements of individual users.
- **Single instances enhance management -** With Citrix XenDesktop, IT departments can manage single instances of each operating system, application and user profile and then dynamically assemble them to greatly simplify desktop management. XenDesktop's open architecture enables customers to easily adopt desktop virtualization using any hypervisor, storage, or management infrastructure.
- **Faster time to productivity and improved business agility -** Customers can achieve faster server deployment and virtual desktop provisioning with XenDesktop, Cisco UCS, Cisco VXC endpoints. . They will be able to provision thousands of workspaces in minutes with rapid, storage-based cloning and server service profiles.

Use Case # 6 Windows 7 migration

As businesses look to upgrade to Microsoft Windows 7 to take advantage of its latest features, enhanced security, and simplicity, two key concerns emerge: cost and complexity. Upgrading an operating system usually requires a PC hardware refresh, which can be very expensive, and requires all existing applications to be tested in the new operating system to ensure maximum compatibility.

This is necessary to ensure the new operating system can run older or custom applications with better performance.

Typical challenges and key considerations
As enterprises look at desktop virtualization for Windows 7 migration, IT should be mindful of:

- Windows licensing for desktop virtualization needs to be considered carefully to ensure cost comparisons for the initiative are accurate. Moving to a virtual desktop solution requires a re-orientation of the expectation of the users and their interaction with the system.

Desktop Virtualization drivers for Windows 7 migration
In this scenario, desktop virtualization offers IT executives the ability to:

- **Lower long-term costs –** With VXI, client machines no longer need to be full-fledged desktop systems. Thin or zero clients that are directly connected to a centralized data center can help reduce costs on hardware in the long term by a significant amount. This extends the hardware refresh cycle that is usually necessary when upgrading the operating system. Also, with the desktop being run from the data center, using a legacy desktop system does not affect performance.

- **Application virtualization –** Porting applications from a previous version of Windows can be challenging, especially when using custom applications that require older software versions. When moving to a virtual environment, businesses have the option of virtualizing existing applications, which removes the dependency of applications from the underlying operating system. Users are able run older applications such as Internet Explorer 6, which is sometimes necessary when running custom-built software.

Cisco and Citrix's Approach

The VXI approach brings the following benefits that make the desktop virtualization proposition for Windows 7 migration stronger.

- **High Density Windows 7 Virtual Desktop Hosting -** Windows 7 needs high memory and processing requirements from the underlying hardware. Cisco UCS Intel Xeon processors, extended memory and unified fabric result in a balanced infrastructure to support hundreds of Win 7 virtual desktops on a single server.

- **Rich Media supported Thin Clients for Windows 7 -** Cisco Virtualized Experience Client (VXC) endpoints available in a variety of form factors. They include zero clients integrated into an IP phone to thin clients that unify virtual desktops, voice and video, all in one device. For mobile clients such as a smart phone or a tablet, Cisco Jabber can be used on the local device to deliver the seamless collaboration experience. This provides a high amount of flexibility of deploying Windows 7 according to user needs, and also improves morale with the usage of cutting-edge solutions

- **Complete Windows 7 desktop delivery with Citrix XenDesktop -** Users can access a high-performance Windows 7 experience via PC, Mac, smart phone, iPad, netbook or thin client, and desktops can follow users from device to device—even to the same ones they use in their personal lives — while maintaining complete security and isolation.

- **Citrix XenDesktop separates applications from OS and hardware –** The separation allows IT to undertake rapid migration to Windows 7 by eliminating the need to upgrade end user devices. Furthermore, Citrix's ability to run session-based applications allows users to run incompatible applications on the server. For example, with XenDesktop organizations can run 16-bit applications in a 64-bit Windows 7 environment.

- **Centralized administration and management –** Moving to a virtual desktop will separate the underlying hardware from the software. This makes it easier to handle software or hardware issues and provides the ability to run a single windows 7 image across different hardware types.

- **Reduce implementation process time –** Implementing a new operating system requires a significant amount of time due to the extensive testing required, as well as rolling out upgrades to hundreds of desktops. With desktop virtualization, this process is greatly simplified due to its centralized architecture and updates can be rolled out all at once.

Use Case # 7 Branch enablement

IT infrastructures in branches including regional offices, retail stores, banks and remote agencies, might give users good application availability and performance, but managing a distributed IT environment can be complex and expensive. A distributed IT environment also increases the security risk of information loss, if proper controls are not enforced. Furthermore, it is challenging to replicate current policies and security postures across future branch expansions. It also slows down the ability to deploy new branches.

An increasingly viable alternative is to consolidate the branch-office IT resources into a single, centralized datacenter to simplify management and decrease operating costs while maintaining reliability and performance.

Typical challenges and key considerations
As enterprises look at desktop virtualization for branch office enablement, IT executives should be mindful of:

- Ensuring a LAN like speed in a WAN is extremely challenging due to the laws of physics, and latency that is created due to round-trip time between the users and the applications.
- Cultural and linguistic challenges may hamper adoption, particularly in scenarios where users are accustomed to a local support team that speaks their language and are available in person.

Desktop Virtualization drivers for branch office enablement
In this scenario, desktop virtualization offers IT executives the following ability:

- **Centralization and control –** By centralizing servers and storage, the IT team can have complete control over data. Centralization also helps in enforcing policies to users, in line with the corporate governance framework, thereby ensuring adherence to regulatory compliance laws.
- **Standardization –** By making the desktops centralized, IT managers are now able to standardize the desktops that can be delivered to users over the networks, allowing them to maintain easier control over licensing, patch management and application usage.
- **Rapid application roll-out –** Due to centralization, application installation and upgrades can happen in a short span of time with no or little downtime to end-users. Organizations are able to save considerable costs through reduced downtime and quicker time to market.
- **Rapid employee on-boarding –** Because new users are provided a virtual desktop, and there is no need to physically send a formatted and configured laptop. New workers, consultants and contractors (and even complete new branches) can be on-boarded much more rapidly.

Cisco and Citrix's Approach

The VXI approach brings the following benefits for branch enablement.

- **Branch and desktop virtualization planning and design -** Cisco branch and desktop virtualization planning and design services helps customers virtualize the branch-office and desktop infrastructure as well as assess important applications that are suitable for the virtualized infrastructure. It helps them develop a financially viable strategy and create a phased roadmap, and supports them through design and deployment.
- **Cisco Branch-Office-in-a-Box –** This is a unified routing, switching, and server solution for the branch office that combines a WAN access router, a Gigabit LAN Switch, and an x86 blade server in a single Cisco Integrated Services Routers (ISR G2) router. Branch-Office-in-a-Box is a solution for providing access to the WAN and the Internet, enabling LAN connectivity between local devices, and hosting popular Windows services such as active directory, DHCP and DNS.
- **Branch Survivability for both Voice and Virtual Desktops –** The coming together of solutions such as survivable remote site telephony, WAN redundancy and the elimination of a single point of failure creates a highly resilient solution. The ability to overcome the hair-pin effect for voice and video results in a superior user experience for branch workers.
- **Citrix XenDesktop with HDX enables enhanced user experience –** The HDX technology enables high definition desktop experience across branch offices over local peripherals, voice and video, creating a rich end-user experience.
- **Cisco Wide Area Application Services (WAAS) optimized for Citrix XenDesktop –** Cisco WAAS enables customers to accelerate their desktop virtualization rollouts at branch offices. It offers optimization of Citrix XenDesktop traffic, which includes Citrix XenApp virtualized applications, over the WAN, to support more virtual desktop sessions and enhance the end-user experience. WAAS can be deployed in a variety of form factors including virtual appliance, physical appliance and ISR G2 router module. collaboration at branch locations.

Use Case # 8 Enabling Unified Communications and Collaboration

Unified Communications has become an indispensible component of the modern workspace and critical for supporting needs of an ever more distributed and virtual workforce. More than 50% of IT organizations will have migrated their traditional voice systems to Unified Communications by the end of 2011. These companies are realizing competitive advantage by promoting improved collaboration among distributed permanent and temporary staff, partners and consultants and through integration of communications into business critical processes. Based on a core Unified Computing voice, video platform, workers can take advantage of additional applications, including voice, video and web conferencing, IM, presence and Telepresence to ensure the most productive and responsive work experience.

Typical challenges and key considerations
As organizations look at desktop virtualization, they should be mindful of the following:

- While both Desktop Virtualization and Unified Communications target the end user work experience, they are often handled by separate organizations and deployed as separate architectures which are often not completely compatible.
- When deploying a soft phone or desktop video application natively on the end user device, media processing and data encapsulation happens at the desktop or client side. With a traditional thin client, this is no longer possible and may lead to latency issues and poor end user experience when combining virtual desktop and unified communications technologies into a unified workspace.
- Using collaboration applications in a virtual desktop environment may need specialized device hardware and software to ensure an optimized user experience.
- Until recently, vendor support for running unified communications (UC) applications on a hypervisor platform was not very common. This means that customers may have fewer options when choosing vendors that support virtualization.

Cisco and Citrix's Approach

The VXI approach brings the following benefits that make enabling unified communications stronger.

- **Cisco VXI with Citrix XenDesktop delivers complete virtual workspace –** By unifying virtual desktop, voice and video technologies to deliver a virtual workspace with an optimized user experience for all applications and collaboration services on both fixed and mobile end-points. solution that combines virtual desktops with voice and video.
- **Cisco Collaboration solutions with Cisco Jabber –** With VXI, Cisco's breadth of collaboration solutions are also available on a virtualized desktop environment, enabling virtualized desktops to deliver rich collaboration tools. Now virtual desktops can be deployed to the large user population that needs access to unified communications and collaboration tools as an integral part of their work environment. With Cisco Jabber supporting Citrix XenDesktop, there is collaboration support across more devices. This includes virtual and native desktops, and mobile and campus-based desktops. For a thin client deployment option, IT can deploy Cisco VXC which combines virtual desktop, voice and virtual desktop all in one device where users can interact with Cisco Jabber on the virtual desktop without compromising the experience. Its unique local processing of voice and video processing optimizes the user experience by eliminating latency and resulting from the hairpin effect. Cisco VXC supports the Citrix HDX protocol that optimizes thin client performance and reduces bandwidth requirements.

Desktop Virtualization drivers for unified communications and collaboration
In this scenario, when deployed as part of VXI, desktop virtualization offers IT the following:

- **Mobility of Complete Workspace –** When desktop virtualization and collaboration applications are designed to work together to deliver an uncompromised user experience, organizations can benefit from being able to access the complete workspace that combines virtual desktops, voice and video from anywhere on multiple devices.
- **Replace or integrate endpoints:** Desktop virtualization enables IT departments to accelerate the integration of voice, data, and video endpoints into a single device. This simplifies the decision to replace a traditional PC with a thin client, thus providing cost benefits and improving efficiency for not only large enterprises, but also small and medium businesses.

Use Case # 9 Supporting business goal for IT reduced IT costs

Desktop/PC procurement, provisioning, management and maintenance (upgrades, migrations, etc.) are significant cost components of the overall IT spend for an enterprise. Many IT executives are considering ways to reduce this cost, and are considering desktop virtualization as a potential alternative.

Typical challenges and key considerations
As enterprises look at desktop virtualization for reducing costs, IT should be mindful of:

- Not compromising on the user experience which includes rich media collaboration
- Total cost of ownership - As desktops get packed into servers in a data center, organizations need to be wary of the associated costs of space, power and cooling.
- Incremental cost of bandwidth, due to additional two-way traffic between the users and the datacenter

Desktop Virtualization drivers for cost reduction
In this scenario, desktop virtualization offers IT executives the ability to:

- **Reduce procurement cost of desktops –** Centralized compute services in the data center eliminate the need to have desktops or laptops for all employees. Only desktop monitors and keyboards, i.e. thin clients, will be required, but the CPU, which is bulk of the cost, is reduced. Alternatively organizations can take a BYOD approach and offer a fixed compensation for users to buy and manage their own devices.
- **Reduce management/support cost of desktops –** With desktop virtualization, IT will be able to centrally and remotely manage the desktop and its applications, hence having more control over the device and reducing management costs.
- **Reduce the cost of provisioning desktops –** With desktop virtualization, setting up new desktops becomes very easy through the centralized management console, and provisioning of a virtualized end-point. The cost of Move-Add-Change is also reduced, as the desktops are now virtual and centrally serviced.
- **Reduce cost of refreshing desktops –** As enterprises decide to move from XP to Windows 7 (OS migration), or look to refresh old desktops with new powerful computing devices, the traditional approach of changing every desktop to meet the new minimum requirements becomes very expensive. With desktop virtualization, enterprises are able to extend desktop lifecycle and manage and future desktop OS migrations more easily.

Cisco and Citrix's Approach

The VXI approach brings the following benefits that make the cost reduction argument of desktop virtualization stronger.

- **UCS memory architecture means fewer servers –** Cisco can pack 60% more virtual machines on a server, thus providing the ability to reduce costs further as more desktops can be handled by a single server. With the latest Cisco UCS innovations with M200 M3 blades, up to 186 Citrix XenDesktop virtual desktops with knowledge worker profiles can be set up per blade. From a data center standpoint, this means fewer servers, less power & cooling costs, and less management costs.
- **Lower Integration and Support Costs –** through end to end validated designs, services and support. Because Cisco and Citrix publish Cisco Validated Designs (CVD) for VXI, that are constantly updated, IT can deploy VXI with lower investment in integration and testing. IT can also take advantage of the expertise and support for the complete solution, including 3rd party technologies.
- **EnergyWise drives lower power costs –** Cisco's Virtualization Experience Clients (VXC) are PoE devices that can run Citrix Receiver. With Cisco's leadership in networking, it can recognize the power consumption of all virtualized devices, and its EnergyWise solution can then manage and reduce the power consumption of the devices based on their usage state.
- **Citrix XenDesktop lowers desktop management costs –** XenDesktop can help IT departments control data access, reduce the number of desktop images that need to be managed, eliminate system conflicts, and reduce application regression testing.
- **Lower storage costs with IntelliCache -** IntelliCache lowers the cost of Citrix XenDesktop deployments by making intelligent use of local storage with a shared virtual desktop model that reduces IOPS requirement on centralized storage. XenDesktop can provide users with a fully personalized virtual desktop with the lowest storage costs on the market.

Use Case # 10 Enabling Agile Businesses

The business environment today is highly dynamic. This is making increasing demands on the organization's internal infrastructure; which needs to scale rapidly to meet the increasing business demands. However, scale is no longer the sole criteria, infrastructure today needs to be highly agile and flexible, i.e., support rapid response and the ability to change according to evolving business requirements, while at the same time keeping costs low.

Typical challenges and key considerations
As enterprises look at desktop virtualization for business agility, IT should be mindful of:

- Migration to a virtualized environment can be a challenging activity and needs to be carefully planned to ensure a smooth transfer of all user data into the virtualized environment.
- Slow or unreliable connectivity may lead to latency and reduce performance. It is necessary to ensure that the network infrastructure is secure.
- Training is very important, helping users work efficiently in a virtualized environment and leveraging the flexibility it offers.

Desktop Virtualization drivers for business agility
In this scenario, desktop virtualization offers IT executives the ability to:

- **Rapidly roll out new desktops -** Virtualization allows businesses to rapidly roll out desktops and applications for a growing work force, consultants or partner workgroups with complete automation. Hence, the time to go live at new locations is significantly reduced.
- **Meet changing business demands –** Since the compute and storage reside in the data center, there is no need to constantly upgrade user hardware. It can easily be provisioned at the server by the IT staff. This also lowers hardware refresh cycles.
- **Limited requirement for local support –** Desktop virtualization is enabling businesses to set up remote offices in a swift manner, with limited IT staff.
- **Anywhere anytime access –** With desktop virtualization, businesses are finding it easier to support virtual desktops with a variety of devices, based on preferences of the global workforce. The hardware agnostic nature allows compatibility with a myriad of end-user devices, providing anywhere anytime access to users.

Cisco and Citrix's Approach

The VXI approach brings the following benefits for agile businesses.

- **Cisco VXI enables rapid deployment -** The Cisco and Citrix solution dramatically speeds the deployment of virtual desktops and virtual workspaces, reducing the time it takes to give employees the tools they need to become productive. Policy-based deployment enables just-in-time provisioning of both virtual desktops and the underlying Cisco UCS infrastructure. With UCS Manager Service Profiles and XenDesktop template, configuration is easy and multiple desktops may be instantaneously provisioned from the same template.
- **Cisco Validated Designs (CVD) for VXI help expedite deployment –** CVD encapsulates design considerations and guidelines for end-to-end VXI deployment, supported by reference architectures and best practices. The periodic CVD refreshes also ensure that new business-enabling innovations can be rapidly introduced.
- **Citrix FlexCast delivery technology –** Different types of workers across the enterprise have different performance and personalization requirements - some require simplicity and standardization, while others need high performance or a fully personalized desktop. VXI with Citrix XenDesktop can address these requirements in a single solution thanks to FlexCast delivery technology.
- **Any device, anytime, anywhere -** Using Citrix Receiver as a lightweight universal client, XenDesktop users can access their desktop and corporate applications from any PC, Mac, thin client, or smart phone. This solution enables workplace flexibility, business continuity, and user mobility.
- **Open Architecture -** Cisco VXI with Citrix XenDesktop is validated with multiple hypervisor and storage infrastructures, enabling IT departments to use their current infrastructure investments while providing the flexibility to add or change hypervisors in the future. It supports XenServer, Hyper-V, and vSphere hypervisors as well as NetApp and EMC storage.

I (I) INTEGRATED SOLUTION - THE BOTTOM LINE

Desktop virtualization is a major trend in the industry and is being considered by many technology executives and decision makesIT executive across the globe as a way to enhance business agility and flexibility, reduce costs, manage and support desktops easily, and enable better security measures on desktops and application/data access.

The Cisco VXI Smart Solution with Citrix's XenDesktop brings together best-of-breed virtualization technologies along with networking, data center and collaboration infrastructure. This collaborative approach can ensure smooth, seamless delivery of virtualized desktops and enables the new unified I workspace that combines virtual desktops, voice and video. By recognizing the nature of desktop virtualization, where multiple solutions and vendors are coming together to deliver the solution, Cisco and Citrix are taking the initiative to provide end-to-end support and to offer a single integrated solution for the customer. The joint solution provides a secure, seamless, flexible and centralized virtual desktop environment that addresses many of the needs of today's organizations.

CONCLUSION

While desktop virtualization brings some obvious benefits, IT executives should consider a few things as they embark on this initiative.

- **Our workspace is changing –** we no longer work just at our desks, and we are collaborating a lot more. Hence, it is critical for IT executives to consider that their desktop virtualization initiative enables mobility, multiple device work-styles as well as delivering a rich media collaboration experience.

- **User expectations are high –** we expect things to work now. Latency on application access and a LAN-like performance in a WAN are becoming base expectations from enterprise users. IT executives need to ensure that the desktop virtualization initiative does not become counter-productive for users. The need to focus on network and application delivery is just as critical.

- **Need for an end-to-end solution –** with desktop virtualization dependent on multiple factors, as discussed earlier, it is essential to choose a solution that has been tried and tested in the past and has been successful in meeting the varying needs of enterprises under different use cases. As enterprises and external environments evolve over time, a solution should be capable of keeping up with the changing requirements. Furthermore, one integrated solution removes the hassle of dealing with multiple vendors if an issue arises, and delivers post-installation support that optimizes application performance for end users using desktop virtualization.

Given the advantages of desktop virtualization, it is essential to evaluate the benefits that the solution can bring to your business. The Cisco VXI with Citrix XenDesktop delivers a solution that addresses a common vision for the changing workplace. With the support of these vendors, the time is right to embrace desktop virtualization.

For more information on Cisco VXI, visit www.cisco.com/go/vxi

For more information on Citrix and Cisco solutions, visit www.cisco.com/go/citrix or www.citrix.com/cisco

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Contact
Tel: (65) 6890 0999
Email: apacfrost@frost.com
Website: www.frost.com

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