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Intel® Optane™ SSD 800P Offers New Levels of Performance for Mobile Platforms

March 8, 2018

Version 1.0

Mobile Performance Necessitates Fast Storage

As the relative performance of notebooks and mobile platforms increases when compared to desktops, there has been a resurgence of interest and focus on the secondary components and systems in these machines. As modern processors increase core and thread count, along with frequency, cache, and more, the impact of other hardware level features becomes more critical to the overall experience for consumers.

Beyond synthetic CPU benchmark scores that tell us little about real-world usage, there is a need for improvements to notebooks that change the user experience. This can be showcased as faster loading times for applications, quicker level loads in a game, or the responsiveness of the machine when multiple applications are open for multi-tasking situations. While the value of faster processing is critical, the impact of storage performance also plays an important role.

The move from spinning hard drives to SSDs brought with it a new understanding and appreciation for just how much impact storage can make on our everyday computing. Technology improvements to SATA SSDs, then PCI Express SSDs, and NVMe SSDs have proven there is a need and desire for faster solutions. Intel® Optane™ represents the next evolution of storage technology and how it can improve the performance and experience of notebooks and 2-in-1s is our focus today.

Intel® Optane™ SSD 800P Brings Peak Performance

Based on the same 3D XPoint technology that powers the workstation-class 900P as well as the system accelerating Optane™ Memory, the new Intel® Optane™ SSD 800P offers best-in-class performance that provides the world's most responsive storage solution for notebooks. The responsiveness of a drive is measured with latency and tells us how quickly the drive responds to user and operating system requests and directly correlates to the user experience of everyday tasks like application loads, game launches, and more.

By combining the performance of 3D XPoint™ technology with higher capacities than were available with Optane Memory, Intel® Optane™ SSD 800P provides mobile users the best combination of features and capability. (You can find more details on the implications and technology of 3D XPoint™ by reading our white paper here.)

Testing Configuration

Evaluating the performance of Intel® Optane™ SSD 800P on a mobile platform can indicate what value the new storage option provides in terms of performance, responsiveness, and even battery life.

- Acer Swift 3 SF314-52G-55WQ
- Intel® Core™ i5-8250U
- 8GB LPDDR3
- NVIDIA GeForce MX150
- Windows 10 Pro 64-bit 10.0.16299 (High Performance power plan)
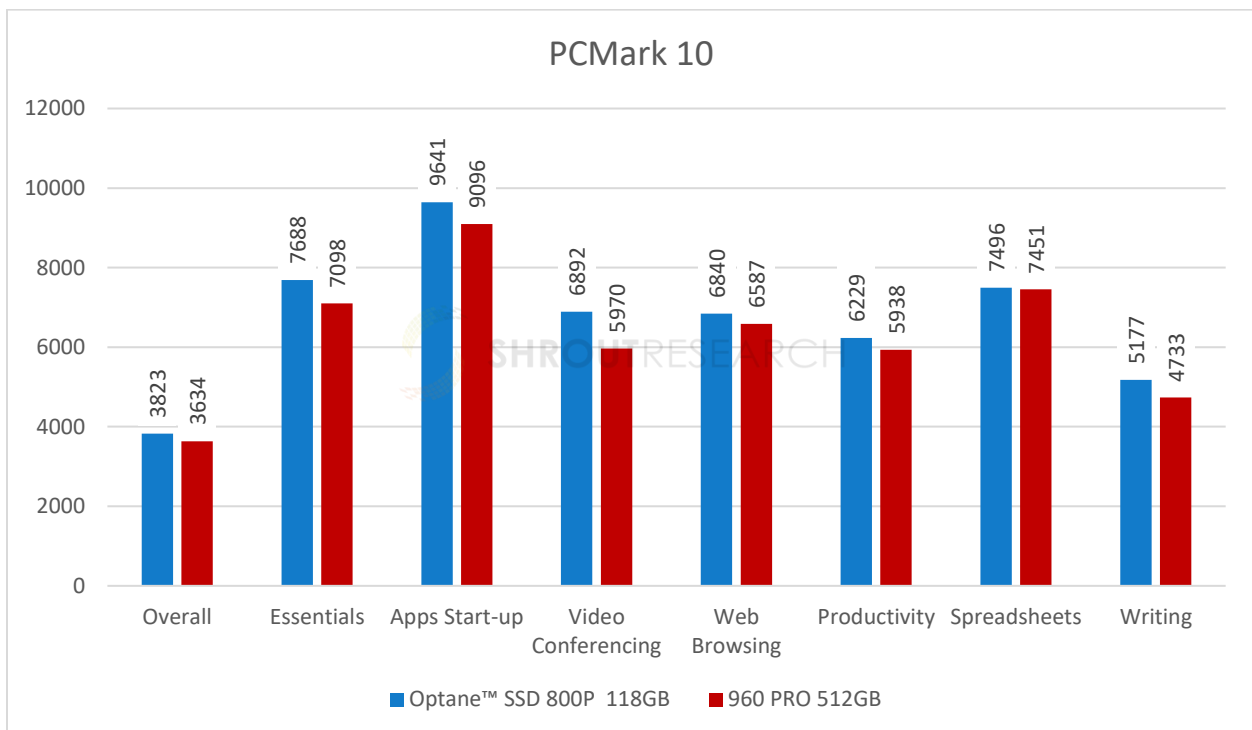
The storage options include:

- Intel® Optane™ SSD 800P 118GB
- Samsung 960 PRO 512GB

PCMark 10

PCMark 10 is the latest industry standard benchmark from Futuremark that features a wide variety of tests that cover the modern workplace. This includes:

- Video conferencing
- App load times
- Office applications
- Photo/video editing
- Rendering
- Basic gaming

PCMark 10

| Test	Optane™ SSD 800P 118GB	960 PRO 512GB
Overall	3823	3634
Essentials	7688	7098
Apps Start-up	9641	9096
Video Conferencing	6892	5970
Web Browsing	6840	6587
Productivity	6229	5938
Spreadsheets	7496	7451
Writing	5177	4733

■ Optane™ SSD 800P 118GB   ■ 960 PRO 512GB

Intel® Optane™ SSD 800P offers a performance improvement over the Samsung 960 PRO in PCMark 10 in most areas. The Apps Start-up test results show a 6% advantage over the leading NVMe SSD, and the Video Conference workload sees a 15% advantage for the 800P. The Overall results from this benchmark gives the advantage to Intel® Optane™ SSD 800P by more than 5%.

PCMark Vantage

PCMark Vantage is a slightly older benchmark suite from Futuremark that attempts to measure storage performance with similar consumer-based workloads. The HDD Suite focuses on tasks like virus scanning, game data streaming, photo importing, video time shifting, and more.
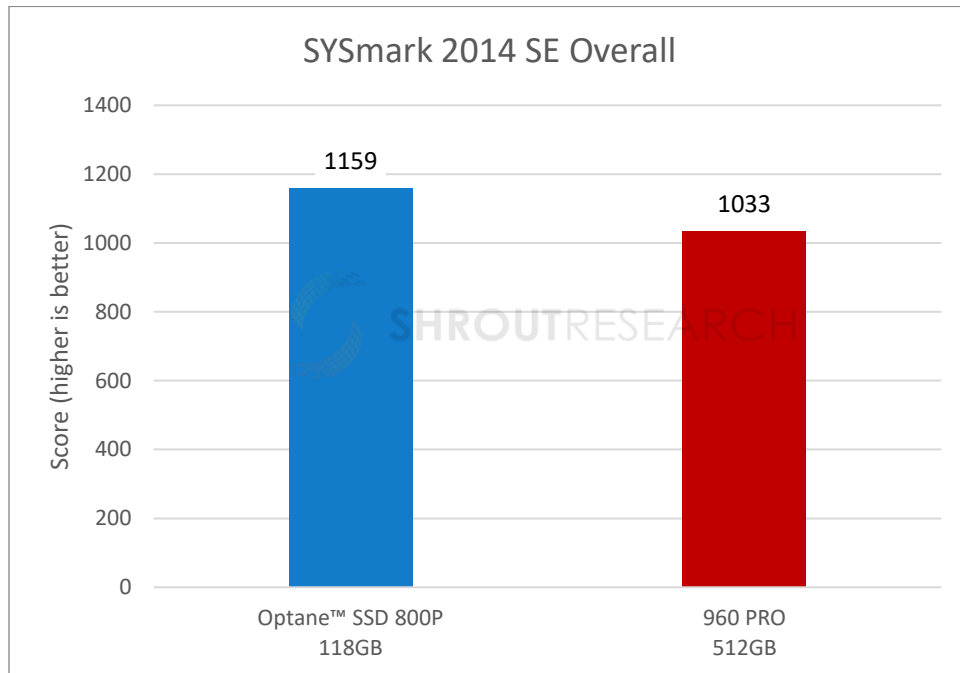
PCMark Vantage HDD

Score (higher is better)

Optane™ SSD 800P 118GB	123,643
960 PRO 512GB	88,123
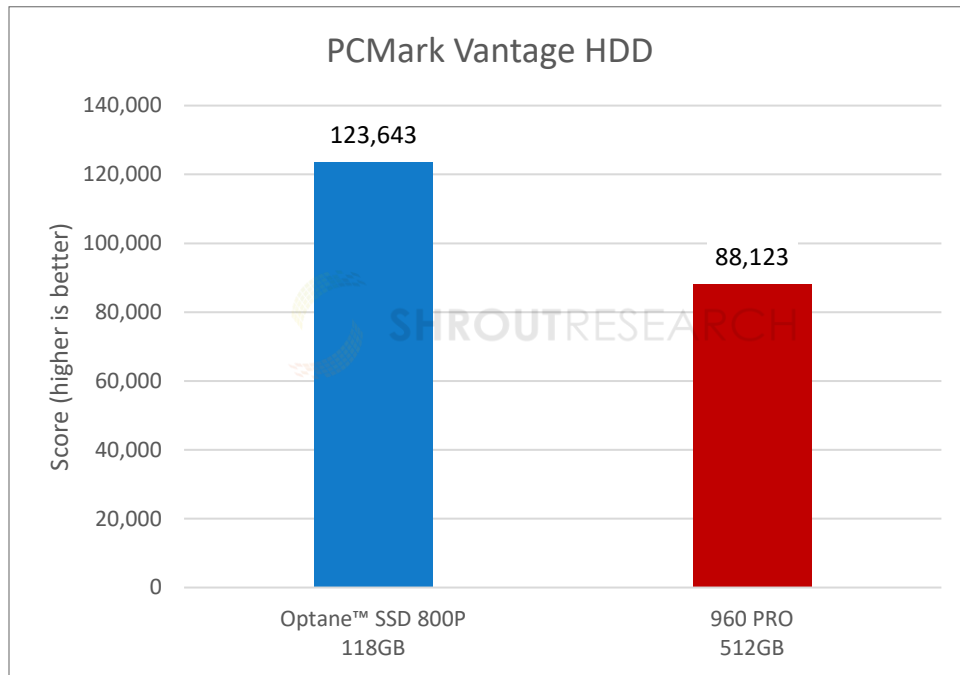
Intel® Optane™ SSD 800P outclasses the 960 PRO offering a performance score that is 40% higher than the leading competing NVMe storage solution.

SYSmark 2014 SE

SYSmark 2014 SE is an application-based benchmark reflecting usage patterns of business consumers.
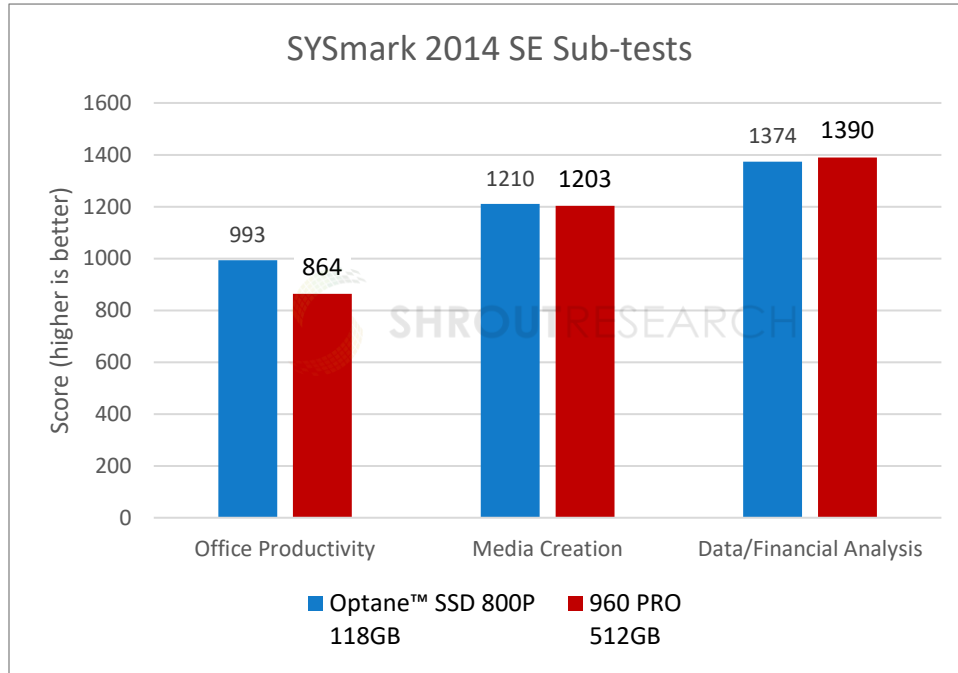

Our results for the overall system score using SYSmark 2014 SE result in an advantage for Intel® Optane™ SSD 800P of 12%, indicating a general system improvement across a mix of workloads.

SYSmark 2014 SE Sub-tests

These tests focus on individual categories of performance including productivity, media creation, and data analysis.

SYSmark 2014 SE Sub-tests

Score (higher is better)

Category	Optane™ SSD 800P 118GB	960 PRO 512GB
Office Productivity	993	864
Media Creation	1210	1203
Data/Financial Analysis	1374	1390

Intel® Optane™ SSD 800P is able to match the performance of the leading Samsung NVMe SSD in both Media Creation and Data/Financial Analysis tests but is nearly 15% faster in the Office Productivity test. For consumers and enterprise customers concerned with the ability to be more productive on the go, the 800P is the best option.

SYSmark 2014 SE Responsiveness

SYSmark 2014 SE is an application-based benchmark reflecting usage patterns of business consumers. The Responsiveness test addresses specific "pain points" for these users including application launch times, multi-tab browsing, file copying and encryption, application installs, and more.
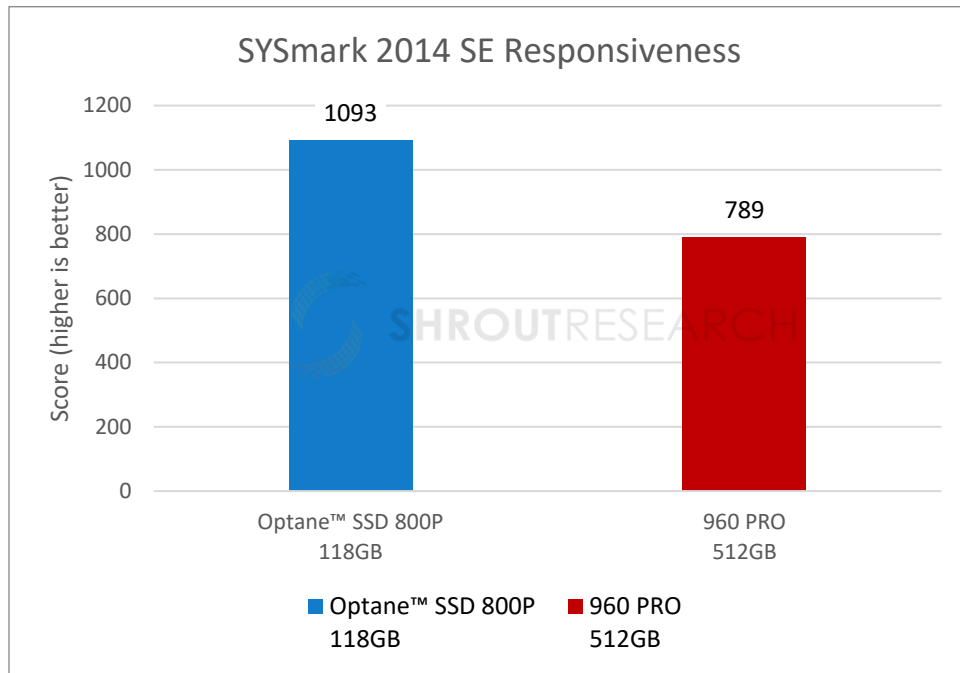

The SYSmark 2014 SE Responsiveness test shows us the performance capability and promise of the underlying 3D XPoint™ technology, with an Intel® Optane™ SSD 800P score that is 38% faster than that of the Samsung 960 PRO.
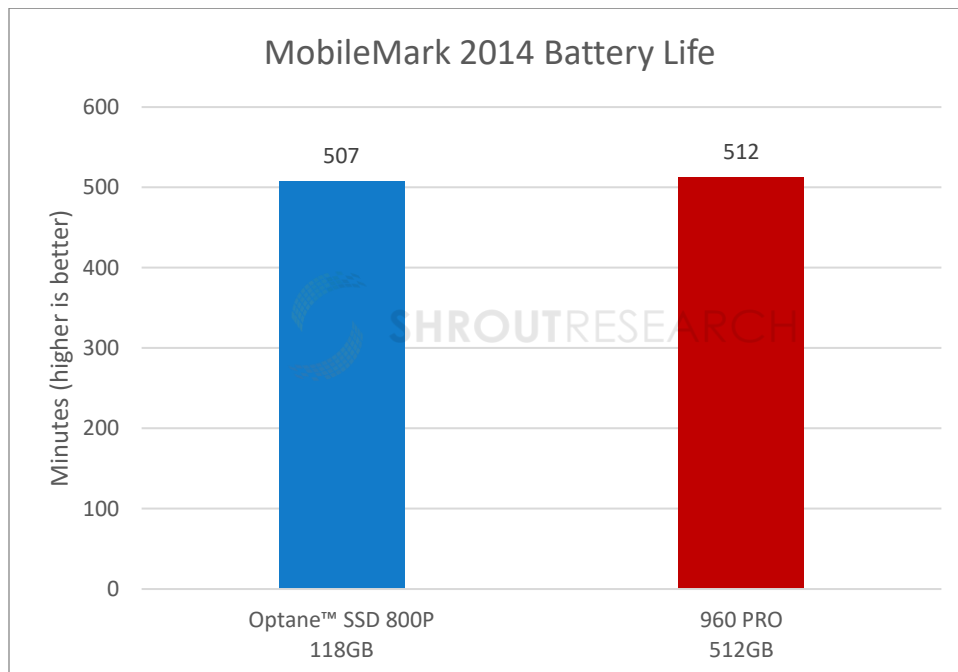
MobileMark 2014

MobileMark is a unique tool from BAPCo that not only measures performance and battery life, but does so simultaneously, offering a better picture of the tradeoffs often made for mobility.

MobileMark 2014 Performance
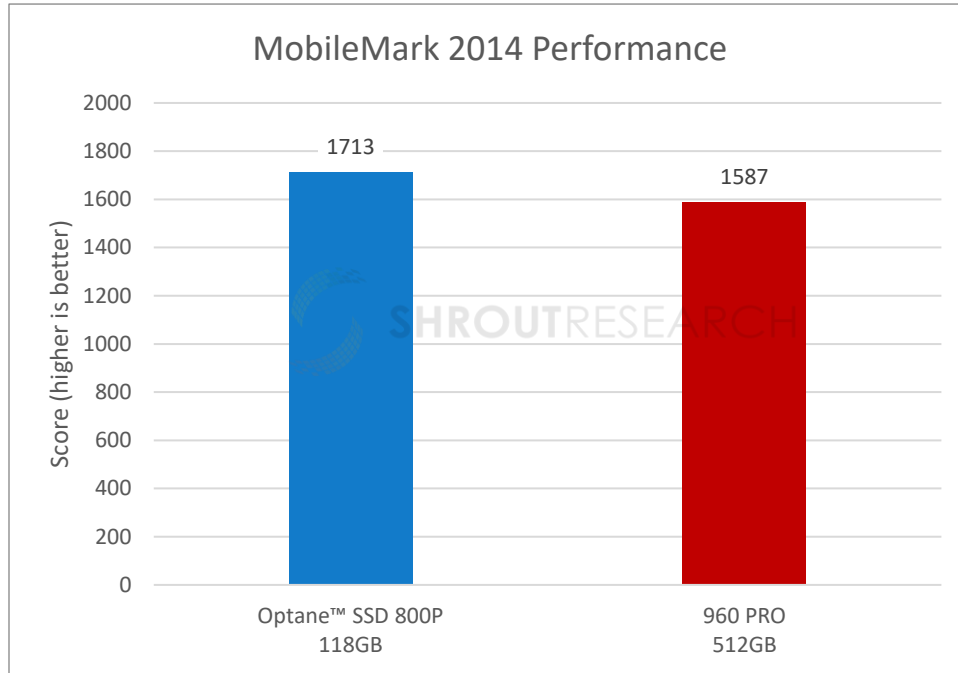
The performance result of Intel® Optane™ SSD 800P is 8% faster than the Samsung 960 PRO.

MobileMark 2014 Battery Life

Despite the performance advantage that Intel® Optane™ SSD 800P offers, there is a negligible impact on battery life, with the platform resulting in nearly identical run-time with both it and the leading NVMe SSD.

Game Load: Ashes of the Singularity

For this test, we took a stopwatch and measured the load time for Ashes of the Singularity after a fresh boot.

Ashes of the Singularity Load Time

Seconds (lower is better)

Optane™ 800P SSD 118GB	22.75
960 PRO 512GB	25.6
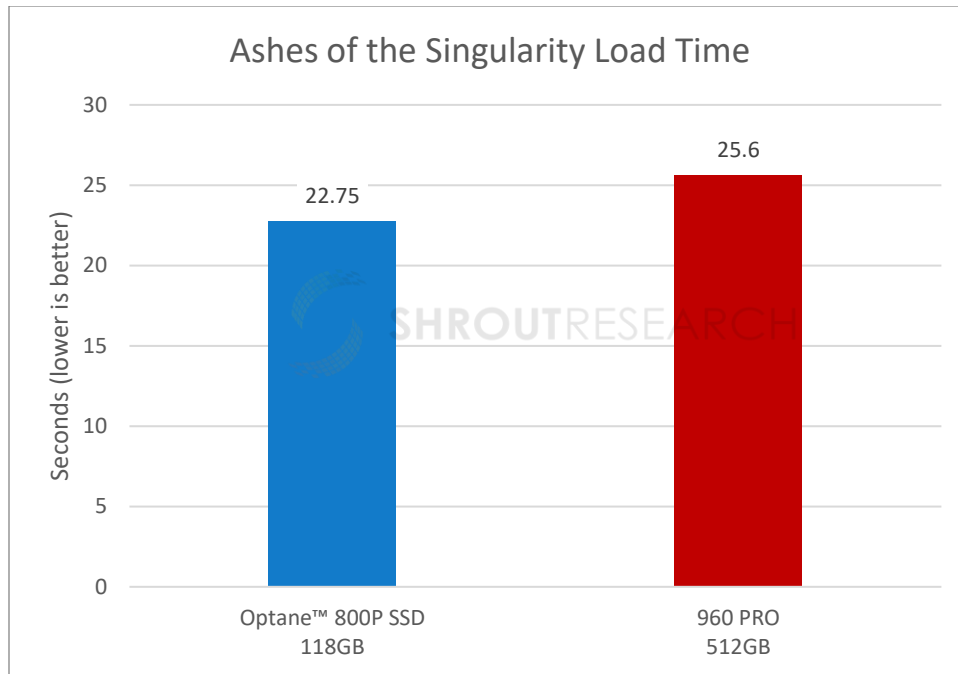
In this graph, we are measuring loading time, so lower is better. Intel® Optane™ SSD 800P is able to load this game 11% faster than the 960 PRO, indicating the Intel® solution provides a more responsive storage system.

Windows 10 Boot Times

Using our stopwatch, we measure the boot times from power on until the Windows 10 desktop is first displayed.
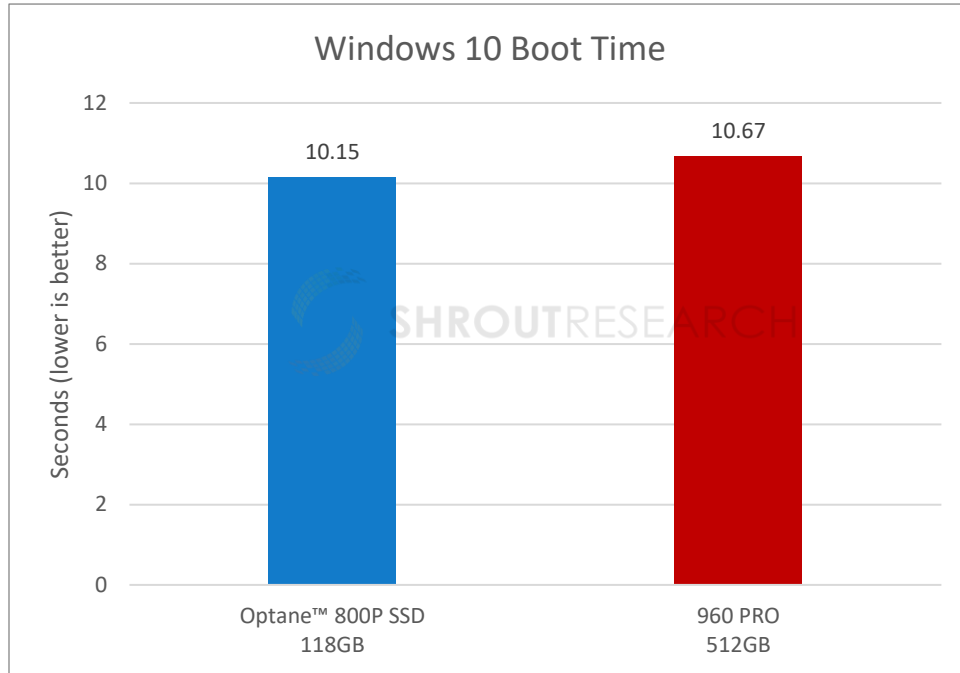
The time to boot to Windows 10 on Intel® Optane™ SSD 800P is about 5% faster than with the Samsung 960 PRO.

Intel® Optane™ SSD 800P Offers Best Performance for Mobile Users

Our evaluation targeting a mobile integration and use for Intel® Optane™ SSD 800P clearly shows that it provides the best overall performance for notebooks and creates a more responsive system than is possible on the leading competitive NVMe NAND SSD solutions. The Samsung 960 PRO has been considered the top performing storage option for mobile and desktop users since its introduction in October of 2016 but it appears that Intel® has created a rival part in the same M.2 form factor with key advantages.

Intel® Optane™ technology promised to be a disruptive force in the storage markets, across different areas of consumer, enterprise, and enthusiasts segments. The release of the P4800X for the data center and the 900P for enthusiasts and workstations are complemented with the Optane™ SSD 800P product that is offering speed and reliability for mainstream mobile consumers.

Both consumer and business users that are looking for the optimal storage solution for a notebook or 2-in-1 will find Intel® Optane™ SSD 800P to offer a fantastic combination of performance, responsiveness, and power efficiency, unmatched by any available alternative.

Author: Ryan Shrout, President and Analyst at [Shrout Research](#)

Editor: Allyn Malventano, Technology Analyst at [Shrout Research](#)

Please direct questions about this paper to ryan@shroutresearch.com.

Appendix

The following test system configuration was used in the preparation of this paper:

Component	Product / Version
System	Acer Swift 3 SF314-52G-55WQ
CPU	Intel® Core™ i5-8250U
RAM	8GB LPDDR3
GPU	NVIDIA GeForce MX 150
OS	Windows 10 Pro RS3