



Independent Performance Comparison:  
Dell Wyse 7040 vs HP t730 Thin Clients



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Miercom  
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# 1 - Executive Summary

Dell Inc. engaged Miercom to conduct an independent performance assessment of its recently introduced Wyse 7040 Thin Client platform, side-by-side with the HP t730 Thin Client, a competitive offering from Hewlett-Packard.

The systems tested here represent the high end of these vendors' Thin Client lines. Thin Clients are deployed at the end-user site in cloud computing and desktop virtualization environments. In that role, performance is defined by their CPU prowess, their ability to efficiently move files and data to and from servers on the WAN and/or LAN network and USB storage devices, and to manage high-definition local displays.

A leading software tool for testing such systems, PassMark Software's *PerformanceTest*, was applied to both products to assess their relative CPU, graphics display, memory and hard disc performance. In addition, tests were devised and applied to compare their video-display quality and file-copy time with USB-attached devices.

## Key Findings and Conclusions

The Dell Wyse 7040 Thin Client system repeatedly demonstrated performance superior to the HP t730. Among the most noteworthy findings:

- **CPU performance.** Using the widely accepted PassMark software test tool, the Dell Wyse 7040 was rated 68 percent higher than the HP t730 in terms of CPU performance.
- **Graphics and memory.** PassMark rated the Dell Wyse 7040 88 percent higher than the HP t730 in 2D graphics handling, and 113 percent better in memory performance.
- **Video Quality.** In retrieving and displaying Ultra-High-Definition 4K videos, the Dell Wyse 7040 Thin Client garnered excellent ratings for most videos viewed, while the display quality of most of the same videos via the HP t730 were rated poor.
- **File Copy.** The Dell Wyse 7040 Thin Client could copy Gigabyte-size files from a local storage device to a network-attached Citrix server over 30 percent faster than the HP t730.

The test results confirm that the Dell Wyse 7040 Thin Client delivers superior performance in almost all respects to the HP t730 Thin Client. With compelling PassMark results, excellent video quality and faster file copy times, we are pleased to award the Miercom Performance Verified certification to the Dell Wyse 7040.

Robert Smithers  
CEO  
Miercom



## 2 - About the Products Tested

The products tested are the competitive high-end Thin Client offerings from Dell and HP. Thin Clients are designed for cloud-driven computing, also called desktop virtualization. In this environment, data and files are stored and maintained primarily within the cloud. The Thin Client, at the customer site, performs mainly data and file retrieval via the network (WAN or LAN), data and file manipulation, and output via one or more displays or other output devices.

### Dell Wyse 7040 Thin Client

Front and rear views, and details of the Dell Wyse 7040 Thin Client, as tested, are shown below.



**Front View**

**Rear View**

CPU	Intel Core i7-6700T, Quad Core, 2.4 GHz
Memory	8 GB
OS	Windows 7 SP1
Video card	Intel HD Graphics 530
Hard drive	500 GB SCSI Drive (128 or 256 GB Solid State Drives also available)
Connectors	6 x USB 3.0 (two front, four rear)
	Slot for optional additional copper or SFP fiber link (rear)
	1 x Audio/mic In, 1 x Audio/headset Out (front)
	1 x DisplayPort (rear): supports 4K UHD resolution on up to 3 displays
	1 x Ethernet RJ-45 (rear)
	1 x HDMI (rear)
Dimensions/weight	7.2 in x 7 in x 1.41 in; 3.12 pounds

## HP t730 Thin Client

Front and rear views, and details of the HP t730 Thin Client, as tested, are shown below.



**Front View**

**Rear View**

CPU	AMD RX-427BB; 2.7 GHz
Memory	8 GB
OS	Windows 7 SP1
Video card	AMD Radeon R7
Hard drive	32 GB Solid State Drive
Connectors	3 x USB 3.0 (two front, one rear); 6 x USB 2.0 (two front, four rear)
	2 x serial, 1 x parallel (rear)
	1 x Microphone In, 1 x Headset Out (front); 1 x Audio In, 1 x Audio Out (rear)
	4 x DisplayPort 1.2 (rear): support 4K/UHD resolution
	1 x Ethernet RJ-45 (rear)
	2 x PS/2
Dimensions/weight	8.7 in x 9.4 in x 2.6 in; 2.29 pounds

## 3 - How We Did It

Our testing of the Thin Clients was conducted in three phases. The test cases were:

- 1) PassMark Performance Testing
- 2) Video Quality Testing
- 3) File-Copy-Time Testing

**PassMark Testing.** For in-depth testing of each Thin Client's CPU, memory and graphics performance, a software test package from Australia-based PassMark Software Pty Ltd ([www.passmark.com](http://www.passmark.com)) was used. PassMark's PerformanceTest, current version 8.0, is regarded as an industry standard for the relative performance assessment of PC-type systems.

PerformanceTest, which loads and runs on the system being tested and measured, applies a spectrum of test suites to quantify the relative performance of a system's CPU, as well as its disk, memory and video processing.

The test suites are:

- 1) CPU benchmark: Eight different tests are conducted, including math operations, compression and encryption. The results are averaged to produce the 'CPU Mark' rating.
- 2) Video benchmark: The rating is based on the peak performance for the type of load generated by the tests. The video tests consisted of two components:
  - a. 2D graphics: drawing lines, bitmaps, fonts, text and GUI elements.
  - b. 3D graphics: simple to complex DirectX 3D graphics and animations.
- 3) Disk benchmark: tests are applied for reading, writing and seeking within disk files.
- 4) Memory benchmark: tests measure the speed and efficiency of allocating and accessing memory.

The individual test scores are then averaged to form an Overall PassMark Rating. Individual results are collected into a series of *Marks* for each group of tests. The resulting *Marks* are scaled averages of the individual tests for that group. The scaling is done to approximate normal use. Higher ratings are better.

For our testing of Thin Client systems, PassMark compared the ratings with other common computer platforms. PassMark maintains ratings of hundreds of thousands of other systems previously tested and rated. The PassMark relative rating system does offer an excellent means of comparing the performance of two or more systems side by side, such as the Thin Clients we tested here.

The PassMark tests are structured to compare the results of a test computer with others on the market. This makes industry-wide interpretation of a particular computer's results difficult, but not impossible.

For example, PassMark publishes a list of "100 Common CPUs," which we analyzed and compared with our Thin Client results. We found that the median CPU Mark rating of the list of 100 common CPUs was 5464. That is, half of the CPUs on the list had a rating greater than 5464, and half were lower.

The CPU Mark rating for the Dell Wyse 7040 Thin client was 8270, considerably above the median of the PassMark list. The CPU Mark rating of the HP t730 Thin Client, by comparison, was 4916, considerably below the median.

**Video Quality Testing.** In this testing we played videos on a 4K monitor attached to and driven by the Thin Client under test. The videos were hosted by a Virtual Desktop running on a VMware View virtual machine, which was connected to the Thin Client via a 1-gigabit/s network link.

As discussed later, we tried initially to download each video from the VMware server and play it through the Thin Client at **full** resolution – 2160 vertical pixels, which is the 4K and Ultra High Definition (UHD) specification.

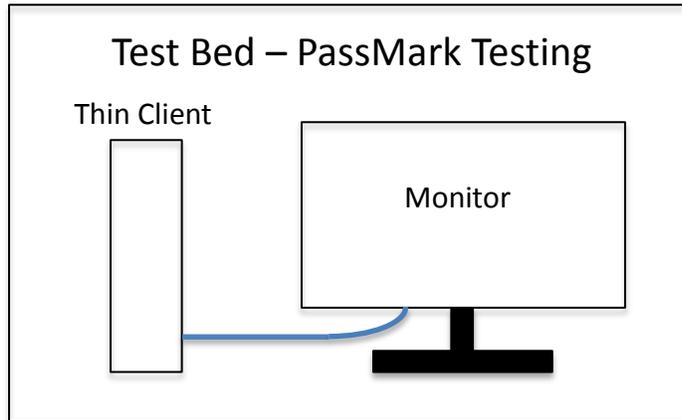
However, neither the Dell nor HP Thin Client could process and play the full-resolution video under these conditions. We experimented and found that the highest resolution we could achieve through both of the Thin Clients was 1440p, so we set both Thin Clients to play the video at 1440p. As shown later, the resulting video quality was markedly different between the two Thin Clients under these conditions.

**File-Copy-Time Testing.** For this testing we would copy a large file – the 1.11-GigaByte SolidWorksFiles.zip file, in native mode – between USB 2.0 and 3.0-attached storage devices to the internal disc storage of the Thin Client.

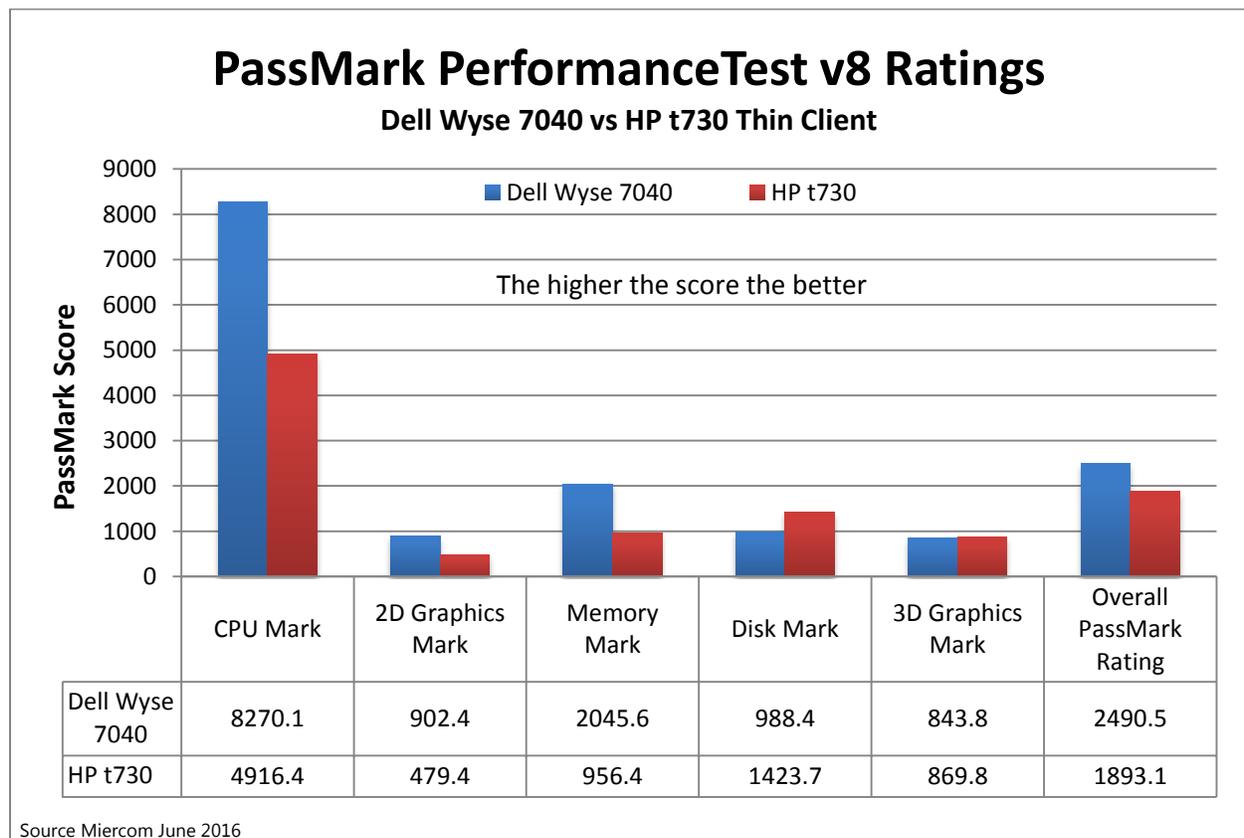
Then we did a copy-time test, of the same 1.1-GB file, from a USB 3.0 disc drive attached to the Thin Client, out onto a Citrix Server. We timed these transfers with a stopwatch, so the times are accurate to within a second or two.

## 4 - PassMark Tests and Test Results

As noted, the PassMark PerformanceTest software loads and executes on the Thin Client platform. The Dell and HP Thin Clients were configured identically for this testing. The simple test bed for the PassMark testing is shown below.



**Results.** The below bar chart shows the PassMark results for each group of tests.

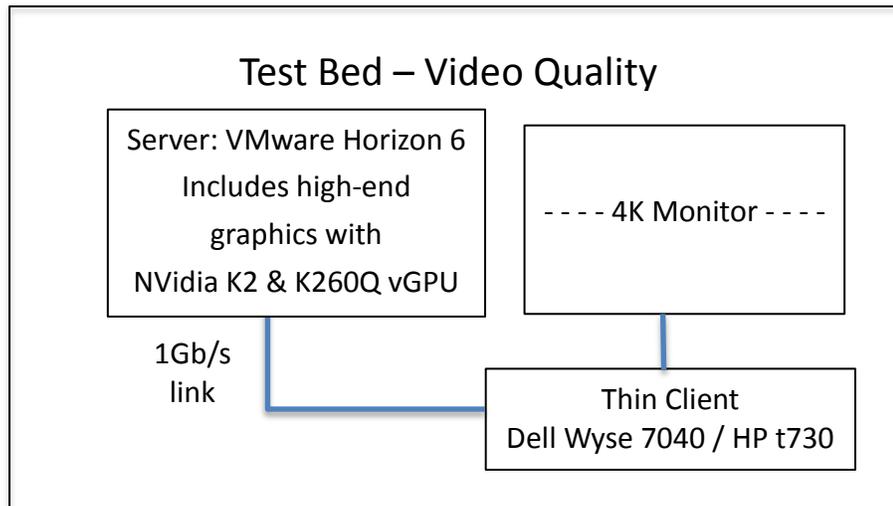


In all, PassMark rated the Dell Wyse 7040 Thin Client higher than the HP t730 in the CPU, 2D graphics and memory performance categories. The CPU Mark and Memory Mark results were among the most dramatic: The Dell Wyse 7040 was rated 68 percent higher than the HP t730 in terms of CPU performance. In memory performance, PassMark rated the Dell Wyse 7040 Thin Client 113 percent higher – more than double – the HP t730 Thin Client.

In the 2D graphics-performance category, PassMark rated the Dell Wyse 7040 88 percent higher than the HP t730.

## 5 - Video Quality Tests and Test Results

For this testing we played videos on a 4K monitor attached to and driven by the Thin Client under test. The videos were hosted by, and streamed from, a Virtual Desktop running on a VMware View virtual machine, which connected to the Thin Client via a 1-gigabit/s network link, as shown in the below test-bed diagram.



We tried initially to play each video from the virtual machine and play it through the Thin Client at **full** resolution – 2160 vertical pixels, which is the 4K and Ultra High Definition (UHD) specification.

However, neither the Dell nor HP Thin Client could process and play the full-resolution video under these conditions. We experimented and found that the highest resolution we could achieve through both the Thin Clients was 1440p, so we set both Thin Clients to play the video at 1440p.

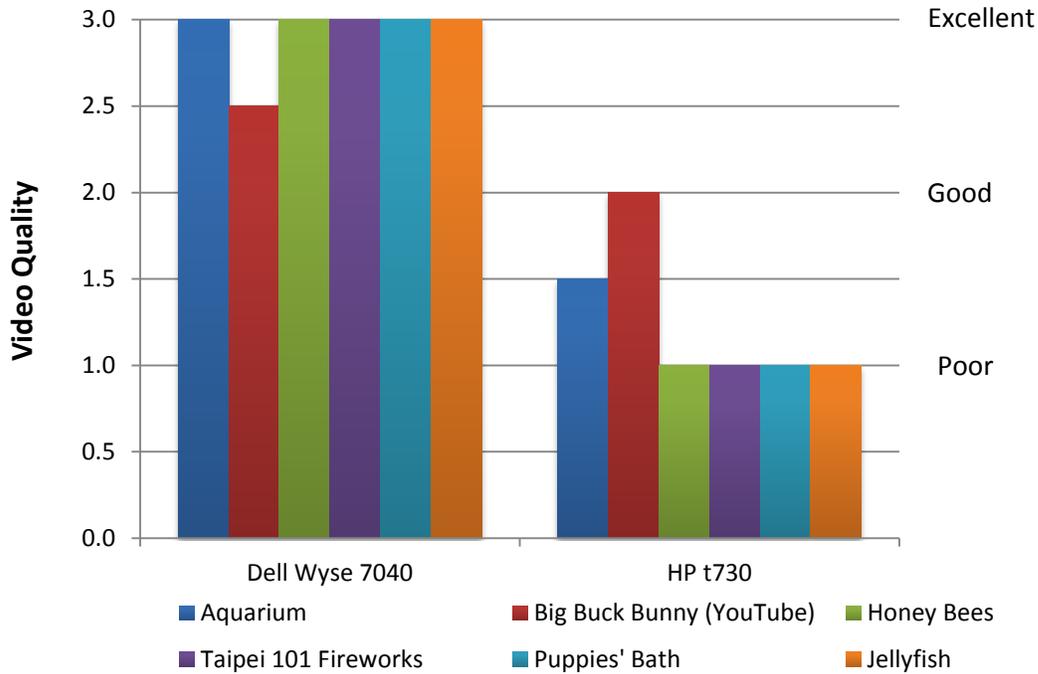
We would play the video and watch for image jitters, skips, freezes and evaluate the "watchability" of each video according to this simplistic scale:

- 1: Poor quality;** video was not watchable; bad jitter, frames freeze, picture is torn up.
- 2: Good quality;** video very watchable; resolution is not perfect though, some skips or jitter.
- 3: Excellent quality;** no skips, excellent resolution; this video would draw one in to watch it.

**Results.** Configured in this manner, with the Thin Clients set for playing video at 1440 horizontal pixels on the 4K display monitor, the differences in the watchability of the videos was pronounced, as shown in the below graph.

# Video Quality - Watchability

Dell Wyse 7040 vs HP t730 Thin Clients



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In retrieving and displaying Ultra-High-Definition 4K videos, the Dell Wyse 7040 Thin Client garnered excellent ratings for most videos viewed, while the display quality of most of the same videos via the HP t730 were rated poor.

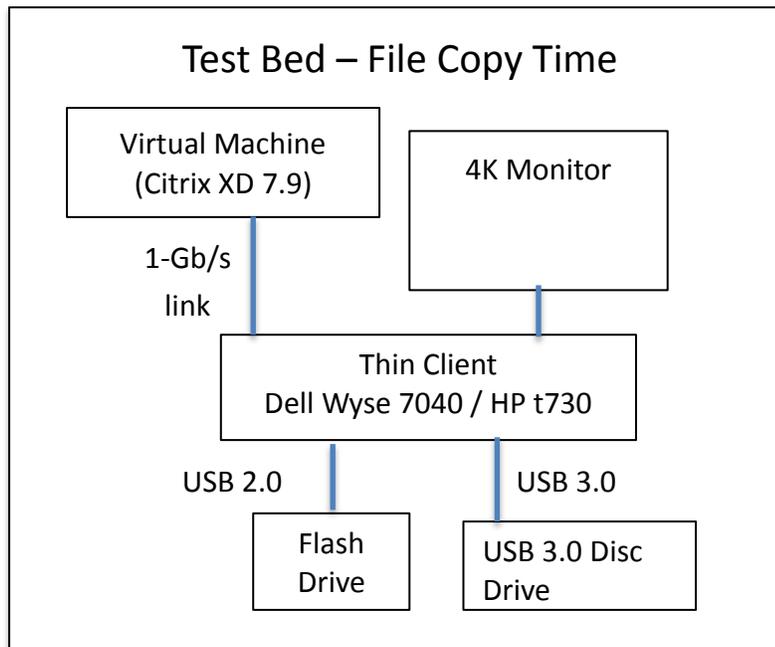
We note again, though, that the Thin Clients were both set to play the videos at 1440p, which was the best resolution that we could achieve in this configuration, even though the 4K UHD monitor is designed to display videos at the 2160 vertical pixels or better.

## 6 - File-Copy Time Tests and Test Results

For this testing we would clock the elapsed time to copy a large file – the 1.11-GigaByte SolidWorksFiles.zip file, in native mode – between USB 2.0 and 3.0-attached storage devices to the internal disc storage of the Thin Client.

Then the same file-copy time was clocked, with a stopwatch, from the Thin Client-attached storage device, across a 1-Gbps network link, to a storage device on a Citrix server, as shown in the below test-bed diagram. Citrix version 4.2.10014 software was run on the server.

The same USB 2.0 and 3.0 devices were used in the testing of both Thin Clients.



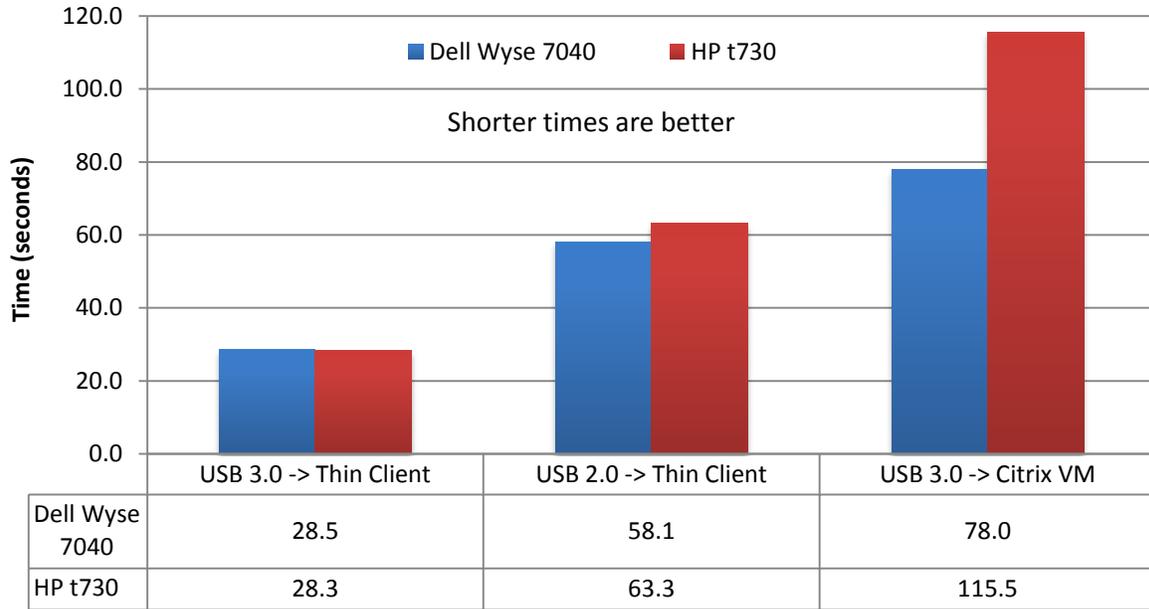
**Results:** The file-copy times from these tests are shown in the graphic below.

The Dell Wyse 7040 and the HP t730 Thin Clients exhibited comparable performance transferring the 1.1-GB SolidWorksFiles.zip test file from USB-attached storage device to the internal disc storage of the Thin Client.

However, the Dell Wyse 7040 Thin Client performed notably better than the HP t730 by transferring this large zipped file out over the network to the virtual machine. We note again that the transfers were timed with a stopwatch, so the file-copy times are accurate to a second or two.

# File Copy Time - 1.1-GB zipped file

## Dell Wyse 7040 v HP t730 Thin Clients



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## 7 - About Miercom

Miercom has published hundreds of network product analyses in leading trade periodicals and other publications. Miercom's reputation as the leading, independent product test center is undisputed.

Private test services available from Miercom include competitive product analyses, as well as individual product evaluations. Miercom features comprehensive certification and test programs including: Certified Interoperable™, Certified Reliable™, Certified Secure™ and Certified Green™. Products may also be evaluated under the Performance Verified™ program, the industry's most thorough and trusted assessment for product usability and performance.

## 8 - Use of This Report

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