Windows Embedded Compact 7: RemoteFX and Remote Experience Thin Client Integration

Windows Embedded Technical Article

Summary:
Microsoft® RemoteFX™ is a new Windows Server® 2008 R2 SP1 feature that enables the delivery of a premium Windows user experience to remote experience thin client devices. When used in conjunction with Windows® Embedded Compact 7, you can build remote experience thin client devices that bring strong performance values and cost comparatively little money. RemoteFX delivers a near-local desktop experience across a local area network (LAN), eliminating poor user experiences to make them rich and realistic.
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Introduction

Microsoft® RemoteFX™ is a new feature in Windows Server® 2008 R2 Service Pack 1 (SP1) that enables the delivery of a premium Windows user experience to remote experience thin client devices. RemoteFX also introduces a set of user experience enhancements for the Remote Desktop Protocol (RDP), including Windows® Aero®, that enable a rich desktop environment from within your corporate network. When used in conjunction with Windows® Embedded Compact 7, you can build remote experience thin client devices that bring strong performance values and cost comparatively little money. Microsoft operating system platforms that support RemoteFX include Windows Embedded Compact 7, Windows® Embedded Standard 7, and Windows® 7 SP1. RemoteFX delivers a near-local desktop experience across a local area network (LAN), eliminating poor user experiences to make them rich and realistic.

This white paper covers the following topics:

- New RemoteFX features.
- New RemoteFX functionality.
- The benefits of using RemoteFX and Windows Embedded Compact 7 when building remote experience thin client devices.

New RemoteFX Features

RemoteFX improves on the previous Remote Desktop experience by delivering a number of new features, including:

- A rich user experience for the Virtual Desktop Infrastructure (VDI), which includes
  - A three-dimensional (3D) virtual adapter.
  - The ability to redirect locally-connected Universal Serial Bus (USB) devices to virtual machines.

VDI is discussed in greater detail in the “Why Use RemoteFX and Windows Embedded Compact 7?” section of this white paper.

- Integration with the RDP protocol, which enables shared encryption, authentication, management, and device support.
- A rich user experience for session-based desktops in terms of remote experience thin client devices.
- Hardware acceleration. When used in tandem, RemoteFX and Windows Embedded Compact 7 can enable low-cost remote experience thin client devices.
Hardware acceleration is discussed in greater detail in the “New RemoteFX Functionality” section of this paper.


New RemoteFX Functionality

RemoteFX brings new functionality to both the server and client sides of the Remote Desktop experience. The new server functionality includes:

- **Host-side rendering.** This allows graphics to be rendered on the host device instead of the client device. This reduces the overall workload of the client device, which in turn lowers the device’s cost. It also enables support for all graphics types by sending highly compressed bitmap images to the endpoint device.

- **Graphics processing unit (GPU) virtualization.** This is a technology that exposes a virtual graphics device to a virtual machine, allowing multiple virtual desktops to share one or more GPUs on a server running Windows Server® 2008 R2 Hyper-V™.

- **Intelligent Screen Capture.** This checks screen content changes between frames and transmits the changes for encoding. Intelligent Screen Capture tracks network speed and then dynamically adjusts according to available bandwidth.

- **RemoteFX Encoder.** This allows for RDP acceleration on the server-side using the processor, the GPU, or on dedicated hardware.

- **RemoteFX for Remote Desktop Session Host.** This enables access to the Remote Desktop Session Host server from remote experience thin client devices.

**Note:** RemoteFX cannot enable 3D applications or generic USB support for the Remote Desktop Session Host.

New client device functionality includes:

- **Increased performance.** Hardware acceleration enables both the server and client processor to not be burdened with the task of encoding and decoding data. Instead, dedicated hardware now performs this task at a reduced price. In combination with the high compression ratio that RemoteFX offers, significant performance improvements can be realized.

- **RemoteFX USB Redirection.** This allows USB devices to be redirected to a virtual machine running on a Remote Desktop Virtualization Host server. No device drivers are required on the client computer, and a universal interface is provided that works with any USB device on any platform where RemoteFX USB Redirection is supported. This functionality helps to reduce the overall IT cost by enabling USB devices to be used on any platform.
drivers to work out of the box, as opposed to manually creating and enabling such functionality. In addition, devices can be managed centrally, which reduces time otherwise spent on device-client programmatic efforts. RemoteFX USB Redirection is discussed in greater detail in the “Why Use RemoteFX and Windows Embedded Compact 7?” section of this paper.

- **RemoteFX Decoder.** This decodes bitmaps that have been transferred from the virtual desktop to the client computer. RemoteFX Decoder decodes the bitmaps on the client computer by using software in the GPU or the processor, or by using a hardware decoder.

- **Hardware acceleration.** Remote Desktop is now able to be hardware accelerated and uses a RemoteFX server-client pipeline to render data. This can be demonstrated using the example of a remote experience thin client device that has the sole purpose of connecting a Windows 7 SP1 virtual machine running on Windows Server 2008 R2 SP1. This device is fast and uses the latest version of RDP, which allows the client computer to use its own processor or hardware to render data (as mentioned in the RemoteFX Decoder bullet point). This device connects to the server on the back-end using host-side rendering. The exact image is transcoded and sent from the server to the client device in a pixel-by-pixel representation. This scenario requires very little management. The hardware does the work instead of the processor, which increases processor performance.

**Note:** To take advantage of RemoteFX functionality when connecting to virtual desktops, the following hardware requirement must be met:

- A server running Windows Server 2008 R2 Hyper-V that meets specific hardware requirements. For more information about these requirements, see Hardware Considerations for RemoteFX ([http://go.microsoft.com/fwlink/?LinkId=191918](http://go.microsoft.com/fwlink/?LinkId=191918)).


**Note:** RemoteFX for remote experience thin client devices is a new feature of Windows Server 2008 R2 SP1 and as such, only works with this server software.
Why Use RemoteFX and Windows Embedded Compact 7?

There are several benefits to using RemoteFX and Windows Embedded Compact 7 to build your remote experience thin client device. Some of these benefits include:

- Client-side hardware acceleration for RemoteFX.
- Support for RemoteFX USB Redirection.
- Easy integration into your current Microsoft infrastructure (for example, a secure enterprise network) with provided software and an operating system, or the ability to create your own distinct, custom, device-based software. This ease of integration significantly reduces the time to market, which lowers device cost.

Client-Side Hardware Acceleration for RemoteFX

A Windows Embedded Compact 7 remote experience thin client device can be developed with less powerful hardware compared to today’s conventional remote experience thin client devices. This is due to hardware acceleration, which simplifies the client device’s workload. Instead of the client receiving drawing commands from the remote computer and then processing these commands in order to accurately render what is being sent from the server, the client can simply pass along a bitmap received from the server to specialized RemoteFX hardware. This specialized hardware will process and display the data, pixel-for-pixel, as it is seen on the remote computer. This approach to displaying RemoteFX data can significantly reduce the cost of remote experience thin clients as relatively less-powerful processors and less RAM is required.

Support for RemoteFX USB Redirection

As mentioned previously, RemoteFX USB Redirection allows USB devices to be redirected to a Windows 7 SP1 virtual machine running on a Remote Desktop Virtualization Host server. Advantages that come with RemoteFX USB Redirection include:

- No device drivers are required on the client computer. This simplifies device management costs for IT personnel.
- Reduced overall IT management costs as drivers do not need to be managed on the remote experience thin client device. Instead, the drivers are managed on the server where the content is maintained.
• All USB devices integrate seamlessly with Windows Embedded Compact 7, including:
  • Audio devices
  • Storage devices
  • Human interface devices
  • Peripherals
  • Scanners
  • All-in-one printers
  • Webcams

• USB support for several peripheral devices saves development time and costs, allowing your enterprise organization to bring your remote experience thin client device to market faster. For enterprises, this means that management of the devices moves from the device to the virtual machine in the data center, allowing for management from one centralized location.

  **Note:** For more information about RemoteFX USB Redirection, see the *Configuring USB Redirection with Microsoft RemoteFX Step-by-Step Guide* ([http://go.microsoft.com/fwlink/?LinkId=192431](http://go.microsoft.com/fwlink/?LinkId=192431)).

### Provided Software and Operating System

Windows Embedded Compact 7 comes with software and an operating system that can be immediately used by your remote experience thin client device. This integration significantly reduces time to market to lower device cost by freeing you from developing custom software to instead quickly build your device to bring it to market. However, should your organization want to develop your own software solution for your device, Windows Embedded Compact 7 allows for that as well.

  **Note:** Developing your own software can require greater bandwidth and hardware. However, on the client side, it can also help your organization build a lower-cost, remote experience thin client device. For more information, see Microsoft RemoteFX ([http://technet.microsoft.com/en-us/library/ff817578(WS.10).aspx](http://technet.microsoft.com/en-us/library/ff817578(WS.10).aspx)).

*Using RemoteFX and Windows Embedded Compact 7, you can now create low-cost remote experience thin client devices that are optimized for VDI and Session Virtualization performance, that can work with any USB device, and that can use the out-of-the-box software or operating system or a custom solution of your own creation.*
Conclusion

RemoteFX is a new feature in Windows Server 2008 R2 SP1 that enables the delivery of a premium Windows user experience to remote experience thin client devices. When used in conjunction with Windows Embedded Compact 7, you can build remote experience thin client devices that bring strong performance values that cost comparatively little money. RemoteFX delivers a near-local desktop experience across a LAN, eliminating poor user experiences to make them rich and realistic.

New RemoteFX features include:

- A rich user experience on the thin client
- Integration with the RDP protocol.
- A rich user experience for VDI and session-based desktops in terms of remote experience thin client devices.

New RemoteFX functionality includes:

- Host-side rendering.
- Intelligent Screen Capture.
- Increased performance.
- Hardware acceleration.

Using RemoteFX and Windows Embedded Compact 7, you can now create low-cost remote experience thin client devices that support client-side hardware acceleration for RemoteFX, that can work with nearly any USB device, and that can use the provided software or operating system, or a custom solution of your own creation.

For more information:
Visit the Windows Embedded website:

http://www.windowsembedded.com