

## Battery life performance ratings of the Acer Aspire One D250- Windows XP Home Edition and Acer Aspire One D250-Windows 7 Starter Edition Netbook systems

### Executive summary

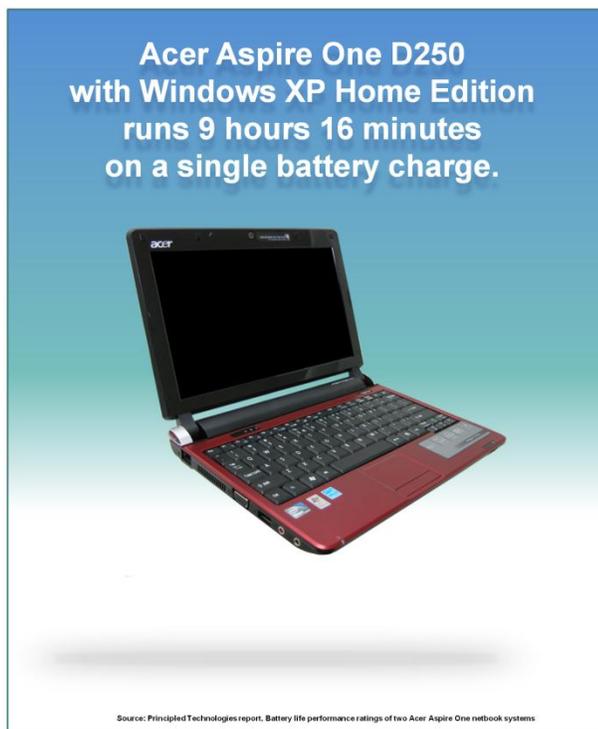
Acer® commissioned Principled Technologies (PT) to run BAPCo's MobileMark 2007 Productivity 2007 battery life benchmark test on the following two systems:

- Acer® Aspire® One D250-Windows XP Home Edition Netbook
- Acer® Aspire® One D250-Windows 7 Starter Edition Netbook

The goal of the testing was to gauge the battery life that buyers would experience. Acer specified and provided the test systems. PT set up the systems and executed all tests.

We measured system battery life using BAPCo's MobileMark 2007 Productivity 2007 test. MobileMark 2007 Productivity 2007 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 2007 Productivity 2007 includes applications and workloads specific to mobile systems, such as 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.

As Figure 1 shows, with a standard 5,800 mAh, 6-cell battery, the Acer Aspire One D250-Windows XP Home Edition Netbook produced a battery life score of 9 hours 16 minutes.



**Figure 1: MobileMark 2007 Productivity 2007 battery life score for the Acer Aspire One D250-Windows XP Home Edition Netbook system.**

### KEY FINDING

- The 10.1" Acer Aspire One D250-XP Home Edition Netbook system, with a weight of just over 2 pounds and retail price of \$349, produced a battery life score of 9 hours 16 minutes on the MobileMark 2007 Productivity 2007 test with its standard 6-cell battery. (See Figure 1.)
- The 10.1" Acer Aspire One D250-Windows 7 Starter Edition Netbook system, with a weight of just over 2 pounds and retail price of \$379, produced a battery life score of 8 hours 1 minute on the MobileMark 2007 Productivity 2007 test with its standard 6-cell battery. (See Figure 2.)

As Figure 2 shows, with a standard 5,800 mAh, 6-cell battery, the Acer Aspire One D250-Windows 7 Starter Edition Netbook produced a battery life score of 8 hours 1 minute.

The Workload section details the specific applications the MobileMark 2007 Productivity 2007 test uses, the Test results section shows the test results in more detail, and the Test methodology section explains how we ran the tests. Appendix A details the system configurations.

### Workload

Our goal was to see how long the Acer Aspire One D250-Windows XP Home Edition Netbook battery and Acer Aspire One D250-Windows 7 Starter Netbook battery would last running BAPCo's MobileMark 2007 Productivity 2007 battery life benchmark test. MobileMark 2007 is an industry-standard benchmark BAPCo created to measure system battery life and performance.

MobileMark 2007 Productivity 2007 consists of the following applications and corresponding tasks: Microsoft Project 2003 (project management), Microsoft

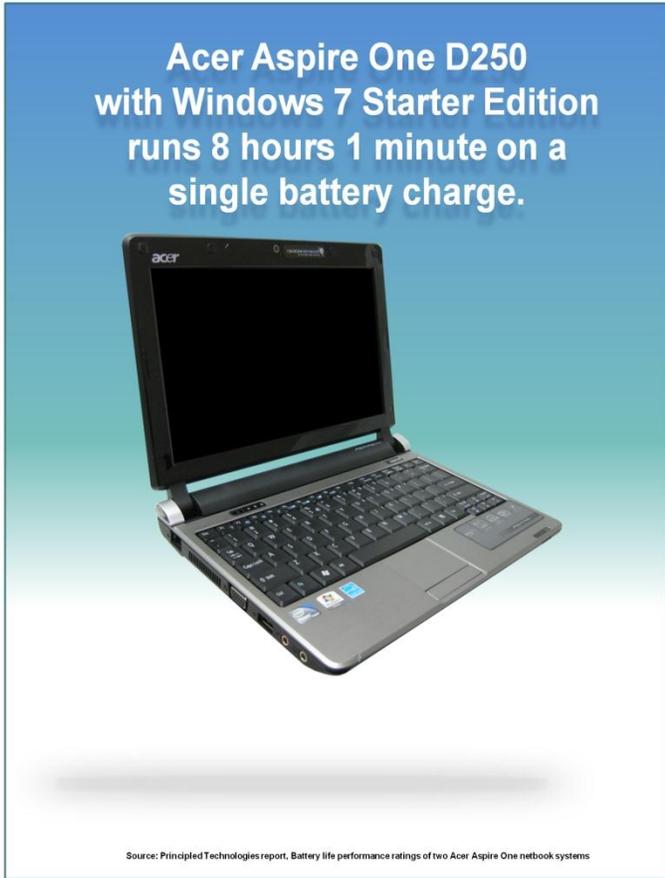


Figure 2: MobileMark 2007 Productivity 2007 battery life score for the Acer Aspire One D250-Windows 7 Starter Edition Netbook system.

Excel 2003 (calculation sheets), Microsoft Outlook 2003 (emails, calendars, scheduler), Microsoft PowerPoint 2003 (slide presentations), Microsoft Word 2003 (formatted text documents), WinZip Computing and WinZip Pro 10.0 (compressed archives), Adobe Photoshop CS2 (manipulated and compressed images), Adobe Illustrator CS2 (manipulated images), and Adobe Flash 8 (vector graphics, animation).

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

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

## Test results

Figure 3 presents the MobileMark 2007 Productivity 2007 median battery life rating for the Acer Aspire One D250-Windows XP Home Edition Netbook and Acer Aspire One D250-Windows 7 Starter Edition netbook. We conducted one conditioning run followed by three Official MobileMark 2007 Productivity 2007 runs. (Complete test results appear in Appendix B.)

Because screen brightness can affect the amount of energy a system consumes, we check the brightness of every system we test and adjust it when necessary. We adjusted the levels of brightness for each system to meet MobileMark's required minimum brightness of 60 nits. We tested the Acer Aspire One D250-Windows XP Home Edition at 80 nits and the Acer Aspire One D250-Windows 7 Starter Edition at 69 nits.

	Acer Aspire One D250-Windows XP Home Edition (80 nits)	Acer Aspire One D250-Windows 7 Starter Edition (69 nits)
<b>MobileMark 2007 Productivity 2007</b>		
Battery life score (hours:minutes)	9:16	8:01

Figure 3: MobileMark 2007 Productivity 2007 scores for the Acer Aspire One D250-Windows XP Home Edition and Acer Aspire One D250-Windows 7 Starter Edition Netbook systems we tested.

## Test methodology

This section details the methodologies we followed in testing each system.

### MobileMark 2007

#### Antivirus software conflicts

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

#### Pre-installed software conflicts

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

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

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

#### Displaying brightness and power settings

Because the brightness of a netbook's display affects its battery life, BAPCo requires that, before you test with MobileMark 2007, you make sure the brightness of the netbook's monitor is greater than or equal to 60 nits on a completely white screen while the netbook is unplugged and running on battery power. The measurement follows the standards from the Video Electronics Standards Association ([www.vesa.org/Standards/summary/2001\\_6a.htm](http://www.vesa.org/Standards/summary/2001_6a.htm)).

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

1. To create a completely blank, white screen, open Microsoft Paint by clicking Start→All Programs→Accessories→Paint.
2. Open the Attributes by pressing Ctrl+E.
3. Enter dimensions that are larger than the current screen resolution. For example, if the screen resolution is 1,280 x 800, type 1600 for Width and 1200 for Height.
4. Click OK.
5. Press Ctrl+F to view the bitmap image and render the screen totally white.
6. Wait 45 minutes to allow the screen to warm.
7. Unplug the netbook from the power supply, and measure the display's brightness using a luminance meter in the center of the screen. (We use the Gossen Mavolux5032C.)
8. If the reading is below or significantly greater than 60 nits, use the netbook's keyboard screen-brightness-adjustment keys to bring the display as close to 60 nits as possible, then retest.
9. Allow the netbook 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 netbook saved the brightness setting by plugging in the system, unplugging it, and taking another reading. If the netbook did not save this setting, use its power-management application(s) to set the brightness appropriately, and save that setting.

## MobileMark 2007 Auto-configuration Tool

This tool supports three levels of configuration:

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

We choose Level 3 in the Auto-configuration tool.

Note: The Acer Aspire One D250-Windows 7 Starter Edition came pre-installed with Windows 7 Starter Edition. The current version of the Auto-configuration tool v1.3.2 does not support Windows 7, so we made the following changes manually:

The MobileMark Auto-configuration tool makes the following configuration changes at each of the three levels:

### Level 1—Required

- Creates and activates a new power scheme that it names MobileMark 2007
- Disables hibernate, standby, and display standby
- Sets hard drive timeout and CPU power management
- See the following POWER SCHEMES section for details on this scheme
- Disables Screen Saver
- Disables Windows Update.
- Disables Desktop Cleanup Wizard
- Disables User Account Control (UAC)
- Disables Sidebar

### Level 2—Recommended

- Completes Level 1 steps
- Disables Windows Security Center warning messages
- Disables Windows Firewall
- Disables incoming Remote Desktop connections
- Disables Windows Error Reporting to Microsoft
- Prevents the Welcome Center from running at startup

### Level 3—Best scores

- Completes Level 1 and Level 2
- Disables Windows Defender

## Power schemes

The MobileMark Auto-configuration tool creates a MobileMark 2007 power scheme, which makes the following power option changes:

- a. Additional settings:
  - Require a password on wakeup: No
- b. Hard disk:
  - Turn off hard disk after: 3 minutes
- c. Wireless Adapter Settings:
  - Power Saving Mode: Maximum Power Saving
- d. Sleep:
  - Sleep after: Never
- e. USB settings
  - USB selective suspend setting: Enabled
- f. Power buttons and lid:
  - Lid close action: Do nothing
  - Power button action: Shut down
  - Sleep button action: Sleep

- Start menu power button: Shut down
- g. PCI Express:
  - Link State Power Management: Maximum power savings
- h. Processor power management:
  - Minimum processor state: 5%
  - Maximum processor state: 100%
- i. Search and Indexing:
  - Power Savings Mode: Power Saver
- j. Display:
  - Turn off display after: Never
  - Adaptive display: Off (Extends the time that Windows waits to turn off the display)
  - Display brightness: 100% (We then adjust the brightness % to be no less than 60 nits)
- k. Multimedia settings:
  - When sharing media: Prevent idling to sleep
- l. Battery:
  - Critical battery action: Shut down (on battery), Do nothing (plugged in)
  - Low battery level: 0%
  - Critical battery level: 0%
  - Low battery notification: Off
  - Low battery action: Do nothing

### Installing MobileMark 2007

1. Turn off the wireless network adapter by using the external toggle switch.
2. Insert the MobileMark 2007 Install DVD in the netbook PC's DVD drive.
3. At the Welcome screen, click Next.
4. Accept the license agreement, and click Next.
5. At the Ready to Install the Program screen, click Install.
6. Run the BAPCo Auto-configuration tool, v.1.3.2, or set manually, the power options:
  - a. Insert the Auto-configuration tool in the netbook PC's DVD drive.
  - b. Double-click BAPCo\_AutoConfig.exe.
  - c. Type **M** to choose MobileMark 2007.
  - d. Type **3** to choose the changes that produce the best possible scores.
7. Adjust the screen brightness to no less than 60 nits:
 

For Windows XP

  - a. Press the Function + screen brightness keys.

For Windows 7

  - 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 60 nits.
2. Disable automatic disk defragmentation:
  - a. Click the Windows start button, and type `disk defragmenter` in the Windows Start Search box.
  - b. Uncheck the box next to Run on a schedule.
3. Disable System Protection:
  - a. Click the Windows start button, and type `System` in the Windows Start Search box.
  - b. Click System Protection.
  - c. Uncheck all disks that are protected, and click Apply.
4. Disable Windows Desktop Search indexing:
  - a. Click the Windows start button, and type `Indexing Options` in the Windows Start Search box.
  - b. Click Modify.
  - c. Click Show all locations.
  - d. Under Summary of selected locations, highlight each Included Location listed, which will automatically take you to the indexed location.

- e. Under Change selected locations, uncheck the boxes next to each indexed location.
5. Defragment the hard drive(s):
  - a. Click the Windows start button, and type `disk defragmenter` in the Windows Start Search box.
  - b. Click Defragment now.

### Conditioning the battery

1. Plug the AC power adapter into the netbook PC, and completely charge the battery.
2. Install MobileMark 2007 v1.06, following the steps we outlined in the Installing MobileMark 2007 section earlier in this section.
3. Double-click the MobileMark 2007 icon on the desktop.
4. Highlight the Productivity 2007 item in the left panel.
5. Type `System Conditioning` as the name for this test in the Project Name field at the top-right panel, and click Next Step.
6. If MobileMark lists no problems or warnings, click Next Step. If it does list any problems or warnings, close MobileMark 2007, and correct the problem(s) before proceeding.
7. Unplug the AC power adapter. The Productivity 2007 test begins immediately.
8. The test is complete when the netbook PC has fully depleted its battery and is no longer operational when running on battery power.
9. Plug the AC power adapter into the netbook PC, and completely charge the battery.

### Measuring battery life

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

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

We executed the Productivity 2007 test three times on the system and took the median battery life run as the representative score for that test.

### Getting the MobileMark 2007 results

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

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

1. Browse to the `C:\Program Files\BAPCo\MobileMark 2007\results` directory.
2. Select My Computer.
3. Select Local Disk (C:).
4. Select the Program Files directory.
5. Select the BAPCo directory.
6. Select the MobileMark2007 directory.
7. Select the results directory. (Note: The name of the directory for the Productivity 2007 results is the name you gave the test in Step 3 of the MobileMark Productivity 2007 process.)

## Appendix A – Test system configuration information

Figure 4 provides detailed configuration information about the test systems.

System	Acer Aspire One D250-Windows XP Home Edition Intel Atom N280 1.66GHz	Acer Aspire One D250-Windows 7 Starter Edition Intel Atom N280 1.66GHz
<b>General</b>		
Processor and OS kernel: (physical, core, logical) / (UP, MP)	1P1C2L / UP	1P1C2L / UP
Number of physical processors	1	1
Single/dual-core processors	Single	Single
System power management policy	MobileMark 2007	Balanced
Processor power-saving option	Enhanced Intel SpeedStep Technology	Enhanced Intel SpeedStep Technology
System dimensions (length x width x height)	10.2" x 7.25" x 1.0"	10.2" x 7.2" x 1.0"
System weight	2 lbs. 11 oz.	2 lbs. 11 oz.
<b>CPU</b>		
Vendor	Intel	Intel
Name	Atom	Atom
Model number	N280	N280
Stepping	C0	C0
Socket type and number of pins	Micro-FCBGA	Micro-FCBGA
Core frequency (GHz)	1.66	1.66
Front-side bus frequency (MHz)	667	667
L1 Cache	24 KB + 32 KB	24 KB + 32 KB
L2 Cache (KB)	512	512
<b>Platform</b>		
Vendor	Acer	Acer
Motherboard model number	Aspire one D250-1517	Aspire one D250-1633
Motherboard chipset	i945GSE	i945GSE
Motherboard revision number	03	03
System serial number	LUS700B375934140841601	LUS670D1239363FB4D1601
BIOS name and version	InsydeH2O v1.08 (7/09/2009)	InsydeH2O v1.13 (8/24/2009)
BIOS settings	Default	Default
<b>Memory module(s)</b>		
Vendor and model number	Samsung M470T2864EH3-CE6	Hynix HMP112S6EFR6C-Y5
Type	PC2-5300	PC2-5300
Speed (MHz)	667	667
Speed running in the system (MHz)	533	533
Timing/latency (tCL-tRCD-tRP-tRASmin)	4-4-4-12	4-4-4-12
Size (MB)	1,024	1,024
Number of memory module(s)	1	1
Chip organization (single-sided, double-sided)	Double-sided	Double-sided
Channel (single/dual)	Single	Single
<b>Hard disk</b>		
Vendor and model number	Hitachi HTS545016B9A300	Western Digital WD2500BEVT
Size (GB)	160	250
Buffer size (MB)	8	8

<b>System</b>	<b>Acer Aspire One D250-Windows XP Home Edition Intel Atom N280 1.66GHz</b>	<b>Acer Aspire One D250-Windows 7 Starter Edition Intel Atom N280 1.66GHz</b>
RPM	5,400	5,400
Type	SATA	SATA
Controller	Intel 82801GHM (ICH7M/U)	Intel 82801GHM (ICH7M/U)
Controller driver	Intel 8.0.0.1039 (4/15/2008)	Intel 8.9.0.1023 (6/4/2009)
<b>Operating system</b>		
Name	Windows XP Home Edition	Windows 7 Starter Edition
Build number	2600	7600
Service pack	SP3	N/A
File system	NTFS	NTFS
Kernel	ACPI Multiprocessor PC	ACPI x86-based PC
Language	English	English
Microsoft DirectX version	9.0c	11.0
<b>Graphics</b>		
Vendor and model number	Intel GMA 950	Intel GMA 950
Type	Integrated	Integrated
Chipset	Mobile Intel 945 Express	Mobile Intel 945 Express
BIOS version	1585.0	1585.0
Total available graphics memory (MB)	224	250
Dedicated video memory (MB)	N/A	0
System video memory (MB)	N/A	64
Shared system memory (MB)	N/A	186
Resolution	1,024 x 600 x 32 bit	1,024 x 600 x 32 bit
Driver	Intel 6.14.10.4926 (2/15/2008)	Intel 8.15.10.1825 (6/16/2009)
<b>Sound card/subsystem</b>		
Vendor and model number	Realtek High Definition Audio	Realtek High Definition Audio
Driver	Realtek 5.10.0.598 (2/24/2009)	Realtek 6.0.1.5888 (7/6/2009)
<b>Ethernet</b>		
Vendor and model number	Atheros AR8132	Atheros AR8132
Driver	Atheros 1.0.0.16 (3/2/2009)	Atheros 1.0.0.10 (7/27/2009)
<b>Wireless</b>		
Vendor and model number	Broadcom 802.11g	Atheros AR5B93
Driver	Broadcom 5.10.79.14 (2/20/2009)	Atheros 8.0.0.177 (7/16/2009)
<b>Optical drive(s)</b>		
Vendor and model number	N/A	N/A
Type	N/A	N/A
<b>USB ports</b>		
Number	3	3
Type	2.0	2.0
Other	Media card reader	Media card reader
<b>IEEE 1394 ports</b>		
Number	0	0
<b>Monitor</b>		
LCD type	LED-backlit TFT LCD	LED-backlit TFT LCD
Screen size	10.1"	10.1"
Refresh rate (Hz)	60	60

<b>System</b>	<b>Acer Aspire One D250-Windows XP Home Edition Intel Atom N280 1.66GHz</b>	<b>Acer Aspire One D250-Windows 7 Starter Edition Intel Atom N280 1.66GHz</b>
<b>Battery</b>		
Type	Acer UM08B52 Lithium-ion	Acer UM08B52 Lithium-ion
Size (length x width x height)	8" x 1.6" x 1.25"	8" x 1.6" x 1.25"
Rated capacity	5800mAh/10.8V (63Wh)	5800mAh/10.8V (63Wh)
Weight (oz)	11	11

**Figure 4: Detailed configuration information for the test systems.**

## Appendix B – Complete test results

Figure 5 presents the complete MobileMark 2007 Productivity 2007 test results for the test systems. We conducted one conditioning run followed by three Official MobileMark 2007 Productivity 2007 runs.

	Acer Aspire One D250- Windows XP Home Edition	Acer Aspire One D250- Windows 7 Starter Edition
<b>MobileMark 2007 Productivity 2007</b>		
MobileMark 2007 - Productivity 2007 - Performance Qualification score - Run 1	75	62
MobileMark 2007 - Productivity 2007 - Performance Qualification score - Run 2	75	62
MobileMark 2007 - Productivity 2007 - Performance Qualification score - Run 3	75	62
MobileMark 2007 - Productivity 2007 - Battery Life score (minutes) - Run 1	554	472
MobileMark 2007 - Productivity 2007 - Battery Life score (minutes) - Run 2	556	482
MobileMark 2007 - Productivity 2007 - Battery Life score (minutes) - Run 3	559	481

**Figure 5: MobileMark 2007 Productivity 2007 scores for Acer Aspire One D250-XP Home Edition and Acer Aspire One D250-Windows 7 Starter Edition Netbook systems we tested.**

## About Principled Technologies

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

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

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



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