

Dell™ Latitude™ notebooks powered by the
2nd generation Intel® Core™ processor family:



**Faster response
for a better
user experience**

versus comparable HP notebooks with AMD mobile processors



Workers can be only as productive as their tools allow them to be. On a sluggish system, carrying out routine tasks such as opening and copying files, starting up and shutting down the system, and even entering and leaving hibernation and sleep modes becomes annoying for employees and causes their productivity to suffer. Systems that respond faster improve the user experience and increase office efficiency.

Principled Technologies conducted a series of custom hand-timed tests to measure system responsiveness on tasks that enterprise employees perform throughout the day. We tested two Dell notebooks powered by 2nd generation Intel Core processors, a mid-range Dell Latitude E6420 and a high-end Dell Latitude E6520, and two HP notebooks powered by AMD processors, a mid-range HP Pavilion dm1z and a high-end HP Pavilion dv6z Select Edition.

The Intel Core processor-based Dell systems consistently performed tasks more quickly—as much as 67.4 percent faster—than the corresponding HP Pavilion systems, making Dell a great choice for an efficient workplace.



SPEEDING UP THE WORKDAY WITH DELL AND INTEL

Today's business world is moving faster than ever, and every second counts. Extra seconds and minutes spent doing everyday office tasks add up quickly over time and over a large number of employees. That's why, when choosing notebook systems for the workplace, it makes sense to purchase systems with enough processing power to complete routine tasks quickly and efficiently.

In our tests, we found that the Intel Core processor-based Dell Latitude E6420 and Dell Latitude E6520 sped up everyday tasks considerably over comparable AMD processor-based HP systems – enough to decrease time doing these tasks by up to 29.2 percent. (To learn more about the systems we tested, see [Appendix A](#).)

Figure 1 shows the time that each system took to open three Microsoft® Office® files—one Word, one Excel®, and one PowerPoint®. We timed each system opening each of the files three ways—from a local hard drive, from a network share using an Ethernet connection, and from the same network share using a wireless connection. Each bar represents the number of seconds the system needed to perform all nine file-opening tasks. (See the [System Responsiveness Results](#) section for complete results.)

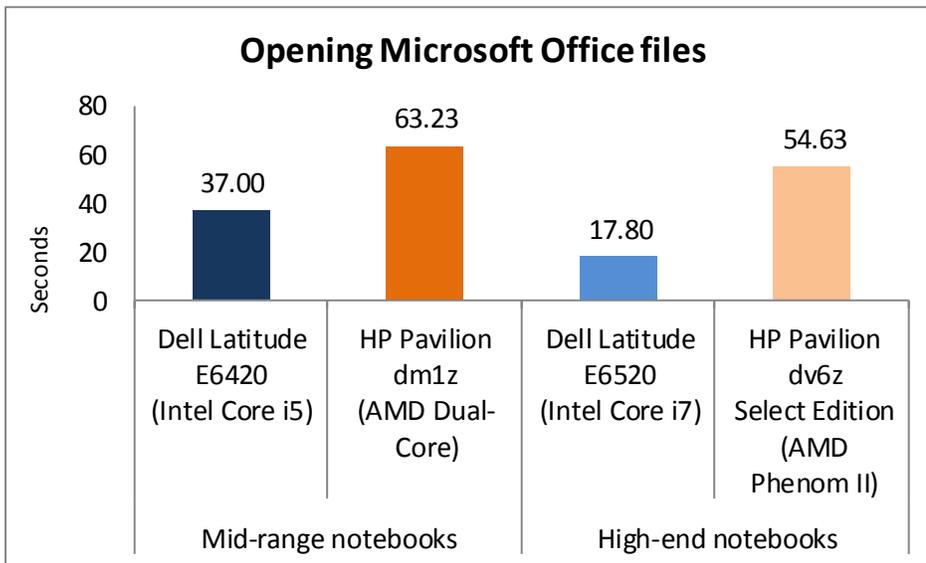


Figure 1: Combined times, in seconds, the four test systems took to perform nine file-opening tasks. Lower numbers are better.

The Intel Core i5-based Dell Latitude E6420 notebook took 41.5 percent less time than the AMD Dual-Core-based HP Pavilion dm1z, a savings of 26.23 seconds. The Intel Core i7-based Dell Latitude E6520 notebook took 67.4 percent less time than the AMD Phenom II-based HP Pavilion dv6z, a savings of 36.83 seconds.

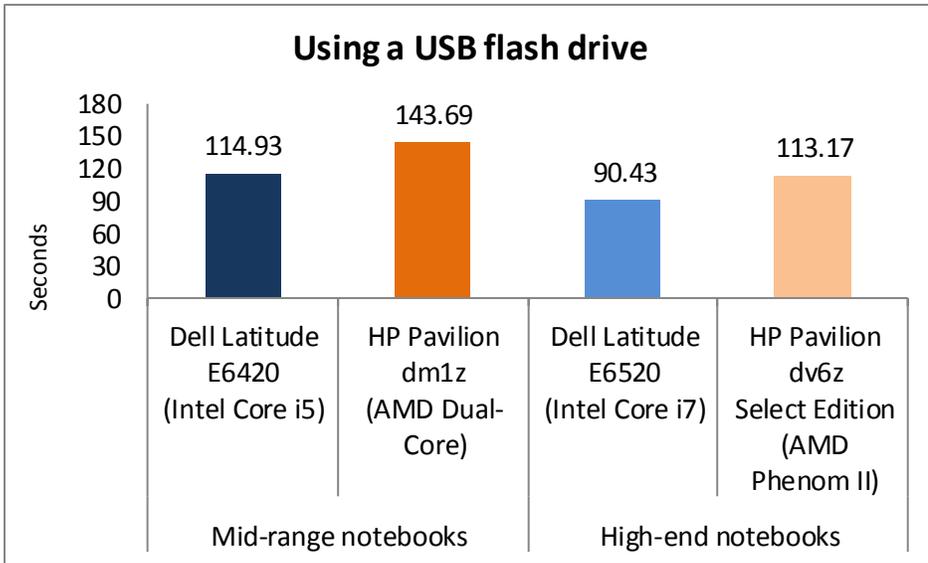


Figure 2: Combined times, in seconds, the four test systems took to perform six tasks involving USB flash drives. Lower numbers are better.

perform all six tasks. The Intel Core i5-based Dell Latitude E6420 notebook took 20.0 percent less time than the AMD Dual-Core-based HP Pavilion dm1z, a savings of 28.76 seconds. The Intel Core i7-based Dell Latitude E6520 notebook took 20.1 percent less time than the AMD Phenom II-based HP Pavilion dv6z, a savings of 22.74 seconds.

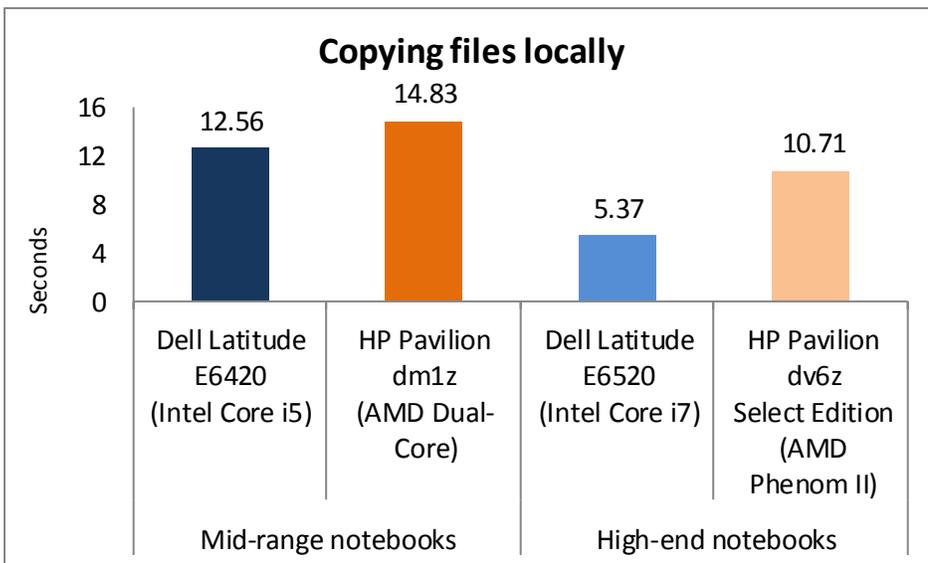


Figure 3: Time, in seconds, the four test systems took to perform one file-copying task. Lower numbers are better.

Figure 2 shows the time that each system took to perform three tasks involving USB flash drives—installing the flash drive, reinserting the flash drive, and copying files to the flash drive. We timed each system performing these tasks with two brands of USB flash drive—Kingston® and PNY®. Each bar represents the number of seconds the system needed to

Figure 3 shows the time each test system took to copy files from one location to another on the local hard drive. The Intel Core i5-based Dell Latitude E6420 notebook took 15.3 percent less time than the AMD Dual-Core-based HP Pavilion dm1z, a savings of 2.27 seconds. The Intel Core i7-based Dell Latitude E6520 notebook took 49.9 percent less time than

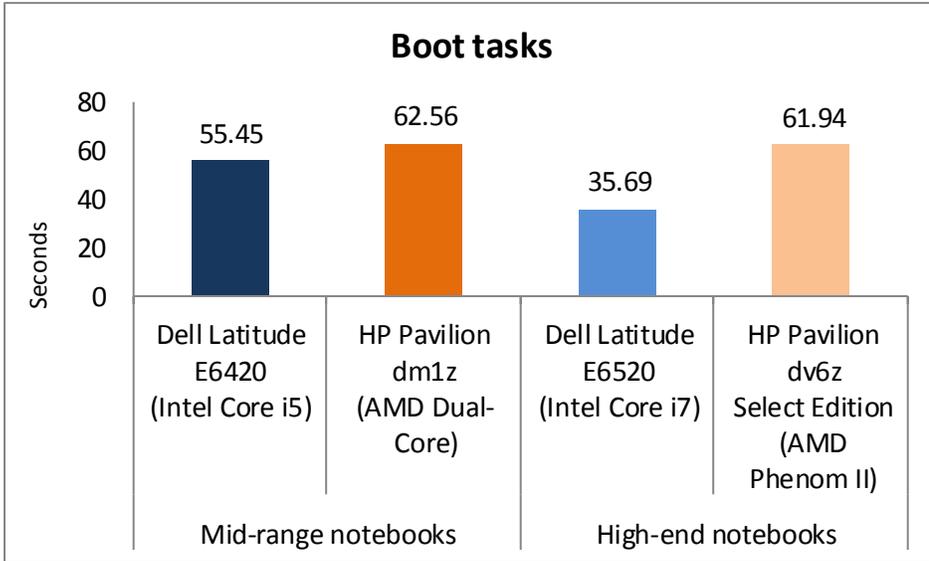


Figure 4: Combined times, in seconds, the four test systems took for three events to occur as the system booted. Lower numbers are better.

the AMD Phenom II-based HP Pavilion dv6z, a savings of 5.34 seconds.

Figure 4 shows the time that each system took for three events to occur as the system boots—the taskbar appearing, indicating the operating system has completely loaded; followed by opening a Word 2010 document, indicating the system is useable; and finally, making a

connection to an Exchange Server with Outlook® 2010, indicating the network is functioning. Each bar represents the number of seconds the system needed to perform all three tasks in quick succession. The Intel Core i5-based Dell Latitude E6420 notebook took 11.4 percent less time than the AMD Dual-Core-based HP Pavilion dm1z, a savings of 7.11 seconds. The Intel Core i7-based Dell Latitude E6520 notebook took 42.4 percent less time than the AMD Phenom II-based HP Pavilion dv6z, a savings of 26.25 seconds

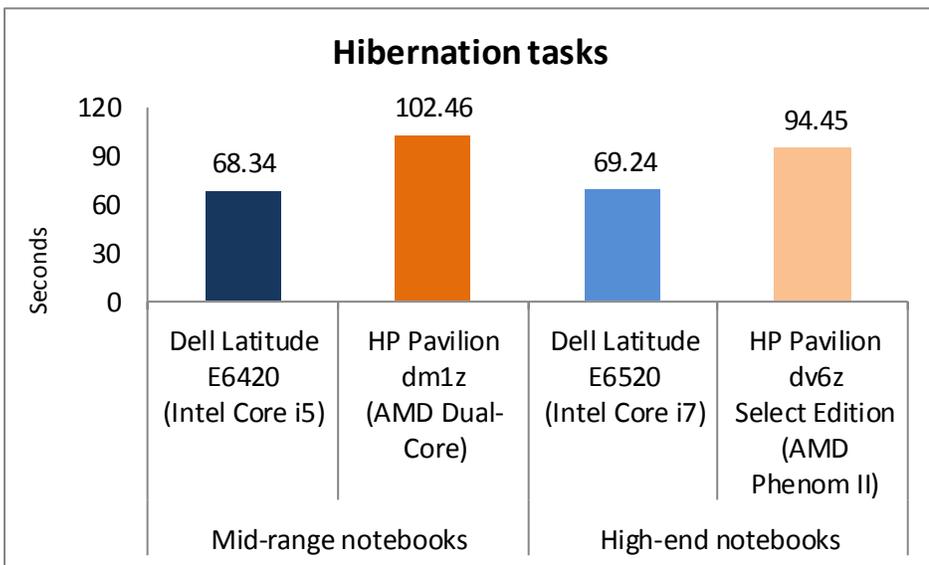


Figure 5: Combined times, in minutes, the four test systems took to complete four tasks related to hibernation. Lower numbers are better.

Figure 5 shows the time each system took to complete four tasks related to hibernation. Each bar represents the number of seconds the system needed to perform all four tasks. The Intel Core i5-based Dell Latitude E6420 notebook took 33.3 percent less time than the AMD Dual-Core-based HP Pavilion dm1z, a savings of 34.12 seconds.

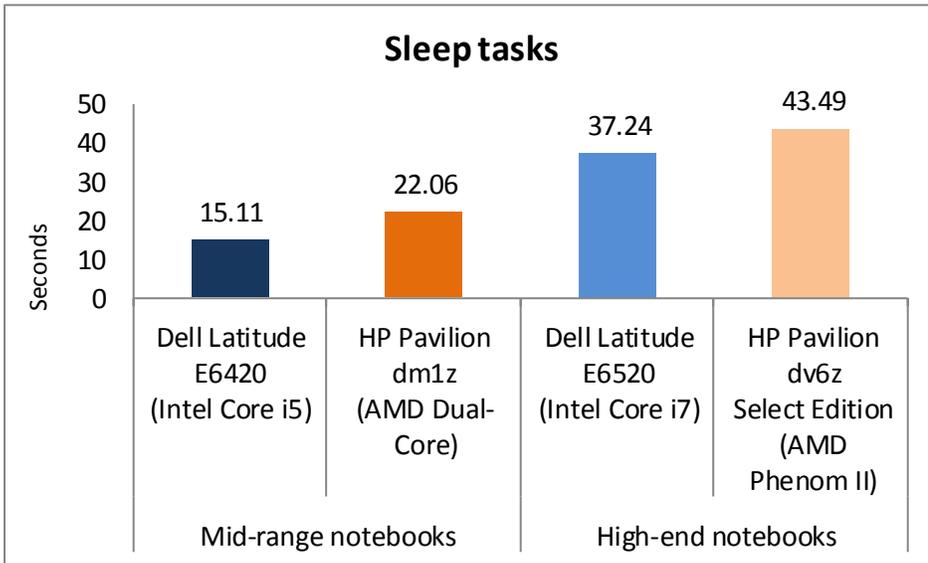


Figure 6: Combined times, in seconds, the four test systems took to complete four tasks related to sleep mode. Lower numbers are better.

The Intel Core i5-based Dell Latitude E6420 notebook took 31.5 percent less time than the AMD Dual-Core-based HP Pavilion dm1z, a savings of 6.95 seconds. The Intel Core i7-based Dell Latitude E6520 notebook took 14.4 percent less time than the AMD Phenom II-based HP Pavilion dv6z, a savings of 6.25 seconds.

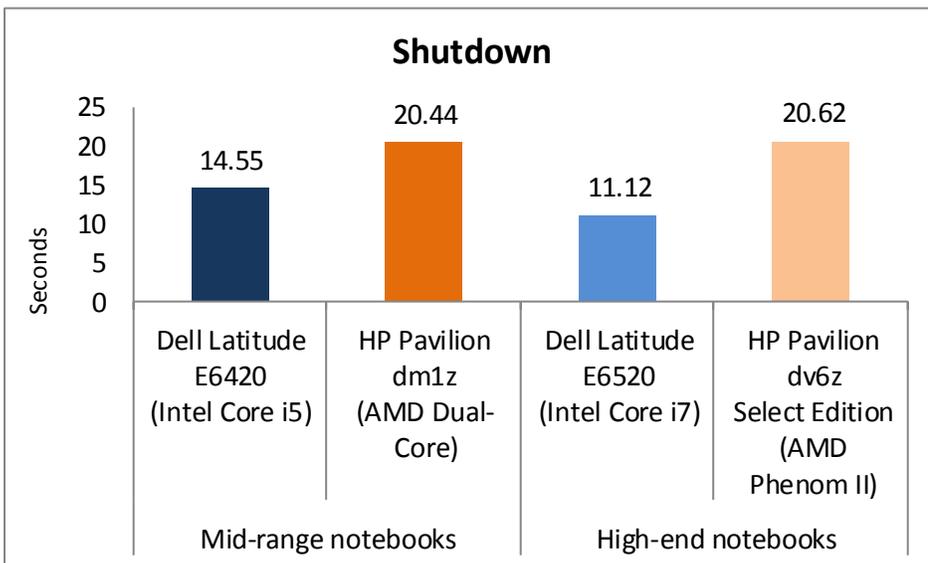


Figure 7: Time, in seconds, the four test systems took to shut down. Lower numbers are better.

The Intel Core i7-based Dell Latitude E6520 notebook took 26.7 percent less time than the AMD Phenom II-based HP Pavilion dv6z, a savings of 25.21 seconds.

Figure 6 shows the time each system took to complete four tasks related to sleep mode. Each bar represents the number of seconds the system needed to perform all four tasks. The Intel

Figure 7 shows the time each system took to shut down. The Intel Core i5-based Dell Latitude E6420 notebook took 28.8 percent less time than the AMD Dual-Core-based HP Pavilion dm1z, a savings of 5.89 seconds. The Intel Core i7-based Dell Latitude E6520 notebook took 46.1 percent less time than the AMD Phenom II-based HP Pavilion dv6z, a savings of 9.50 seconds.

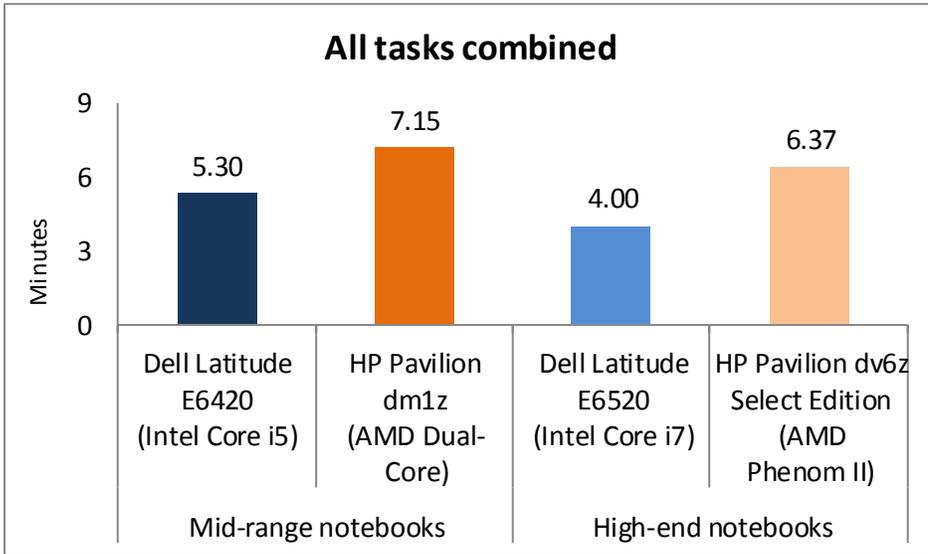


Figure 8: Time, in minutes, the four test systems took to complete all 17 tasks. Lower numbers are better.

Figure 8 shows the time in minutes each system took to complete all 17 tasks we tested. The Intel Core i5-based Dell Latitude E6420 notebook took 25.9 percent less time than the AMD Dual-Core-based HP Pavilion dm1z, a savings of 1.86 minutes.

If each worker performed this set of tasks daily, the annual savings for the company would work out to **154.63 hours for 100**

employees and **1,546.25 hours for 1,000 employees**. The Intel Core i7-based Dell Latitude E6520 notebook took 37.2 percent less time than the AMD Phenom II-based HP Pavilion dv6z, a savings of 2.37 minutes. If each worker performed this set of tasks daily, the annual savings for the company would work out to **197.85 hours** for 100 employees and **1,978.47 hours for 1,000 employees**.

SYSTEM RESPONSIVENESS RESULTS

Figures 9 and 10 show a detailed breakdown of system responsiveness results, in seconds, for the four test systems. These results represent the median of three test runs. [Appendix C](#) presents the results from all three runs.

Mid-range systems	Dell Latitude E6420 (Intel Core i5)	HP Pavilion dm1z (AMD Dual-Core)	Time saved with Dell Latitude E6420 (Intel Core i5)
Opening Microsoft Office files			
Opening local Word document	4.96	12.61	7.65
Opening local Excel spreadsheet	2.37	4.01	1.64
Opening local PowerPoint deck	1.95	3.79	1.84
Opening Word document - network connection	9.09	12.57	3.48
Opening Excel spreadsheet - network connection	4.34	5.90	1.56
Opening PowerPoint deck - network connection	2.68	2.86	0.18
Opening Word document - wireless connection	5.15	12.13	6.98
Opening Excel spreadsheet - wireless connection	3.99	5.65	1.66
Opening PowerPoint deck - wireless connection	2.47	3.71	1.24
USB flash drive tasks			
Installing PNY USB flash drive	8.45	17.45	9.00
Installing Kingston USB flash drive	3.08	3.09	0.01
Re-inserting PNY USB flash drive	2.66	14.60	11.94
Re-inserting Kingston USB flash drive	1.70	1.82	0.12
Copying files to a USB flash drive	78.81	79.71	0.90
Copying files from a USB flash drive	20.23	27.02	6.79
Copying files locally			
Copying files locally	12.56	14.83	2.27
Boot tasks			
Taskbar appears	29.28	41.74	12.46
Word document appears	15.44	8.76	(6.68)
Time to connect to Exchange Server after booting system	10.73	12.06	1.33
Hibernation tasks			
Cold hibernate experience			
Time to hibernate	14.62	25.78	11.16
Time to resume from hibernate	20.40	26.45	6.05
Warm hibernate experience			
Time to hibernate	12.81	24.06	11.25
Time to resume from hibernate	20.51	26.17	5.66
Sleep tasks			
Cold sleep experience			
Time to sleep	4.40	8.54	4.14

Mid-range systems	Dell Latitude E6420 (Intel Core i5)	HP Pavilion dm1z (AMD Dual-Core)	Time saved with Dell Latitude E6420 (Intel Core i5)
Time to resume from sleep	3.26	4.44	1.18
Warm sleep experience			
Time to sleep	4.04	4.53	0.49
Time to resume from sleep	3.41	4.55	1.14
Shutdown			
Time to turn system off	14.55	20.44	5.89
Total seconds	317.94	429.27	111.33
Total minutes	5.30	7.15	1.86

Figure 9: Application and system responsiveness, in seconds, for the mid-range systems. Lower numbers are better.

High-end systems	Dell Latitude E6520 (Intel Core i7)	HP Pavilion dv6z Select Edition (AMD Phenom II)	Time saved with Dell Latitude E6520 (Intel Core i7)
Opening Microsoft Office files			
Opening local Word document	2.69	9.40	6.71
Opening local Excel spreadsheet	1.28	3.75	2.47
Opening local PowerPoint deck	0.95	2.51	1.56
Opening Word document - network connection	3.14	10.47	7.33
Opening Excel spreadsheet - network connection	1.44	5.45	4.01
Opening PowerPoint deck - network connection	1.24	3.40	2.16
Opening Word document - wireless connection	2.89	10.99	8.10
Opening Excel spreadsheet - wireless connection	2.59	5.43	2.84
Opening PowerPoint deck - wireless connection	1.58	3.23	1.65
USB flash drive tasks			
Installing PNY USB flash drive	3.63	8.29	4.66
Installing Kingston USB flash drive	3.06	8.59	5.53
Re-inserting PNY USB flash drive	2.68	2.46	(0.22)
Re-inserting Kingston USB flash drive	1.64	1.56	(0.08)
Copying files to a USB flash drive	60.19	70.02	9.83
Copying files from a USB flash drive	19.23	22.25	3.02
Copying files locally			
Copying files locally	5.37	10.71	5.34
Boot tasks			
Taskbar appears	25.59	37.46	11.87
Word document appears	7.66	15.88	8.22
Time to connect to Exchange Server after booting system	2.44	8.60	6.16

Mid-range systems	Dell Latitude E6420 (Intel Core i5)	HP Pavilion dm1z (AMD Dual-Core)	Time saved with Dell Latitude E6420 (Intel Core i5)
Hibernation tasks			
Cold hibernate experience			
Time to hibernate	11.62	25.70	14.08
Time to resume from hibernate	22.71	23.37	0.66
Warm hibernate experience			
Time to hibernate	11.42	21.01	9.59
Time to resume from hibernate	23.49	24.37	0.88
Sleep tasks			
Cold sleep experience			
Time to sleep	2.68	8.06	5.38
Time to resume from sleep	2.78	6.07	3.29
Warm sleep experience			
Time to sleep	2.52	6.79	4.27
Time to resume from sleep	2.35	5.99	3.64
Shutdown			
Time to turn system off	11.12	20.62	9.50
Total seconds	239.98	382.43	139.18
Total minutes	4.00	6.37	2.32

Figure 10: Application and system responsiveness, in seconds, for the high-end systems. Lower numbers are better.

SUMMARY

A few seconds here, a few seconds there—over the course of the workday, it may not seem like much, but it adds up to a half a day of lost time per employee each year. As our tests prove, Dell notebooks powered by the Intel Core processor family help your employees save time by running common applications responsively, increasing productivity in your workplace.

APPENDIX A – DETAILED SYSTEM CONFIGURATION INFORMATION

Figure 11 presents each test system and the details of its configuration.

System	Dell Latitude E6420 (Intel Core i5)	Dell Latitude E6520 (Intel Core i7)	HP Pavilion dm1z (AMD Dual-Core)	HP Pavilion dv6 (AMD Phenom II)
General				
Number of processor packages	1	1	1	1
Number of cores per processor	2	4	2	4
Number of hardware threads per core	4	8	1	4
System power management policy	Dell	Dell	HP Recommended	HP Recommended
Processor power-saving option	Enhanced Intel SpeedStep® Technology	Enhanced Intel SpeedStep Technology	AMD PowerNow!™ Technology (Cool'n'Quiet™ Technology)	AMD PowerNow! Technology (Cool'n'Quiet Technology)
System dimensions (length x width x height)	13-7/8" x 9-4/8" x 1-3/8"	15-1/8" x 10-1/4" x 1-3/8"	11-4/8" x 8-3/8" x 1-1/8"	15" x 9-7/8" x 1-3/8"
System weight	5 lbs. 5 oz.	6 lbs. 5 oz.	3 lbs. 6 oz.	5 lbs. 8 oz.
CPU				
Vendor	Intel	Intel	AMD	AMD
Name	Core i5	Core i7	Dual-Core Processor	Phenom II
Model number	2520M	2720QM	E-350	N970
Stepping	D2	D2	B0	BL-C3
Socket type and number of pins	Socket 988B rPGA	Socket 988B rPGA	Socket FT1 BGA	Socket S1 (638)
Core frequency (GHz)	2.50	2.20	1.60	2.20
L1 cache	32 KB + 32 KB (per core)	32 KB + 32 KB (per core)	32 KB + 32 KB (per core)	64 KB + 64 KB (per core)
L2 cache	512 KB (256 KB per core)	1 MB (256 KB per core)	1 MB (512 KB per core)	2 MB (512 KB per core)
L3 cache	3 MB	6 MB	N/A	N/A
Platform				
Vendor	Dell	Dell	HP	HP
Motherboard model number	0K0DNP	OJ4TFW	1611	1640
Motherboard chipset	Intel QM67	Intel QM67	AMD A40/A50 Series FCH	AMD 785GX
BIOS name and version	Dell A01 (03/02/2011)	Dell A01 (03/02/2011)	HP F.05 (03/04/2011)	HP F.25 (02/15/2011)

System	Dell Latitude E6420 (Intel Core i5)	Dell Latitude E6520 (Intel Core i7)	HP Pavilion dm1z (AMD Dual-Core)	HP Pavilion dv6 (AMD Phenom II)
Memory module(s)				
Vendor and model number	Micron® 8JSF25664HZ-1G4D1	Samsung M471B5273DHO-CH9	Hyundai HMT325S6BFR8C-H9	Micron 16JSF51264HZ-1G4D1
Type	PC3-10600S	PC3-10600S	PC3-10600	PC3-10600S
Speed (MHz)	1,333	1,333	1,333	1,333
Speed running in the system (MHz)	1,333	1,333	1,066	1,333
Timing/Latency (tCL-tRCD-tRP-tRASmin)	9-9-9-24	9-9-9-24	7-7-7-20	9-9-9-24
Size (MB)	4,096	8,192	4,096	8,192
Number of memory module(s)	2 x 2,048 MB	2 x 4,096 MB	2 x 2,048 MB	2 x 4,096 MB
Chip organization (single-sided/double-sided)	Double-sided	Double-sided	Double-sided	Double-sided
Channel (single/dual)	Dual	Dual	Dual	Dual
Hard disk				
Vendor and model number	Western Digital WD2500BEKT-75PVMTO	Samsung SSD PM810	Seagate ST9250410AS	Samsung HM640JJ
Number of disks in system	1	1	1	1
Size (GB)	250	128	250	640
Buffer size (MB)	16	128	16	16
RPM	7,200	N/A	7,200	7,200
Type	SATA 3.0 Gb/s	SATA II 3.0 Gb/s	SATA 3.0 Gb/s	SATA 3.0 Gb/s
Controller	Intel QM67	Intel QM67	AMD A40/A50 Series FCH	AMD SB800
Driver	Intel 10.1.0.1008 (11/06/2010)	Intel 10.1.0.1008 (11/06/2010)	Microsoft 6.1.7600.20713 (06/21/2006)	Microsoft 6.1.7600.20713 (06/21/2006)
Operating system				
Name	Windows 7 Ultimate	Windows 7 Professional	Windows 7 Professional	Windows 7 Professional
Build number	7600	7600	7600	7600
Service Pack	N/A	N/A	N/A	N/A
File system	NTFS	NTFS	NTFS	NTFS
Kernel	ACPI x64-based PC	ACPI x64-based PC	ACPI x64-based PC	ACPI x64-based PC
Language	English	English	English	English
Microsoft DirectX® version	DirectX 11	DirectX 11	DirectX 11	DirectX 11

System	Dell Latitude E6420 (Intel Core i5)	Dell Latitude E6520 (Intel Core i7)	HP Pavilion dm1z (AMD Dual-Core)	HP Pavilion dv6 (AMD Phenom II)
Graphics 1				
Vendor and model number	Intel HD Graphics 3000	NVIDIA® NVS 4200M	AMD Radeon™ HD 6310M	ATI Mobility Radeon HD 6550
Type	Integrated	Discrete	Integrated	Discrete
Chipset	Intel HD Graphics Family	NVS 4200M	ATI Radeon HD 6310M	ATI Mobility Radeon HD 6550
BIOS version	2089.11	75.19.17.1.2	BR39197.bin	BR38060.010
Total available graphics memory (MB)	1,696	4,095	1,972	4,083
Dedicated video memory (MB)	64	512	384	1,024
System video memory (MB)	0	0	0	0
Shared system memory (MB)	1,632	3,583	1,588	3,059
Resolution	1,366 x 768 x 32-bit	1,920 x 1,080 x 32-bit	1,366 x 768 x 32-bit	1,366 x 768 x 32-bit
Driver	Intel 8.15.10.2266 (12/16/2010)	NVIDIA 8.17.12.6696 (02/02/2011)	ATI Technologies Inc. 8.792.0.0 (11/09/2010)	ATI Technologies Inc. 8.770.2.2000 (09/29/2010)
Graphics 2				
Vendor and model number	N/A	N/A	N/A	AMD M880G with ATI Mobility Radeon HD 4250
Type	N/A	N/A	N/A	Integrated
Chipset	N/A	N/A	N/A	ATI Mobility Radeon HD 4250
BIOS version	N/A	N/A	N/A	VER010.094.001.045. 035812
Total available graphics memory (MB)	N/A	N/A	N/A	3,131
Dedicated video memory (MB)	N/A	N/A	N/A	320
System video memory (MB)	N/A	N/A	N/A	0
Shared system memory (MB)	N/A	N/A	N/A	2,811
Resolution	N/A	N/A	N/A	1,366 x 768 x 32-bit
Driver	N/A	N/A	N/A	ATI Technologies Inc. 8.770.2.2000 (09/29/2010)

System	Dell Latitude E6420 (Intel Core i5)	Dell Latitude E6520 (Intel Core i7)	HP Pavilion dm1z (AMD Dual-Core)	HP Pavilion dv6 (AMD Phenom II)
Sound card/subsystem				
Vendor and model number	Intel Display Audio	NVIDA High Definition Audio	ATI High Definition Audio Device	ATI High Definition Audio Device
Driver	Intel 6.14.0.3074 (10/15/2010)	NVIDIA 1.2.14.0 (12/13/2010)	ATI Technologies Inc. 7.11.0.7710 (08/30/2010)	ATI Technologies Inc. 7.11.0.7706 (05/06/2010)
Ethernet				
Vendor and model number	Intel 82579LM Gigabit	Intel 82579LM Gigabit	Realtek PCIe GBE Family	Realtek PCIe GBE Family
Driver	Intel 11.8.81.0 (10/28/2010)	Intel 11.8.81.0 (10/28/2010)	Realtek 7.27.920.2010 (09/20/2010)	Realtek 7.23.623.2010 (06/23/2010)
Wireless				
Vendor and model number	Intel Centrino™ Ultimate-N 6300 AGN	Intel Centrino Ultimate-N 6300 AGN	Ralink RT5390	Broadcom® 43224AG
Driver	Intel 14.0.1.2 (12/21/2010)	Intel 14.0.1.2 (12/21/2010)	Ralink Technology Corp. 3.1.13.0 (11/04/2010)	Broadcom 5.60.350.11 (05/07/2010)
Optical drive(s)				
Vendor and model number	TSSTcorp TS-U333B	TSSTcorp TS-U633J	HP HSTNN-ID06	HP TS-L633R
Type	DVD ROM	DVD+/-RW	BD-ROM	CD/DVD-RW
USB ports				
Number	3	3	3	3
Type	2.0	2.0	2.0	2.0
Other	eSATA, Media Card Reader	eSATA, HDMI, Media Card Reader	HDMI, Media Card Reader	eSATA, HDMI, Media Card Reader
Monitor				
LCD type	HD LED WXGA	HD LED WXGA	HD LED WXGA	HD LED WXGA
Screen size	14"	15.6"	11.6"	15.6"
Refresh rate	60 Hz	60 Hz	60 Hz	60 Hz
Battery				
Type	T54FJ Lithium-ion	T54FJ Lithium-ion	HSTNN-OB2D Lithium-ion	HSTNN-DBOX Lithium-ion
Size (length x width x height)	8-1/8" x 2" x 3/4"	8-1/8" x 2" x 3/4"	8" x 2-3/8" x 1"	8" x 2" x 7/8"
Rated capacity	5400mAh/ 11.1V (60Wh)	5400mAh/ 11.1V (60Wh)	5100 mAh / 10.8V (55Wh)	5100 mAh / 10.8V (55Wh)
Weight	11 oz.	11 oz.	11 oz.	11 oz.

Figure 11: Configuration information for the four test systems.

APPENDIX B - TEST METHODOLOGY

Note: We ran each test three times, and report the results of the median run.

Setting up the test workload

We used a specific test workload for four of five test cases (see [Appendix D](#)). 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 that 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 flash drive, and a 1GB Kingston Traveler USB flash drive.

Setting up the test

1. Copy the test.mp3 file from the Corpus folder to the PNY USB flash drive.
2. Copy the test.mp3 file from the Corpus folder to the Kingston USB flash drive.
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 flash drives.
 - 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 flash drive into USB port #1 and start the timer.
2. Stop the timer when the AutoPlay menu for the USB flash drive appears on the desktop.
3. After the USB device driver software installs successfully, remove the USB flash drive using the Safely Remove Hardware tool.
4. Wait 30 seconds.
5. Simultaneously insert the PNY USB flash drive into USB port #2 and start the timer.
6. Stop the timer when the AutoPlay menu for the USB flash drive appears on the desktop.
7. Remove the USB flash drive using the Safely Remove Hardware tool.
8. Wait 30 seconds.
9. Simultaneously insert the Kingston USB flash drive into USB port #1 and start the timer.
10. Stop the timer when the AutoPlay menu for the USB flash drive appears on the desktop.
11. After the USB device driver software installs successfully, remove the USB flash drive using the Safely Remove Hardware tool.
12. Wait 30 seconds.
13. Simultaneously insert the Kingston USB flash drive into USB port #2 and start the timer.
14. Stop the timer when the AutoPlay menu for the USB flash drive appears on the desktop.
15. Remove the USB flash drive 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 flash drives.

- d. Type `decay.exe` and press Enter to run the tool and remove these device drivers.
 - e. Type `decay.exe -1` 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 flash drive, 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 flash drive, and create one output folder on the USB drive (e.g., `E:\testusbout1`).
7. Remove the USB flash drive 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 flash drive 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 flash drive.
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 flash drive using the Safely Remove Hardware tool.
16. Re-insert the USB flash drive 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 testusb1 folder from the USB flash drive.
 - b. Create a new output folder with a different unique name on the USB drive (e.g., E:\testusbout2).
 - c. Remove the USB flash drive 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).

Boot experience tests

Cold boot experience

This test requires a stopwatch with multiple timers.

Setting up the test

1. Reset the system to the base test image.

Running the test

1. Boot the system.
2. Shut down the system, and wait 3 minutes.
3. Simultaneously start the timer and boot the system.
4. Stop timer 1 when the taskbar appears.
5. Immediately after the taskbar appears, click once on the test Word document on the desktop and then press Enter to open the document.
6. Stop timer 2 when the word count for the document appears in the bottom left of the task pane.
7. Wait 3 minutes before shutting the system down.
8. Repeat steps 3 through 8 two more times.

Trained boot experience

This test requires a stopwatch with multiple timers. This test requires no setup.

Running the test

1. Simultaneously start the timer and boot the system.
2. Stop timer 1 when the taskbar appears.
3. Immediately after the taskbar appears, click once on the test Word document on the desktop and then press Enter to open the document.
4. Stop timer 2 when the word count for the document appears in the bottom left of the task pane.
5. Wait 3 minutes before shutting the system down.
6. Repeat steps 1 through 6 two more times.

Boot experience with Outlook 2007

This test requires a stopwatch. This test requires no setup.

Running the test

1. Boot the system.
2. Launch Outlook.
3. Shut down the system, and wait 3 minutes.
4. Boot the system.
5. Simultaneously launch Outlook and start the timer.
6. Stop the timer when the system is online with Microsoft Exchange, as indicated by the status bar in Outlook 2007.
7. Wait 3 minutes before shutting the system down.
8. Repeat steps 4 through 7 two more times, but do not shut down the system after the third timed run.

Shutdown experience tests

Shutdown experience

This test requires a stopwatch. This test requires no setup.

Running the test

1. Boot the system.
2. Wait 2 minutes.
3. Shut down the system: Start→Turn Off Computer→Shut Down (Windows XP), Start→Shut Down (Windows Vista, Windows 7).
4. Simultaneously start the timer and select Shut Down.
5. Stop the timer when the hard drive LED turns off.
6. Repeat steps 1 through 5 two more times.

Hibernate experience tests

Cold hibernate experience

This test requires a stopwatch. This test requires no setup.

Running the test

1. Boot the system.
2. Put the system into hibernate mode: Start→Hibernate.
3. Select Hibernate.
4. Press the power button to resume from hibernate mode.
5. Shut down the system.
6. Boot the system.
7. Wait 5 minutes.
8. Put the system in hibernate mode: Start→Hibernate.
9. Simultaneously start the timer and select Hibernate.
10. Stop the timer when the hard drive LED turns off.
11. Reset the timer.

12. Simultaneously start the timer and press the power button to resume from hibernate mode.
13. Stop the timer when the system displays the desktop.
14. Shut down the system.
15. Repeat steps 6 through 14 two more times, but do not shut down the system after the third timed run.

Warm hibernate experience

This test requires a stopwatch. This test requires no setup.

Running the test

1. Wait 1 minute.
2. Put the system in hibernate mode: Start→Hibernate.
3. Simultaneously start the timer and select Hibernate.
4. Stop the timer when the hard drive LED turns off.
5. Reset the timer.
6. Simultaneously start the timer and press the power button to resume from hibernate mode.
7. Stop the timer when the system displays the desktop.
8. Repeat steps 1 through 7 two more times.

Sleep experience tests

Cold sleep experience

This test requires a stopwatch. This test requires no setup.

Running the test

1. Reboot the system.
2. Put the system in sleep mode (Start→Sleep).
3. Press the power button to resume from sleep mode.
4. Shut down the system.
5. Boot the system.
6. Wait 5 minutes.
7. Put the system in sleep mode (Start→Sleep).
8. Simultaneously start the timer and select Sleep.
9. Stop the timer when the hard drive LED turns off.
10. Reset the timer.
11. Simultaneously start the timer and press the power button to resume from sleep mode.
12. Stop the timer when the system displays the desktop.
13. Shut down the system.
14. Repeat steps 5 through 13 two more times, but do not shut down the system after the third timed run.

Warm sleep experience

This test requires a stopwatch. This test requires no setup.

Running the test

1. Wait 1 minute.
2. Put the system in sleep mode (Start→Sleep).
3. Simultaneously start the timer and select Sleep.

4. Stop the timer when the hard drive LED turns off.
5. Reset the timer.
6. Simultaneously start the timer and press the power button to resume from sleep mode.
7. Stop the timer when the system displays the desktop.
8. Repeat steps 1 through 7 two more times.

APPENDIX C – DETAILED RESULTS

Figures 12 and 13 present the detailed test results for the systems.

Mid-range systems	Dell Latitude E6420 (Intel Core i5)			HP Pavilion dm1z (AMD Dual-Core)		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Opening Microsoft Office files						
Opening local Word document	00:04.01	00:04.96	00:05.11	00:12.90	00:12.54	00:12.61
Opening local Excel spreadsheet	00:02.29	00:02.44	00:02.37	00:05.08	00:04.01	00:03.82
Opening local PowerPoint deck	00:02.08	00:01.95	00:01.83	00:03.95	00:03.09	00:03.79
Opening Word document - network	00:09.09	00:09.30	00:08.81	00:12.69	00:12.57	00:12.01
Opening Excel spreadsheet - network	00:04.36	00:04.34	00:04.09	00:07.06	00:05.90	00:05.23
Opening PowerPoint deck - network	00:01.59	00:02.68	00:02.73	00:04.25	00:02.86	00:02.79
Opening Word document - wireless	00:05.15	00:08.44	00:05.02	00:13.59	00:11.71	00:12.13
Opening Excel spreadsheet - wireless	00:03.99	00:04.12	00:03.72	00:06.26	00:05.17	00:05.65
Opening PowerPoint deck - wireless	00:02.83	00:02.47	00:02.43	00:04.15	00:03.69	00:03.71
USB flash drive tasks						
Installing PNY USB flash drive	00:08.13	00:08.45	00:08.45	00:18.09	00:16.75	00:17.45
Installing Kingston USB flash drive	00:03.08	00:03.19	00:02.70	00:02.67	00:03.09	00:03.17
Re-inserting PNY USB flash drive	00:02.70	00:02.64	00:02.66	00:14.53	00:14.60	00:14.78
Re-inserting Kingston USB flash drive	00:01.65	00:01.70	00:01.70	00:01.82	00:01.89	00:01.82
Copying files to a USB flash drive	01:23.38	01:16.91	01:18.81	01:19.23	01:20.36	01:19.71
Copying files from a USB flash drive	00:20.03	00:20.81	00:20.23	00:28.87	00:26.42	00:27.02
Copying files locally						
Copying files locally	00:20.57	00:12.56	00:11.59	00:14.34	00:14.83	00:14.92
Boot tasks						
Taskbar appears	00:29.25	00:29.24	00:29.44	00:41.74	00:41.88	00:41.67
Word document appears	00:15.88	00:15.44	00:15.44	00:08.63	00:08.76	00:08.91
Time to connect to Exchange Server after booting system	00:12.04	00:10.73	00:08.51	00:12.71	00:12.06	00:11.04
Hibernation tasks						
Cold hibernate experience						
Time to hibernate	00:14.98	00:14.35	00:14.62	00:25.78	00:25.73	00:26.05
Time to resume from hibernate	00:17.88	00:20.93	00:20.40	00:26.96	00:26.45	00:26.22
Warm hibernate experience						
Time to hibernate	00:12.81	00:12.81	00:12.72	00:24.06	00:24.14	00:24.02
Time to resume from hibernate	00:20.49	00:20.51	00:21.18	00:26.26	00:26.17	00:26.12
Sleep tasks						
Cold sleep experience						
Time to sleep	00:04.40	00:04.09	00:04.51	00:08.54	00:08.67	00:07.71
Time to resume from sleep	00:03.26	00:03.52	00:03.15	00:04.52	00:04.42	00:04.44
Warm sleep experience						
Time to sleep	00:04.03	00:04.92	00:04.04	00:04.40	00:04.68	00:04.53

Mid-range systems	Dell Latitude E6420 (Intel Core i5)			HP Pavilion dm1z (AMD Dual-Core)		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Time to resume from sleep	00:03.41	00:03.31	00:03.51	00:04.55	00:04.51	00:04.60
Shutdown						
Time to turn system off	00:14.55	00:14.56	00:13.81	00:20.38	00:20.74	00:20.44

Figure 12: System responsiveness results, in seconds, for the two mid-range notebook systems. Lower numbers are better.

High-end systems	Dell Latitude E6520 (Intel Core i7)			HP Pavilion dv6z Select Edition (AMD Phenom II)		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Opening Microsoft Office files						
Opening local Word document	00:02.38	00:02.84	00:02.69	00:10.15	00:09.40	00:08.23
Opening local Excel spreadsheet	00:01.48	00:01.28	00:01.18	00:03.09	00:03.75	00:03.87
Opening local PowerPoint deck	00:00.90	00:00.95	00:01.06	00:02.40	00:03.12	00:02.51
Opening Word document - network	00:03.29	00:03.14	00:02.86	00:10.06	00:10.47	00:10.68
Opening Excel spreadsheet - network	00:01.43	00:01.44	00:01.45	00:05.03	00:06.74	00:05.45
Opening PowerPoint deck - network	00:01.20	00:01.76	00:01.24	00:03.28	00:03.60	00:03.40
Opening Word document - wireless	00:02.57	00:03.96	00:02.89	00:10.99	00:11.90	00:10.88
Opening Excel spreadsheet - wireless	00:03.62	00:01.94	00:02.59	00:05.43	00:05.31	00:05.87
Opening PowerPoint deck - wireless	00:01.58	00:01.52	00:02.27	00:02.84	00:03.34	00:03.23
USB flash drive tasks						
Installing PNY USB flash drive	00:03.63	00:04.06	00:03.43	00:08.77	00:08.01	00:08.29
Installing Kingston USB flash drive	00:03.07	00:02.96	00:03.06	00:08.59	00:08.72	00:08.18
Re-inserting PNY USB flash drive	00:02.54	00:02.68	00:02.69	00:02.43	00:03.02	00:02.46
Re-inserting Kingston USB flash drive	00:01.62	00:01.68	00:01.64	00:01.59	00:01.42	00:01.56
Copying files to a USB flash drive	01:00.81	00:59.14	01:00.19	01:10.31	01:10.01	01:10.02
Copying files from a USB flash drive	00:19.22	00:19.23	00:19.83	00:22.25	00:22.26	00:22.24
Copying files locally						
Copying files locally	00:05.46	00:05.35	00:05.37	00:10.30	00:10.71	00:11.50
Boot tasks						
Taskbar appears	00:25.59	00:25.62	00:25.30	00:37.78	00:37.24	00:37.46
Word document appears	00:07.70	00:07.21	00:07.66	00:21.33	00:15.88	00:13.35
Time to connect to Exchange Server after booting system	00:02.69	00:02.04	00:02.44	00:08.65	00:08.22	00:08.60
Hibernation tasks						
Cold hibernate experience						
Time to hibernate	00:11.84	00:11.34	00:11.62	00:24.81	00:25.70	00:25.81
Time to resume from hibernate	00:22.71	00:22.83	00:22.68	00:23.41	00:23.37	00:23.31
Warm hibernate experience						
Time to hibernate	00:11.42	00:11.47	00:11.18	00:21.01	00:21.01	00:21.64
Time to resume from hibernate	00:23.49	00:23.65	00:23.07	00:24.26	00:24.37	00:25.96

High-end systems	Dell Latitude E6520 (Intel Core i7)			HP Pavilion dv6z Select Edition (AMD Phenom II)		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Sleep tasks						
Cold sleep experience						
Time to sleep	00:02.73	00:02.68	00:02.41	00:08.18	00:08.06	00:07.78
Time to resume from sleep	00:02.78	00:02.82	00:02.28	00:06.17	00:05.84	00:06.07
Warm sleep experience						
Time to sleep	00:02.84	00:02.44	00:02.52	00:06.79	00:07.65	00:06.63
Time to resume from sleep	00:02.29	00:02.35	00:02.53	00:06.35	00:05.99	00:05.80
Shutdown						
Time to turn system off	00:10.71	00:11.45	00:11.12	00:21.42	00:20.62	00:19.10

Figure 13: System responsiveness results, in seconds, for the two high-end notebook systems. Lower numbers are better.

APPENDIX D – 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
12/19/2003	11:42 PM	16,896	bank24 (2).xls
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
9/9/2007	12:16 AM	118,051	ChristmasCarol.docx
9/12/2007	12:56 AM	287,538	ChristmasCarol.pdf
9/12/2007	12:55 AM	507,684	ChristmasCarol.xps
9/9/2005	4:21 PM	1,160,640	Church Altar-All Mosaic! (2).JPG
9/9/2005	4:21 PM	1,160,640	Church Altar-All Mosaic!.JPG
12/19/2003	11:42 PM	24,064	ciscoexpo (2).xls
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
9/9/2007	2:03 AM	107,778	Communicating Bad News (2).pptx
9/9/2007	2:03 AM	107,778	Communicating Bad News.pptx
9/9/2007	2:23 AM	142,036	Company Handbook (2).pptx
9/9/2007	2:23 AM	142,036	Company Handbook.pptx
9/9/2007	2:24 AM	137,524	Company Meeting Title (2).pptx
9/9/2007	2:24 AM	137,524	Company Meeting Title.pptx
9/9/2007	2:09 AM	126,324	Company Meeting3 (2).pptx
9/9/2007	2:09 AM	126,324	Company Meeting3.pptx
9/9/2007	1:58 AM	252,618	Company Name (2).pptx
9/9/2007	1:58 AM	252,618	Company Name.pptx
9/9/2007	2:05 AM	340,381	Company Name2 (2).pptx
9/9/2007	2:05 AM	340,381	Company Name2.pptx
9/9/2007	2:18 AM	165,587	Company Name4 (2).pptx
9/9/2007	2:17 AM	165,587	Company Name4.pptx
9/9/2007	9:46 PM	1,467,429	conference (2).pptx
9/9/2007	9:46 PM	1,467,429	conference.pptx
9/11/2007	12:31 AM	1,468,617	conferenceA (2).pptx
9/11/2007	12:31 AM	1,468,617	conferenceA.pptx
9/11/2007	12:31 AM	1,468,621	conferenceC (2).pptx
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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9/9/2007	12:51 PM	803,809	Microsoft© Office9.pptx
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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



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