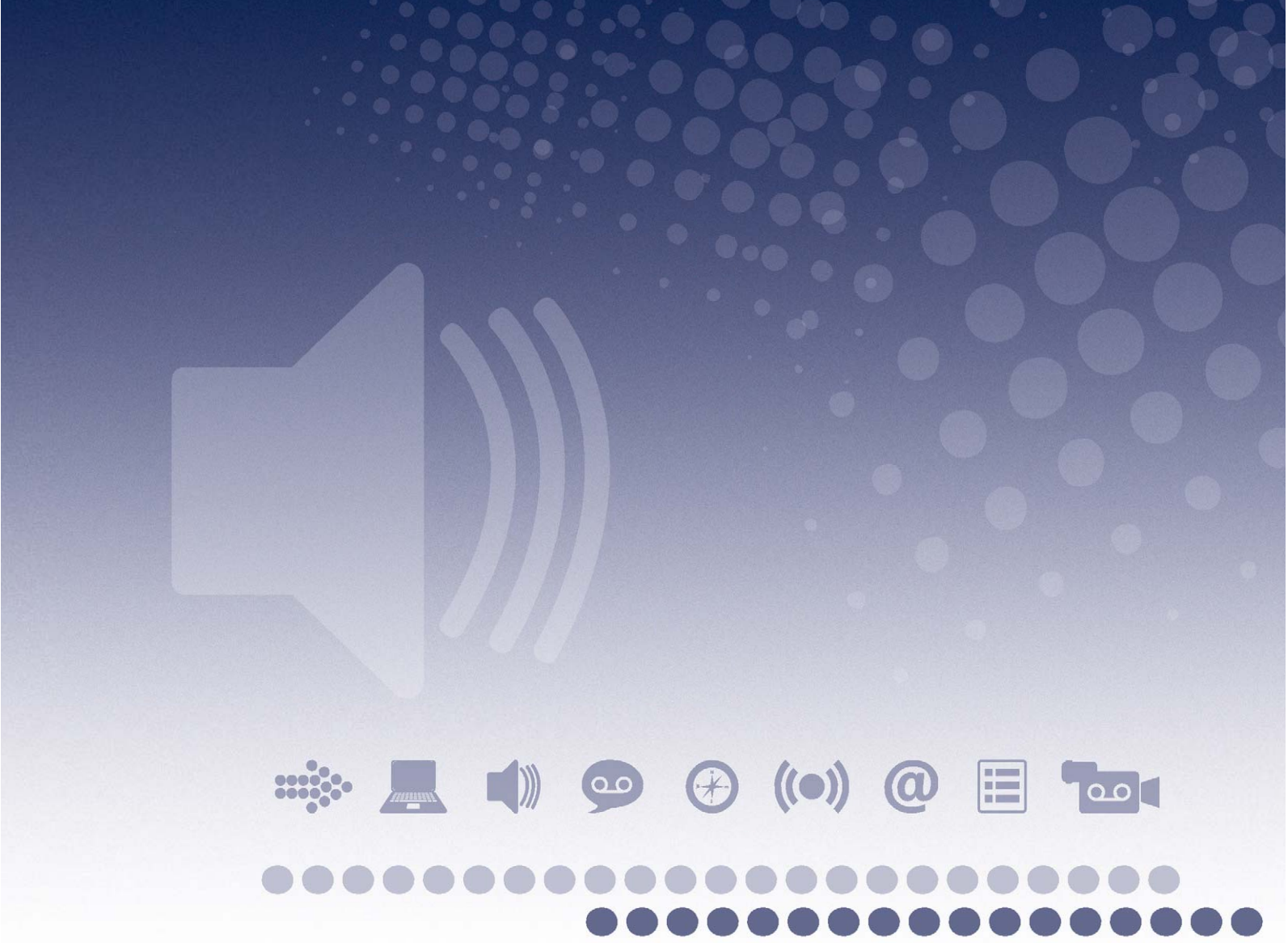


Giving Voice to the Virtual Desktop

For the first time ever, Unified Communications (UC) joins other mission-critical applications on users' cloud-based desktops

A Mitel and VMware White Paper

MITEL®
Simply Communicating®

Mitel Virtualized Solutions for the Desktop

Giving voice to the virtual desktop delivers benefits throughout an organization.

For IT it means:

- **Centralized Administration.** With a single infrastructure, IT delivers data, applications, configuration settings, and unified communications to users throughout the organization.
- **Reduced hardware requirements.** There is no longer a need to continually upgrade and maintain a range of high-end desktops and laptops. Processing power, desktop settings, and voice-related and other applications reside in the data center and are accessed by users via the Internet—from "the cloud."
- **Easier software upgrades.** No more individual software licenses to keep track of, and days and weeks spent upgrading individual computers. Manage and upgrade everyone centrally, with no disruption to service.
- **Increased data and application security.** Lost or stolen laptops are no longer an issue. They don't need to be high end processors, to have expensive applications installed, or to store valuable data. Turn access to everything on or off with a click in the data center.

For business users it means:

- **Greatly increased flexibility.** Work, communicate, and collaborate from anywhere, on any device, with a single sign on.
- **Easier communication.** Sign on anywhere, on any smart device, to access personal phone numbers, messaging, and collaboration capabilities, along with all of your desktop settings and applications
- **BYOD (Bring Your Own Device).** Bring your own computer or other smart device to work. A simple client software installation and you're ready to sign in and start working. Because your device is functioning as a terminal, it doesn't have to be a high-end machine with tons of processing power and storage space.

For the organization it means:

- **Lower capital expenses.** A single, centralized infrastructure replaces separate voice and data systems. There is no longer a need to buy and upgrade high-end desktops and laptops, or to build a separate communications infrastructure.
- **Lower operating expenses.** Less space and energy is needed to house and operate servers. Data, applications, and communications are managed together, in a single system.
- Easier business continuity and disaster recovery. Virtualized desktops, applications, and communications can be stored in different locations, backed up, and restored, all without any impact on end users.
- **Increased security and data integrity.** Sensitive data is stored centrally, instead of on widespread user devices, so it's more secure, helping meet Sarbanes-Oxley and other regulatory requirements. A lost or stolen laptop is no longer an issue, because everything of importance is in the data center. Access to the laptop can be shut down with a click in the data center.
- **Greater productivity.** More streamlined operations, and more easily accessible business applications and communications capabilities, drive productivity throughout the enterprise, freeing IT and business users alike to focus on improved performance and innovation.

Table of Contents

Welcome to the virtualized voice revolution—take two

In early 2010, Mitel® and VMware®—leaders in Unified Communications (UC) and virtualization respectively—announced a technological breakthrough with profound benefits for IT departments and the organizations that depend on them.

After extensive work in the laboratories of both partners, they had overcome longstanding obstacles that prevented unified communications from joining other applications on virtualized industry-standard servers. Specifically, they had united the previously separate worlds of data and voice on a single virtualized infrastructure.

Using Mitel Virtual Solutions, organizations could now run business-critical telephony applications on the same servers as other business applications, reducing capital and operating expenses, improving application availability, ensuring integrated business continuity, and driving innovation and productivity like never before.[1]

Voice comes to the virtual desktop

Building on the effort that led to that breakthrough, and based on a shared commitment to crafting solutions that free people to work anywhere using any device in ways that best suit them and their organizations, VMware and Mitel are now announcing a second breakthrough. Again, it unites the worlds of data and voice. Again, the benefits are far-reaching, leading to increased productivity, not just for IT departments but also for users at all levels of the organization. Now, for the first time ever, UC is not only part of the virtualized data center, it can also run alongside other applications on the virtualized desktop.

Virtualization 101

The benefits of voice on the virtual desktop are significant. But to understand them, you need to know something about virtualization, and about desktop virtualization in particular.

Server virtualization

Virtualization at the server level uses software to turn one physical computer into many virtual computers, or servers. Each virtual server is capable of running a different operating system and applications, so that a single virtualized server can perform work that would otherwise require two or more—typically **many** more—physical servers. It was VMware that first figured out how to virtualize personal computers, and the company remains a leader in the virtualization field.

Server virtualization is popular because it saves money. You don't need to buy as many physical machines, and the processing power and storage space on the machines you do have can be used to their fullest potential, not underemployed as they typically are in non-virtualized environments.

[1] Read the full story. Get the white paper "Uniting the Worlds of Data and Voice" at http://www.mitel.com/DocController?documentId=33381

With fewer physical servers, you need less space in the data center, and less energy to power and cool hardware. And, because virtual servers can be managed centrally and created, duplicated, and moved easily from one physical machine to another, administration is simpler, business continuity is more readily assured, and disaster recovery is more dependable and easier to plan and implement.

Virtualization has been estimated to reduce IT maintenance costs from almost three-quarters of the typical IT budget to less than half. This increases the component of the budget that can be devoted to innovation from less than a third to more than half—from about 28 percent to 55 percent.[2]

Until the first VMware and Mitel breakthrough, a stumbling block to realizing the full benefits of data center virtualization was that real-time applications, such as telephony and other components of unified communications, couldn't be virtualized on the same servers as data and other business applications. That meant building and managing two separate infrastructures—one for data, the other for voice. But that problem was overcome when VMware and Mitel united the worlds of data and voice in the virtualized data center.

Desktop virtualization

Desktop virtualization takes virtualization a step further. Operating systems, configuration settings, and applications that, even in a virtualized world have traditionally run on individual personal computers, are instead located on virtual servers in the data center. As a result, users no longer need to use their own systems, but can sign in to their "computer" via a terminal, or even via client software on their own laptop or mobile devices.

Being able to virtualize desktops is hugely significant for both IT departments and end users. It means that IT no longer has to purchase and continually upgrade computers capable of running business applications for people with a range of processing needs. Instead, the applications, much of the data, the personalized configuration settings, and most of the processing power can all reside in a centralized data center, where they are accessed by users via the Internet—from "the cloud."

With the virtualized desktop, software upgrades can be done centrally instead of on each of hundreds or thousands of end-user machines. And centralized control of applications and data by IT boosts security, ensures data integrity, and helps meet various regulatory and policy requirements, such as HIPAA and Sarbanes-Oxley.

Given these benefits alone, it's no wonder that approximately 10 percent of midsize businesses have deployed desktop virtualization in production; approximately 30 percent are testing and piloting desktop virtualization; and, on average, midsize businesses plan to virtual 42 percent of their PCs.[3]

[2] VMware customer study, 2010
[3] Gartner User Survey Analysis: Midsize Businesses Continue to be Aggressive with Desktop and Server Virtualization, 2011

But the benefits extend beyond the IT department. For business users, desktop virtualization means a huge leap forward in the quest for more flexible and productive working arrangements. With desktops on virtual servers in the data center instead of on individual computers, workers can access their desktops, and their applications and data, using any computer—increasingly, using any smart device.

Instead of being tied to a desktop computer in a single cubicle, or to a particular laptop computer, users are free to work from just about anywhere. They sign in just as they always have, and get immediate access to their personal desktops and the applications and data they need to get down to work. Whether at home using a laptop, in an airport using a pad computer or tablet, or on the go with a smartphone, they can easily access everything they need to stay productive—everything, that is, except the unified voice communications they depend on to stay in touch and to collaborate effectively, because until now voice could not be part of the virtual desktop.

The problem with voice and the virtual desktop

As was the case with server virtualization, some real-time applications, such as telephony and other components of UC, haven't worked well or cost-effectively on a virtual desktop.

Voice communication, critical to effective performance in any organization, could not be a part of the virtual desktop solution, limiting the benefits of desktop virtualization and impacting its cost effectiveness. When it came to desktop virtualization and unified communications, IT still had two different infrastructures to build and maintain, and business users could not access critical voice communications as part of their virtualized desktop.

The problem was that VoIP (Voice over Internet Protocol) is a very demanding application that can easily suffer from quality of service issues. One of the tenets of VoIP network design is to ensure that, once a call is set up, there is peer-to-peer, or end-point to end-point, connectivity for the streaming media—be it voice, data, or video. This is challenged by the architecture of virtual desktops, whose configuration, by definition, assumes that all data and voice traffic is transmitted back to the data center, rather than point-to-point between those who are communicating.

As a result, voice on the virtual desktop can suffer from jitter and poor quality because of latency–the short amount of time it takes a virtual data center to determine which of its available resources to use to process a command. Streaming through a data center generates a backlog, and breaks the fundamental tenet of VoIP telephony when it comes to its effectiveness for large numbers of users: to scale effectively, don't backlog the traffic.

One way to solve the media streaming issue, where all UC traffic is transmitted back to the data center rather than point-to-point, is to throw more servers and resources at it. But ramping up resources to meet the special needs of voice just wouldn't be cost effective—it would defeat the purpose of moving to virtualized voice in the first place.

The Mitel and VMware solution

Just as they had with the challenge of server virtualization, VMware and Mitel leveraged their strong partnership and years of industry leadership in virtualization and IP telephony to address the problems that prevented UC from joining other applications on the virtual desktop. Again they spent many months working together in the laboratories of both organizations.

Rather than take a band-aid approach and try to find ways to handle a communications bottleneck more efficiently in a virtualized environment, they adhered to the VoIP principle that one should never backlog communications, that once a UC call is up—again, be it voice, data, or video—it must be transmitted directly from one end point to another. As a result, they devoted their energies to finding a truly innovative and effective solution to the problem. The result is a unique offering that combines the strengths of VMware and Mitel to bring efficient voice communications to the virtual desktop for the first time.

The VMware View virtualization platform

The starting point of the solution from the VMware side was VMware View™, the industry's leading desktop virtualization platform.

Built on VMware's market-leading virtualization technology, View delivers desktops as a managed service, providing the platform, management tools, and rich user experience needed to realize all of the benefits of desktop virtualization. It includes a version of VMware vSphere™ designed specifically to provide a highly scalable, reliable and robust platform for running virtual desktops and applications.

The Mitel UC Advanced unified communications client

From the Mitel side, the starting point was the Mitel Virtual Solutions portfolio of software-based UC applications, which are available as VMware-ready virtual appliances. A key application of the portfolio is Mitel's award-winning Unified Communicator® (UC) Advanced.

An integral part of the virtualized data center—and now the virtualized desktop—Mitel UC Advanced provides a single access point for all business communication and collaboration needs, enabling unprecedented control over communications and allowing real-time access to everyone in the organization, regardless of location. It integrates presence and availability, secure instant messaging, audio conferencing, and web and video collaboration with the call control capabilities of an organization's communications system.

Based on Mitel's Freedom Architecture, which allows people to communicate wherever they are on whatever device they want, Mitel UC Advanced delivers the full range of communications capabilities to users anywhere, anytime, on anything from a virtual desktop computer to a smartphone.

Mitel Virtual Solutions for the Desktop

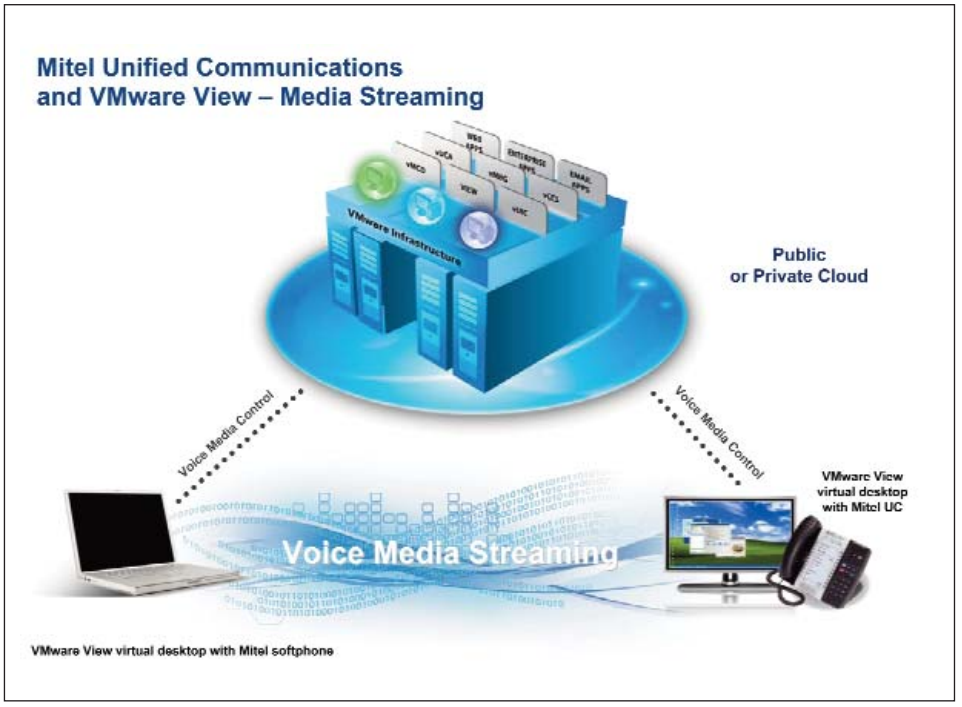
To extend the capabilities of both their leading products, VMware and Mitel set out to accomplish two things: overcome the problem of media streaming already described, and build a single-sign-on (SSO) capability to maximize the value of voice on the virtual desktop.

Overcoming the media streaming challenge

To solve the streaming problem, VMware crafted a series of Application Program Interfaces (APIs) that enabled the Mitel solution to break communications into two pieces—the voice streaming component that is susceptible to latency and bottlenecks in a traditional virtual desktop, and the call processing part that manages voice communications.

This meant that the problematic streaming component of communications could be installed on users' devices, avoiding the bottleneck problem, while the call processing part could remain in the data center, where it would enjoy all the benefits of virtualization.

Figure 1



VMware and Mitel overcame the media streaming challenge to create Mitel Virtual Solutions for the desktop

Building a single-sign-on (SSO)

With the streaming challenge overcome, the partners turned their efforts to building a single-sign-on capability.

SSO ensures that, when an end-user signs on to a View workstation and enters their name and password for their desktop, the phone associated with the workstation automatically "hot desks." It is enabled with the user's profile, speed-call list, and extension number. In essence, the user is signing into both their desktop and their unified communications simultaneously. When the user signs on to a different workstation, not only does the complete desktop move, so does the complete UC experience. And while all this is happening, security is maintained – when a user signs out, their desk-phone also signs out, protecting their personal information and locking the phone from being used fraudulently.

For example, if one participant in a work-group collaboration signs off from a workstation and on to another during a meeting—on a conference call and shared PowerPoint presentation, for instance—the entire desktop and UC experience stays up during the transition period. A user can move from, say, a work cubicle, to a conference room workstation and still be connected to the other collaborators.

Figure 2

With Mitel Virtual Solutions for the desktop, a single-sign-on (SSO) gives users immediate access to their desktops, applications, data, and unified communications capabilities via the cloud, on the computer or smart device of their choice.

Benefits of voice on the virtual desktop—some scenarios

By breaking the communications process into two parts—one that resides in the data center and takes advantage of shared resources, the other installed on users' PCs and other devices—Mitel and VMware solved the problem of voice on the virtual desktop. And by adding a single-sign-on capability, they extended its value. Now, for the first time, organizations can realize the full rewards of desktop virtualization, complete with high quality, effectively scalable, and very flexible unified communications.

This means that IT managers can now treat voice communications as an integral part of their virtualized desktop solutions—voice can finally co-reside with and share resources with virtual desktops and other business-critical applications in a virtualized data center.

It means the people whose decisions and actions determine the organization's success can now communicate and collaborate effectively from anywhere, taking advantage of all the features of desktop virtualization and unified communications without being tied to a location or device.

For the organization as a whole, it means greater productivity driven by lower capital and operational costs and more effective and cost-effective communications.

In the call center—anytime, anywhere support

Take, for example, the call center, where effective communication is critical to developing and maintaining positive, profitable customer relationships.

With Mitel Virtual Solutions for the desktop, agents are no longer tied to the traditional office, where each signs on to their own computer and telephone at the start of a shift, signs off at the end, and then repeats the process in the same location every day.

Mitel Virtual Solutions for the desktop single-sign-on means they sign on only once to access their desktops and phones. And, because collaboration tools and other UC applications reside in the data center—in the cloud—call center agents are free to easily move from station to station. They can sign in from anywhere, on almost any device, and be immediately productive. They can open case files, answer and make calls, and collaborate with fellow workers to solve problems from any workstation in any cubicle, from home PCs, and from smartphones.

In the hospital—freedom to move

In a hospital, doctors and nurses can be constantly in motion, moving from room to room, floor to floor, and office to office.

With Mitel Virtual Solutions for the desktop, they can access their desktops wherever they are, using a range of devices. With a single sign on to any workstation in the hospital, they display their personal desktops and view x-rays, diagnostic charts, and other data previously stored on their PCs.

They can also use any of their applications, including their communications tools. Personal phone numbers, messaging, and collaboration capabilities are there when they sign in. They need never turn to a separate system to collaborate with colleagues or give critical advice and instructions.

Medical staff can also access those capabilities when out of the hospital, using personal computers, smartphones, or other handheld devices, so that they can perform effectively from anywhere, with access to the same critical tools, including their voice communication systems. The result is greater productivity for staff, and a solution that can be located and managed centrally by IT.

In the consulting firm—Bring Your Own Device (BYOD)

In an increasingly flexible working world, consulting shops and similar firms are often loose affiliations of professionals brought together on an ad hoc basis to work as a team on specific projects.

Without desktop virtualization, each member of the team must be set up with the business applications needed to work effectively, and with access to data and information essential to completing a project. For IT, it means providing sufficiently up-to-date desktop or laptop computers, installing software, assigning access permissions, and then providing support for the many different devices in use. This includes a totally separate system for the all-important voice communication and collaboration.

With desktop virtualization and Mitel Virtual Solutions for the desktop, that changes. IT provides a single sign on to each team member, so they can access a virtual desktop on a server in the data center. Team members can use PCs, whatever their vintage or processing capabilities, as terminals that give them access to data and software, including unified communications that let them communicate, share, and collaborate with others. When projects are complete, or personnel change, access to applications, data, and communications tools can be turned on or off with a click in the data center.

This helps considerably in the trend toward realizing a Bring Your Own Device (BYOD) workplace, in which consultants or new employees can install a single piece of client software on their own desktops, laptops, or handhelds, and then sign in to an organization's centralized desktops to get everything they need to work and communicate effectively.

In your organization

The benefits of the voice-enabled virtual desktop can be realized in just about any organization.

By centralizing control of the applications that drive your business—including the unified communications you rely on—your IT department gains greater control over them, realizing savings when it comes to hardware and software deployment and management. Instead of replacing desktops and laptops on a regular basis to ensure they are capable of performing adequately, end-user devices become access points to centrally located and managed applications, data storage, and communications capabilities.

Security issues associated with lost or stolen laptops disappear, because these devices no longer have to be high-end processors, no longer have expensive software installed, and no longer need to have sensitive data and information stored on them. Access to applications and data can be turned off with a click in the data center, and a replacement device made available immediately, without the need to install and configure application and communications software on the new machine.

Having all of your business and communications software integrated in a virtualized data center means there is a single infrastructure to set up and manage. And it can be easily backed up, duplicated, stored, and moved from location to location, so that business continuity and disaster recovery are far easier.

The critical lines of communication and collaboration are more secure and available, and people can work, communicate, and collaborate effectively from anywhere, on just about any device.

These are the benefits of the voice-enabled virtual desktop. And with Mitel Virtual Solutions for the desktop, you can now realize them for the first time.

About Mitel

Mitel (Nasdaq:MITL) is a global provider of business communications and collaboration software and services. Mitel's Freedom architecture provides the flexibility and simplicity organizations need to support today's dynamic work environment. Through a single cloud-ready software stream, Mitel delivers a powerful suite of advanced communications and collaboration capabilities that provides freedom from walled garden architectures and enables organizations to implement best-of-breed solutions on any network; extends the "in-office" experience anywhere, on any device; and offers choice of commercial options to fit business needs.

For more information visit: http://www.mitel.com

About VMware

VMware delivers virtualization and cloud infrastructure solutions that enable IT organizations to energize businesses of all sizes. With the industry leading virtualization platform – VMware vSphere – customers rely on VMware to reduce capital and operating expenses, improve agility, ensure business continuity, strengthen security and go green. With 2010 revenues of $2.9 billion, more than 250,000 customers and 25,000 partners, VMware is the leader in virtualization which consistently ranks as a top priority among CIOs.

VMware is headquartered in Silicon Valley with offices throughout the world and can be found online at www.vmware.com.

Global Headquarters	U.S.	EMEA	CALA	Asia Pacific
Tel: +1(613) 592-2122 Fax: +1(613) 592-4784	Tel: +1(480) 961-9000 Fax: +1(480) 961-1370	Tel: +44(0)1291-430000 Fax: +44(0)1291-430400	Tel: +1(613) 592-2122 Fax: +1(613) 592-7825	Tel: +61(0) 2 9023 9500 Fax: +61(0) 2 9023 9501

For more information on our worldwide office locations, visit our website at www.mitel.com/offices

www.mitel.com

GD 1132_9147