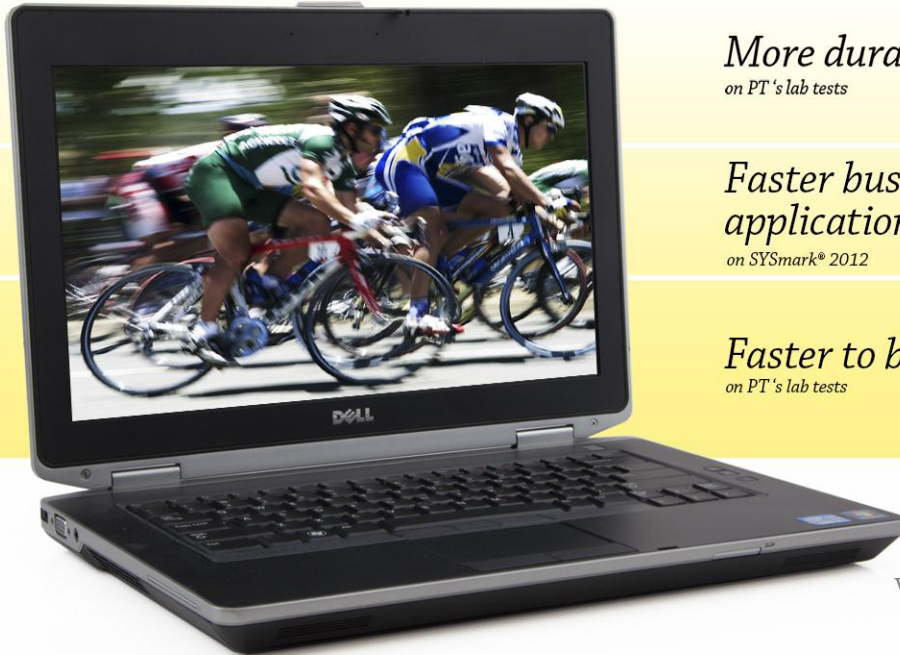# PERFORMANCE COMPARISON: DELL LATITUDE E6430 VS. LENOVO THINKPAD T430

Dell™ Latitude™ E6430 notebook

More durable
on PT's lab tests

Faster business application performance
on SYSmark® 2012

Faster to boot and shutdown
on PT's lab tests

versus Lenovo® ThinkPad® T430

When it comes to your employees' notebook computers, every second counts. A sluggish system not only affects productivity, but is a source of annoyance as well. Durability also matters. That's why it's essential to select a model with fast performance and the ability to keep running and keep your data safe even if it takes the occasional tumble.

Principled Technologies tested two notebook systems in our labs, the Dell Latitude E6430 and the Lenovo ThinkPad T430. We found that the Latitude outperformed the ThinkPad in four areas: business application performance, boot time, shutdown time, and durability. These advantages can save your workers time, making the Dell Latitude E6430 an excellent choice.

TIME IS OF THE ESSENCE

Notebook system response time, performance, and durability are all extremely important to today's worker. Having to wait for your system to perform everyday tasks and risking downtime and data loss should your notebook accidentally fall—neither of these are acceptable. We performed a range of tests to compare the Dell Latitude E6430 and the Lenovo ThinkPadT430 in these areas. We conducted each test three times and present the results for the median run of each test.

Durability

When workers are on the go, accidents sometimes happen. Not all notebooks do an equally good job of surviving a fall. To see how our two test systems compared, we attempted to drop each three times from a height of 29 inches (73.7 cm), or about desk-high. After each drop, we used using HD Tune Pro 5.00 and HDDScan 3.3, tests that assess hard drive damage, to measure how well the system had protected its data. Once a system failed to boot, we conducted no further testing on that system.

After the first drop, the data on the Lenovo ThinkPad T430 was intact, with no bad or damaged blocks. After the second drop, our hard drive testing revealed that 33.8 percent of the blocks had suffered damage and there were 116,504 bad blocks. At this point the operating system had ceased to function, so we did not conduct a third drop.

The Dell Latitude E6430 stood up to our tests, however, working fine after three drops with no discernible damage to its hard drive. Figure 1 summarizes the results of our hard drive scans.

Drop testing – physical data protection		
	Dell Latitude E6430	Lenovo ThinkPad T430
Drop 1		
HD Tune Pro 5.00 damaged blocks percentage	0%	0%
HDDScan 3.3 bad blocks	0	0
Drop 2		
HD Tune Pro 5.00 damaged blocks percentage	0%	33.8%
HDDScan 3.3 bad blocks	0	116,504
Drop 3		
HD Tune Pro 5.00 damaged blocks percentage	0%	NA
HDDScan 3.3 bad blocks	0	NA

Figure 1: The results of our physical data protection drop test for the notebooks.

Business application performance

Because performance is so important to today's worker, we used the BapCo SYSmark® 2012 benchmark to rate the performance of the notebooks, and found that the Dell Latitude E6430 was up to completing the tasks workers require.

BapCo SYSmark® 2012 measures system performance for a number of common tasks including office productivity and media creation. Figure 2 shows the median

results of our SYSmark 2012 tests. The Dell Latitude E6430 achieved a higher SYSmark2012 Overall Performance Rating than the Lenovo ThinkPad T430.
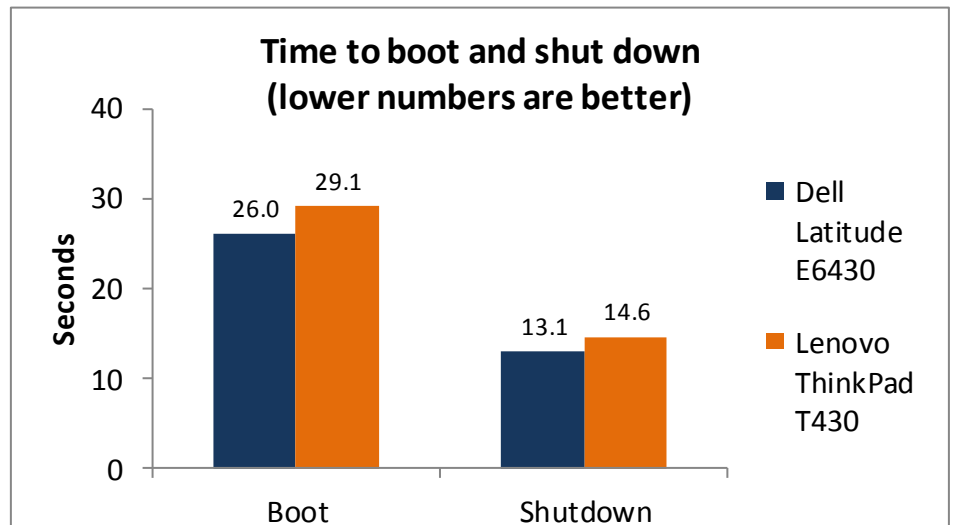
BAPCo SYSmark 2012		
	Dell Latitude E6430	**Lenovo ThinkPad T430**
SYSmark 2012 Overall Performance Rating	**144**	**141**
SYSmark 2012 – Office Productivity	136	133
SYSmark 2012 – Media Creation	146	146
SYSmark 2012 – Web Development	133	129
SYSmark 2012 – Data/Financial Analysis	164	156
SYSmark 2012 – 3D Modeling	134	137
SYSmark 2012 – System Management	155	147

Figure 2: Median scores for the BAPCo SYSmark 2012 benchmark. Higher numbers are better.

Boot and shutdown

The less time users spend waiting for their notebooks to boot up or shut down, the more time they have to be productive. Figure 3 shows the median results for our boot and shutdown tests. In our tests, the Dell Latitude E6430 took 10.6 percent less time to boot and 10.8 percent less time to shut down than the Lenovo ThinkPadT430.

Figure 3: The Dell Latitude E6430 took 10.6 percent less time to boot and 10.8 percent less time to shut down than the Lenovo ThinkPadT430.

Time to boot and shut down (lower numbers are better)

Boot — Dell Latitude E6430: 26.0, Lenovo ThinkPad T430: 29.1
Shutdown — Dell Latitude E6430: 13.1, Lenovo ThinkPad T430: 14.6

WHAT WE TESTED

In this section, we present a brief overview of what we tested. For detailed system configuration information, see Appendix A. For step-by-step details on how we tested, see Appendix B.

BAPCo SYSmark 2012

BAPCo SYSmark 2012 is an application-based benchmark that tests performance in the following office workload scenarios: office productivity, media creation, Web development, data/financial analysis, 3D modeling, and system management. SYSmark 2012 records the time the system takes to complete each individual operation in each scenario. For more information on this benchmark, see http://www.bapco.com/products/sysmark2012/.

IN CONCLUSION

Today's workers do not want their computers to keep them waiting and they certainly don't want to worry about having to replace a notebook that accidentally slips to the floor. Selecting notebooks that perform everyday tasks quickly and are extremely durable makes good business sense. In our tests, the Dell Latitude E6430 booted, shut down, and performed office workload scenarios more quickly than the Lenovo ThinkPad T430, and continued working while keeping data intact despite a series of drops. This makes it an excellent choice for your employees.

APPENDIX A – SYSTEM CONFIGURATION INFORMATION

Figure 4 provides detailed configuration information for the test systems.

System	Dell Latitude E6430	Lenovo ThinkPad T430
General		
Number of processor packages	1	1
Number of cores per processor	2	2
Number of hardware threads per core	2	2
System power management policy	Dell	Energy Saver
Processor power-saving option	Enhanced Intel® SpeedStep® Technology	Enhanced Intel SpeedStep Technology
System dimensions (length x width x height)	14-7/8" x 9-1/2" x 1-3/8" (37.8 cm x 24.1 cm x 3.5 cm)	13-3/8" x 9-1/8" x 1-3/8" (34.0 cm x 23.2 cm x 3.5 cm)
System weight	5 lbs. 4 oz. (2.38 kg)	4 lbs. 14 oz. (2.21 kg)
CPU		
Vendor	Intel	Intel
Name	Core™ i7	Core i7
Model number	3520M	3520M
Stepping	E1	E1
Socket type and number of pins	Socket 988B rPGA	Socket 988B rPGA
Core frequency (GHz)	2.90	2.90
L1 cache	32 KB + 32 KB (per core)	32 KB + 32 KB (per core)
L2 cache	512 KB (256 KB per core)	512 KB (256 KB per core)
L3 cache	4 MB	4 MB
Platform		
Vendor	Dell	Lenovo
Motherboard model number	0H3MT5	2342CTO
Motherboard chipset	Intel QM77	Intel QM77
BIOS name and version	Dell A02 (04/24/2012)	Lenovo G1ET41WW (1.16) (05/25/2012)
Memory module(s)		
Vendor and model number	Hyundai HMT351S6CFR8C-PB	Hyundai HMT351S6CFR8C-PB
Type	PC3-12800	PC3-12800
Speed (MHz)	1,600	1,600
Speed running in the system (MHz)	1,600	1,600
Timing/Latency (tCL-tRCD-tRP-tRASmin)	11-11-11-28	11-11-11-28
Size (MB)	4,096	4,096
Number of memory module(s)	2	2
Amount of RAM in system (GB)	8	8
Chip organization (single-sided/double-sided)	Double-sided	Double-sided
Channel (single/dual)	Dual	Dual

System	Dell Latitude E6430	Lenovo ThinkPad T430
Hard disk		
Vendor and model number	Seagate ST500LX003-1AC15G	Hitachi HTS725050A7E630
Number of disks in system	1	1
Size (GB)	500	500
Buffer size (MB)	32	32
RPM	7,200	7,200
Type	SATA 6.0 Gb/s	SATA 6.0 Gb/s
Controller	Intel Mobile Express Chipset SATA RAID Controller	Intel 7 Series Chipset Family SATA AHCI Controller
Driver	Intel 11.0.0.1032 (11/29/2011)	Intel 11.2.0.1006 (05/30/2012)
Operating system		
Name	Windows 7 Professional x64	Windows 7 Professional x64
Build number	7601	7601
Service Pack	1	1
File system	NTFS	NTFS
Kernel	ACPI x64-based PC	ACPI x64-based PC
Language	English	English
Microsoft DirectX version	DirectX 11	DirectX 11
Graphics card 1		
Vendor and model number	NVIDIA® NVS 5200M	NVIDIA NVS 5400M
Type	Discrete	Discrete
Chipset	NVS 5200M	NVS 5400M
BIOS version	70.8.a8.0.13	70.08.B7.01.00
Total available graphics memory (MB)	4,095	4,095
Dedicated video memory (MB)	1,024	1,024
System video memory (MB)	0	0
Shared system memory (MB)	3,071	3,071
Resolution	1,366 x 768 x 32-bit	1,366 x 768 x 32-bit
Driver	NVIDIA 8.17.12.9679 (05/10/2012)	NVIDIA 8.17.12.9688 (05/31/2012)
Sound card/subsystem		
Vendor and model number	IDT High Definition Audio	Realtek High Definition Audio
Driver	IDT 6.10.0.6324 (01/25/2011)	Realtek Semiconductor Corp. 6.0.1.6617 (04/17/2012)
Ethernet		
Vendor and model number	Intel 82579LM Gigabit	Intel 82579LM Gigabit
Driver	Intel 11.15.12.0 (11/30/2011)	Intel 11.15.16.0 (01/11/2012)
Wireless		
Vendor and model number	Intel Centrino® Ultimate-N 6300	Intel Centrino Ultimate-N 6300
Driver	Intel 15.1.1.1 (03/12/2012)	Intel 15.1.0.18 (02/20/2012)
Optical drive(s)		
Vendor and model number	Matshita UJ8B2	Optiarc AD-7740H
Type	DVD-RW	DVD-RW

System	Dell Latitude E6430	Lenovo ThinkPad T430
USB ports		
Number	4	4
Type	2 x USB 2.0, 2 x USB 3.0	2 x USB 2.0, 2 x USB 3.0
Other	Media card reader, HDMI, eSATA	Media card reader
IEEE 1394 ports		
Number	0	0
Monitor		
LCD type	HD LED WXGA	HD LED WXGA
Screen size	14" (35.6 cm)	14" (35.6 cm)
Refresh rate	60 Hz	60 Hz
Battery		
Type	Dell T54FJ	Lenovo 45N1005
Size (length x width x height)	8-1/4" x 2" x 13/16" (21.0 cm x 5.1 cm x 2.1 cm)	8-1/8" x 2" x 3/4" (20.6 cm x 5.1 cm x 1.9 cm)
Rated capacity	5400mAh / 11.1V (60Wh)	5200mAH / 10.8V (57Wh)
Weight	11 oz. (312 g)	11 oz. (312 g)

Figure 4: Configuration information for the systems we tested.

APPENDIX B - HOW WE TESTED

Measuring durability

This test measures the damage that the impact from a drop of 29 inches (73.7 cm) inflicts upon an open notebook running MAXON® CINEBENCH 11.5.

Setting up CINEBENCH R11.5
1. Download CINEBENCH 11.5 from http://www.maxon.net/downloads/cinebench.html.
2. Install CINEBENCH:
   a. Right-click the CINEBENCH ZIP file, and choose Extract All.
   b. In the Select a Destination and Extract Files window, click Browse, click Desktop, and click OK.
   c. Click Extract.

Running CINEBENCH 11.5
1. Launch CINEBENCH 11.5 by double-clicking the CINEBENCH 11.5.exe file in the CINEBENCH 11.5 folder.
2. Enter the MHz frequency of the processor in the MHz (real freq.) field.
3. Click Start all tests.

Conducting the drop test

We used a Lansmont PDT56ED Precision Drop Tester, with a landing area covered by commercial carpet. We opened the notebook so that the screen and keyboard formed a 120-degree angle, and then placed the notebook flat on the platen. Orienting the notebook in this way resulted in a flat drop. (Figure 5 shows our test setup.)

To allow us to scan the notebooks identically, we booted to a Hiren's BootCD and installed the hard disk scanning software to the Microsoft® Windows® 7 virtual machine's RAM disk. Running the scanning software from RAM, we scanned the hard disk with HD Tune Pro 5.00 and HDDScan for Windows 3.3, and recorded the number of bad sectors and blocks before and after the drop test. We also recorded any other physical defects, such as cracks or breaks in the display, as well as separated hinges or displaced screws, which the impact of the drop caused. We took still photographs of the notebooks before and after each drop. We dropped each notebook once, using this process:

1. Install MAXON CINEBENCH 11.5 onto the test notebook, as outlined above.
2. Run EFD Software's HD Tune Pro 5.00 and HDDScan 3.3 to get baseline data on the state of the hard disk. Boot the system using a Hiren's BootCD.
   a. Install HD Tune Pro 5.00:
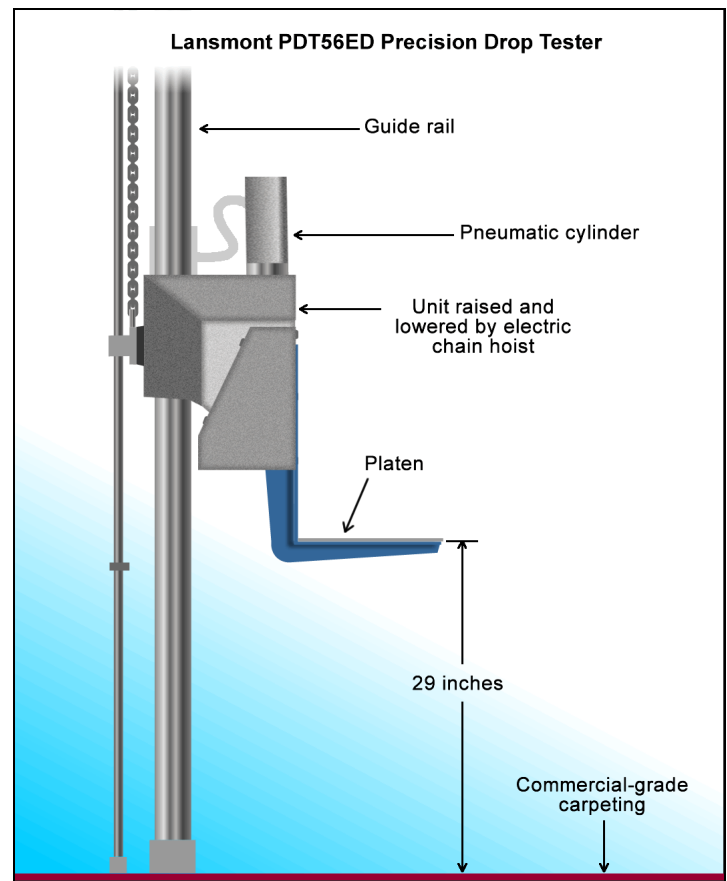   i. Insert a USB flash drive containing the HD

Lansmont PDT56ED Precision Drop Tester

- Guide rail
- Pneumatic cylinder
- Unit raised and lowered by electric chain hoist
- Platen
- 29 inches
- Commercial-grade carpeting

Figure 5: Our physical data protection test setup.

Tune Pro installation executable, and click once on My Computer.
  ii.   Navigate to the USB drive, and double-click the hdtunepro_500_trial.exe installation file to install the application.
  iii. At the welcome screen, click Next.
  iv.   Click the I accept the agreement radio button, and click Next.
  v.   In the Select Destination Location window, click Browse.
  vi.   Click the RAMDisk drive once to select it, and click OK.
  vii. Click Next in the next two windows.
  viii. Leave check box empty for Create a desktop icon, and click Next.
  ix.   Click Install.
  x.   Leave the check box checked for Launch HD Tune Pro, and click Finish.
  b. Run the HD Tune Pro 5.00 Error Scan:
  i.   Select the Error Scan tab.
  ii.   Click Start in the right hand pane.
        Note: The Error Scan is complete when the Start button changes from grey to black.
  c. Save the Error Scan Results.
  d. Click the Copy information to clipboard button on the upper right hand menu bar (it is the first button on the left):
  i.   Open a new text file by clicking Start→Run, typing `notepad`, and clicking OK.
  ii.   In the Notepad window, click Edit→Paste.
  iii. Click File→Save As, enter an appropriate filename using a `.txt` extension, and choose the location to save the file (we saved ours to a USB flash drive). Click Save.
  e. Close the HD Tune Pro 5.00 Hard Disk Utility.
  f. Scan the notebook's hard drive with HDDScan for Windows version 3.3:
  i.   Open the HDDScan folder, and double-click the HDDScan.exe executable file to run the application.
  ii.   Click Tasks→Surface Tests to open the Test Selection window.
  iii. Select Verify from the list of tests, and click Add Test.
  iv.   At the conclusion of the run, double-click the VR-Verify test id in the Test Manager window to open up the results.
  v.   Select the Report tab, and copy and paste the test results into Notepad.
  vi.   Save the results as a text file.

3. Set the height of the platen on the Lansmont Precision Drop Tester to 29 inches (73.7 cm) above the surface of the 28-ounce commercial carpeting.
4. Place the fully charged notebook onto the platen of the drop tester, with the notebook's base flat on the platen and the screen facing forward, open at a 120-degree angle.
5. Launch CINEBENCH.
6. Unplug the notebook, and drop the notebook onto the commercial carpeting.
7. Wait until the notebook is completely still.
8. If the battery or any other components come off the system, inspect them for damage, and reinstall them if possible.
9. Take digital pictures of the notebook from all angles after completing the checklist.
10. Stop CINEBENCH.
11. Reconnect the notebook's AC adapter.
12. Run HD Tune Pro 5.00 and HDD Scan 3.3 using the process in Step 2, and record the results as the notebook's post-test disk status.

Measuring performance with SYSmark 2012

Avoiding antivirus software conflicts

SYSmark 2012 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.

Avoiding pre-installed software conflicts

SYSmark 2012 installs the following applications, which its test scripts employ:

- ABBYY FineReader Pro 10.0
- Adobe Acrobat Pro 9
- Adobe After Effects CS5
- Adobe Dreamweaver CS5
- Adobe Photoshop CS5 Extended
- Adobe Premiere Pro CS5
- Adobe Flash Player 10.1
- Autodesk® 3DS Max® 2011
- Autodesk AutoCAD® 2011
- Google SketchUp™ Pro 8
- Microsoft Internet Explorer
- Microsoft Office 2010
- Mozilla Firefox Installer
- Mozilla Firefox 3.6.8
- Winzip Pro 14.5

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 SYSmark 2012 uses.

Setting up the test

Using the SYSmark built-in Configuration Tool

This tool supports three levels of configuration:

1. Only makes changes that are REQUIRED in order for the benchmark to run.
2. Additionally, makes changes that are RECOMMENDED for repeatable results.
3. Additionally, makes OPTIONAL changes that help ensure best results.

The Configuration tool makes the following configuration changes at each of the three levels:

Level 1 - Required

- Disables User Account Control (UAC)
- Disables Windows Update
- Disables System Sleep and Hibernate
- Disables Low Battery Actions
- Disables Network Proxies

Level 2 - Recommended

- Creates BAPCo power scheme

- Sets Power Plan Type to High Performance
- Disables Windows Firewall
- Disables Windows Sidebar/Gadgets
- Disables Windows Pop-ups
- Disables Incoming Remote Desktop Connections
- Disables Windows Error Reporting
- Disables Screen Saver and Monitor Timeout
- Sets CPU Adaptive Mode
- Disables Desktop Slideshow
- Disables Disk Defrag

Level 3 - Optional

- Sets Hard Disk Timeout
- Disables Windows Defender
- Disables System Restore
- Ignores Laptop Lid Close
- Sets Maximum Display Brightness
- Disables Adaptive Brightness

    Because we are testing how well each system does out of the box, we chose only the Required options in the

Configuration tool.

1. Insert the SYSmark 2012 Install DVD into the notebook PC's DVD drive.
2. When the Autoplay menu appears, click Run SYSmark2012_setup.exe.
3. At the Welcome screen, click Next.
4. Enter the serial number, and click Next.
5. Accept the license agreement, and click Next.
6. At the Choose Components screen, select Full, and click Next.
7. At the Choose Install Location screen, accept the default location of C:\Program Files (x86)\BAPCo\SYSmark2012, and click Next.
8. At the Choose Start Menu Folder screen, click Install.
9. Insert Disc 2 when prompted.
10. At the InstallShield Wizard Complete screen, click Finish.
11. Download and install SYSmark 2012 Patch 2 http://www.bapco.com/support/.
12. Launch SYSmark 2012.
13. Click Configuration and choose only the Required options.
14. Click Apply, and restart the computer when prompted.

Running the test

1. Launch SYSmark 2012 by double-clicking the desktop icon.
2. Enter a Project name and choose 3 iterations.
3. Click Run Benchmark.

Getting the SYSmark 2012 results

When SYSmark 2012 has completed, the Test Results Viewer appears. To submit these results to BAPCo, we saved the test results by performing the following steps:

1. Click Save.
2. Enter a name, and select FDR to save the results as an FDR file.
3. Click Save again, and select PDF to save the results as a PDF file.
4. Browse to the Documents directory where the result FDR and PDF files were saved.

Measuring time to boot and shut down

Boot and shutdown times

1. Simultaneously start the timer and boot the system.
2. Stop the timer when the Windows taskbar appears.
3. Record the result as the Boot time.
4. Bring up an administrative command prompt:
   a. Select Windows Start orb.
   b. Type `cmd` and right-click cmd.exe.
   c. Select Run as administrator.
5. Type `Cmd.exe /c start /wait Rundll32.exe advapi32.dll,ProcessIdleTasks`
6. Do not interact with the system until the command completes.
7. After the command completes, wait 5 minutes before running the test.
8. Simultaneously start the timer and shut down the system (Start→Shut Down).
9. Stop the timer when the power LED turns off.
10. Record the result as the shutdown time.
11. Repeat steps 1 through 10 two more times, and report the median of the three runs.

ABOUT PRINCIPLED TECHNOLOGIES

Principled Technologies, Inc.
1007 Slater Road, Suite 300
Durham, NC, 27703
www.principledtechnologies.com

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.

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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.