



Hosted desktops
from Synergy IT
Solutions Inc. with
Microsoft Windows
Server 2012

Technical whitepaper



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Virtual Desktop Solutions

The explosion in the use and number of consumer devices, as well as ubiquitous information access, is changing the way people perceive technology. The constant use of IT throughout the day, along with the easy access to information, is blurring traditional boundaries between work and home life.

People expect consistent access to corporate tools and data regardless of the type of device they are using. They also want their corporate-issued technology and resources to look and behave like their personal technology—always on and always available from any device, from virtually anywhere.

This complex set of demands creates challenges for IT departments. For instance, it can be difficult for administrators to maintain data security and compliance. IT must effectively manage the influx of these consumer devices while continuing to deliver on operating efficiency without compromising compliance. Patching and updating multiple applications across a variety of devices and platforms also places a burden on IT resources.

Synergy IT Solutions's hosted desktop solutions based on Microsoft Windows Server 2012 R2

Our hosted desktop solutions change how employees use and manage data relevant to their operations. By virtualizing desktops and providing anytime, anywhere access to business applications, employees have the ability to work remotely, on the device they choose. This provides broad workspace flexibility and enables bring-your-own-device (BYOD) scenarios. By investing in our cloud solution, you can deliver the type of secure access your users require, which is reinforced by always-on, high availability infrastructure. Without the headache of managing virtual desktop environments and updating applications across multiple platforms, IT can now focus its attention on high value, strategic initiatives. Our hosted desktop solutions are built on the latest Virtual Desktop Infrastructure (VDI) from Microsoft so you receive all the benefits a hosted desktop solution can offer.

Microsoft VDI in the Microsoft Windows Server 2012 R2 operating system enables us to deliver desktops and apps to users on a variety of devices. People can enjoy the full Windows experience, access corporate data, and be productive from virtually anywhere on whatever device they choose. And although the virtual desktops and apps can be accessed from a variety of devices and locations, the integrity of the data is always maintained, because apps and desktops are centralized in our data center, so the risk of losing data on stolen or lost devices is mitigated.

Centralizing and controlling apps and data enables your users to get their work done on the devices they choose, while also maintaining compliance. In addition, with Microsoft VDI, even organizations that have tight resources now have a solution to embrace the BYOD trend without compromise. Hosted desktop solutions built on the Microsoft platform provide:

- **Rich experiences across devices.** Available on a variety of devices and platforms, including Windows, Windows RT, Apple iOS, Mac OS X, and Google Android.
- **Simple and secure IT.** Meets compliance while reducing risk. Protects against loss of sensitive corporate data while removing the need for application patching enabling IT to focus on value-added strategic initiatives.
- **Dynamic application delivery.** Extends legacy applications to modern devices and removes the need to develop on multiple platforms—all while rapidly responding to changing business needs.

Microsoft VDI

New and enhanced features for Remote Desktop Services

VDI accelerates and extends desktop and app deployments to any device. It improves remote worker efficiency while helping to keep critical intellectual property secure and simplifying compliance with regulations. With Windows Server 2012 R2 Remote Desktop Services, VDI provides a single infrastructure to enable both virtual and session-based desktops and RemoteApp programs. In fact, all features of Remote Desktop Services are available to both virtual and session-based desktops, which provides a consistent user experience.

Windows Server 2012 R2 improves Remote Desktop Services for users:

- All features of Remote Desktop Services are available to both sessions and virtual machines (VMs), providing a consistent user experience.
- Remote desktops behave more like traditional desktops, whether they connect across the LAN or the WAN. Users can even disconnect from their workspace, and then reconnect from another location.

Remote Desktop Services in Windows Server 2012 R2 possess features that enhance the VDI experience including:

- **Simplified scenario-based deployments.** Easily deployed virtual session collections or pooled or personal virtual desktops with new scenario-based deployment tools.
- **Centralized RemoteApp and desktop publishing.** File type association, allowing users to assign files on the client device to their associated RemoteApp programs.

Session Shadowing. Administrators can see or take over a session from the console or the command line using the Terminal Server client. This functionality back-ports to Windows 7 with SP1 operating systems.

Enhanced user experience:

- **Microsoft Remote Desktop app.** Easy access with a variety of devices and platforms, including Windows, Windows RT, iOS, Mac OS X, and Android. The Remote Desktop app delivers rich Windows experiences and allows users to be productive on their devices. Users can install the app by visiting the app store.
- **RemoteFX enhancements.** Enjoy the benefits of several user experience enhancements to the Remote Desktop Protocol (RDP),

including WAN optimizations, enhanced graphics processing, media streaming, and expanded USB device redirection.

- **Improved remote app experience.** Remote apps seem more like local apps, including borderless whole-window dragging, actual application thumbnails, transparent windows, and click-to-run remote applications.
- **Dynamic display changes.** Change the local display resolution by rotating the device, adding a second display, or plugging in a projector.
- **Quick reconnect.** The app display automatically updates itself immediately without having to reconnect.
- **User Profile Disk.** Stored user personalization and app cache data for pooled VMs and sessions, allowing data to be maintained across user logon sessions.
- **Fair share.** Dynamic allocation of CPU, network, and disk I/O are balanced, preventing one user from affecting the performance of other users on the same server.

Lower-cost storage features:

- **Disk deduplication.** Identifies redundant blocks of data and stores only one copy, greatly reducing the storage requirements of VDI for personal or pooled desktops by as much as 80 percent. Disk deduplication also provides performance gains through caching.
- **Storage tiering.** Puts the most frequently accessed material on the fastest disks and helps automate capacity planning by optimizing Read and Write operations.
- **Server virtualization over Server Message Block 2.0 (SMB2).** Conveniently stores VM files (including configuration, virtual hard disk [VHD] files, and snapshots) in shared folders that use the SMB2 protocol, thereby reducing costs. **Local storage cache.** This feature allows client VM images to be hosted on SMB shares or Cluster Shared Volumes and cached on direct attached storage (DAS), enabling the best performance at a lower cost.

Scenario-based deployments

VDI deployments

Windows Server 2012 R2 introduces the concept of *collections*. A virtual desktop collection consists of one or more virtual desktops used in a VDI deployment scenario. You can choose to have pooled or personal collections deployed: The method you select depends on your environment and preferences, as summarized in Table 1.

Pooled collection	Personal collection
Single, shared master VM	Separate VM instance for each user
Operating system-level changes (user changes persist on the user VHD)	Changes retained after logoff
One image to manage	Coordinated with Windows Server Update Services (WSUS) and Microsoft System Center Configuration Manager to avoid patch storms
Reduced storage requirements	Users can install apps and be an administrator on their own VM
Lower deployment cost	–
Supports User Profile Disk	–

Table 1. Pooled versus personal collections

Pooled VM collections. You can choose to have VDI deployed through VM pools. In this model, all users in the VM pool share a single master image. The changes that each user makes during a session are stored on a transient VHD that's discarded when the user logs off (although user profile changes are persisted). The main advantages of this model are reduced storage costs and simplified management. This translates into cost savings for you by sacrificing advanced personalization capabilities.

Personal VM collections. Personal VMs are based on a master VM. Windows Server 2012 R2 automates the rollout process by copying the master image for each instance of the personal VM.

Session virtualization deployments. Remote Desktop Services session virtualization, formerly known as *Terminal Services*, is a proven and mature centralized desktop infrastructure that many organizations deploy instead of VDI to increase user density on the host and therefore reduce total cost to you.

A session virtualization deployment consists of RD Session Host servers and infrastructure servers, such as RD Licensing, RD Connection Broker, RD Gateway, and RD Web Access, which, as mentioned above, are consistent across both VM and session deployments.

Centralized publishing of RemoteApp and desktops

Centralized resource publishing presents a centralized desktop or app to users, providing a user experience that is similar to locally installed apps. With our hosted desktop solutions, we can view a history of the resources assigned to users, change the published resources for any given collection, and edit the properties of published resources.

We can also configure a RemoteApp and desktop connection URL by using Group Policy, which allows users to subscribe to a desktop or application feed. This means that by simply entering their email address, users can automatically gain access to their remote resources.

RemoteFX enhancements

In Windows Server 2008 R2 with SP1 and Windows 7 with SP1, Microsoft introduced RemoteFX, which enables the delivery of a full-fidelity Windows user experience to a range of remote client devices, including rich clients, thin clients, and ultrathin clients. RemoteFX delivers a rich user experience for VDI by providing a 3D virtual adapter, intelligent codecs, and the ability to redirect USB devices in VMs. RemoteFX was integrated with RDP, which enabled shared encryption, authentication, management, and device support. RemoteFX also delivers a rich user experience for session-based desktops and RemoteApp programs to a broad range of client devices.

Windows Server 2012 R2 builds on this platform to enable a far richer and easier experience on all types of networks and all types of devices. Specifically, RDP in Windows Server 2012 R2 enables a more consistent user experience when connecting to centralized desktops, even on networks in which bandwidth is limited and end-to-end latency is high.

Technical description

The enhanced user experience in Windows Server 2012 R2 and Windows 8 RemoteFX includes the following new or enhanced features:

- **RemoteFX for WAN** helps maintain a consistent user experience over highly variable WANs.
- **RemoteFX Adaptive Graphics** provide a full Windows Aero and 3D user experience over WANs.
- **RemoteFX USB redirection** supports the RD Session Host role service and allows all standard USB devices to appear only within each user's individual remote session.
- **RemoteFX Media Streaming** provides a smooth multimedia experience over variable or unreliable networks.
- **RemoteFX Multitouch** allows users to use touch-enabled and gesture-enabled apps in remote desktop environments.

- **RemoteFX virtualized GPU (vGPU)** enables VMs to use a GPU in the host server to deliver a more robust experience and enable use of 3D or video-intensive applications in a remote session.

RemoteFX for WAN

With today's modern workforce, clients frequently need to connect from branch offices, homes, or hotels over low-bandwidth or high-latency connections. To support remote desktops and applications over WANs, Remote Desktop Services must be able to quickly adapt to different network conditions.

In Windows Server 2012 R2, RemoteFX for WAN responds to this challenge by including optimizations for low-bandwidth, high-latency connections over RDP. To help achieve this, RDP adds the following improvements:

- **Dynamic transport detection.** RDP in Windows Server 2012 R2 intelligently chooses between TCP and User Datagram Protocol (UDP) transports to achieve the optimum user experience, depending on the content type and the connection quality. When Remote Desktop is enabled on a computer, UDP for port 3389 is automatically enabled in Windows Firewall.
- **Compensation for network packet loss.** RDP uses several techniques for networks with packet loss, including Forward Error Correction (FEC), to recover quickly from packet loss without requiring retransmission.
- **Network auto-detect.** RDP in Windows Server 2012 R2 detects end-to-end network speed by measuring latency and available bandwidth, and then adjusts the type of connection and the data transfer based on the available bandwidth and latency.

RemoteFX Adaptive Graphics

RemoteFX Adaptive Graphics provides graphics processing that enables higher-fidelity delivery of virtual desktop and RemoteApp programs, including video, text, Aero Glass, and 3D experience across various networks (such as those where bandwidth is limited and latency is high).

The following are some of the key components that enable RemoteFX Adaptive Graphics:

- RemoteFX graphics processing pipeline and codecs
- RemoteFX Progressive Rendering
- Aero and 3D experience that uses the Microsoft basic display adapter

By default, the RemoteFX graphics processing pipeline adaptively determines the optimal RDP experience level based on available bandwidth and server resources.

Figure 6 demonstrates how RemoteFX Adaptive Graphics dynamically adapts to changing network conditions and optimizes encoding to the content.



-  Text Content
-  Image Content
-  Video/Animations

Figure 6. RemoteFX Adaptive Graphics selectively identifying and downloading content

With progressive rendering, text remains clear while images are progressively refined, as shown in Figure 7.

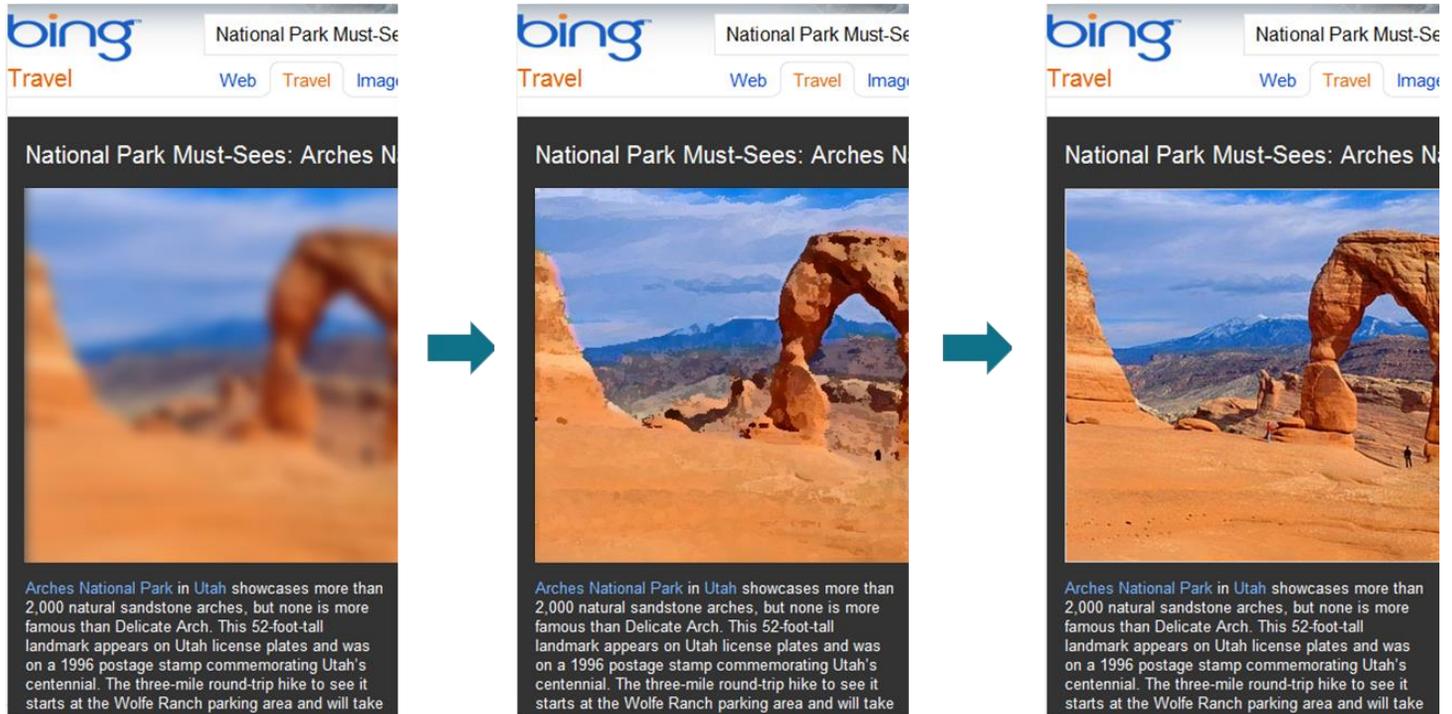


Figure 7. RemoteFX Adaptive Graphics performing progressive rendering of online content

DirectX11 Support with vGPU

In Windows Server 2008 R2 with SP1, Microsoft first introduced the RemoteFX vGPU, which provided Microsoft DirectX® 9 application support and Aero theming for VMs running on Server Virtualization servers with physical GPUs. In Windows Server 2012 R2, the vGPU feature is expanded, and all Windows 8 VMs can take advantage of a DirectX 11–capable GPU, either emulated in software (softGPU) when no GPU is present in the host or paravirtualized and hardware-accelerated (vGPU) when a DirectX 11–compatible video card is present in the host.

RemoteFX USB redirection

Windows Server 2012 R2 includes several improvements to provide a better experience for remote users who want to connect through a USB device, such as a USB flash drive or webcam, to the local client device. Users see the device within the remote session; the USB device, desktop, and apps all appear as local, integrated resources, creating a unified experience. In Windows Server 2008 R2 with SP1, RemoteFX USB redirection is supported only within virtual desktops that use the RD Virtualization Host role service. RDP in Windows 8 extends support for RemoteFX USB redirection to include remote sessions through the RD Session Host role service.

When a user plugs in a USB-based resource, it appears only within that user's session and isn't visible to other users who connect to the same server.

RemoteFX USB redirection supports USB flash drives, cameras, all-in-one printers, scanners, biometric readers, webcams, Voice over IP telephones and headsets, and all other standard USB devices. It's configured by enabling the **Allow RDP redirection of other supported RemoteFX**

USB devices from this computer setting in the RemoteFX USB Device Redirection Group Policy object.

RemoteFX Media Streaming

RemoteFX Media Streaming enables a smooth multimedia experience on WANs. The key features that are part of RemoteFX Media Streaming include smooth video playback that uses H.264-encoded video streaming and audio video synchronization. RemoteFX Media Streaming requires the Desktop Experience feature.

RemoteFX Multitouch

Windows Server 2012 R2 introduces multitouch and gesture remoting with support for up to 256 simultaneous touch inputs. This feature enables users to employ the new breed of touch-enabled and gesture-enabled apps in remote desktop environments.

User Profile Disk

Typically, in pooled or session-based VM deployments, personal settings are temporarily stored in a transient VHD that's discarded when the user logs off. This means that after each session, user personalization settings and application cache data are lost.

As a result, apps like Microsoft Outlook® must re-create personalized settings each time a user logs on to the VM or session, which increases the time it takes for the user to be productive with the application.

Windows Server 2012 R2 introduces User Profile Disk to store user profile settings in pooled or session-based VM environments. Any user state changes are stored in the User Profile Disk, and these changes are immediately available to users the next time they log on.

Technical description

Windows Server 2012 R2 solves the problem of lost settings and application cache data with the new User Profile Disk. A User Profile Disk is created for each user and applies to a specific VM pool or session collection. The User Profile Disk stores user personalization and application cache data so that it is maintained across user logon sessions.

When the user logs on to a session or within a pooled VM, the User Profile Disk is mounted and user personalization is quickly made available. Users benefit from faster startup times and personalization even within the shared environment of a VM pool or session.

Summary

Modern workers need access to files and applications at any time and from any location, including branch offices, airports, hotels, and homes. Whether they are using PCs, phones, tablets, or all of these devices, our hosted desktop solution—built on Microsoft technologies—provides the flexibility required to meet the unique needs of individual users. Administrators and IT departments don't want to spend time and resources managing a complex virtual desktop environment. With our hosted desktop solution, you can remove the management burden, reduce costs, and enable IT to focus on key strategic initiatives.

For more information on hosted desktop solutions from **Synergy IT Solutions Inc.** contact: info@synergyit.ca or visit our website www.synergyit.ca

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