PERFORMANCE COMPARISON:
DELL LATITUDE E6430s VS. LENOVO THINKPAD T430s

Dell™ Latitude™ E6430s notebook

Faster business application performance
on SYSmark® 2012

Longer battery life
on MobileMark® 2012

Faster boot and shutdown
on PT's lab tests

versus Lenovo® ThinkPad® T430s

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. Battery life also matters—the longer the better. That's why it's essential to select notebooks that offer the fast performance and long battery life.

Principled Technologies tested two notebook systems in our labs, the Dell Latitude E6430s and the Lenovo ThinkPad T430s. We found that the Latitude outperformed the ThinkPad in three areas: business application performance, boot and shutdown time, and battery life. These advantages can save your workers time, making the Dell Latitude E6430s an excellent choice.

TIME IS OF THE ESSENCE

Because battery life and notebook performance are so important to today's worker, we conducted a range of tests to compare the Dell Latitude E6430s and the Lenovo ThinkPad T430s. We conducted every test three times and present the results for the median run of each test.

Battery life testing

As Figure 1 shows, the Dell Latitude E6430s had longer battery life than the Lenovo ThinkPad T430s, lasting for 311 minutes, a 12.7 percent increase in battery life.

Figure 1: The battery of the Dell Latitude E6430s lasted 12.7 percent longer than that of the Lenovo ThinkPad T430s.
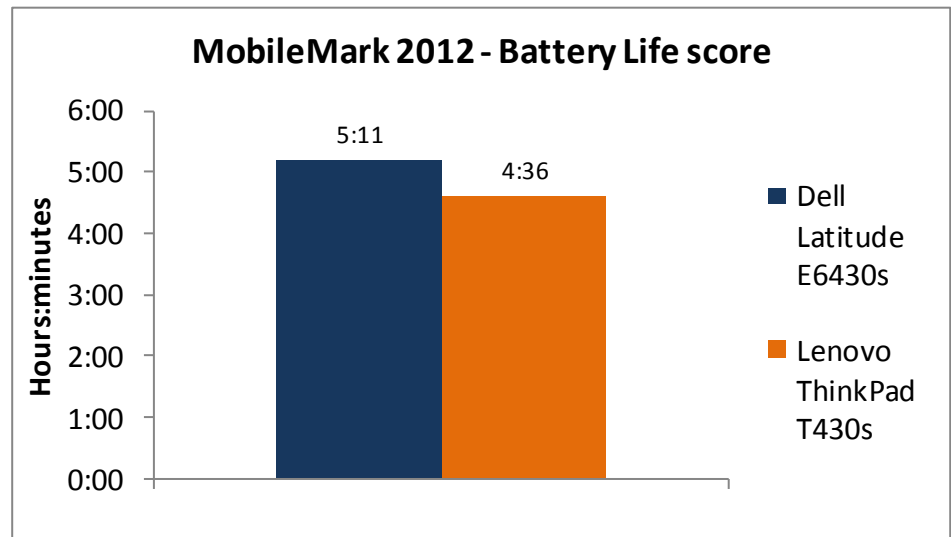

MobileMark 2012 - Battery Life score

Figure 2 shows the median results for our battery life testing using the BAPCo® MobileMark® 2012 benchmark.

BAPCo MobileMark 2012		
	Dell Latitude E6430s	**Lenovo ThinkPad T430s**
Screen brightness	154 nits	172 nits
MobileMark 2012 - Battery Life score (minutes)	311	276
MobileMark 2012 - Battery Life score (hours: minutes)	5:11	4:36

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

Boot and shutdown times

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 E6430s took 9.1 percent less time to boot and 13.8 percent less time to shut down than the Lenovo ThinkPad T430s.

Boot and shutdown times			
	Dell Latitude E6430s	Lenovo ThinkPad T430s	Percentage Dell win
Boot	23.03	25.34	9.1%
Shutdown	12.89	14.96	13.8%

Figure 3: Median boot and shutdown times, in seconds, for the two systems.

Performance testing

Because performance is so important to today's worker, we used an industry-standard benchmark to rate the performance of the notebooks, and found that the Dell Latitude E6430s 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 4 shows the median results of our SYSmark 2012 tests. The Dell Latitude E6430s achieved a higher SYSmark2012 Overall Performance Rating than the Lenovo ThinkPad T430s.

BAPCo SYSmark 2012		
	Dell Latitude E6430s	Lenovo ThinkPad T430s
SYSmark 2012 Overall Performance Rating	145	143
SYSmark 2012 – Office Productivity	140	137
SYSmark 2012 – Media Creation	147	146
SYSmark 2012 – Web Development	134	129
SYSmark 2012 – Data/Financial Analysis	157	153
SYSmark 2012 – 3D Modeling	138	138
SYSmark 2012 – System Management	157	159

Figure 4: Median scores for the BAPCo SYSmark 2012 benchmark. Higher numbers are better.

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 MobileMark 2012

MobileMark 2012 is an industry-standard benchmark that provides a battery life rating and a performance rating based on common office scenarios. In our tests, we focus solely on the battery life rating. MobileMark 2012 applications and workloads specific to mobile systems. These include office activities like file and document management, data processing, and rich content creation. This module provides a score for battery life of the tested applications.

MobileMark 2012 includes the following applications with their corresponding tasks:

- ABBYY® FineReader Pro 11

- Adobe® Acrobat® Pro X
- Adobe Flash® Player 11
- Adobe Photoshop® CS5 Extended 12.04
- Adobe Photoshop Elements 10
- Adobe Premiere® Pro CS 5.5
- CyberLink PowerDVD Ultra 11
- Microsoft® Excel® 2010 SP1
- Microsoft Internet Explorer® 9
- Microsoft Outlook® 2010 SP1
- Microsoft PowerPoint® 2010 SP1
- Microsoft Windows Media Player
- Microsoft Word 2010 SP1
- Mozilla® Firefox® 10.0.2
- WinZip® Pro 16

MobileMark 2012 measures system battery life in minutes. It records system battery life at the start of the benchmark and repeats the workload until the system battery life is depleted, or until the system powers down due to low battery life.

MobileMark 2012 records a timestamp once per minute. At the end of the benchmark, it compares the beginning timestamp to the final (last recorded) timestamp. MobileMark 2012 derives its system battery life rating as the number of minutes between the start and end timestamps.

For more information on this benchmark, see http://www.bapco.com/products/mobilemark2012/index.php.

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 computes that keep them waiting and they certainly want their notebooks to run as long as possible when unplugged. Selecting notebooks that perform everyday tasks quickly and have long battery life makes good business sense. In our tests, the Dell Latitude E6430s delivered better performance and longer battery life than the Lenovo ThinkPad T430s. This makes it an excellent choice for your employees.

APPENDIX A – SYSTEM CONFIGURATION INFORMATION

Figure 5 provides detailed configuration information for the test systems.

System	Dell Latitude E6430s	Lenovo ThinkPad T430s
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)	13-1/8" x 9-3/4" x 1-1/4"	13-1/2" x 9" x 1-1/4"
System weight	4 lbs. 10 oz.	4 lbs. 1 oz.
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	0N9T9J	2352CTO
Motherboard chipset	Intel QM77	Intel QM77
BIOS name and version	Dell A00 (05/02/2012)	Lenovo G7ET29WW (1.11) (05/24/2012)
Memory module(s)		
Vendor and model number	Hyundai HMT351S6CFR8C-PB	Samsung M471B5273DH0-CK0
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 E6430s	Lenovo ThinkPad T430s
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 11.0.3.1002 (03/06/2012)
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		
Vendor and model number	Intel HD Graphics 4000	Intel HD Graphics 4000
Type	Integrated	Integrated
Chipset	Intel HD Graphics 4000	Intel HD Graphics 4000
BIOS version	2132.8	2124.0
Total available graphics memory (MB)	1,696	1,696
Dedicated video memory (MB)	64	64
System video memory (MB)	0	0
Shared system memory (MB)	1,632	1,632
Resolution	1,366 x 768 x 32-bit	1,366 x 768 x 32-bit
Driver	Intel 8.15.10.2639 (02/01/2012)	Intel 8.15.10.2639 (02/01/2012)
Sound card/subsystem		
Vendor and model number	IDT High Definition Audio	Realtek High Definition Audio
Driver	IDT 6.10.0.6388 (02/13/2012)	Realtek 6.0.1.6602 (03/27/2012)
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-7940H
Type	DVD-RW	DVD-RW
USB ports		
Number	3	3

System	Dell Latitude E6430s	Lenovo ThinkPad T430s
Type	1 x USB 2.0, 2 x USB 3.0	2 x USB 3.0, 1 x USB 2.0
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"	14"
Refresh rate	60 Hz	60 Hz
Battery		
Type	Dell RFJMW	Lenovo 45N1039
Size (length x width x height)	8-3/8" x 2-1/8" x 6/8"	8-11/16" x 3" x 1/2"
Rated capacity	5900mAh / 11.1V (65Wh)	3900mAh / 11.1V (44Wh)
Weight	12 oz.	10 oz.

Figure 5: Configuration information for the systems we tested.

APPENDIX B - HOW WE TESTED

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.

Measuring battery life with MobileMark 2012

Avoiding antivirus software conflicts

MobileMark 2012 is not compatible with any virus-scanning software, so we uninstalled any such software present on the notebook PCs before we installed the benchmark.

Avoiding pre-installed software conflicts

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

- ABBYY FineReader Pro 11
- Adobe Acrobat Pro X
- Adobe Flash Player 11
- Adobe Photoshop CS5 Extended 12.04
- Adobe Photoshop Elements 10
- Adobe Premiere Pro CS 5.5
- CyberLink PowerDVD Ultra 11
- Microsoft Excel 2010 SP1
- Microsoft Internet Explorer
- Microsoft Outlook 2010 SP1
- Microsoft PowerPoint 2010 SP1
- Microsoft Windows Media Player
- Microsoft Word 2010 SP1
- Mozilla Firefox 10.0.2
- WinZip Pro 16

If any of these applications are already on the system under test, they could 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 2012 uses.

Adjusting display brightness and power settings

The brightness of a notebook's display affects its battery life. Therefore, BAPCo requires that, before you test with MobileMark 2012, you do the following step: make sure the brightness of the notebook's monitor is greater than or equal to 150 nits on a completely white screen while the notebook is unplugged and running on battery power. The measurement follows the standards from the Video Electronics Standards Association (www.vesa.org).

We complied with this standard for all the tests we ran by setting the notebook PC's brightness as close to 150 nits as we could without going below that brightness level. We used the following procedure before we started each test. Note: This procedure assumes we began with the notebook plugged into the power supply.

1. To create a completely blank, white screen, open Microsoft Paint by clicking Start→All Programs→ Accessories→Paint.
2. Press Ctrl+W to open the Resize and Skew dialog.
3. Under Horizontal and Vertical enter 200, and click OK.
4. Click the View tab.
5. Click Full screen to view a white screen.
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 used the Gossen Mavolux5032C.)
8. If the reading is below or significantly greater than 150 nits, use the notebook's keyboard screen-brightness-adjustment keys to bring the display as close to 150 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.

Note: If the notebook did not save this setting, use its power management application(s) to set the brightness appropriately, and save that setting. If saving the settings is ineffective, use the keyboard brightness setting keys to adjust the screen to bring the display as close to 150 nits as possible. Next, note how many times you pressed the button to achieve the desired brightness. After unplugging the system under test, use the keyboard to set the desired brightness by pressing the brightness button as many times as you previously noted to return the screen to the correct brightness level.

Using the MobileMark 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 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
- Sets Screen Dimming Timeout (2 minutes)
- Disables Low Battery Actions
- Disables Network Proxies
- Disables Autorun for Optical Drive

Level 2 - Recommended

- Create BAPCo power scheme
- Set Power Plan Type to balanced
- 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-box, we chose only the Required options in the
Configuration tool.

Installing MobileMark 2012 and configuring the system for testing

1. Verify that the wireless adapter is enabled and connected to a wireless router that is not connected to the Internet.
2. Insert the MobileMark 2012 Install DVD into the notebook PC's DVD drive.
3. When the Autoplay menu appears, click Run MobileMark2012_Setup.exe.
4. At the Welcome screen, click Next.
5. Enter the serial number, and click Next.
6. Accept the license agreement, and click Next.
7. At the Choose Components screen, select Full, and click Next.
8. At the Choose Install Location screen, accept the default location of C:\Program Files (x86)\BAPCo\MobileMark2012, and click Next.
9. At the Choose Start Menu Folder screen, click Install.
10. Insert Disc 2 when prompted.

11. At the InstallShield Wizard Complete screen, click Finish.
12. Launch MobileMark 2012.
13. Click Configuration and choose only the Required options.
14. Click Apply, and restart the computer when prompted.
15. Adjust the screen brightness to no less than 150 nits:
    a. Click the Windows start button, and type `power options` in the Windows Start Search box.
    b. Click Change plan settings.
    c. Click Change advanced power settings.
    d. Expand the Display option, and change the Display brightness on battery and plugged in to the correct percentage that produces no less than 150 nits.
       Note: If you are unable to save these settings, please see the Displaying Brightness section above.

Conditioning the battery

1. Plug the AC power adapter into the notebook PC, and completely charge the battery.
2. Install MobileMark 2012, following the steps we outlined in the Installing MobileMark 2012 section earlier in this section.
3. Double-click the MobileMark 2012 icon on the desktop.
4. Click the Office Productivity icon.
5. Type `System Conditioning` as the name for this test in the Project Name, check the box next to conditioning, and click Continue.
6. If MobileMark 2012 lists no problems or warnings, click Continue. If it does list any problems or warnings, close MobileMark 2012, and correct the problem(s) before proceeding.
7. When prompted, unplug the AC power adapter. The Office Productivity 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. Plug the AC power adapter into the notebook PC, and completely charge the battery.

Measuring battery life with MobileMark 2012

We performed the following steps to run the MobileMark 2012 Office Productivity benchmark:
1. Double-click the MobileMark 2012 icon on the desktop.
2. Select the Office Productivity test by clicking the Office Productivity icon.
3. Enter a name for this test in the Project Name field, and click Continue.
4. If MobileMark 2012 lists no problems or warnings, click Continue. If it does list any problems or warnings, close MobileMark 2012, and correct the problem(s) before proceeding.
5. When prompted, unplug the AC power adapter. The test begins immediately.
6. The Office Productivity 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 MobileMark 2012 Office Productivity test three times on the system and took the median battery life run as the representative score for that test.

Getting the MobileMark 2012 results

After each MobileMark Productivity 2012 test completed, we plugged the AC power adapter into the notebook PC and turned on the system. MobileMark 2012 started automatically after the system booted, then 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 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 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.

ABOUT PRINCIPLED TECHNOLOGIES

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Principled Technologies, Inc.
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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 our clients assess how it will fare against its competition, its performance, its market readiness, 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.