

Handling Multimedia Under Desktop Virtualization for Knowledge Workers

Wyse® TCX Multimedia™ capabilities deliver the applications and performance required, for less

A white paper by
Wyse Technology Inc.

WYSE
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ABSTRACT

Knowledge workers frequently need access to multimedia applications, such as computer-based training, video conferencing, intelligent hypermedia systems, groupware support, and informal media spaces that enable geographically dispersed groups to collaborate effectively. Increasingly, they'll also be turning to multimedia applications that help them to deal with large amounts of interrelated information through visualization, and to manipulate and access information quickly and easily across organizational boundaries.

Supporting these multimedia requirements has traditionally meant providing knowledge workers PCs and high-bandwidth networks. Organizations that wanted to take advantage of the cost savings and efficiency inherent in thin-client computing have restricted themselves to deploying it to employees executing simple tasks. They haven't been able to broaden their deployment to include knowledge workers because multimedia applications have traditionally performed poorly in the virtual desktop environment of thin computing.

For example, in a thin-client infrastructure using Remote Desktop Protocol (RDP), even a powerful dual quad, 8-core server running a test video can only run about 15 virtual machines (VMs) before reaching 100 percent of capacity and taking up 120 MB of network bandwidth. This excessive consumption of resources undermines the entire value proposition for thin-client computing—and doesn't work well. But now, with the availability of Wyse TCX Multimedia virtualization software, multimedia applications can run within a VMware virtual desktop infrastructure (VDI) in a way that:

- Improves server scalability
- Makes better use of network bandwidth
- Saves energy
- Simplifies data center operations

Wyse TCX Multimedia software enables organizations to increase their cost savings and productivity gains from thin computing by putting knowledge workers on thin-client devices. Wyse's TCX Multimedia software can run more virtual sessions with fewer physical servers, which can cut data center energy costs, reduce the amount of heat generated, and reduce the amount of data center floor space required per user supported. It also helps simplify data center operations, because IT now only needs to support one model of user, in a highly resilient, low-maintenance environment.

IDC: THIN COMPUTING DELIVERS SIGNIFICANT BUSINESS BENEFITS

Wyse thin client users studied by IDC experienced significant business benefits from the migration of a portion of their PC users to thin clients. These benefits include:

- ✓ Reduction in hardware and software costs by 40%
- ✓ Reduction in IT operations costs by 29%
- ✓ Increase in IT staff productivity by 78%
- ✓ Reduction in worker downtime by 88%¹

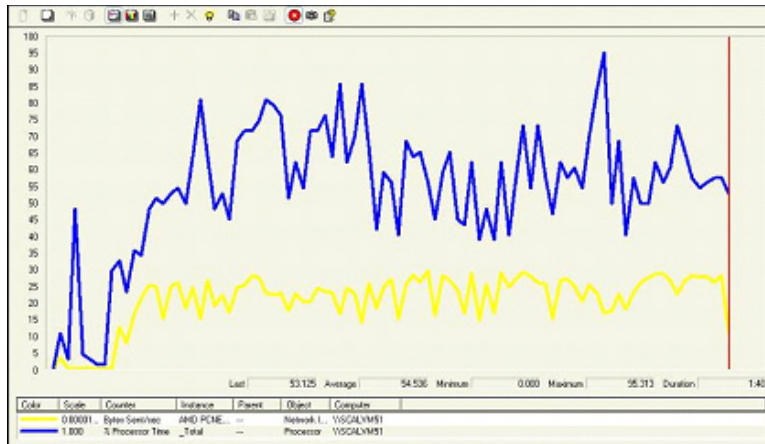
WYSE TCX: WHAT MAKES IT DIFFERENT

Wyse TCX Multimedia software intelligently manages multimedia processing tasks dynamically between the client and server. The multimedia stream decodes on the client using the local processing power of the device. This reduces the server load as well as the network bandwidth. Wyse TCX Multimedia software supports multi-cast delivery and can stream media directly from a network-based media server, eliminating multimedia overhead from the server VM.

THE PROOF IS IN THE NUMBERS

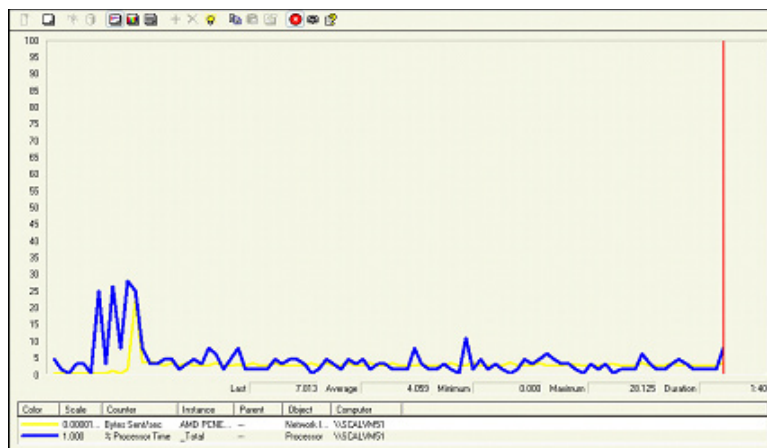
To test the impact of Wyse TCX Multimedia, Wyse set out first to measure typical RDP multimedia video performance. The problems with CPU capacity and network bandwidth were immediately apparent.

¹ Thin Computing ROI : The Untold Story, IDC, November 2005



Typical Situation – Heavy and constant use of both the server CPU and the network bandwidth as RDP tries to communicate the multimedia information to the client

Wyse then enabled Wyse TCX Multimedia and measured the performance of multimedia on this same virtual machine.

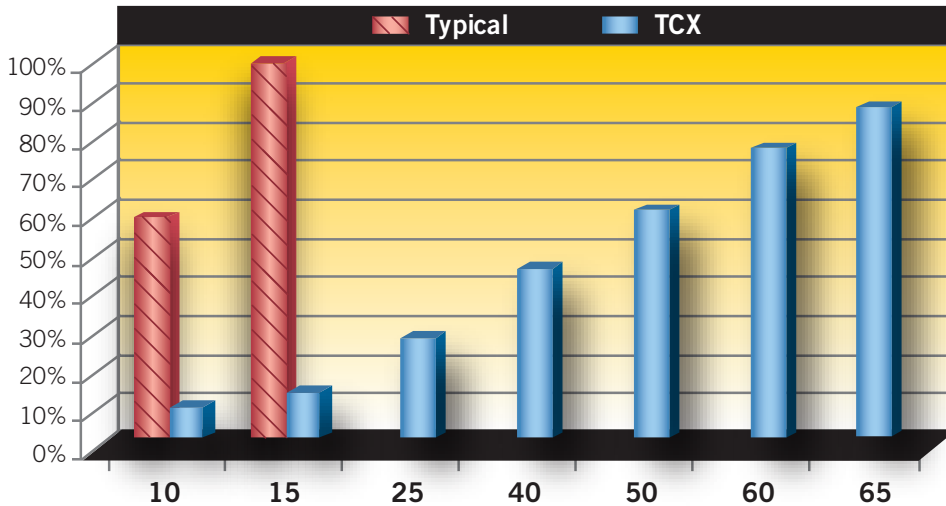


With Wyse TCX Multimedia enabled – Server CPU and network activity for the same user action is reduced significantly

For each of these two configurations (with and without TCX), the objective was to determine how many Wyse clients per server could simultaneously run multimedia applications under Windows Media Player 9, with what impact on VDI server CPU, client local CPU, and network bandwidth utilization.

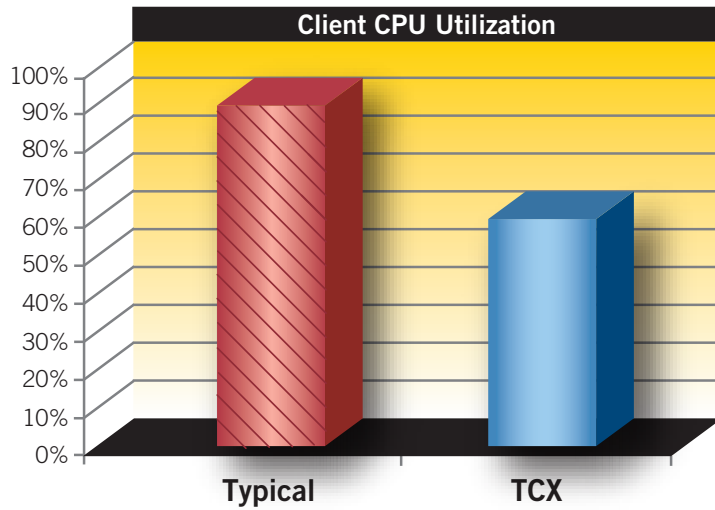
TEST 1: WINDOWS MEDIA VIDEO 9 (WMV) VIDEO OVER RDP

Server Capacity. In this test, the Wyse team played a typical WMV file (Amazon-2.wmv) on a series of clients, each connected to a server virtual machine over RDP and measured the total number of users supported on this configuration, and the percent of server utilization. Without Wyse TCX Multimedia, 15 VMs playing the media file drove server CPU utilization up to 97%. With Wyse TCX Multimedia, server scalability improved up to 800%, with 65 VMs playing the media file and still only consuming 86% of CPU.



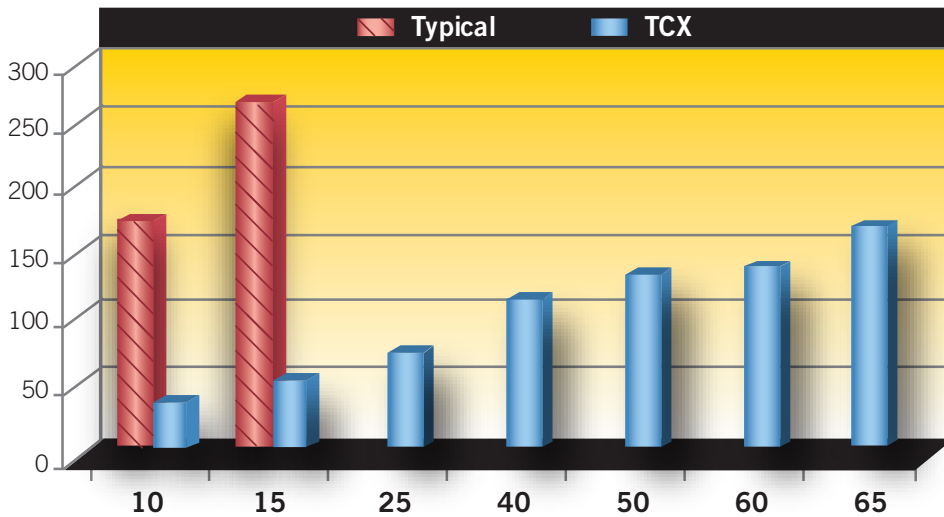
Number of virtual machines and percent utilization per server when playing a 2 Mbps video (Amazon-2.wmv) video over RDP

Client CPU. In tests without Wyse TCX Multimedia, client CPU utilization during multimedia playback was at 90%; and the user experience was characterized by low video quality (visible painting, frame drops, and audio out of sync). With Wyse TCX Multimedia, client CPU utilization dropped to 60%, for a 33% reduction in CPU usage and power consumption. Playing the clip consumed just 2Mb/s network bandwidth—the native bit rate of the file. The user experience was the same as on a PC displaying a local file—with no frame drops or other quality problems.



Client CPU utilization (as a percent) when playing Amazon-2.wmv video over RDP, with and without Wyse TCX Multimedia

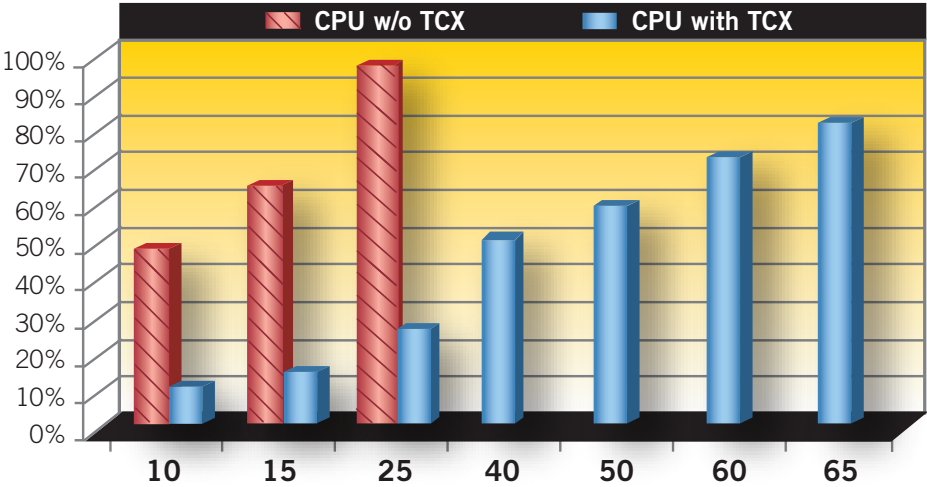
Network Bandwidth. Without Wyse TCX Multimedia, 15 VMs playing the multimedia file consumed 258Mb/s of network bandwidth, but with Wyse TCX Multimedia enabled, that same configuration consumed less than 50Mb/s, and 65 VMs only consumed 165Mb/s of network bandwidth for a 677% improvement in bandwidth utilization.



Network bandwidth utilization (in Mb/s) when playing Amazon-2.wmv video over RDP, with and without Wyse TCX Multimedia

TEST 2: MPEG 1 VIDEO OVER RDP

To ensure that these results were not limited to the WMV format, Wyse repeated the test, this time using a typical MPEG-1 video (Olympics.mpg). This time, without Wyse TCX Multimedia, 25 VMs consumed 96% of CPU capacity. With Wyse TCX Multimedia, 65 VMs playing the media file only consumed 80% of CPU, delivering up to 400% improvement in server scalability.



Number of virtual machines and percent utilization per server when playing Olympics.mpg video over RDP

WITH WYSE TCX MULTIMEDIA, MULTIMEDIA MEANS BUSINESS

The availability of Wyse TCX Multimedia technology means it's time to reconsider decisions to keep knowledge workers on PCs. With Wyse TCX Multimedia supporting high-performance delivery of multimedia to thin-client devices, including mobile devices, knowledge workers can now use thin-client devices without deterioration in user experience. In fact, they may even benefit from increased mobility. Organizations shouldn't overlook this new opportunity to reduce their cost of hardware, software, and IT support by extending thin-client computing to knowledge workers.

REAL-WORLD RESULTS: THIN CLIENTS ARE GOOD FOR YOUR HEALTH

Can thin clients really support knowledge workers who need a lot of information—including images and video—immediately? Metro Health, one of the largest, most comprehensive health care providers in Michigan, says yes. Approximately 3,500 employee sessions are always running in Metro Health's data centers. Employees—clinicians, pharmacists, receptionists—simply go up to any of the approximately 1,000 Windows XP Embedded-powered Wyse V90 thin client workstations in the hospital, enter their login information, and immediately see the same screen they had up when they logged out of their last session. The system supports both traditional and multimedia applications, including video for patient and staff education, video conferencing, and CT scan views.

At first, many users didn't understand the thin-client computing model, and some perceived it as a step down from PCs. But the ease and speed of access, even with multimedia, won users over—especially doctors and nurses, who can get to their data without multiple logins. Almost all those who initially insisted on keeping their PCs have changed their minds.

TEST CONFIGURATION DETAILS

- Server:**
- Dell PowerEdge 2950
 - 2.5” SAS (10K rpm): 146GB2
 - Two quad-core Intel Xeon Processors 5300 series at 3.0GHz
 - 32GB of RAM
 - O/S:
 - Host: VMware Virtual Infrastructure 3.0.2
 - Guest: MS Windows XP Pro SP2, (pool of 70 VMs)
-

- SAN:**
- EqualLogic PS5000XV iSCSI
 - 15,000 RPM, 300 GB SAS drives in RAID 50 configuration
-

- Network:**
- Gigabit Ethernet with 6 ports
 - Two are teamed between Service console/vmotion in Active/Standby configuration
 - Two are teamed for vSwitch ports in active/active
 - Two are teamed for iSCSI in active/active
-

- Thin client:**
- 45 Wyse V90 thin clients
 - Embedded O/S: XPe SP2 5.01 build 551.512
 - RDP 6 / Media Player 9
 - Wyse TCX Multimedia Client: version 1.11
 - Memory: 512MB Flash, 256MB DRAM
 - Network: Ethernet 10/100
 - 20 Wyse V10L thin clients
 - Embedded O/S: WTOS 6.1.0_03
 - Wyse TCX Multimedia Client (enabled in WTOS)
 - Memory: 128MB Flash, 128MB DRAM
 - Network: Ethernet 10/100
 - Network
 - 65 ports of 10/100 switched with 2- 1Gbit uplinks
-

- Videos:**
- Amazon: WMV9 video with WMA audio, Bitrate 2Mbps
 - Olympics: Mpeg1 video with MP3 audio, Bitrate 1.4Mbps
-

- Test parameters:**
- Created 70 XP Pro SP2 Virtual Machines on ESX 3.02 using Virtual Center 2.0.1
 - CPU: 1 Virtual CPU
 - Memory: 384MB
 - Disk: 5GB
 - IP Address: DHCP Assigned
 - VM Name: Manually assigned
 - VM Suspended: When not under test



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