Principled Technologies®

TEST REPORT
MARCH 2010

A performance comparison of current Dell Precision M4400 and M6500 notebook systems vs. previous-generation Dell notebook and desktop systems

Executive summary

Dell Inc. (Dell) commissioned Principled Technologies (PT) to run a set of performance tests on two current-generation Intel® processor-based Dell™ Precision™ notebook systems, a previous-generation Dell Precision desktop system, and a previous-generation Dell Latitude notebook system.

We tested the following current Dell Precision notebook systems:

- Dell Precision M4400 with Intel® Core™ 2 Duo Mobile Processor P8600
- Dell Precision M6500 with Intel® Core™ i7 820QM

Appendix A provides detailed system configuration information. We compared the performance of Microsoft Windows® 7 Ultimate (Windows 7), Microsoft Windows Vista® Ultimate SP2 (Windows Vista), and Windows® XP Professional SP3 (Windows XP) on these notebooks to that of Windows XP on the following two previous-generation Dell PCs:

- Dell Latitude D620 notebook with Intel® Core™ Duo T2400 Processor (3-year-old system)
- Dell Precision 390 desktop with Intel® Pentium® D Processor 950 (4-year-old system)

KEY FINDINGS

- The current Dell Precision notebooks provided up to 128.9% greater SYSmark Preview 2007 system performance than the previous-generation Dell Latitude D620 notebook, and up to 84.9% greater performance than the Dell Precision 390 desktop. (See Figure 1.)
- The Dell Precision M4400 notebook provided up to 41.1% longer MobileMark 2007 battery life than the Dell Latitude D620 notebook—an extra 85 minutes. (See Figure 2.)
- The Dell Precision notebooks beat the 4-year-old Dell Precision 390 by up to 143.7% on the single- and multiple-CPU CineBench R10 tests. (See Figure 3.)
- The Dell Precision notebooks running Windows 7 outperformed the 4-year-old Dell Precision 390 in all SPECviewperf 10 tests, with wins ranging from 645.9% to 2,966.7%. (See Figure 4.)
- The current Dell Precision notebooks running Windows 7 provided up to 20.9% faster application responsiveness than the previous-generation Dell Precision 390 desktop. (See Figure 5).

Figure 1 shows the SYSmark 2007 Preview performance for the current Dell Precision notebook running all three OSs and the previous-generation systems running Windows XP. The Dell Precision M4400 notebook outperformed the previous-generation Dell Latitude D620 notebook by an average of 65.1 percent, and beat the Dell Precision 390 desktop by an average of 84.9 percent. The Dell Precision M6500 notebook outperformed the previous-generation Dell Latitude D620 notebook by an average of 104.4 percent, and beat the Dell Precision 390 desktop by an average of 128.9 percent.

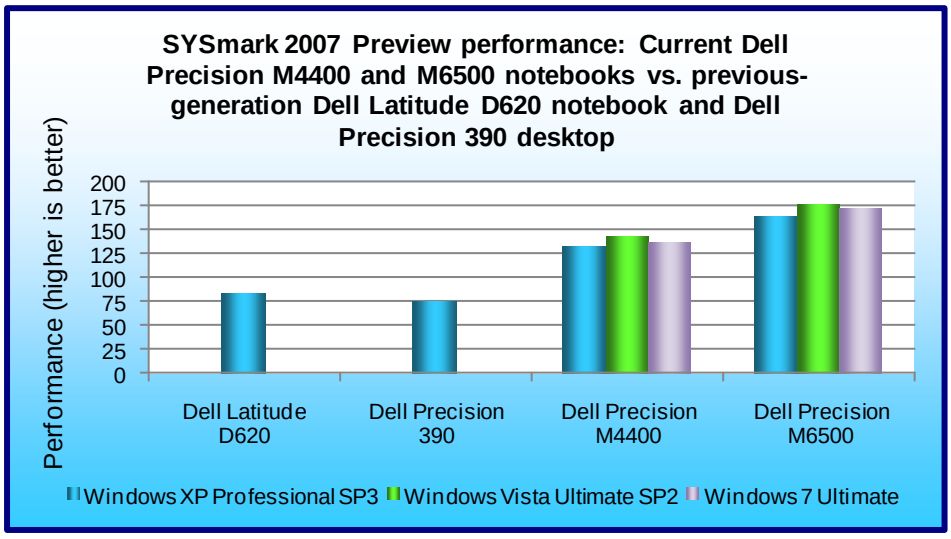


Figure 1: SYSmark 2007 Preview productivity results for our test systems. Higher numbers are better.

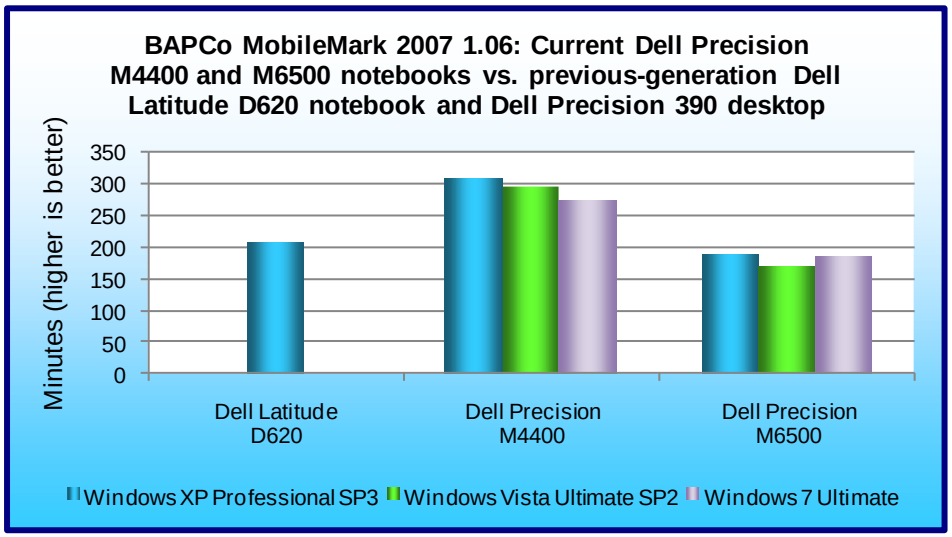
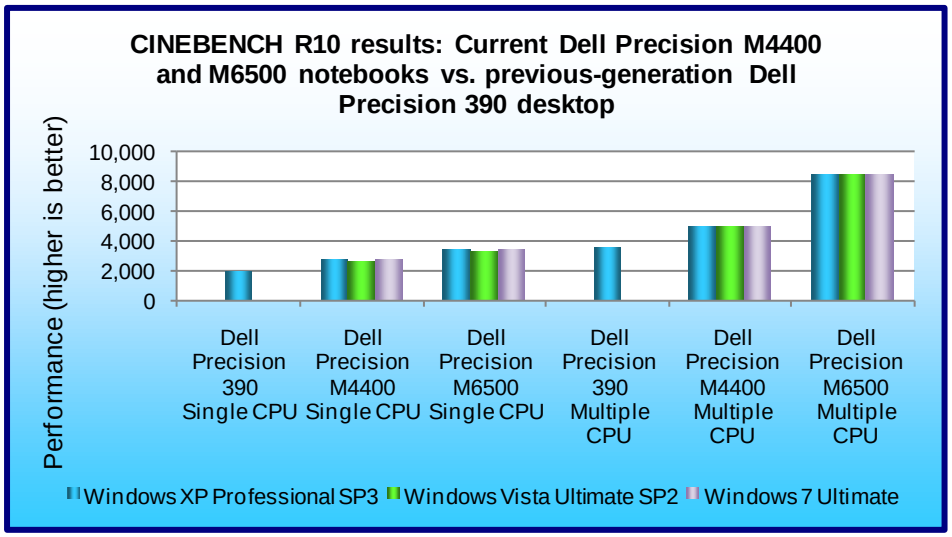


Figure 2 shows the BAPCo MobileMark 2007 battery life testing results. While the current Dell Precision M6500 notebook underperformed the previous-generation Dell Latitude D620 notebook by an average of 12.2 percent, the current Dell Precision M4400 notebook outperformed the previous-generation Dell Latitude D620 notebook by 41.1 percent (an extra hour and 15 minutes).

Figure 2: MobileMark 2007 Preview battery life results for our test systems. Higher numbers are better.

At Dell's request, PT ran the CINEBENCH R10 and SPECviewperf 10 benchmarks only on the Precision-family notebooks and desktops.

MAXON CINEBENCH consists of two main components. The first test sequence targets the computer's main processor. CINEBENCH plays a scene that makes use of various CPU-intensive features. During the first run, the benchmark uses only one CPU or CPU core to determine a reference value. On computers that have multiple CPUs or cores, CINEBENCH will run a second test using all available CPU power. The benchmark produces a single-CPU score for all computers, and a multiple-CPU score for those computers with multiple cores.



As Figure 3 shows, the current Dell Precision M4400 notebook outperformed the previous-generation Dell Precision 390 desktop by an average of 42.2 percent on the single-CPU test and 43.2 percent on the multiple-CPU test. The current Dell Precision M6500 notebook outperformed the previous-generation Dell Precision 390 desktop by an average of 76.3 percent on the single-CPU test and 143.7 percent on the multiple-CPU test.

Figure 3: CINEBENCH R10 results for our test systems. Higher numbers are better.

SPECviewperf 10 compares the performance of systems running in higher-quality graphics modes, and measures how effectively graphics subsystems scale when running multithreaded graphics content using popular CAD/CAM, visualization and digital content creation applications.

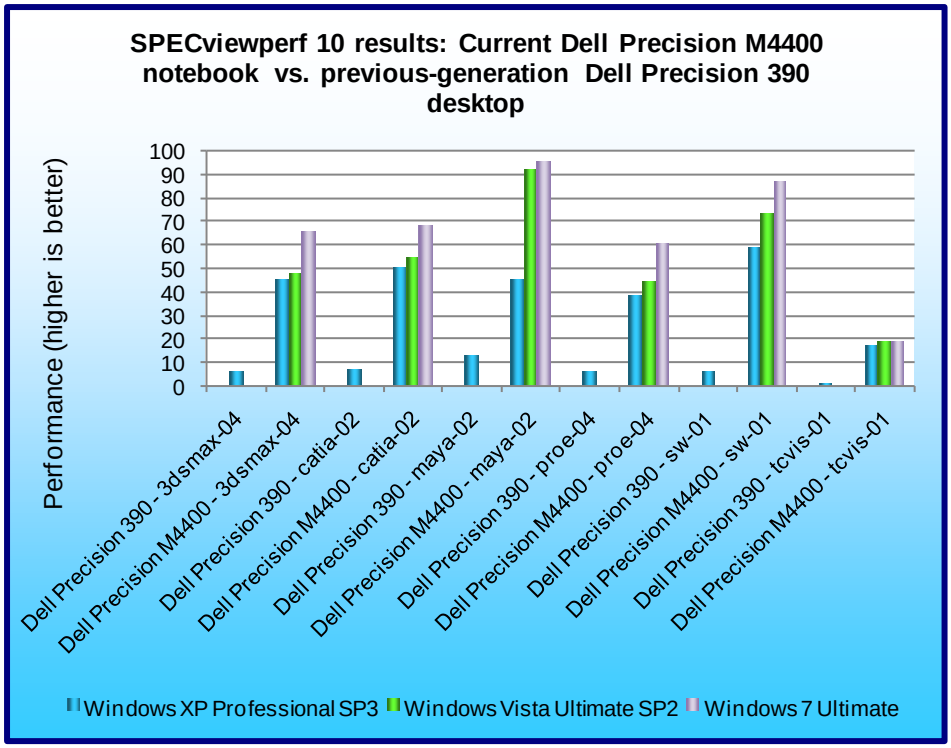


Figure 4: SPECviewperf 10 results for the Dell Precision M440 notebook system and the Dell Precision 390 desktop system. Higher numbers are better.

Figure 4 shows the SPECviewperf 10 results of the Dell Precision M4400 notebook and the Dell Precision 390 desktop. The Dell Precision M4400 notebook running Microsoft Windows 7 outperformed the previous-generation Dell Precision 390 desktop in all tests, with wins ranging from 645.9 percent to 1,397.6 percent. See Appendix B for detailed test results.

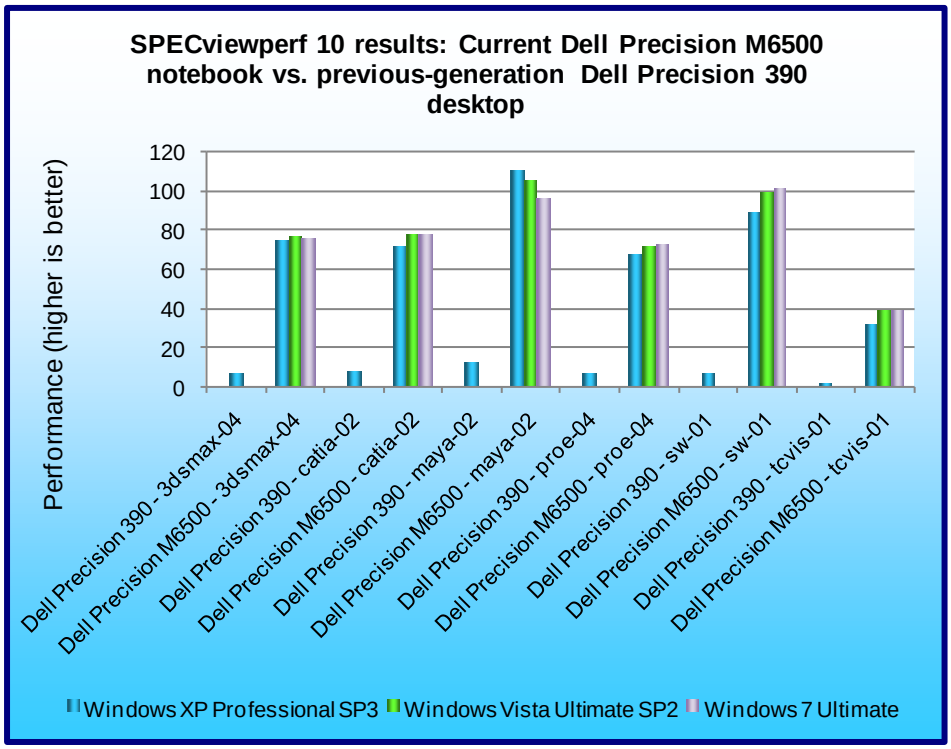


Figure 5: SPECviewperf 10 results for the Dell Precision M6500 notebook system and the Dell Precision 390 desktop system. Higher numbers are better.

Figure 5 shows the SPECviewperf 10 results of the Dell Precision M6500 notebook and the Dell Precision 390 desktop. The Dell Precision M6500 running Microsoft Windows 7 outperformed the previous-generation Dell Precision 390 desktop in all tests, with wins ranging from 653.8 to 2,966.7 percent. See Appendix B for detailed test results.

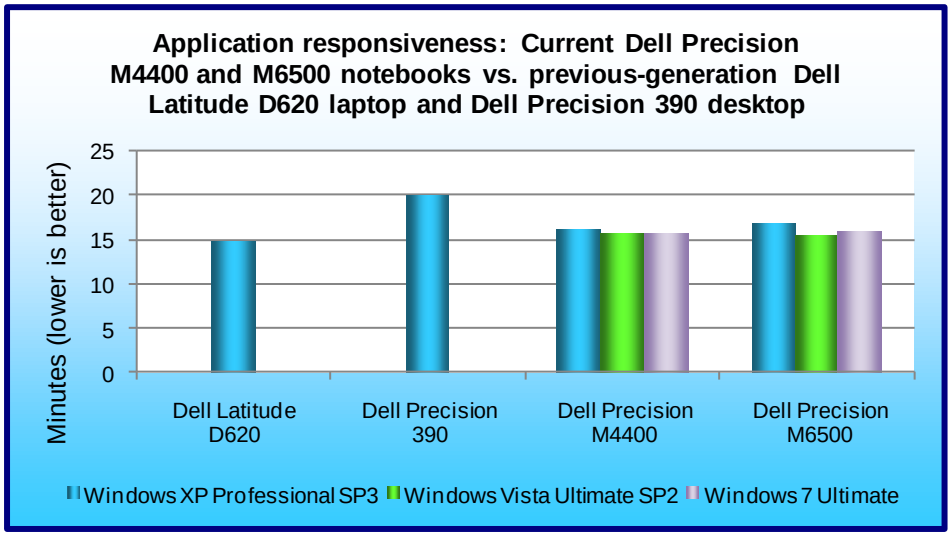


Figure 6: Application responsiveness results for our test systems – the sum of the averages for all application responsiveness tests. Lower numbers are better.

Figure 6 shows the application responsiveness for our three test systems. The current Dell Precision M4400 notebook responded an average of 6.7 percent more slowly than the previous-generation Dell Latitude D620 notebook, but outperformed the previous-generation Dell Precision 390 desktop by over 20.9 percent, or 4 minutes and 15 seconds faster. The current Dell Precision M6500 notebook responded an average of 8.1 percent more slowly than the previous-generation Dell Latitude D620 notebook, but outperformed the previous-generation Dell Precision 390 desktop by over 19.9 percent, or 4 minutes and 0 seconds faster.

Workload

We compared the systems in three categories of tests: performance, battery life, and application responsiveness. We used SYSmark 2007 Preview v1.06, CINEBENCH R10, and SPECviewperf 10 to test overall system performance and used MobileMark 2007 v1.06 Productivity 2007 to test battery life performance. We used custom hand-timed tests to measure application responsiveness.

SYSmark 2007 Preview v1.06

SYSmark 2007 Preview is a performance metric BAPCo created to measure system performance.

SYSmark 2007 Preview determines its overall rating from the mean result from four workload scenarios: e-learning, office productivity, video creation, and 3D modeling. SYSmark 2007 Preview records the time the system takes to complete each individual operation in each scenario.
SYSmark 2007 Preview consists of the following applications and corresponding tasks: Adobe® After® Effects 7 (e-learning), Adobe® Illustrator® CS2 (video creation), Adobe® Photoshop® CS2 (video creation), AutoDesk® 3ds Max® 8 (3D modeling), Macromedia® Flash 8 (e-learning), Microsoft® Excel 2003 (office productivity), Microsoft® Outlook 2003 (office productivity), Microsoft® PowerPoint 2003 (office productivity), Microsoft® Word 2003 (office productivity), Microsoft® Project 2003 (office productivity), Microsoft® Windows Media™ Encoder 9 series (video creation), Sony® Vegas 7 (video creation), SketchUp 5 (3D modeling), and WinZip® 10.0 (office productivity).

To learn more, visit http://www.bapco.com/support/sysmark2007preview/Help/Help.html.

MobileMark 2007 v1.06

MobileMark 2007 is an industry-standard benchmark BAPCo created to measure system battery life and performance.

MobileMark 2007 measures system battery life in minutes. MobileMark 2007 records system battery life at the start of the Productivity 2007 benchmark, and repeats the benchmark workload until the system battery life is depleted, or until the notebook system powers down due to low battery life. At the 7 percent battery life setting, MobileMark 2007 records a timestamp once per minute. At the end of the benchmark, it compares the beginning timestamp to the final (last recorded) timestamp. MobileMark 2007 derives its system battery life rating as the number of minutes between the start and end timestamps.

MobileMark 2007 Productivity 2007 consists of the following applications and corresponding tasks: Microsoft Project 2003 (project management), Microsoft Excel 2003 (calculation sheets), Microsoft Outlook 2003 (emails, calendars, scheduler), Microsoft PowerPoint 2003 (slide presentations), Microsoft Word 2003 (formatted text documents), WinZip Computing and WinZip Pro 10.0 (compressed archives), Adobe Photoshop CS2 (manipulated and compressed images), Adobe Illustrator CS2 (manipulated images), and Adobe Flash 8 (vector graphics, animation).

We followed the run rules that MobileMark 2007 specifies here: http://www.bapco.com/support/mobilemark2007/Manual/rules.html.

Test results

Figures 7 and 8 show a more detailed breakdown of application and system responsiveness results for the current Dell Precision notebook systems running Windows 7 and the previous-generation Dell Precision 390 desktop workstation running Windows XP.

As Figure 7 shows, the current Dell Precision M4400 notebook running Windows 7 completed the below tasks over 250 seconds (over 4 minutes) faster than did the previous-generation Dell Precision 390 desktop workstation running Windows XP. For 100 users, this translates to over 7 hours moving to the current Dell Precision M4400 notebook running Windows 7.

Application responsiveness tasks	Previous-generation Dell Precision 390 desktop running Windows XP	Median current Dell Precision M4400 notebook running Windows 7	Time saved with upgrading to current Dell Precision M4400 notebook
Opening local Word document	6.29	3.18	3.11
Opening local Excel spreadsheet	2.84	1.87	0.97
Opening local PowerPoint deck	1.53	1.04	0.49
Opening Word document over network connection	6.39	3.50	2.89
Opening Excel spreadsheet over network connection	2.84	2.20	0.64
Opening PowerPoint deck over network connection	1.47	1.29	0.18
Installing PNY USB stick	8.90	2.78	6.12
Installing Kingston USB stick	10.28	2.63	7.65
Re-inserting PNY USB stick	2.15	1.77	0.38
Re-inserting Kingston USB Stick	1.81	1.24	0.57
Copying files locally	14.52	4.03	10.49
Copying files to a USB stick	287.33	281.98	5.35
Copying files from a USB stick	35.14	38.34	-3.20
Ripping a CD using Windows Media Player – Disc #1	382.10	286.04	96.06
Ripping a CD using Windows Media Player – Disc #2	438.66	313.05	125.61
Total	**1,202.25**	**944.94**	**257.31**

Figure 7: Application and system responsiveness, in seconds. Lower numbers are better.

As Figure 8 shows, the current Dell Precision M6500 notebook running Windows 7 completed the below tasks over 307 seconds (over 5 minutes) faster than did the previous-generation Dell Precision 390 desktop workstation running Windows XP. For 100 users, this translates over 8.5 hours saved moving to the current Dell Precision M6500 notebook running Windows 7.

Application responsiveness tasks	Previous-generation Dell Precision 390 desktop running Windows XP	Median current Dell Precision M6500 notebook running Windows 7	Time saved with upgrading to current Dell Precision M6500 notebook
Opening local Word document	6.29	3.43	2.86
Opening local Excel spreadsheet	2.84	1.67	1.17
Opening local PowerPoint deck	1.53	1.56	-0.03
Opening Word document over network connection	6.39	2.87	3.52
Opening Excel spreadsheet over network connection	2.84	2.31	0.53
Opening PowerPoint deck over network connection	1.47	1.64	-0.17
Installing PNY USB stick	8.90	4.30	4.60
Installing Kingston USB stick	10.28	1.77	8.51
Re-inserting PNY USB stick	2.15	2.26	-0.11
Re-inserting Kingston USB Stick	1.81	1.18	0.63
Copying files locally	14.52	13.04	1.48
Copying files to a USB stick	287.33	312.65	-25.32
Copying files from a USB stick	35.14	33.05	2.09
Ripping a CD using Windows Media Player – Disc #1	382.10	245.08	137.02
Ripping a CD using Windows Media Player – Disc #2	438.66	267.93	170.73
Total	**1,202.25**	**894.74**	**307.51**

Figure 8: Application and system responsiveness, in seconds. Lower numbers are better.

Test methodology

In this section, we provide the methodology for four sets of tests: SYSmark 2007 Preview v.1.06, MobileMark 2007 v.1.06, system responsiveness, and application responsiveness. For the application responsiveness and system responsiveness tests, we ran each test three times, taking the median of the three runs.

Measuring performance with BAPCo SYSmark 2007 Preview v1.06

Setting up the test

1. Reset the system to the base test image.
2. Disable the User Account Control.
    a. Click Start→Control Panel.
    b. At the User Accounts and Family Safety settings screen, click Add or remove user account.
    c. At the User Account Control screen, click Continue.
    d. Click Go to the main User Accounts page.
    e. At the Make changes to your user account screen, click Turn User Account Control on or off.
    f. At the User Account Control screen, click Continue.
    g. Uncheck Use User Account Control to help protect your computer, and click OK.
    h. At the You must restart your computer to apply these changes screen, click Restart Now.
3. Purchase and install SYSmark 2007 Preview v1.05 from https://www.bapcostore.com/store/product.php?productid=16165&cat=251&page=1.

4. At the Welcome to InstallShield Wizard screen, click Next.
5. At the License Agreement screen, select I accept the terms in the License Agreement, and click Next.
6. At the Choose Destination Location screen, click Next.
7. At the Ready to Install the Program screen, click Install.
8. When the installation is complete, click Finish.

Running the test

1. Launch SYSmark 2007 Preview by double-clicking the desktop icon.
2. Click Run.
3. Select Official Run, choose 3 Iterations, check the box beside run conditioning run, and enter a name for that run.
4. When the benchmark completes and the main SYSmark 2007 Preview menu appears, click Save FDR to create a report.

Record the results for each iteration.

Measuring battery life with BAPCo MobileMark 2007 v.1.06

Preparing to measure battery life with MobileMark 2007 v.1.06

We conditioned the battery prior to testing. To do so, we performed two complete drains of the battery, starting from a battery at 100 percent charge. To expedite the draining process, we ran the MobileMark 2007 Productivity 2007 test until the battery completely discharged. We recorded the room temperature at the beginning of each official run.

Antivirus software conflicts

MobileMark 2007 is not compatible with any virus-scanning software, so we uninstalled any such software that was present on the notebook PCs before we installed the benchmark.

Pre-installed software conflicts

MobileMark 2007 installs the following applications, which its test scripts employ:

- Adobe Photoshop 6.0.1
- InterVideo WinDVD 6.0
- Macromedia Flash 5.0
- Microsoft Excel 2002
- Microsoft Outlook 2002
- Microsoft PowerPoint 2002
- Microsoft Word 2002
- Netscape Communicator 6.01
- Network Associates McAfee VirusScan 5.13
- WinZip Computing WinZip 8.0

If any of these applications are already on the system under test, they will cause problems with the benchmark due to software conflicts. To avoid any such issues, before we installed the benchmark, we uninstalled all conflicting pre-installed software applications, including different versions of any of the programs MobileMark 2007 uses.

Installing MobileMark 2007 v.1.06

1. Reset the notebook to the base image using Symantec's Ghost product.
2. Turn off the wireless network adapter by using the external toggle switch.
3. Insert the MobileMark 2007 Install DVD in the notebook PC's DVD drive.
4. At the Welcome screen, click Next.
5. Accept the license agreement, and click Next.
6. At the Ready to Install the Program screen, click Install.
7. Run the BAPCo Auto-configuration tool, v.1.3.2, to set the power options.
   a. Insert the Auto-configuration tool in the notebook PC's DVD drive.

b. Double-click BAPCo_AutoConfig.exe.
c. Type `M` to choose MobileMark 2007.
d. Type `3` to choose the changes that produce the best possible scores, as follows:
    1. Set Critical battery alarm to 0%.
    2. Set Low battery alarm to 0%.
    3. Disable screen saver.
    4. Stop and disable Windows Update.
    5. Disable desktop cleanup wizard.
    6. Disable Windows Security Center warnings.
    7. Disable Windows Firewall.
    8. Disable incoming Remote Desktop connections.
    9. Disable Windows Error Reporting to Microsoft.
    10. Disable Windows Defender.

Displaying brightness and power settings

Because the brightness of a notebook's display affects its battery life, BAPCo required that, before we tested with MobileMark 2007, we made sure the brightness of the notebook's monitor was greater than or equal to 60 nits on a completely white screen while the notebook was unplugged and running on battery power. The measurement follows the standards from the Video Electronics Standards Association (www.vesa.org/Standards/summary/2001_6a.htm).

We complied with this standard for all the tests we ran by setting each notebook PC's brightness as close to 60 nits as we could without going below that brightness level. We used the following procedure, which assumes we began with the notebook plugged into the power supply, to meet this requirement before we started each test:

1. To create a completely blank white screen, open Microsoft Paint by clicking Start→All Programs→Accessories→Paint.
2. Open the Attributes by pressing Ctrl+E.
3. Enter dimensions that are larger than the current screen resolution. For example, if the screen resolution is 1,280 x 800, enter 1,600 for Width and 1,200 for Height.
4. Click OK.
5. Press Ctrl+F to view the bitmap image and render the screen completely white.
6. Wait 45 minutes to allow the screen to warm.
7. Unplug the notebook from the power supply, and measure the display's brightness using a luminance meter in the center of the screen. (We use the Gossen Mavolux5032C.)
8. If the reading is below or significantly greater than 60 nits, use the notebook's keyboard screen-brightness-adjustment keys to bring the display as close to 60 nits as possible, then retest.
9. Allow the notebook to run on battery power for 10 minutes, re-measure the display, and adjust the brightness up or down as necessary.
10. Verify that the notebook saved the brightness setting by plugging in the system, unplugging it, and taking another reading. If the notebook did not save this setting, use its power-management application(s) to set the brightness appropriately, and save that setting.

Conditioning the battery

1. Plug the AC power adapter into the notebook PC, and completely charge the battery.
2. Install MobileMark 2007 v1.05, following the steps we outlined in the Installing MobileMark 2007 section.
3. Double-click the MobileMark 2007 icon on the desktop.
4. Highlight the Productivity 2007 item in the left panel.
5. Enter a name for this test in the Project Name field at the top-right panel, and click Next Step.
6. If MobileMark lists no problems or warnings, click Next Step. If it does list any problems or warnings, close MobileMark 2007, and correct the problem(s) before proceeding.
7. Unplug the AC power adapter. The Productivity 2007 test begins immediately.
8. The test is complete when the notebook PC has fully depleted its battery and is no longer operational when running on battery power.
9. Repeat steps 3 through 8 for the second conditioning run and for all official runs.
10. Plug the AC power adapter into the notebook PC, and completely charge the battery.

Measuring battery life with MobileMark 2007 v.1.06

We performed the following steps to run the MobileMark Productivity 2007 benchmark:

1. Double-click the MobileMark 2007 icon on the desktop.
2. Select the Productivity 2007 test by highlighting it in the left panel.
3. Enter a name for this test in the Project Name field in the top right panel, and click Next Step.
4. If MobileMark lists no problems or warnings, click Next. If it does list any problems or warnings, close MobileMark 2007, and correct the problem(s) before proceeding.
5. Unplug the AC power adapter. The test begins immediately.
6. The Productivity 2007 test is complete when the notebook PC has fully depleted its battery and is no longer operational when running on battery power.

We executed the Productivity 2007 test three times on each system configuration and used the average result of each set of three as the representative score for that test.

1. Configure the notebook with the standard battery and the BAPCo recommendations for running MobileMark 2007.
2. Execute the Productivity 2007 test three times in this configuration.
3. Configure the notebook with the maximum-sized battery available at the time of purchase and the BAPCo recommendations for running MobileMark 2007.
4. Execute the Productivity 2007 test three times in this configuration.

Getting the MobileMark 2007 results

After each MobileMark test completed, we plugged the AC power adapter into the notebook PC and turned on the system. MobileMark 2007 started automatically after the system booted, analyzed the test scores, and opened the Test Results Viewer with the results from the last test.

To submit these results to BAPCo, we saved the test results directory. To do so, we performed the following steps:

1. Browse to the C:\ Program Files\BAPCo\MobileMark 2007\results directory.
   a. Select My Computer.
   b. Select Local Disk (C:).
   c. Select the Program Files directory.
   d. Select the BAPCo directory.
   e. Select the MobileMark2007 directory.
   f. Select the results directory. (Note: The name of the directory for the Productivity 2007 results is the name you gave the test in Step 6 of the MobileMark Productivity 2007 process.)

Measuring performance with MAXON CINEBENCH R10

Setting up the test

1. Reset the system to the base test image.
2. Download CINEBENCHR10.zip from http://www.maxon.net/en/downloads/downloads/cinebench.html.
3. Right-click the CINEBENCH ZIP file, and choose Extract All.
4. Click Extract.

Running the test

1. Launch CineBench R10 by double-clicking the CINEBENCH R10.exe file in the CINEBENCH R10 folder.
2. Enter the MHz frequency of the processor in the MHz (real freq.) field.
3. Enter a name in the Tester field.
4. Click the Start all tests button.
5. When the picture finishes rendering in multi-processor mode, save the results.
   a. Click the `To Clipboard` button.
   b. Launch notepad and paste the results into an empty notepad document.
   c. Save the results in the format system_run_N.txt.
6. Close CineBench R10.
7. Reboot the system.

8. Repeat steps 1 through 7 two times, and report the median.

Measuring performance with SPECviewperf 10

Setting up the test

1. Reset the system to the base test image.
2. Download SPECViewperf10.exe from http://www.spec.org/gwpg/downloadindex.html.
3. Double-click the SPECViewperf10 executable file to install the benchmark.
4. Click OK at the Language Selection dialog box.
5. Click Next at the Setup dialog box.
6. Click Next to accept the default installation directory.
7. Click Next to install.
8. update the config.txt file located in the C:\Program Files\SPECopc\SPECViewperf\viewperf\viewperf10.0 directory with the hardware configuration details of the test system.

Running the test

1. Reboot the system.
2. Launch SPECviewperf® 10: Start→Programs\All Programs→SPECopc→ SPECViewperf10.0 Multithread\Viewperf 2 Threads.
3. Close the results viewer at the conclusion of the run, and save a copy of the ViewperfMTsummary.html file.
4. Repeat steps 1 through 3 two times, and report the median.

Application responsiveness tests

Setting up the test workload

We used a specific test workload for four of five test cases (see Appendix B). Before running the test on a system image, we copied the workload to both the system itself and to a target system. While the workload is the same for four test cases, we gave the workload folder a unique name for each test case. We describe the initial setup of the test workload below. When applicable, we include steps for renaming the test workload in the setup for the specific test case.

Setting up the test workload on the test system

1. Reset the system to the base image.
2. Copy the Corpus workload folder to the Documents folder (Windows 7, Windows Vista) or the My Documents folder (Windows XP). Note: For simplicity, we will refer to this folder only as the Documents folder throughout this report.

Setting up the test workload on the target system

1. Copy the Corpus folder to the target system.
2. Rename the Corpus folder to `openfiles2`.

Opening Microsoft Office files (local HDD)

This test requires a stopwatch. We used the following test documents:

- TwoCities.docx 496 KB (507,904 bytes)
- Supply Requisition Form2.xlsx 820 KB (839,680 bytes)
- Welcome!.pptx 352 KB (360,448 bytes)

Setting up the test

1. Rename the Corpus folder to `openfiles1`.
2. Reboot the system.
3. Allow the system to idle for 3 minutes before running the test.

Running the test

1. Open the openfiles1 folder.
2. Click once on the TwoCities.docx file to highlight the file.
3. Simultaneously press Enter to open the test document and start the timer.

4. Stop the timer when the document appears.
5. Close Word.
6. Wait 30 seconds.
7. Click the Supply Requisition Form2.xlsx file once to highlight the file.
8. Simultaneously press Enter to open the test spreadsheet and start the timer.
9. Stop the timer when the workbook appears.
10. Close Excel.
11. Wait 30 seconds.
12. Click the Welcome!.pptx file once to highlight the file.
13. Simultaneously press Enter to open the test slide deck and start the timer.
14. Stop the timer when the first slide appears.
15. Close PowerPoint.
16. Repeat steps 2 through 15 two times, and report the median.
17. Close the openfiles1 folder.

Opening Microsoft Office files (over a network using a wired connection)

This test requires a target system on the network and a stopwatch. We used the following test documents:

- TwoCities.docx 496 KB (507,904 bytes)
- Supply Requisition Form2.xlsx 820 KB (839,680 bytes)
- Welcome!.pptx 352 KB (360,448 bytes)

Note: We installed Windows 7 Ultimate (32-bit) on the target system.

Setting up the test

1. Disable the wireless network connection on the test system.
2. Verify the wired network connection works properly.
    a. Open the openfiles2 folder on the test system.
    b. Close the folder.
3. Reboot the system.
4. Allow the system to idle for 3 minutes before running the test.

Running the test

1. Browse to the target system on the network using the test system's wired network connection, and open the openfiles2 folder.
2. Click the TwoCities.docx file once to highlight the file.
3. Simultaneously press Enter to open the test document and start the timer.
4. Stop the timer when the document appears.
5. Close Word.
6. Wait 30 seconds.
7. Click the Supply Requisition Form2.xlsx file once to highlight the file.
8. Simultaneously press Enter to open the test spreadsheet and start the timer.
9. Stop the timer when the workbook appears.
10. Close Excel.
11. Wait 30 seconds.
12. Click the Welcome!.pptx file once to highlight the file.
13. Simultaneously press Enter to open the test slide deck and start the timer.
14. Stop the timer when the first slide appears.
15. Close PowerPoint.
16. Repeat steps 2 through 15 two times, and report the median.
17. Close the openfiles2 folder.

Installing/re-inserting a USB drive

This test requires a stopwatch, a 1GB PNY USB stick, and a 1GB Kingston Traveler USB stick.

Setting up the test

1. Copy the test.mp3 file from the Corpus folder to the PNY USB stick.
2. Copy the test.mp3 file from the Corpus folder to the Kingston USB stick.
3. Copy the 32-bit decay.exe device driver removal tool to the hard drive (e.g., C:\decay.exe).
4. Run the decay.exe tool.
    a. Open an administrative command prompt.
        i. In Windows 7 and Windows Vista, click the Start button, type `cmd` in Start Search, and press Ctrl+Shift+Enter.
        ii. In Windows XP, click the Start button, click Run, type `cmd` and press Enter.
    b. Type `cd C:\` and press Enter.
    c. Type `decay.exe -l` and press Enter to view drivers installed by the two USB sticks.
    d. Type `decay.exe` and press Enter to run the tool and remove these device drivers.
    e. Type `decay.exe -l` and press Enter to confirm that the tool removed the USB device drivers.
5. Reboot the system.
6. Allow the system to idle for 3 minutes before running the test.

Running the test

1. Simultaneously insert the PNY USB stick into USB port #1 and start the timer.
2. Stop the timer when the AutoPlay menu for the USB stick appears on the desktop.
3. After the USB device driver software installs successfully, remove the USB stick using the Safely Remove Hardware tool.
4. Wait 30 seconds.
5. Simultaneously insert the PNY USB stick into USB port #2 and start the timer.
6. Stop the timer when the AutoPlay menu for the USB stick appears on the desktop.
7. Remove the USB stick using the Safely Remove Hardware tool.
8. Wait 30 seconds.
9. Simultaneously insert the Kingston USB stick into USB port #1 and start the timer.
10. Stop the timer when the AutoPlay menu for the USB stick appears on the desktop.
11. After the USB device driver software installs successfully, remove the USB stick using the Safely Remove Hardware tool.
12. Wait 30 seconds.
13. Simultaneously insert the Kingston USB stick into USB port #2 and start the timer.
14. Stop the timer when the AutoPlay menu for the USB stick appears on the desktop.
15. Remove the USB stick using the Safely Remove Hardware tool.
16. Run the decay.exe tool.
    a. Open an administrative command prompt.
        i. In Windows 7 and Windows Vista, click the Start button, type `cmd` in Start Search, and press Ctrl+Shift+Enter.
        ii. In Windows XP, click the Start button, click Run, type `cmd` and press Enter.
    b. Type `cd C:\` and press Enter.
    c. Type `decay.exe -l` and press Enter to view drivers installed by the two USB sticks.
    d. Type `decay.exe` and press Enter to run the tool and remove these device drivers.
    e. Type `decay.exe -l` and press Enter to confirm that the tool removed the USB device drivers.
17. Repeat steps 1 through 16 two times, and report the median.

Copying files

This test requires a stopwatch, a 1GB Kingston Traveler USB stick, and the following workload:

- Corpus: 426 MB (446,697,472 bytes)

Setting up the test

1. Rename the openfiles1 folder to `copyfileslocal1`.
2. Right-click the copyfileslocal1 folder, and select Copy.
3. Right-click the Document folder, and select Paste.
4. Rename the new folder to `copyfilesusb1`.

5. Create two new output folders in the in Documents folder (e.g., `testouta1` and `testoutb1`).
6. Insert the USB stick, and create one output folder on the USB drive (e.g., E:\`testusbout1`).
7. Remove the USB stick using the Safely Remove Hardware tool.
8. Reboot the system.
9. Allow the system to idle for 3 minutes before running the test.

Running the test

1. Open the copyfileslocal1 workload folder in the Documents folder.
2. Press Ctrl+A to select all files, right-click the files, and select Copy.
3. Open the testouta1 folder.
4. Right-click the testouta1 folder.
5. Simultaneously select Paste and start the timer.
6. Stop the timer when the copy operation is complete, as indicated by the disappearance of the copy status bar.
7. Delete the testouta1 folder from the Documents folder and empty the Recycle Bin.
8. Insert the USB stick into a USB port.
9. Open the copyfilesusb1 workload folder in the Documents folder.
10. Press Ctrl+A to select all files, right-click the files, and select Copy.
11. Open the testusbout1 folder on the USB stick.
12. Right-click the testusbout1 folder.
13. Simultaneously select Paste and start the timer.
14. Stop the timer when the copy operation is complete, as indicated by the disappearance of the copy status bar.
15. Rename the testusbout1 folder to `testusbin1` and remove the USB stick using the Safely Remove Hardware tool.
16. Re-insert the USB stick into the same USB port.
17. Open the testusbin1 folder.
18. Press Ctrl+A to select all files, right-click the files, and select Copy.
19. Open the testoutb1 folder in the Documents folder.
20. Right-click the testoutb1 folder.
21. Simultaneously select Paste and start the timer.
22. Stop the timer when the copy operation is complete, as indicated by the disappearance of the copy status bar.
23. Repeat steps 1 through 22 two more times, using the following steps to set up the test for each subsequent run.
    a. Delete the testusbin1 folder from the USB stick.
    b. Create a new output folder with a different unique name on the USB drive (e.g., E:\`testusbout2`).
    c. Remove the USB stick using the Safely Remove Hardware tool.
    d. Delete the testoutb1 folder from the Documents folder and empty the Recycle Bin.
    e. Create two new output folders with unique names in the Documents folder (e.g., `testouta2` and `testoutb2`).
    f. Rename both the copyfileslocal1 and copyfilesusb2 workloads to unique names (e.g., `copyfileslocal2` and `copyfilesusb2`).

Appendix A – Detailed system configuration information

Figures 9 through 11 present each test system and the details of its configuration.

Current notebook systems	Dell Precision M4400	Dell Precision M6500
General		
Processor and OS kernel: (physical, core, logical) / (UP, MP)	1P,2C,2L / MP	1P,4C,8L / MP
System power management policy XP	Dell Mobile Battery Methodology	Dell Mobile Battery Methodology
System power management policy Vista	Dell Mobile Battery Methodology	Dell Mobile Battery Methodology
System power management policy Windows 7	Dell Mobile Battery Methodology	Dell Mobile Battery Methodology
Processor power-saving option	EIST	EIST
System dimensions (length x width x height)	12.1” x 10.1” x 1.3”	15.4" x 11" x 1.5"
System weight	6 lbs. 11 oz.	8 lbs. 10 oz.
CPU		
Vendor	Intel	Intel
Name	Core 2 Duo	Core i7
Model number	P8600	820QM
Stepping	R0	B1
Socket type and number of pins	Socket P 478	Socket PGA998
Core frequency (GHz)	2.4	1.73
Front-side bus frequency	1,066	2,400 MHz QPI Link
L1 cache	32 KB + 32 KB (per core)	32 KB + 32 KB (per core)
L2 cache	3 MB	1 MB (256 KB per core)
L3 cache	NA	8 MB
Platform		
Vendor	Dell	Dell
Motherboard model number	0R906R	04KMC9
Motherboard chipset	Intel PM45	Intel PM55
Motherboard revision number	07	11
System/motherboard serial number	HXVTZK1	JT07WL1
Bios name and version	Dell A15 (07/31/2009)	Dell A00 (10/06/2009)
BIOS settings	Default	Default
Memory module(s)		
Vendor and model number	Nanya Technology NT2GT64U8HD0BN-AD	Samsung M471B5673EH1-CH9
Type	PC2-6400	PC3-10600
Speed (MHz)	800	1,333
Speed running in the system (MHz)	800	1,333
Timing/Latency (tCL-tRCD-tRP-tRASmin)	6-6-6-18	9-9-9-24
Size (MB)	4,096	4,096
Number of memory module(s)	2	2
Channel (single/dual)	Dual	Dual

Current notebook systems	Dell Precision M4400	Dell Precision M6500
Hard disk		
Vendor and model number	Seagate ST9160412ASG	Western Digital WD3200BJKT-75F4T0
Size	160 GB	320 GB
Buffer Size	16 MB	16 MB
RPM	7200	7200
Type	SATA 3.0 Gb/s	SATA 3.0 Gb/s
Controller	Intel 82801IM (ICH9-M)	Intel PCHM
Driver XP	Intel 8.8.0.1009 (02/11/2009)	Intel 8.9.4.1004 (10/13/2009)
Driver Vista	Intel 8.8.0.1009 (02/11/2009)	Intel 8.9.4.1004 (10/13/2009)
Driver Windows 7	Intel 8.9.2.1002 (08/07/2009)	Intel 8.9.4.1004 (10/13/2009)
Operating system 1		
Name	Windows XP Professional	Windows XP Professional
Build number	2600	2600
Service Pack	3	3
File system	NTFS	NTFS
Kernel	ACPI Multiprocessor PC	ACPI Multiprocessor PC
Language	English	English
Microsoft DirectX version	9.0c	9.0c
Operating system 2		
Name	Microsoft Windows Vista Ultimate	Microsoft Windows Vista Ultimate
Build number	6002	6002
Service Pack	2	2
File system	NTFS	NTFS
Kernel	ACPI x86-based PC	ACPI x86-based PC
Language	English	English
Microsoft DirectX version	10	10
Operating system 3		
Name	Microsoft Windows 7 Ultimate	Microsoft Windows 7 Ultimate
Build number	7600	7600
Service Pack	NA	NA
File system	NTFS	NTFS
Kernel	ACPI x86-based PC	ACPI x86-based PC
Language	English	English
Microsoft DirectX version	11	11
Graphics		
Vendor and model number	NVIDIA Quadro FX 770M	NVIDIA Quadro FX 3800M
Type	Discrete	Discrete
Chipset	Quadro FX 770M	Quadro FX 3800M
BIOS version	62.94.8f.0.1	62.92.A2.00.07
Total available graphics memory (MB)	2,041	2,554
Dedicated video memory (MB)	512	1,024
System video memory (MB)	0	0
Shared system memory (MB)	1,529	1,530
Resolution	1,024 x 768 x 32 bit	1,024 x 768 x 32 bit
Driver XP	NVIDIA 6.14.11.7076 (03/27/2009)	NVIDIA 6.14.11.8737 (09/17/2009)
Driver Vista	NVIDIA 7.15.11.7950 (02/06/2009)	NVIDIA 6.14.11.8737 (09/17/2009)
Driver Windows 7	NVIDIA 8.15.11.8621 (06/16/2009)	NVIDIA 6.14.11.8737 (09/17/2009)

Current notebook systems	Dell Precision M4400	Dell Precision M6500
Sound card/subsystem		
Vendor and model number	IDT High Definition Audio CODEC	IDT High Definition Audio CODEC
Driver XP	IDT 5.10.0.6159 (02/23/2009)	IDT 5.10.0.6255 (11/06/2009)
Driver Vista	IDT 6.10.0.6227 (07/31/2009)	IDT 6.10.0.6229 (08/05/2009)
Driver Windows 7	IDT 6.10.0.6227 (07/31/2009)	IDT 6.10.0.6229 (08/05/2009)
Ethernet		
Vendor and model number	Intel 82567LM Gigabit	Broadcom NetXtreme 57xx Gigabit
Driver XP	Intel 9.50.14.2 (04/04/2008)	Broadcom 12.2.0.2 (05/29/2009)
Driver Vista	Intel 9.50.14.2 (04/04/2008)	Broadcom 12.2.0.3 (05/28/2009)
Driver Windows 7	Intel 10.0.6.0 (06/12/2009)	Broadcom 12.2.0.3 (05/28/2009)
Wireless		
Vendor and model number	Intel 5100 AGN	Dell Wireless 1397 WLAN Mini-Card
Driver XP	Intel 12.4.3.9 (05/28/2009)	Broadcom 5.10.79.14 (02/20/2009)
Driver Vista	Intel 12.4.3.9 (05/28/2009)	Broadcom 5.10.79.14 (02/20/2009)
Driver Windows 7	Intel 12.4.1.11 (05/14/2009)	Broadcom 5.30.21.0 (07/07/2009)
Bluetooth		
Vendor and model number	NA	Dell Wireless 365 Bluetooth
Driver XP	NA	Broadcom 5.5.0.7600 (07/08/2009)
Driver Vista	NA	Broadcom 6.2.0.9000 (06/15/2009)
Driver Windows 7	NA	Broadcom 6.2.0.9000 (06/15/2009)
Optical drive(s)		
Vendor and model number	Matshita UJ862A	LG GS20N
Type	DVD-RW	DVD-RW
Interface	SATA	SATA
Dual/Single layer	Dual	Dual
USB ports		
Number	4	4
Type	USB 2.0	USB 2.0
Other	eSATA/USB 2.0, media card reader	eSATA/USB 2.0, media card reader
IEEE 1394 ports		
Number	1 (4-pin)	1 (6-pin)
Power Adapter		
Type	Dell DA130PE1-00 130W	Dell GA240PE1-00 210W
Monitor		
LCD type	WXGA	WUXGA RGB LED
Screen size	15.4”	17"
Refresh rate (Hz)	60	60
Battery		
Type	Dell KY265 lithium-ion	Dell 8M039
Size (length x width x height)	8.10" x 3" x .80"	10" x 3.4" x .70"
Rated capacity	7,700 mAh / 11.1V (85Wh)	8,100 mAh / 11.1V (90Wh)
Weight	1 lb.1 oz.	1 lb. 3 oz.

Figure 9: Detailed system configuration for the current Dell Precision notebooks.

Previous-generation notebook system	Dell Latitude D620
General	
Processor and OS kernel: (physical, core, logical) / (UP, MP)	1P,2C,2L / MP
System power management policy Windows XP	Dell Mobile Battery Methodology
Processor power-saving option	EIST
System dimensions (length x width x height)	13.25" x 9.5" x 1.5"
System weight	5 lbs. 5 oz.
CPU	
Vendor	Intel
Name	Core Duo
Model number	T2400
Stepping	C0
Socket type and number of pins	Socket 479
Core frequency (GHz)	1.83
Front-side bus frequency	667
L1 cache	32 KB + 32 KB (per core)
L2 cache (MB)	2
Platform	
Vendor	Dell
Motherboard model number	0TD761
Motherboard chipset	Intel i945GM
Motherboard revision number	03
System/motherboard serial number	BX49XB1
BIOS name and version	Dell A10 (05/16/2008)
BIOS settings	Default
Memory module(s)	
Vendor and model number	Hyundai HYMP512S64BP8-Y5
Type	PC2-5300
Speed (MHz)	667
Speed running in the system (MHz)	667
Timing/Latency (tCL-tRCD-tRP-tRASmin)	5-5-5-15
Size (MB)	2,048
Number of memory module(s)	2
Channel (single/dual)	Dual
Hard disk	
Vendor and model number	Toshiba MK4034GSX
Size (GB)	40
Buffer size (MB)	8
RPM	5,400
Type	SATA 1.5 Gb/s
Controller	Intel 82801GHM (ICH7-M/U)
Driver Windows XP	Intel 7.0.0.1020 (05/23/2005)
Operating system	
Name	Windows XP Professional
Build number	2600
Service pack	3
File system	NTFS
Kernel	ACPI Multiprocessor PC

Previous-generation notebook system	Dell Latitude D620
Language	English
Microsoft DirectX version	9.0c
Graphics	
Vendor and model number	Mobile Intel GMA 950
Type	Integrated
Chipset	Mobile Intel 945GM Express Chipset
BIOS version	1343
Total available graphics memory (MB)	224
Resolution	1,024 x 768 x 32 bit
Driver Windows XP	Intel 6.14.10.4814 (03/30/2007)
Sound card/subsystem	
Vendor and model number	SigmaTel High Definition Audio CODEC
Driver Windows XP	SigmaTel 5.10.0.5515 (05/10/2007)
Ethernet	
Vendor and model number	Broadcom NetXtreme 57xx Gigabit
Driver Windows XP	Broadcom 8.48.0.0 (10/31/2005)
Wireless	
Vendor and model number	Dell Wireless 1490 Dual Band WLAN Mini-Card
Driver Windows XP	Broadcom 5.10.79.14 (02/20/2009)
Modem	
Vendor and model number	Conexant HDA D110 MDC V.92
Driver Windows XP	Conexant 7.38.0.0 (12/02/2005)
Optical drive(s)	
Vendor and model number	Optiarc AD-5540A
Type	DVD-RW
Interface	ATA
Dual/single layer	Single
USB ports	
Number	4
Type	USB 2.0
Other	NA
IEEE 1394 ports	
Number	NA
Power adapter	
Type	Dell DA90PS1-00 90W
Monitor	
LCD type	WXGA
Screen size	14.1"
Refresh rate (Hz)	60
Battery	
Type	Dell PC764 lithium-ion
Size (length x width x height)	7.25" x 2.6" x .9"
Rated capacity	5050 mAh / 11.1V (56Wh)
Weight (oz)	12

Figure 10: Detailed system configuration for the current Dell Latitude D620 notebook.

Previous-generation desktop workstation system	Dell Precision 390
General	
Processor and OS kernel: (physical, core, logical) / (UP, MP)	1P,2C,2L / MP
System power management policy Windows XP	Dell Desktop Power Methodology
Processor power-saving option	EIST
CPU	
Vendor	Intel
Name	Pentium D
Model number	950
Stepping	B1
Socket type and number of pins	LGA 775
Core frequency (GHz)	3.40
Front-side bus frequency (MHz)	800 MHz
L1 cache	16 KB + 12 KB (per core)
L2 cache	4 MB (2 MB per core)
Platform	
Vendor	Dell
Motherboard model number	0MY510
Motherboard chipset	Intel i975X
Motherboard revision number	A0
System/motherboard serial number	PS030835
BIOS name and version	Dell 2.6.0 (05/22/08)
BIOS settings	Default
Memory module(s)	
Vendor and model number	Infineon 72T64000HU3SA
Type	PC2-5300
Speed (MHz)	667
Speed running in the system (MHz)	667
Timing/Latency (tCL-tRCD-tRP-tRASmin)	5-5-5-15
Size (MB)	512 MB
Number of memory module(s)	1
Channel (single/dual)	Single
Hard disk	
Vendor and model number	Samsung HD080HJ/P
Size (GB)	80 GB
Buffer size (MB)	8 MB
RPM	7,200
Type	SATA 3.0 Gb/s
Controller	Intel 82801GB (ICH7/R)
Driver Windows XP	Intel 7.6.1.1002 (07/26/2007)
Operation system Windows XP	
Name	Windows XP Professional
Build number	2600
Service pack	3
File system	NTFS
Kernel	ACPI Multiprocessor PC
Language	English
Microsoft DirectX version	9.0c

Previous-generation desktop workstation system	Dell Precision 390
Graphics	
Vendor and model number	NVIDIA Quadro NVS 285
Type	Discrete
Chipset	Quadro NVS 285
BIOS version	5.44.2.21.9
Total available graphics memory (MB)	64
Resolution	1280 x 1024 x 32 bit
Driver Windows XP	NVIDIA 6.14.11.8267 (05/12/2009)
Sound card/subsystem	
Vendor and model number	SigmaTel High Definition Audio CODEC
Driver Windows XP	SigmaTel 5.10.0.4991 (03/20/2006)
Ethernet	
Vendor and model number	Broadcom NetXtreme 57xx Gigabit
Driver Windows XP	Broadcom 10.39.0.0 (06/05/2007)
Optical drive(s)	
Vendor and model number	Lite-On LTN486S
Type	CD-ROM
Interface	IDE
Dual/Single layer	Single
USB ports	
Number	7
Type	USB 2.0
Other	NA
IEEE 1394 ports	
Number	NA
Monitor	
LCD type	ViewSonic Optiquest Q7
Screen size	17"
Refresh rate (Hz)	60 Hz

Figure 11: Detailed system configuration for the previous-generation Dell Precision 390 desktop workstation.

Appendix B – Detailed results

Figures 12 through 14 present the detailed test results for the systems.

Previous-generation systems	Dell Latitude D620	Dell Precision 390
Operating system	**XP Professional SP3**	**XP Professional SP3**
Application responsiveness (Lower is better)		
Test case 1a: Opening files using common office applications (local HDD)		
Word document appears - median	00:04.28	00:06.29
Excel workbook appears - median	00:02.34	00:02.84
PowerPoint slide appears - median	00:02.25	00:01.53
Test case 1b: Opening files using common office applications (wired)		
Word document appears - median	00:04.15	00:06.39
Excel workbook appears - median	00:02.54	00:02.84
PowerPoint slide appears - median	00:02.39	00:01.47
Test case 2: Installing/re-inserting a USB drive		
Installing PNY USB stick - median	00:10.22	00:08.90
Installing Kingston USB stick - median	00:10.57	00:10.28
Re-inserting PNY USB stick - median	00:02.08	00:02.15
Re-inserting Kingston USB stick - median	00:01.98	00:01.81
Test case 3: Copying files locally		
Copying files to another location on the C: drive - median	00:26.84	00:14.52
Copying files from the hard drive to a USB stick - median	05:01.08	04:47.33
Copying files from a USB stick to the hard drive - median	00:34.88	00:35.14
Test case 4: Ripping a CD using system default software		
Disc #1 ripped - median	03:51.93	06:22.10
Disc #2 ripped - median	04:13.43	07:18.66
Industry standard benchmarks		
BAPCo SYSmark 2007 Preview v1.06 (Higher is better)		
SYSmark 2007 Preview v1.06 Rating	84.00	75.00
BAPCo MobileMark 2007 1.06 Battery Life Rating (Higher is better)		
Battery Life - median	207.00	NA
Performance Qualification - median	161.00	NA
MAXON CINEBENCH R10 (Higher is better)		
CINEBENCH – Single CPU - median	NA	1,865.00
CINEBENCH – Multiple CPU - median	NA	3,473.00
SPECviewperf 10 (Higher is better)		
3dsmax-04 - Median	NA	6.43
catia-02 - Median	NA	7.25
maya-02 - Median	NA	12.75
proe-04 - Median	NA	6.64
sw-01 - Median	NA	6.40
tcvis-01 - Median	NA	1.26

Figure 12: Detailed test results for the previous-generation notebook systems.

Current-generation notebook system	Dell Precision M4400	Dell Precision M4400	Dell Precision M4400
Operating system	**Windows XP Professional SP3**	**Windows Vista Ultimate SP2**	**Windows 7 Ultimate**
Application responsiveness (Lower is better)			
Test case 1a: Opening files using common office applications (local HDD)			
Word document appears - median	00:02.69	00:03.18	00:03.18
Excel workbook appears - median	00:01.50	00:01.77	00:01.87
PowerPoint slide appears - median	00:00.78	00:01.15	00:01.04
Test case 1b: Opening files using common office applications (wired)			
Word document appears - median	00:02.87	00:03.37	00:03.50
Excel workbook appears - median	00:01.80	00:02.02	00:02.20
PowerPoint slide appears - median	00:01.23	00:01.28	00:01.29
Test case 2: Installing/re-inserting a USB drive			
Installing PNY USB stick - median	00:09.31	00:04.90	00:02.78
Installing Kingston USB stick - median	00:09.51	00:02.68	00:02.63
Re-inserting PNY USB stick - median	00:01.82	00:02.03	00:01.77
Re-inserting Kingston USB stick - median	00:01.39	00:01.44	00:01.24
Test case 3: Copying files locally			
Copying files to another location on the C: drive - median	00:24.48	00:05.17	00:04.03
Copying files from the hard drive to a USB stick - median	04:35.19	04:39.71	04:41.98
Copying files from a USB stick to the hard drive - median	00:35.37	00:37.98	00:38.34
Test case 4: Ripping a CD using system default software			
Disc #1 ripped - median	04:44.88	04:45.17	04:46.04
Disc #2 ripped - median	05:13.76	05:09.63	05:13.05
Industry standard benchmarks			
BAPCo SYSmark 2007 Preview v1.06 (Higher is better)			
SYSmark 2007 Preview v1.06 Rating	134	144	138
BAPCo MobileMark 2007 1.06 Battery Life Rating (Higher is better)			
Battery Life - median	307	295	274
Performance Qualification - median	243	234	226
MAXON CINEBENCH R10 (Higher is better)			
CINEBENCH – Single CPU - median	2,679	2,597	2,680
CINEBENCH – Multiple CPU - median	4,997	4,955	4,967
SPECviewperf 10 (Higher is better)			
3dsmax-04 - Median	45.64	48.17	66.12
catia-02 - Median	50.57	54.67	68.50
maya-02 - Median	45.02	92.25	95.10
proe-04 - Median	38.13	44.28	61.01
sw-01 - Median	58.83	73.46	87.32
tcvis-01 - Median	17.42	19.30	18.87

Figure 13: Detailed test results for the current-generation Dell Precision M4400 notebook system.

Current-generation notebook system	Dell Precision M6500	Dell Precision M6500	Dell Precision M6500
Operating system	**Windows XP Professional SP3**	**Windows Vista Ultimate SP2**	**Windows 7 Ultimate**
Application responsiveness (Lower is better)			
Test case 1a: Opening files using common office applications (local HDD)			
Word document appears - median	00:02.61	00:03.19	00:03.43
Excel workbook appears - median	00:02.21	00:02.29	00:01.67
PowerPoint slide appears - median	00:01.47	00:01.79	00:01.56
Test case 1b: Opening files using common office applications (wired)			
Word document appears - median	00:03.03	00:03.19	00:02.87
Excel workbook appears - median	00:02.08	00:02.33	00:02.31
PowerPoint slide appears - median	00:25.63	00:01.37	00:01.64
Test case 2: Installing/re-inserting a USB drive			
Installing PNY USB stick - median	00:10.02	00:03.01	00:04.30
Installing Kingston USB stick - median	00:09.63	00:02.78	00:01.77
Re-inserting PNY USB stick - median	00:02.38	00:01.61	00:02.26
Re-inserting Kingston USB stick - median	00:01.96	00:01.65	00:01.18
Test case 3: Copying files locally			
SPECviewperf 10 (Higher is better)	00:08.56	00:06.61	00:13.04
Copying files from the hard drive to a USB stick - median	05:30.20	05:01.53	05:12.65
Copying files from a USB stick to the hard drive - median	00:38.07	00:34.04	00:33.05
Test case 4: Ripping a CD using system default software			
Disc #1 ripped - median	03:49.37	04:00.27	04:05.08
Disc #2 ripped - median	04:21.09	04:20.35	04:27.93
Industry standard benchmarks			
BAPCo SYSmark 2007 Preview v1.06 (Higher is better)			
SYSmark 2007 Preview v1.06 Rating	165	178	172
BAPCo MobileMark 2007 1.06 Battery Life Rating (Higher is better)			
Battery Life - median	189	171	185
Performance Qualification - median	267	275	265
MAXON CINEBENCH R10 (Higher is better)			
CINEBENCH – Single CPU - median	3,364	3,165	3,336
CINEBENCH – Multiple CPU - median	8,509	8,420	8,457
3dsmax-04 - Median	74.82	76.82	75.84
catia-02 - Median	71.30	77.91	77.51
maya-02 - Median	110.74	105.40	96.11
proe-04 - Median	67.44	72.09	72.49
sw-01 - Median	89.32	99.34	101.39
tcvis-01 - Median	32.28	38.71	38.64

Figure 14: Detailed test results for the current-generation Dell Precision M6500 notebook system.

Appendix C – Corpus contents

The 426MB (446,697,762 bytes) test workload included the following files:

11/6/2005	7:14 PM	1,161,163	19th Century Asylum.JPG
9/3/2007	6:10 PM	14,239	2008 calendar10 (2).xlsx
9/3/2007	6:10 PM	14,239	2008 calendar10.xlsx
9/3/2007	11:35 PM	617,349	3boat-Jerome10 (2).docx
9/12/2007	12:57 AM	675,901	3boat-Jerome10 (2).pdf
9/12/2007	12:57 AM	1,071,399	3boat-Jerome10 (2).xps
9/3/2007	11:35 PM	617,349	3boat-Jerome10.docx
9/12/2007	12:57 AM	675,901	3boat-Jerome10.pdf
9/12/2007	12:57 AM	1,071,399	3boat-Jerome10.xps
9/9/2007	1:32 AM	11,947	Adjustable Meeting Agenda template1 (2).xlsx
9/9/2007	1:32 AM	11,947	Adjustable Meeting Agenda template1.xlsx
9/9/2007	2:01 AM	197,621	Adventure Works (2).pptx
9/9/2007	2:01 AM	197,621	Adventure Works.pptx
9/9/2007	1:18 AM	11,953	Agenda1 (2).xlsx
9/9/2007	1:18 AM	11,953	Agenda1.xlsx
9/3/2007	6:14 PM	11,968	Agenda10 (2).xlsx
9/3/2007	6:14 PM	11,968	Agenda10.xlsx
9/3/2007	5:58 PM	774,350	alice-carroll10 (2).docx
9/12/2007	12:56 AM	518,539	alice-carroll10 (2).pdf
9/12/2007	12:56 AM	629,597	alice-carroll10 (2).xps
9/3/2007	5:58 PM	774,350	alice-carroll10.docx
9/12/2007	12:56 AM	518,539	alice-carroll10.pdf
9/12/2007	12:56 AM	629,597	alice-carroll10.xps
7/28/2003	7:56 AM	70,144	Analysis (2).xls
7/28/2003	7:56 AM	70,144	Analysis.xls
9/16/2005	8:39 PM	1,074,183	Ancient christian stone marking Patrick's well.JPG
8/26/2005	5:12 PM	1,041,140	Art Gallery.JPG
9/10/2007	1:16 AM	26,694	Automation (2).rar
9/10/2007	1:16 AM	26,694	Automation.rar
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12/19/2003	11:42 PM	16,896	bank24.xls
12/19/2003	11:42 PM	16,384	bank24temp (2).xls
12/19/2003	11:42 PM	16,384	bank24temp.xls
9/9/2007	1:13 AM	19,547	Bidder comparison worksheet and process1 (2).xlsx
9/9/2007	1:13 AM	19,547	Bidder comparison worksheet and process1.xlsx
9/3/2007	6:15 PM	24,480	Breakeven analysis10 (2).xlsx
9/3/2007	6:15 PM	24,480	Breakeven analysis10.xlsx
9/9/2005	4:22 PM	1,236,485	Bust of Collins.JPG
12/19/2003	11:42 PM	27,136	capbudget (2).xls
12/19/2003	11:42 PM	27,136	capbudget.xls
12/19/2003	11:42 PM	26,624	capbudgettemp (2).xls
12/19/2003	11:42 PM	26,624	capbudgettemp.xls
9/16/2005	8:38 PM	1,135,462	Christ Church 1038 AD.JPG
9/9/2007	12:16 AM	118,051	ChristmasCarol (2).docx

9/12/2007	12:56 AM	287,538	ChristmasCarol (2).pdf
9/12/2007	12:55 AM	507,684	ChristmasCarol (2).xps
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9/12/2007	12:56 AM	287,538	ChristmasCarol.pdf
9/12/2007	12:55 AM	507,684	ChristmasCarol.xps
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9/9/2005	4:21 PM	1,160,640	Church Altar-All Mosaic!.JPG
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12/19/2003	11:42 PM	24,064	ciscoexpo.xls
12/19/2003	11:43 PM	15,872	ciscoexpotemp (2).xls
12/19/2003	11:43 PM	15,872	ciscoexpotemp.xls
9/9/2005	4:21 PM	1,049,553	Clonakilty (2).JPG
9/9/2005	4:21 PM	1,049,553	Clonakilty.JPG
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9/9/2007	2:03 AM	107,778	Communicating Bad News.pptx
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9/9/2007	2:23 AM	142,036	Company Handbook.pptx
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9/9/2007	2:24 AM	137,524	Company Meeting Title.pptx
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9/9/2007	2:18 AM	165,587	Company Name4 (2).pptx
9/9/2007	2:17 AM	165,587	Company Name4.pptx
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9/11/2007	12:31 AM	1,468,621	conferenceC.pptx
9/11/2007	12:32 AM	1,468,505	conferenceD (2).pptx
9/11/2007	12:32 AM	1,468,505	conferenceD.pptx
9/11/2007	12:33 AM	1,468,329	conferenceE (2).pptx
9/11/2007	12:32 AM	1,468,329	conferenceE.pptx
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9/12/2007	12:53 AM	1,826,512	ConnecticutYankee (2).xps
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9/12/2007	12:53 AM	1,826,512	ConnecticutYankee.xps
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9/3/2007	6:34 PM	1,342,932	copperfield10.docx
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9/8/2007	8:41 PM	1,260,859	DavidCopperfield.docx

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9/11/2007	1:31 AM	1,383,386	DavidCopperfieldB.docx
9/11/2007	1:32 AM	1,424,127	DavidCopperfieldC.docx
9/11/2007	1:33 AM	1,446,638	DavidCopperfieldD.docx
9/11/2007	1:34 AM	1,482,655	DavidCopperfieldE.docx
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9/3/2007	6:12 PM	20,173	Forecasting report10.xlsx
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9/12/2007	2:48 AM	1,464,587	HuckFinn.xps
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9/11/2007	12:34 AM	1,812,476	Introducing PowerPoint 2007A.pptx
9/11/2007	12:34 AM	1,812,480	Introducing PowerPoint 2007B.pptx
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9/11/2007	12:35 AM	1,812,488	Introducing PowerPoint 2007D.pptx
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9/11/2007	1:52 AM	1,019,386	LittleDorritD.docx
9/11/2007	1:52 AM	1,018,168	LittleDorritE.docx
11/6/2005	7:13 PM	1,109,309	Looking East.JPG
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10/1/2005	8:19 PM	1,345,552	Lovely foliage.JPG
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9/9/2007	2:44 AM	1,280,593	MartinChuzzlewit.docx
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9/9/2007	4:07 PM	1,280,678	MartinChuzzlewit.rar

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9/11/2007	1:53 AM	1,020,651	MartinChuzzlewitB.docx
9/11/2007	1:54 AM	1,017,247	MartinChuzzlewitC.docx
9/11/2007	1:54 AM	1,023,558	MartinChuzzlewitD.docx
9/11/2007	1:55 AM	1,020,227	MartinChuzzlewitE.docx
9/3/2007	11:47 PM	614,882	Math - Dudeney10.docx
9/11/2007	12:42 AM	800,966	Microsoft© Office A.pptx
9/11/2007	12:43 AM	800,998	Microsoft© Office B.pptx
9/11/2007	12:43 AM	800,994	Microsoft© Office C.pptx
9/11/2007	12:44 AM	800,974	Microsoft© Office D.pptx
9/11/2007	12:44 AM	801,013	Microsoft© Office E.pptx
9/9/2007	10:59 AM	1,025,163	Microsoft© Office.pptx
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9/9/2007	1:06 PM	416,471	Microsoft© Office11.pptx
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9/9/2007	1:01 PM	839,836	Microsoft© Office16.pptx
9/9/2007	12:57 PM	1,561,643	Microsoft© Office17.pptx
9/11/2007	12:53 AM	1,561,260	Microsoft© Office17A.pptx
9/11/2007	12:54 AM	1,561,582	Microsoft© Office17B.pptx
9/11/2007	12:54 AM	1,561,564	Microsoft© Office17C.pptx
9/11/2007	12:55 AM	1,561,657	Microsoft© Office17D.pptx
9/11/2007	12:55 AM	1,561,617	Microsoft© Office17E.pptx
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9/9/2007	1:21 PM	712,466	Microsoft© Office2.pptx
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9/9/2007	1:00 PM	949,022	Microsoft© Office21.pptx
9/9/2007	1:02 PM	981,825	Microsoft© Office22.pptx
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9/11/2007	1:23 AM	1,200,641	Microsoft© Office23A.pptx
9/11/2007	1:24 AM	1,200,610	Microsoft© Office23B.pptx
9/11/2007	1:24 AM	1,200,622	Microsoft© Office23C.pptx
9/11/2007	1:25 AM	1,200,706	Microsoft© Office23D.pptx
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9/9/2007	1:03 PM	1,013,396	Microsoft© Office24.pptx
9/9/2007	1:06 PM	962,131	Microsoft© Office25.pptm
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9/11/2007	12:28 AM	958,094	Microsoft© Office25A.pptx
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9/11/2007	12:28 AM	958,053	Microsoft© Office25C.pptx
9/11/2007	12:29 AM	958,053	Microsoft© Office25D.pptx
9/11/2007	12:29 AM	958,086	Microsoft© Office25E.pptx

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9/11/2007	12:23 AM	1,141,351	Microsoft© Office26B.pptx
9/11/2007	12:23 AM	1,141,370	Microsoft© Office26C.pptx
9/11/2007	12:23 AM	1,141,363	Microsoft© Office26D.pptx
9/11/2007	12:24 AM	1,141,355	Microsoft© Office26E.pptx
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9/11/2007	1:26 AM	1,220,268	Microsoft© Office31C.pptx
9/11/2007	1:27 AM	1,220,272	Microsoft© Office31D.pptx
9/11/2007	1:27 AM	1,220,296	Microsoft© Office31E.pptx
9/11/2007	1:27 AM	1,220,319	Microsoft© Office31F.pptx
9/9/2007	1:13 PM	583,427	Microsoft© Office32.pptx
9/9/2007	1:16 PM	391,371	Microsoft© Office33.pptx
9/9/2007	1:21 PM	449,972	Microsoft© Office34.pptx
9/9/2007	1:22 PM	322,092	Microsoft© Office35.pptx
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9/9/2007	1:28 PM	472,584	Microsoft© Office37.pptx
9/9/2007	1:29 PM	230,500	Microsoft© Office38.pptx
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9/11/2007	12:46 AM	1,571,475	Microsoft© Office3C.pptx
9/11/2007	12:46 AM	1,571,476	Microsoft© Office3D.pptx
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9/9/2007	1:33 PM	393,466	Microsoft© Office42.pptx
9/9/2007	1:34 PM	355,726	Microsoft© Office43.pptx
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9/9/2007	2:24 PM	695,362	Microsoft© Office50.pptx
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9/9/2007	4:12 PM	350,753	Microsoft© Office53.pptx
9/9/2007	4:13 PM	976,384	Microsoft© Office54.ppt

9/9/2007	4:14 PM	314,015	Microsoft© Office54.pptx
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9/11/2007	12:25 AM	554,610	Microsoft© Office54B.pptx
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9/11/2007	12:26 AM	554,611	Microsoft© Office54D.pptx
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9/9/2007	5:49 PM	573,438	Microsoft© Office56.pptx
9/9/2007	8:49 PM	573,428	Microsoft© Office57.pptx
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9/9/2007	11:16 AM	498,382	Microsoft© Office6.pptx
9/9/2007	9:22 PM	569,541	Microsoft© Office60.pptx
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9/9/2007	9:26 PM	383,562	Microsoft© Office62.pptx
9/9/2007	9:26 PM	356,419	Microsoft© Office63.pptx
9/9/2007	9:27 PM	656,644	Microsoft© Office64.pptx
9/9/2007	9:28 PM	580,065	Microsoft© Office65.pptx
9/9/2007	9:31 PM	453,163	Microsoft© Office66.pptx
9/9/2007	9:31 PM	388,797	Microsoft© Office67.pptx
9/9/2007	9:32 PM	409,618	Microsoft© Office68.pptx
9/9/2007	9:34 PM	618,184	Microsoft© Office69.pptx
9/9/2007	12:43 PM	1,696,999	Microsoft© Office7.pptx
9/9/2007	9:35 PM	304,286	Microsoft© Office70.pptx
9/9/2007	9:36 PM	451,891	Microsoft© Office71.pptx
9/9/2007	9:37 PM	258,210	Microsoft© Office72.pptx
9/9/2007	9:37 PM	473,998	Microsoft© Office73.pptx
9/9/2007	9:38 PM	547,570	Microsoft© Office74.pptx
9/9/2007	9:39 PM	587,596	Microsoft© Office75.pptx
9/9/2007	9:40 PM	247,814	Microsoft© Office76.pptx
9/9/2007	9:40 PM	386,262	Microsoft© Office77.pptx
9/9/2007	9:41 PM	435,885	Microsoft© Office78.pptx
9/9/2007	9:42 PM	260,788	Microsoft© Office79.pptx
9/11/2007	12:48 AM	1,672,311	Microsoft© Office7A.pptx
9/11/2007	12:48 AM	1,672,332	Microsoft© Office7B.pptx
9/11/2007	12:49 AM	1,672,329	Microsoft© Office7C.pptx
9/11/2007	12:49 AM	1,672,323	Microsoft© Office7D.pptx
9/11/2007	12:50 AM	1,672,355	Microsoft© Office7E.pptx
9/9/2007	12:51 PM	1,464,915	Microsoft© Office8.pptx
9/9/2007	9:44 PM	349,939	Microsoft© Office80.pptx
9/9/2007	9:44 PM	298,069	Microsoft© Office81.pptx
9/9/2007	9:57 PM	635,975	Microsoft© Office82.pptx
9/9/2007	10:00 PM	451,882	Microsoft© Office83.pptx
9/12/2007	12:00 AM	1,465,093	Microsoft© Office8A.pptx
9/12/2007	12:38 AM	1,465,103	Microsoft© Office8B.pptx
9/12/2007	12:38 AM	1,465,058	Microsoft© Office8C.pptx
9/12/2007	12:39 AM	1,465,089	Microsoft© Office8D.pptx
9/12/2007	12:39 AM	1,465,168	Microsoft© Office8E.pptx
9/9/2007	12:51 PM	803,809	Microsoft© Office9.pptx
9/9/2007	4:07 PM	702,034	Microsoft© Office9.rar

9/9/2007	1:21 AM	69,239	MONDAY.docx
10/1/2005	8:20 PM	1,292,403	Mountain stream.JPG
10/1/2005	8:18 PM	1,263,306	Muckross House.JPG
9/9/2007	2:33 AM	161,083	MysteriousStranger.docx
12/19/2003	11:42 PM	92,160	NBA01_02.xls
12/19/2003	11:42 PM	136,704	nba02_03.xls
12/19/2003	11:42 PM	29,184	nfl01.xls
12/19/2003	11:42 PM	68,096	NFL2002ratings.xls
12/19/2003	11:42 PM	216,576	nfl2002temp.xls
9/9/2007	3:55 PM	1,250,320	NicholasNickleby.docx
12/19/2003	11:42 PM	59,392	normalsim.xls
12/19/2003	11:43 PM	27,136	normalsimtemp.xls
9/9/2007	2:30 AM	828,326	OldCuriosityShop.docx
9/9/2007	4:07 PM	827,783	OldCuriosityShop.rar
9/9/2007	2:15 AM	625,145	OliverTwist.docx
9/3/2007	11:23 PM	417,426	Organization Chart10.pptx
9/9/2007	1:40 AM	1,230,430	OurMutualFriend.docx
9/16/2005	8:39 PM	1,045,606	Out to the valley of Cashel.JPG
7/28/2003	7:56 AM	26,624	Pacific Guitar Sales.xls
9/3/2007	6:36 PM	201,756	Pan10.docx
9/9/2007	12:42 AM	1,195,872	PickWickPapers.docx
9/9/2007	1:59 AM	177,375	Pitchbook.pptx
9/3/2007	6:18 PM	357,410	Plant10.pptx
12/19/2003	11:42 PM	15,872	pmt.xls
12/19/2003	11:42 PM	13,824	pmttemp.xls
9/3/2007	5:48 PM	14,454,815	PPTfiles10.rar
9/9/2007	10:57 AM	42,444	Presentation1.pptx
9/3/2007	6:19 PM	136,034	Presentation10.pptx
9/9/2007	9:50 PM	317,684	presentation2.pptx
9/9/2007	9:51 PM	74,504	presentation3.pptx
9/9/2007	9:51 PM	134,559	Presentation4.pptx
9/9/2007	9:52 PM	53,903	Presentation5.pptx
12/19/2003	11:42 PM	16,384	pressdata.xls
9/9/2007	12:32 AM	277,232	PrinceandPauper.docx
9/3/2007	5:33 PM	144,246	Process diagram10.pptx
12/19/2003	11:42 PM	28,160	prodmix.xls
12/19/2003	11:42 PM	26,112	prodmixtemp.xls
9/9/2007	2:11 AM	87,243	Product Name.pptx
9/9/2007	2:21 AM	300,846	Product Name5.pptx
9/9/2007	2:00 AM	283,493	Product Name].pptx
9/3/2007	6:10 PM	18,598	Project compare10.xlsx
9/9/2007	2:07 AM	206,208	Project Overview.pptx
9/9/2007	1:53 AM	11,852	Purchase order with sales tax1.xlsx
9/9/2007	1:49 AM	16,460	Purchase order(2)1.xlsx
9/9/2007	1:50 AM	15,854	Purchase order(3)1.xlsx
9/9/2007	1:51 AM	15,734	Purchase order(4)1.xlsx
9/9/2007	1:48 AM	21,972	PURCHASE ORDER.docx
9/3/2007	6:16 PM	15,819	Purchase order10.xlsx
12/19/2003	11:42 PM	13,824	PV.xls
12/19/2003	11:42 PM	13,824	PVtemp.xls

9/9/2007	2:13 AM	75,931	Quarterly Results and.pptx
12/19/2003	11:42 PM	41,984	randdemo.xls
12/19/2003	11:43 PM	27,136	randdemotemp.xls
9/9/2007	2:18 AM	76,882	Recommending a Strategy.pptx
12/19/2003	11:42 PM	17,920	ReorderPoint_Backorder.xls
12/19/2003	11:42 PM	17,920	ReorderPoint_Lostsales.xls
9/9/2007	2:23 AM	122,701	Reporting Progress or Status.pptx
9/9/2007	2:06 AM	161,158	Return on Investment.pptx
10/1/2005	8:19 PM	1,288,715	Ring of Kerry.JPG
11/5/2005	6:39 PM	1,070,887	River Lee rising.JPG
11/6/2005	7:13 PM	1,109,309	River Rising.JPG
9/9/2007	2:27 PM	632,401	RoughingIt.docx
9/11/2007	12:03 AM	45,764	s1-s10.rar
12/19/2003	11:42 PM	13,824	s10_1.xls
12/19/2003	11:42 PM	13,824	s10_10.xls
12/19/2003	11:42 PM	13,824	s10_2.xls
12/19/2003	11:42 PM	15,872	s10_3.xls
12/19/2003	11:42 PM	13,824	s10_4.xls
12/19/2003	11:42 PM	13,824	s10_5.xls
12/19/2003	11:42 PM	14,336	s10_6.xls
12/19/2003	11:42 PM	97,280	S10_7.xls
12/19/2003	11:42 PM	97,280	s10_8.xls
12/19/2003	11:42 PM	13,824	s10_9.xls
9/11/2007	12:04 AM	10,898	s24.rar
12/19/2003	11:42 PM	13,824	s24_1.xls
12/19/2003	11:42 PM	13,824	s24_2.xls
12/19/2003	11:42 PM	13,824	s24_3.xls
12/19/2003	11:42 PM	13,824	s24_4.xls
12/19/2003	11:42 PM	13,824	s24_5.xls
12/19/2003	11:42 PM	13,824	s24_6.xls
12/19/2003	11:42 PM	13,824	s24_7.xls
9/11/2007	12:04 AM	11,542	s25.zip
12/19/2003	11:42 PM	14,848	s25_1.xls
12/19/2003	11:42 PM	15,360	s25_2.xls
12/19/2003	11:42 PM	14,848	s25_3.xls
12/19/2003	11:42 PM	14,848	s25_4.xls
12/19/2003	11:42 PM	15,360	s25_5.xls
9/11/2007	12:05 AM	12,276	s26.zip
12/19/2003	11:42 PM	16,384	s26_1.xls
12/19/2003	11:42 PM	16,896	s26_2.xls
12/19/2003	11:42 PM	19,968	s26_3.xls
12/19/2003	11:42 PM	15,360	s26_4.xls
12/19/2003	11:42 PM	16,896	s27_1.xls
12/19/2003	11:42 PM	17,920	s27_2.xls
12/19/2003	11:42 PM	16,896	s27_3.xls
12/19/2003	11:42 PM	15,360	s27_4.xls
12/19/2003	11:42 PM	29,696	s28_1.xls
12/19/2003	11:42 PM	17,408	s28_2.xls
12/19/2003	11:42 PM	23,552	s29_1.xls
12/19/2003	11:42 PM	23,552	s29_2.xls

12/19/2003	11:42 PM	16,384	s29_3.xls
12/19/2003	11:42 PM	26,112	s29_4.xls
12/19/2003	11:42 PM	15,872	s29_5.xls
12/19/2003	11:42 PM	264,192	S30_1.xls
12/19/2003	11:42 PM	259,584	s30_2.xls
12/19/2003	11:42 PM	56,832	s30_3.xls
12/19/2003	11:42 PM	13,824	s30_4.xls
12/19/2003	11:42 PM	13,824	s30_5.xls
12/19/2003	11:42 PM	22,016	S42problems1thru4.xls
12/19/2003	11:42 PM	21,504	S42problems1thru5.xls
9/11/2007	12:06 AM	149,171	s58.zip
12/19/2003	11:42 PM	404,480	s58_1.xls
12/19/2003	11:42 PM	207,360	s58_2.xls
12/19/2003	11:42 PM	17,408	s66_1.xls
12/19/2003	11:42 PM	16,896	s66_2.xls
12/19/2003	11:42 PM	13,824	s66_3.xls
9/3/2007	6:20 PM	30,418	Sales effectiveness.xlsx
9/9/2007	1:52 AM	15,474	Sales order1.xlsx
9/9/2007	2:20 AM	164,904	Sales proposal.pptx
9/9/2007	2:17 AM	54,168	Sales Training.pptx
9/9/2007	9:58 PM	54,185	Sales Training2.pptx
9/9/2007	10:02 PM	48,145	Sales Training3.pptx
1/24/2008	10:26 AM	109	Search
1/24/2008	12:21 PM	0	SearchCorpus.txt
9/9/2007	2:12 AM	68,502	Selling a Product or Service.pptx
12/19/2003	11:42 PM	18,944	ServiceLevelReorder.xls
9/9/2007	1:46 AM	12,139	Software Inventory1.xlsx
9/9/2007	9:55 PM	68,590	Staff Training.pptx
7/28/2003	7:56 AM	150,016	Staff.xls
7/28/2003	7:56 AM	142,336	Staff2.xls
9/3/2007	5:31 PM	139,054	Status charts10.pptx
11/6/2005	7:15 PM	1,744,412	Stone path.JPG
9/11/2007	12:15 AM	1,741,369	Stone path.zip
11/6/2005	7:15 PM	1,752,998	Stone staircase.JPG
9/11/2007	12:18 AM	837,626	Supply Requisition Form2.xlsx
9/11/2007	12:18 AM	838,128	Supply Requisition Form3.xlsx
9/11/2007	12:19 AM	837,886	Supply Requisition Form4.xlsx
9/11/2007	12:20 AM	837,884	Supply Requisition Form5.xlsx
1/24/2008	10:20 AM	1,463,296	Test methodology.doc
1/16/2000	5:48 PM	3,941,355	test.mp3
9/9/2007	9:56 PM	90,037	Title of Training Presentation.pptx
9/9/2007	10:01 PM	58,226	Title of Training Presentation2.pptx
9/9/2007	12:29 AM	281,104	TomSawyer.docx
9/9/2007	12:27 AM	124,045	TomSawyerAbroad.docx
9/9/2007	10:03 PM	172,469	Training Presentation.pptx
12/19/2003	11:42 PM	18,944	transport.xls
12/19/2003	11:42 PM	16,384	transporttemp.xls
9/9/2007	1:14 AM	25,007	Treasury analysis worksheet1.xlsx
7/28/2003	7:56 AM	27,136	TreeOrders.xls
9/9/2007	12:24 AM	504,476	TwoCities.docx

12/19/2003	11:42 PM	177,664	valentine.xls
12/19/2003	11:43 PM	13,824	valentinetemp.xls
9/9/2007	1:58 AM	357,867	Welcome!.pptx
9/9/2007	2:21 AM	121,946	Welcome!2.pptx
9/9/2007	10:56 AM	174,213	Widescreen Presentation.pptx
9/3/2007	6:13 PM	38,404	worker hours10.xlsx

About Principled Technologies

We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.
When the assessment is complete, we know how to present the results to a broad range of target audiences. We provide our clients with the materials they need, from market-focused data to use in their own collateral to custom sales aids, such as test reports, performance assessments, and white papers. Every document reflects the results of our trusted independent analysis.

We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help you assess how it will fare against its competition, its performance, whether it's ready to go to market, and its quality and reliability.

Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.

Principled Technologies, Inc.
1007 Slater Road, Suite 250
Durham, NC 27703
www.principledtechnologies.com
info@principledtechnologies.com