



Lenovo ThinkPad T430 notebook

- ▶ **82.7% better**
graphics performance
- ▶ **24.0% better**
digital media performance
- ▶ **23.0% better**
overall system performance

compared to previous-generation ThinkPad T420

Your notebook system has been chugging along, but upgrading to a system with a newer processor could make your life much, much easier. The Lenovo ThinkPad T430 with the Intel® Core™ i5-3320M processor can boost your performance dramatically.

In the Principled Technologies labs, we measured the performance of the Lenovo ThinkPad T430 and the previous-generation Lenovo ThinkPad T420. We found that the newer system increased performance by as much as 82.7 percent.

In addition to the improved performance you experience with the 3rd generation Intel Core processor, the Lenovo ThinkPad T430 has an mPCIe slot that supports an optional mSATA drive. The mSATA drive is an inexpensive alternative to installing an SSD (Solid State Drive) and, when configured to use Diskeeper ExpressCache, is designed to drastically reduce boot time, and application launch times.

Better performance, and the option to take advantage of the latest technologies, makes upgrading to the Lenovo ThinkPad T430 an excellent decision.



BETTER PERFORMANCE

Thanks to its Intel Core i5-3320M processor, The Lenovo ThinkPad T430 delivers strong performance to keep up with your demands, which lets you be more productive wherever you're working.

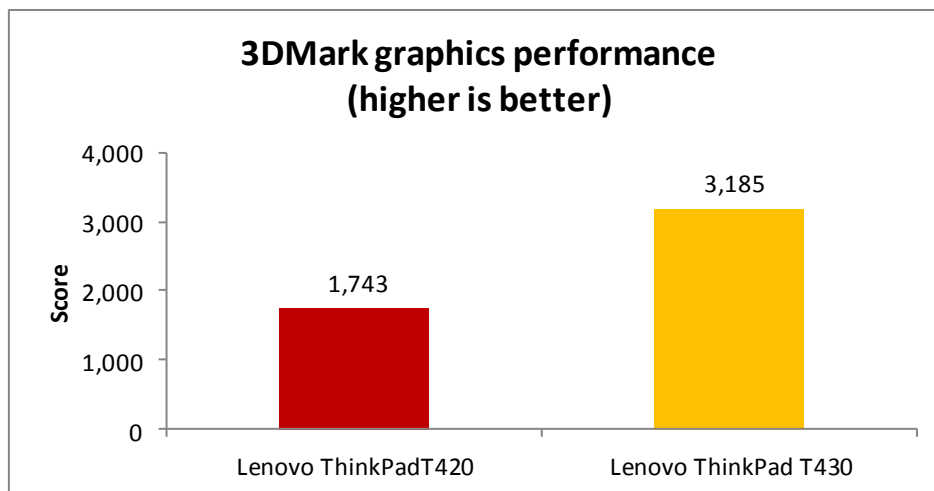
We used three industry-standard benchmarks to compare the Lenovo ThinkPad T430 to the previous-generation Lenovo ThinkPad T420. Across the board, the newer ThinkPad delivered better performance.

For detailed system configuration information, see [Appendix A](#). For detailed steps on how we tested, see [Appendix B](#) and [Appendix C](#).

Graphics performance

The graphics performance of a notebook system can greatly affect how responsive and usable that system in. Figures 1 and 2 show the graphics performance of the two systems using the industry-standard 3DMark Vantage 1.1.0 benchmark. On this benchmark, the Intel Core i5-3320M processor-based Lenovo ThinkPad T430 delivered 82.7 percent better graphics performance than the ThinkPad T420.

Figure 1: 3DMark graphics performance benchmark results for the Lenovo ThinkPad T420 and the Lenovo ThinkPad T430 we tested.



3DMark Vantage 1.1.0 graphics performance			
	Lenovo ThinkPad T420	Lenovo ThinkPad T430	Percentage difference
3DMark Score	1,743	3,185	82.7%
Graphics Score	1,371	2,585	88.5%
CPU Score	9,328	10,481	12.4%

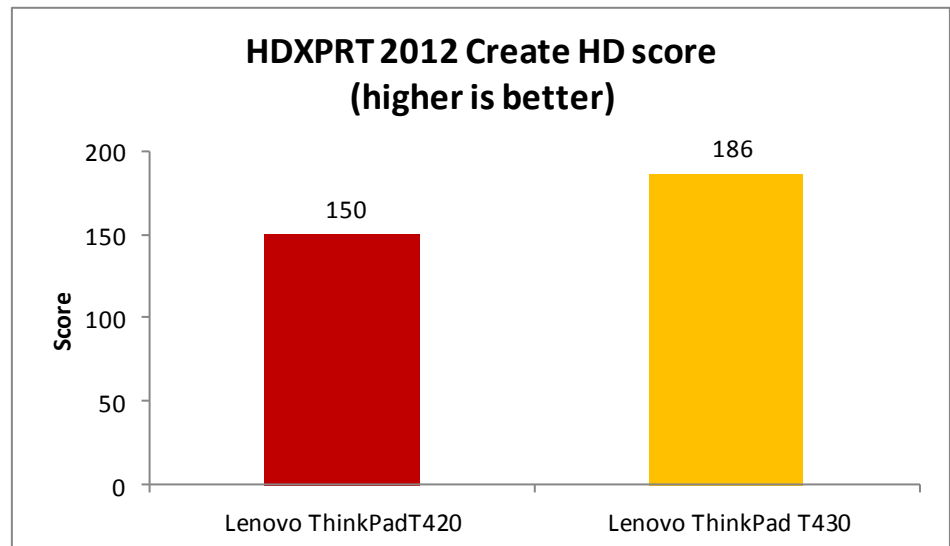
Figure 2: Median 3DMark graphics performance benchmark results for the two systems. Higher numbers are better.

Digital media performance

It's important to know that the system you use can handle the types of tasks you use it for – from organizing your photos, videos, and music to editing your media. HDXPRT tests the media-handling capabilities of a system using real-world tasks that the average user would actually do.

Figure 3 shows the overall HDXPRT Create HD Score for the two systems and Figure 4 presents detailed benchmark results. The Intel Core i5-3320M processor-based Lenovo ThinkPad T430 outperformed the Lenovo ThinkPad T420 by 24.0 percent, indicating it would be better able to meet a number of media creation and manipulation demands.

Figure 3: HDXPRT 2012 Create HD scores for the Lenovo ThinkPad T420 and the Lenovo ThinkPad T430 we tested.



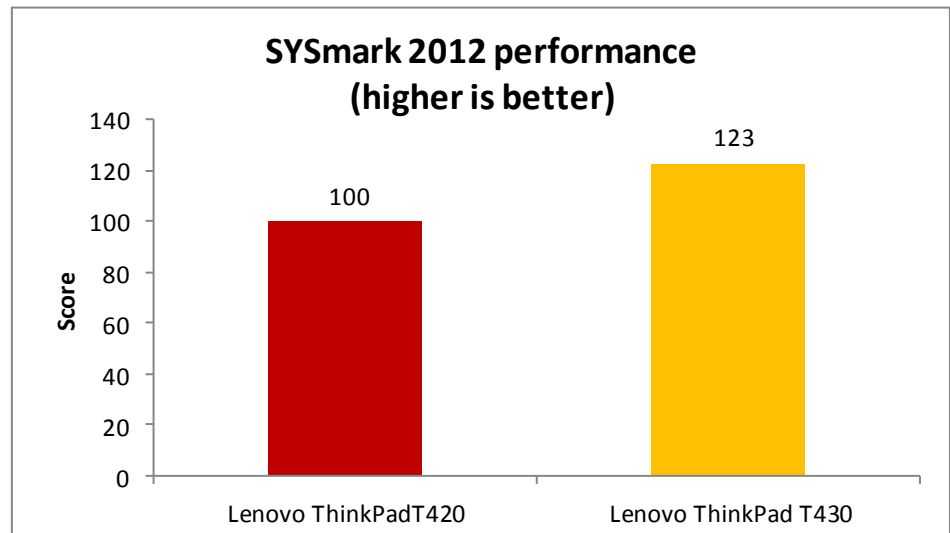
HDXPRT 2012 performance			
	Lenovo ThinkPad T420	Lenovo ThinkPad T430	Percentage difference
Create HD Score (higher is better)	150	186	24.0%
Media Organizer - minutes (lower is better)	6.36	5.43	14.6%
Media Creator - minutes (lower is better)	14.19	11.56	18.5%
Photo Blogger - minutes (lower is better)	10.23	8.18	20.0%
Video Producer – minutes (lower is better)	3.67	2.45	33.2%
Music Maker - minutes (lower is better)	2.84	2.63	7.4%

Figure 4: HDXPRT 2012 performance scores for the two systems. A higher overall Create HD Score is better, but lower category scores are better.

Overall system performance

BAPCo® SYSmark® 2012 tests the performance of systems in a number of different areas to determine overall performance. Figure 5 shows the overall SYSmark 2012 score for the two systems and Figure 6 presents detailed benchmark results. The Intel Core i5-3320M processor-based Lenovo ThinkPad T430 outperformed the Lenovo ThinkPad T420 by 23.0 percent.

Figure 5: SYSmark 2012 Rating for the Lenovo ThinkPad T420 and the Lenovo ThinkPad T430 we tested.



SYSmark 2012 performance			
	Lenovo ThinkPad T420	Lenovo ThinkPad T430	Percentage difference
SYSmark 2012 - Overall Performance Rating	100	123	23.0%
SYSmark 2012 - Office Productivity - Overall	103	123	19.4%
SYSmark 2012 - Media Creation - Overall	68	123	80.9%
SYSmark 2012 - Web Development - Overall	93	115	23.7%
SYSmark 2012 - Data/Financial Analysis - Overall	128	134	4.7%
SYSmark 2012 - 3D Modeling - Overall	113	115	1.8%
SYSmark 2012 - System Management - Overall	109	130	19.3%

Figure 6: SYSmark 2012 performance scores for the two systems. Higher scores are better.

THE BENCHMARKS WE USED

In this section, we present a brief overview of the benchmarks we used in our testing.

Futuremark® 3DMark Vantage

Futuremark 3DMark Vantage is a benchmark designed to rate the performance of DirectX® 10 gaming PCs. It includes two graphics tests, two CPU tests, and six feature tests. The benchmark reports both graphics and CPU scores, as well as an overall 3DMark score to rate overall gaming performance.

For more information on 3DMark Vantage, see <http://www.3dmark.com/3dmarkvantage/>.

HDXPRT 2012

The High Definition eXperience & Performance Ratings Test (HDXPRT) 2012, is a benchmark that evaluates the capabilities of PCs in consumer digital media uses, including

- Media Organizer
- Media Creator
- Photo Blogger
- Video Producer
- Music Maker

For more information on HDXPRT 2012, see www.hdxprt.com.

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

As technology changes and evolves, so should your notebook. An older system with an older processor is unlikely to deliver the best performance for the tasks and workloads of today.

In our tests, the new Intel Core i5-3320M processor-based Lenovo ThinkPad T430 improved performance dramatically over the previous-generation ThinkPad T420, increasing performance by as much as 82.7 percent.

As these results show, upgrading to a new Lenovo ThinkPad T430 can speed performance on a number of tasks you do daily, making for an improved experience compared to your older system.

APPENDIX A: DETAILED SYSTEM CONFIGURATION

Figure 7 presents detailed configuration information for the two systems we tested.

System	Lenovo ThinkPad T420	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	Energy Saver	Energy Saver
Processor power-saving option	Enhanced Intel SpeedStep® Technology	Enhanced Intel SpeedStep Technology
System dimensions (length x width x height)	13-3/8" x 9-1/8" x 1-3/8"	13-3/8" x 9-1/8" x 1-3/8"
System weight	4 lbs. 13 oz.	5 lbs. 3 oz.
CPU		
Vendor	Intel	Intel
Name	Core i5	Core i5
Model number	2520M	3320M
Stepping	D2	E0
Socket type and number of pins	Socket 988B rPGA	Socket 988B rPGA
Core frequency (GHz)	2.50	2.60
L1 cache	32 KB +32 KB (per core)	32 KB +32 CB (per core)
L2 cache	512 KB (256 KB per core)	512 KB (256 KB per core)
L3 cache	3 MB	3 MB
Platform		
Vendor	Lenovo	Lenovo
Motherboard model number	4177Q5U	234222U
Motherboard chipset	Intel QM67	Intel QM77
BIOS name and version	Lenovo 83ET71WW (1.41) (07/23/2012)	Lenovo G1ET69WW (2.05) (09/12/2012)
Memory module(s)		
Vendor and model number	Samsung M471B5773CHS-CH9	Samsung M471B5273DH0-CK0
Type	PC3-10700	PC3-12800
Speed (MHz)	1,333	1,600
Speed running in the system (MHz)	1,333	1,600
Timing/Latency (tCL-tRCD-tRP-tRASmin)	9-9-9-24	11-11-11-28
Size (MB)	2,048	4,096
Number of memory module(s)	1	1
Chip organization (single-sided/double-sided)	Double-sided	Double-sided
Channel (single/dual)	Single	Single

System	Lenovo ThinkPad T420	Lenovo ThinkPad T430
Hard disk		
Vendor and model number	Hitachi HTS725032A9A364	Hitachi HTS725050A7E630 Optional: SanDisk SSD U100 mSATA
Number of disks in system	1	2
Size (GB)	320	Hitachi: 50 SanDisk: 24
Buffer size (MB)	16	Hitachi: 32 SanDisk: NA
RPM	7,200	Hitachi: 7,200 SanDisk: NA
Type	SATA 3.0 Gb/s	SATA 6.0 Gb/s
Controller	Intel Mobile Express Chipset SATA AHCI Controller	Intel 7 Series Chipset Family SATA AHCI Controller
Driver	Intel 11.2.0.1006 (05/30/2012)	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		
Vendor and model number	Intel HD Graphics 3000	Intel HD Graphics 4000
Type	Integrated	Integrated
Chipset	Intel HD Graphics 3000	Intel HD Graphics 4000
BIOS version	2089.0	2137.0
Total available graphics memory (MB)	773	1,696
Dedicated video memory (MB)	64	64
System video memory (MB)	0	0
Shared system memory (MB)	709	1,632
Resolution	1,366 x 768 x 32-bit	1,366 x 768 x 32-bit
Driver	Intel 8.15.10.2769 (05/25/2012)	Intel 8.15.10.2696 (03/19/2012)
Sound card/subsystem		
Vendor and model number	Conexant 20672 Smart Audio HD	Realtek High Definition Audio
Driver	Conexant 8.32.23.5 (06/05/2012)	Realtek 6.0.1.6710 (08/21/2012)
Ethernet		
Vendor and model number	Intel 82579LM Gigabit Network Connection	Intel 82579LM Gigabit Network Connection
Driver	Intel 11.15.16.0 (01/11/2012)	Intel 11.15.16.0 (01/11/2012)

System	Lenovo ThinkPad T420	Lenovo ThinkPad T430
Wireless		
Vendor and model number	Intel Centrino™ Advanced-N 6205	Intel Centrino Advanced-N 6205
Driver	Intel 15.2.0.19 (06/03/2012)	Intel 15.2.0.19 (06/03/2012)
Modem		
Vendor and model number	N/A	N/A
Driver	N/A	N/A
Optical drive(s)		
Vendor and model number	Matshita UJ8A0A	Optiarc AD-7740H
Type	DVD-RAM	DVD-RW
USB ports		
Number	4	4
Type	3 x USB 2.0, 1 x USB 2.0/eSATA	2 x USB 2.0, 2 x USB 3.0
Other	Media card reader, DisplayPort	Media card reader, Mini DisplayPort
IEEE 1394 ports		
Number	0	0
Monitor		
LCD type	HD LED WXGA	HD LED WXGA
Screen size	14"	14"
Refresh rate	50 Hz	60 Hz
Battery		
Type	Lenovo 42T4791	Lenovo 45N1011
Size (length x width x height)	8-1/8" x 2" x 3/4"	8-1/2" x 3" x 3/4"
Rated capacity	5200mAh / 10.8V (57Wh)	8400mAh / 11.1V (94Wh)
Weight	11 oz.	1 lbs. 1 oz.

Figure 7: System configuration information.

APPENDIX B: MEASURING SYSTEM PERFORMANCE

Measuring graphics performance with 3DMark Vantage 1.1.0

Installing and patching 3DMark Vantage

1. Download the 3DMark_Vantage_v110_installer.exe Windows package from <http://www.futuremark.com/benchmarks/3dmarkvantage/download/>.
2. Install 3DMark Vantage 1.1.0 with the default options by double-clicking the 3DMark_Vantage_v110_installer.exe file.
3. At the Welcome screen, click Next.
4. At the License Agreement screen, click I accept the terms of the license agreement, and click Next.
5. At the Setup Type screen, click Express, and click Next.
6. At the Ready to Install the Program screen, click Install.
7. When the 3DMark Vantage Read Me page appears in your Web browser, review the document, and click Close when you are finished.
8. At the Setup Complete screen, click Finish.
9. Launch 3DMark Vantage 1.1.0 by double-clicking on the 3DMark Vantage desktop icon. Enter the registration code, and click Register.
10. Exit 3DMark Vantage 1.1.0.

Running 3DMark Vantage 1.1.0

For Performance-level results:

1. Reboot the system, and wait 2 minutes.
2. Double-click the 3DMark Vantage desktop icon to launch the benchmark.
3. To close the Important Information window, click Close.
4. Click Run Benchmark.
5. When the benchmark run completes, take a screenshot of the results, and record the 3DMark, GPU, and CPU scores.
6. Perform steps 1 through 5 nine more times, and report the median of the last three runs.

Measuring digital media capabilities with HDXPRT 2012

Setting up the test

1. Insert the HDXPRT DVD-ROM into your DVD drive.
2. At the HDXPRT Install screen, click Install HDXPRT.
3. Accept the HDXPRT end user license agreement.
4. After the setup is complete, select Yes, I want to restart my computer now, and click Finish.

Running HDXPRT

1. Click the HDXPRT 2012 shortcut on the desktop.
2. Click Run HDXPRT.
3. Enter a test name, choose 3 iterations, and click Run.
4. The Results Screen automatically appears at the end of a successful run. The test results files are found in the C:\ProgramFiles\HDXPRT\Reports\<TestName> directory.

Measuring overall system 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

Installing SYSmark 2012 and configuring the system for testing

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 all 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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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.

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