



Cisco Wide Area Application Services and Microsoft RDP 7.1: Optimize VDI Delivery over the WAN

What You Will Learn

As part of a virtual desktop infrastructure (VDI), the Microsoft RemoteFX enhancement to Remote Desktop Services (RDS) provides a local-like, full-fidelity virtual desktop experience over the network. When using virtual desktops over a wide area network (WAN), providing high-quality end-user performance, reducing WAN bandwidth costs and control of latency and jitter are important.

This white paper, intended for server and desktop administrators, explains how Cisco® Wide Area Application Services (WAAS) and Cisco WAAS Mobile enhance the value of RemoteFX for wide area networks in the following manner:

- **Performance:** Cisco WAAS addresses network issues, improving the end-user experience by nearly 60% and accelerating print performance by up to 90%
- **WAN Cost Savings:** Cisco WAAS reduces VDI traffic consumption of WAN bandwidth by up to 66%, reducing WAN costs
- **Higher Scalability:** Cisco WAAS WAN bandwidth optimization enables you to support 2X-3X more remote desktop users and more business video traffic for a given WAN capacity

According to Chris Phillips, General Manager, Solutions Shared Services, Microsoft, “Working with Microsoft, Cisco has provided a network performance solution for delivering virtual desktops over the WAN with high performance. Using a combination of the Remote Desktop Protocol (RDP) 7.1 with Microsoft RemoteFX for delivering the virtual desktop and Cisco WAAS for optimizing the VDI traffic, enterprises can benefit from increased VDI deployment flexibility while improving end-user productivity.”

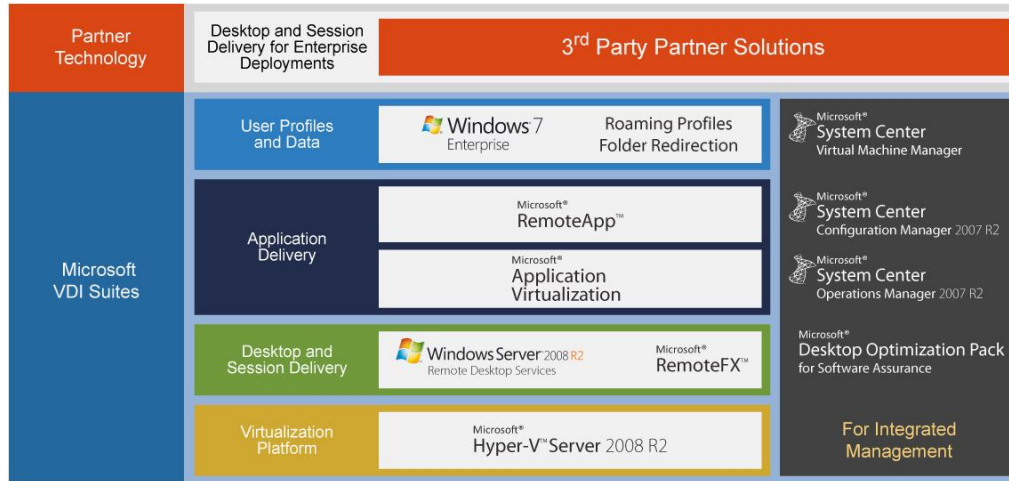
Benefits and Challenges of Virtual Desktop Infrastructures

Many companies are adding virtual desktops that employees can access over the network using a broad range of end point devices including rich clients, thin clients or tablets. The main advantages of VDI include:

- Increased compliance because data is secured within centralized data centers
- Increased flexibility to access desktops from anywhere
- Improved business continuity and rapid recovery from laptop loss
- Simplified management with easier operations for patching, backups and security

RDP 7.1 with Microsoft RemoteFX delivers a full-fidelity experience to employees using access devices such as rich or thin clients (Figure 1). Using RemoteFX lets you introduce 3D applications, and business video applications for communications, collaboration, and training.

Figure 1: Role of RemoteFX in Microsoft VDI Solution



The challenge for IT teams is making sure the user experience is as good when the employee's desktop is accessed over the WAN as it is when the desktop is locally hosted on a PC or laptop. Factors that can adversely affect the user experience over the WAN include:

- **Inadequate WAN bandwidth:** Each desktop delivered over the WAN can consume up to 1 Mbps bandwidth, and considerably more when employees access streaming video. In companies with many virtual desktops, traffic can quickly exceed existing WAN capacity, noticeably degrading the user experience.
- **Latency and jitter:** Delivering the desktop over the WAN can introduce latency and jitter, which degrade the local-like RemoteFX experience. Symptoms include poor video quality, slow application response, and slow screen refreshes.

Overcoming these issues is especially important if your company wants to deliver high-bandwidth applications over the WAN, including video and print services.

Solution: Cisco Wide Area Application Services

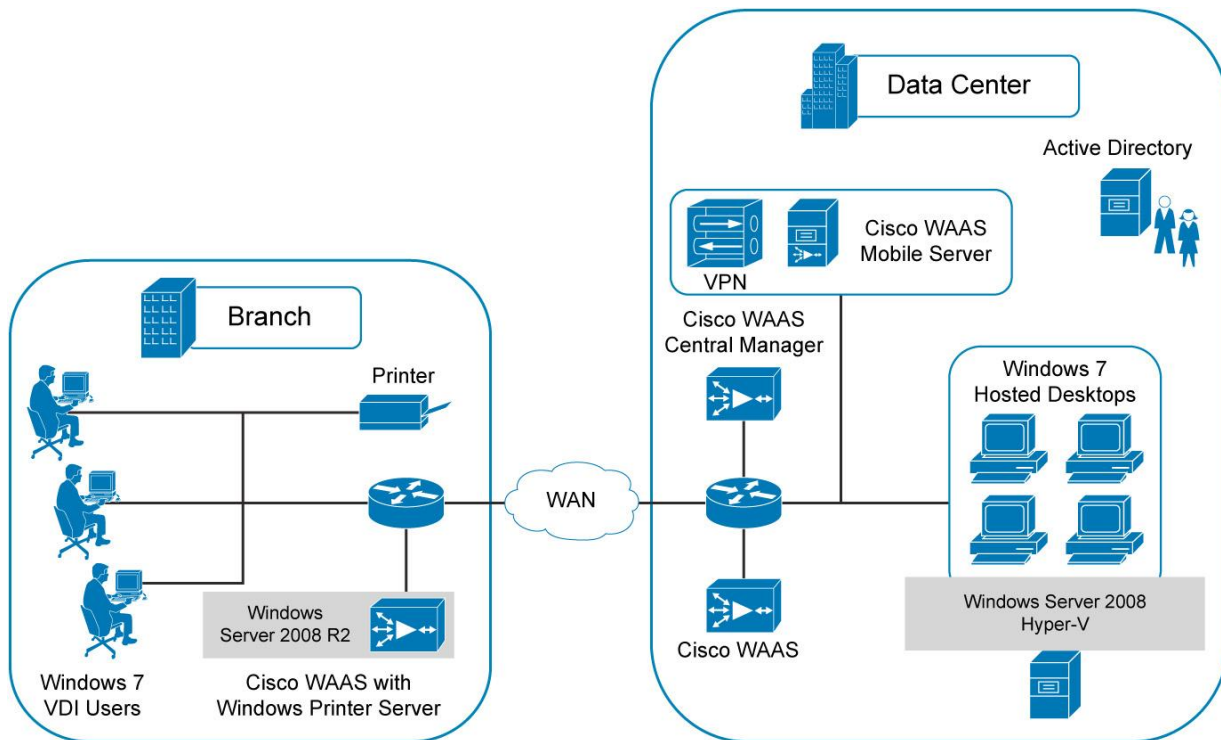
Cisco WAAS and Cisco WAAS Mobile operate in conjunction with RDP (including RemoteFX) and Microsoft Windows Server Hyper-V to provide a scalable desktop delivery solution. Used with RemoteFX, Cisco WAAS optimizes WAN bandwidth consumption and accelerates application and print performance by mitigating latency and packet loss (Table 1).

Table 1: Cisco WAAS Increases the Value of Microsoft RemoteFX for the WAN

Measurement Criteria	Improvement with Cisco WAAS
Response Time for Interactive Tasks	Up to 57% Faster
Print Performance	89% Faster 90% Reduction in WAN Bandwidth Consumption
Maximum Number of Users on a Given WAN Link	Up to 2X-3X more, without costly bandwidth upgrades
Bandwidth Consumption	66% Reduction

The tests were conducted using the setup described in Figure 2.

Figure 2: Test Lab Network



Cisco WAAS provides a number of benefits for companies using RemoteFX for virtual desktops.

1. Improved End-User Performance for Data and Video

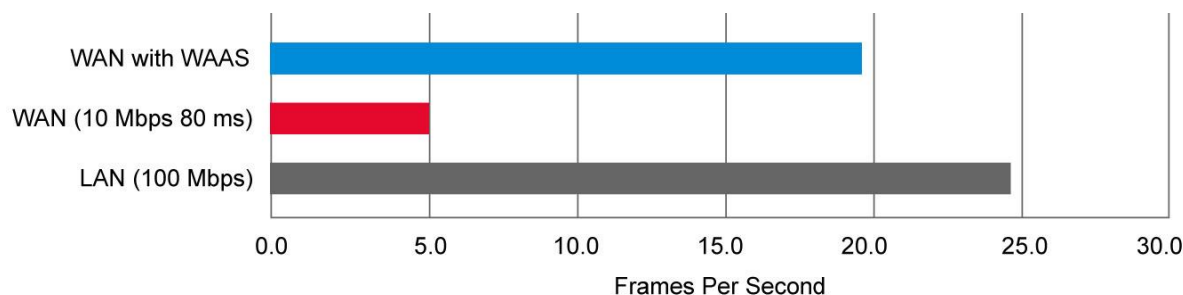
Cisco WAAS provides a local-like user experience when desktops are hosted in the data center and delivered over the WAN. This means that branch employees, teleworkers, and field workers using thin clients and tablets can enjoy an excellent experience using Microsoft Office suite, 3D graphics, Windows Aero, business video services, and print services. Users tend to notice the difference in terms of faster screen refreshes, good PowerPoint transitions, and higher quality video.

Video Performance Test Results

Following are Cisco's test results for RDP 7.1 (using RemoteFX) WAN performance with Cisco WAAS. The tests measured user experience for a remote branch user watching a video (**Harry Potter and the Deathly Hallows Part 1**), and response time for common Microsoft Office suite activities.

The tests showed that Cisco WAAS improves RemoteFX video quality over the WAN, as measured by the average frames-per-second (fps) rate (Figure 3). Over a 100 Mbps campus LAN, the video played at 24.6 fps. When video played over a 10 Mbps WAN with 80 milliseconds of latency, quality degraded noticeably, to 5 fps. With Cisco WAAS, the quality of video played over the same WAN increased almost 400 percent, to 19.5 fps, providing a local-like experience for remote branch users.

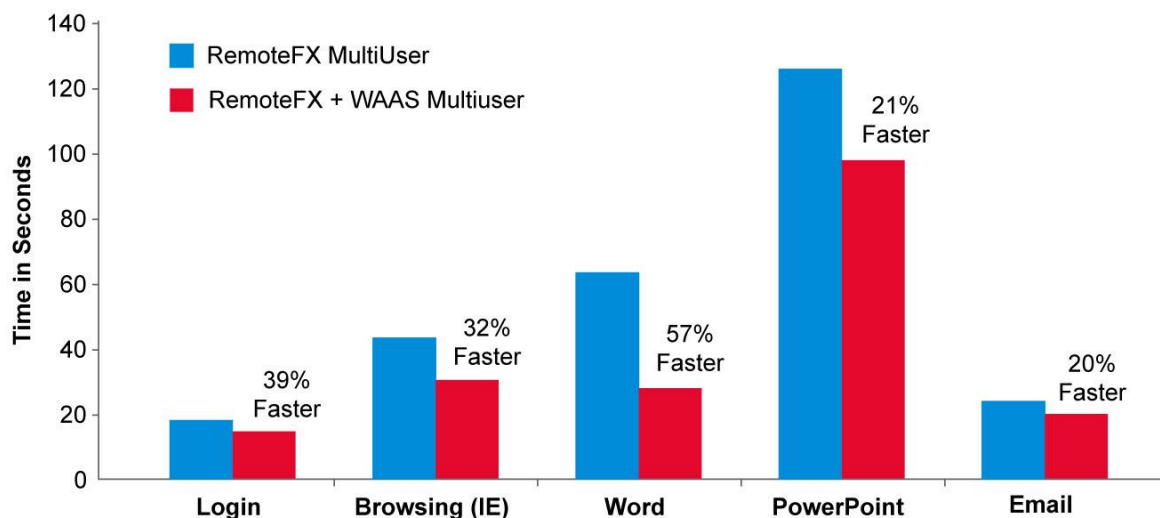
Figure 3: Cisco WAAS Enhances the End-User Experience Watching RemoteFX Video



Data/Application Performance Test Results

Cisco WAAS improved the user experience for common Microsoft Office Suite tasks, accelerating display performance as much as 57 percent (Figure 4).

Figure 4: Cisco WAAS Improves RemoteFX Response Time for Microsoft Office Tasks



2. Print Acceleration

Cisco WAAS optimizes delivery of print, improving response time and reducing bandwidth consumption in a VDI environment. When remote users print a document over the WAN, performance is slower than it would be if the document were hosted locally. Cisco WAAS provides two options to deliver print performance comparable to when the desktop is hosted locally (Figure 5 and Figure 6).

- One option is using built-in Cisco WAAS capabilities for printing optimization, data reduction, compression, and TCP Flow Optimization (TFO), providing up to 89 percent better end-user performance and more than 90 percent reduction in WAN bandwidth consumption.
- The other option is using the Microsoft Windows Print Server-based printing option on branch-office Cisco WAAS appliances. Windows Server 2008 R2 on WAAS saves hardware costs of deploying separate print servers at each branch office.

Figure 5: Cisco WAAS Improves Response Time of Printing in a VDI environment

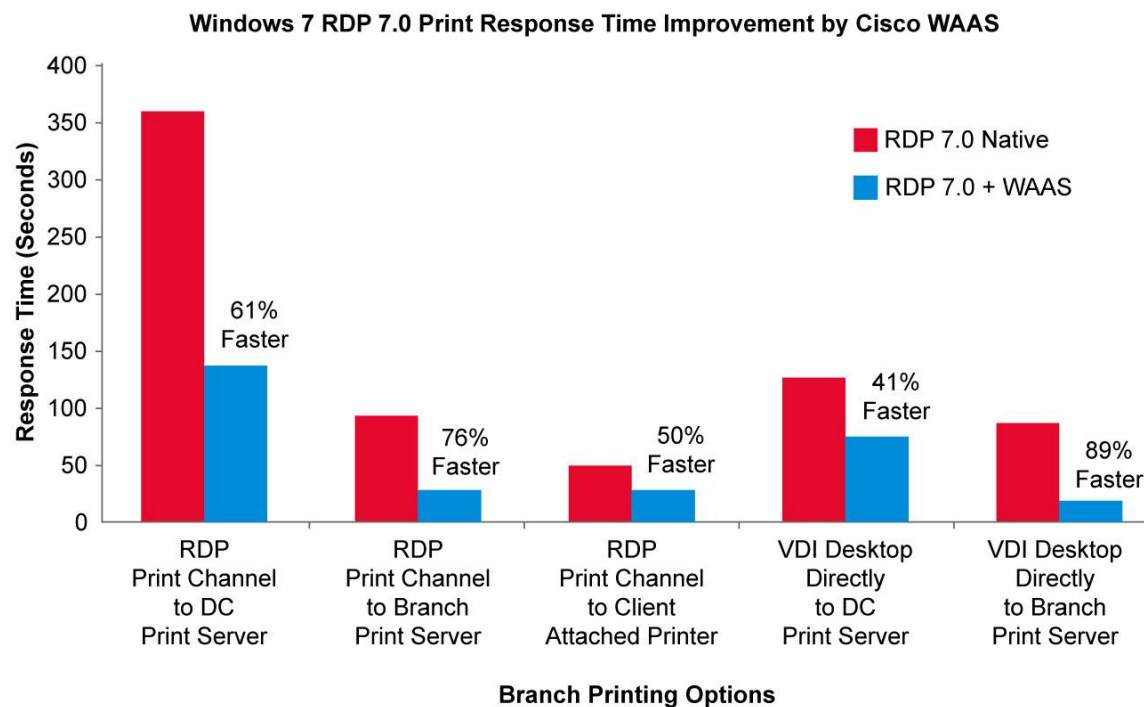
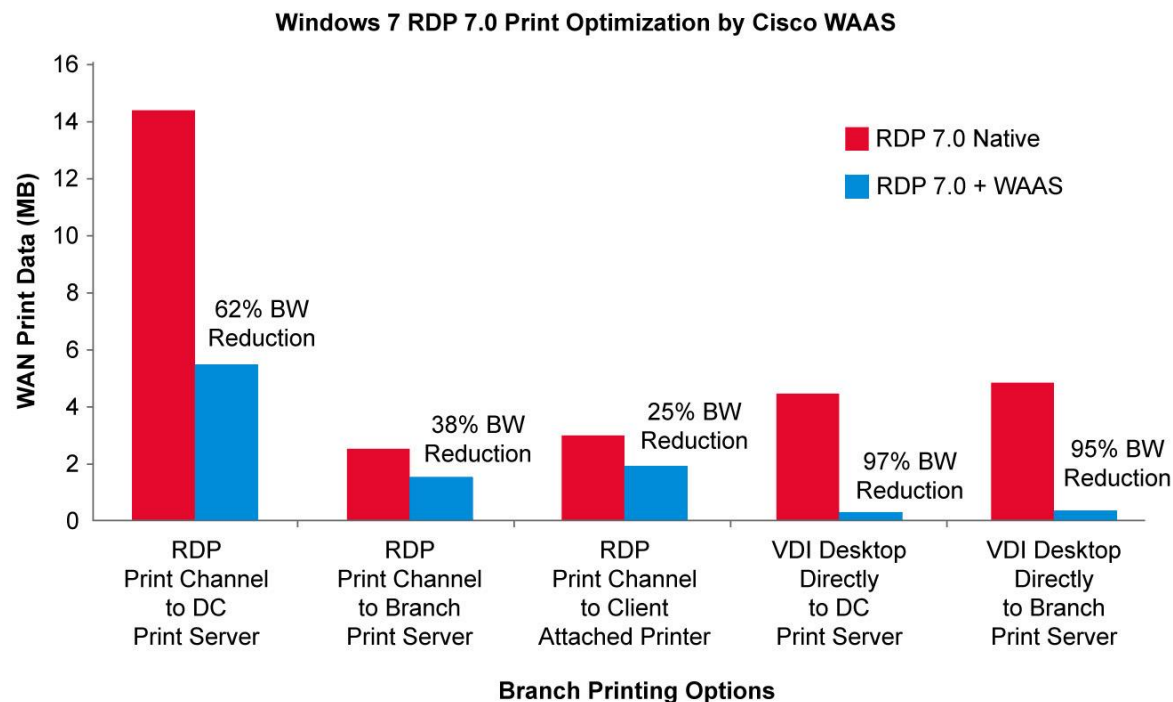


Figure 6: Cisco WAAS Reduces WAN Consumption of Printing in a VDI environment



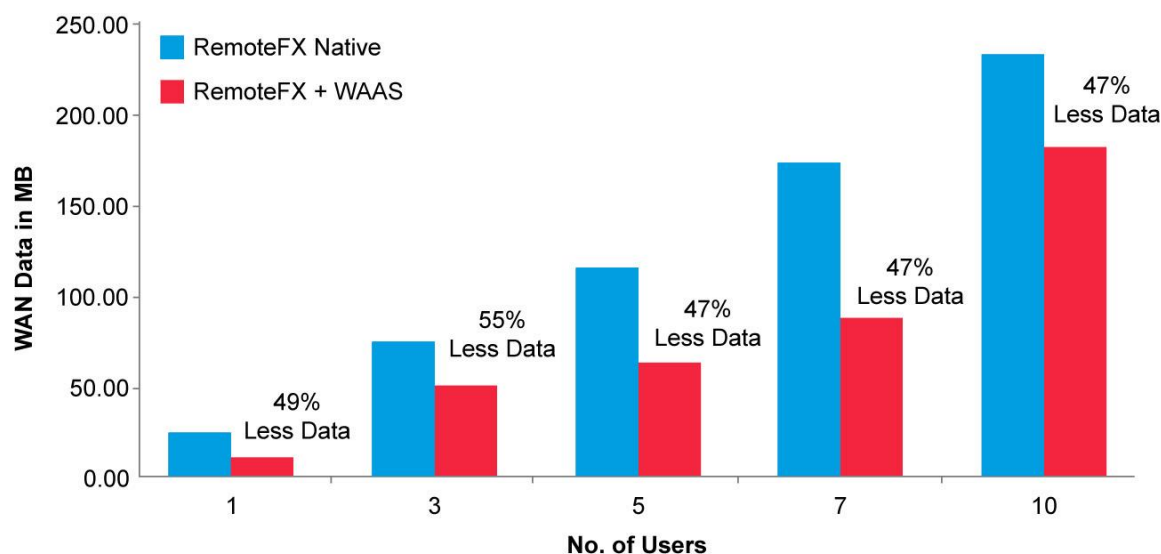
3. WAN Cost Savings

The tests demonstrated that WAAS enables organizations to reduce VDI bandwidth consumption by up to 66% and make more room for business video traffic.

4. Improved Scalability of Number of Users Supported on a WAN Link

Finally, the tests demonstrated that Cisco WAAS reduces WAN bandwidth required per user by 47 percent, enabling organizations to support almost double the number of RemoteFX users without costly WAN upgrades (Figure 5).

Figure 7: Cisco WAAS Decreases WAN Bandwidth Consumed by Each RemoteFX User



Summary

Cisco worked with Microsoft to optimize virtual desktop WAN performance with RemoteFX using Cisco WAAS appliances. Key benefits of this solution for delivering VDI over the WAN include:

- Improvements in performance of video (up to 400%) and data (up to 57%)
- Print acceleration (up to 90%)
- WAN cost savings (up to 66%)
- Increased scalability of number of VDI users supported (up to 2X) without costly WAN upgrades

For More Information

For more details on Cisco WAAS and Microsoft RemoteFX, including detailed performance metrics, visit: http://www.cisco.com/en/US/prod/collateral/contnetw/ps5680/ps6870/solution_overview_c22-635381.html

To learn more about Cisco WAAS in general, visit: <http://www.cisco.com/go/waas>

To learn more about Windows Server 2008 R2 Remote Desktop Services visit: <http://www.microsoft.com/rds>

To learn more about Microsoft RemoteFX visit: <http://www.microsoft.com/remotefx>



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