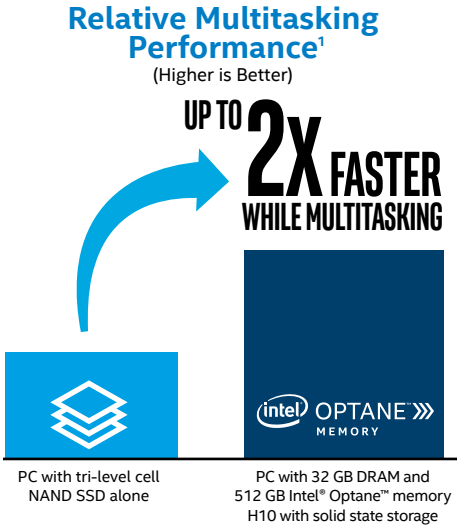
SOLUTION BRIEF

Commercial Client

Intel® Optane™ Memory H10 with Solid State Storage

Is Your PC Keeping Up With the Pace of Business?

If intelligent responsiveness and high performance—even in the face of multiple applications and background tasks—sounds too good to be true, then you haven't experienced Intel® Optane™ Memory H10 with Solid State Storage



Executive Summary

You rely on your PC to get your work done; it's a critical business tool. You need a PC that allows you to keep up with your business and lets you get more work done in less time. The problem is, today's business environment requires significant multitasking, with numerous applications working at the same time; even really good PCs can't keep up. Imagine loving your PC again because, with the intelligent combination of Intel® Optane™ memory and Intel® quad-level cell (QLC) 3D NAND technology (in one M.2 form factor), you get all of the following:

- **Great multitasking performance.** Very rarely are you doing only one thing on your PC. Users typically have multiple applications open along with several OS- or user-initiated tasks running in the background. A PC equipped with Intel® Optane™ memory H10 with solid state storage can launch workbooks up to 2X faster while multitasking compared to a tri-level cell (TLC) NAND SSD alone.[1]
- **A personalized SSD experience.** The Intel Optane memory system acceleration solution identifies and accelerates the files and applications you use the most, providing performance that is uniquely tailored to how you use your PC.
- **Optimized performance for real-world workloads.** Unlike typical NAND SSDs today, Intel Optane memory H10 is specifically designed to provide the best real-world performance (compared to NAND SSDs) for typical office and business applications.[2]

Intel Optane memory H10 delivers a new level of performance plus the high-capacity storage you need to accomplish your demanding daily tasks. With Intel Optane memory H10, your PC can deliver foreground application responsiveness even with a heavy load of background activities—resulting in a smoother workflow. What's more, Intel Optane memory H10 features a single-socket design that is ideal for compact devices such as 2-in-1 notebooks and small-form-factor desktops.

Business Challenge: Your Business PC Is Bogging Down

The minute you put your coffee down and boot your PC up, your day takes off. You have a lot of work to do. And it seems like applications and the OS, not to mention your data, take up more space each month. It's not unusual to be on a conference call that uses VoIP while simultaneously watching video, sharing desktops, and editing documents.

If your duties include content creation or editing, you're dealing with files that are several GBs in size and that can take literally hours to render. For example, 4K raw video consumes about 742 GB per hour,[3] while 300 raw photos can take up almost 2.5 GB.[4]

Then there's all the stuff that happens behind the scenes, like anti-virus and malware scans, OS updates, file and email synchronization, manageability agents, and encryption/decryption.

You're using a high-performance enterprise-level PC for your daily tasks—with a traditional NAND-based SSD and what you thought was enough DRAM. Even so, you find yourself tapping your fingers, waiting for a file to load or an application to launch. Your blood pressure rises. You may even shout at your PC, "Hurry up! I have a deadline!" But the little red light just blinks, and the hourglass blithely ignores you. What's worse, your SSD, which had pretty good performance at first, is now sluggish as it fills with data and tries to keep up with the constant demands of the CPU.

And your co-workers wonder why you are frustrated. There HAS to be a better way.

Solution Value: Love Your PC Again!

Intel® Optane™ memory H10 with solid state storage is specifically designed for the demanding environment. You get a personalized SSD experience with a new level of performance and large storage capacity options. Specific benefits include:

- **Multitasking.** Fast responsiveness even on a super-busy business PC. There's less waiting time and less frustration because applications launch and files open quickly even if there are a lot of applications already running.
- **Premium intelligent performance.** Support for your unique work patterns and requirements, delivering a personalized SSD experience. The technology remembers which files and applications you use the most, and caches them for fast access. Your PC becomes a trusted business partner that knows what you need.
- **Performance optimized for real-world tasks.** Compared to NAND, Intel Optane memory H10 provides the best performance for the tasks you do every day, such as launching office applications and opening large files.[5]
- **Security features.** Peace of mind resulting from encryption and other security protections such as support for industry-standard secure erase.
- **Manageability.** Complete transparency to you, as well as to IT utilities and the OS. You'll see only one storage volume and no special tools are required for OS re-imaging if that becomes necessary.[6]

A PC equipped with Intel Optane memory H10 with solid state storage can open an application twice as fast on a busy system as a PC that uses just a TLC NAND SSD.[7] Less time waiting—no more tapping your fingers, no more shouting. Just the smooth performance that you need to get your job done.

Accelerate Your Experience – Wherever You Are

To meet today's memory and storage challenges, Intel developed Intel® Optane™ technology.

Intel Optane technology is a new class of memory technology, which means Intel Optane SSDs and Intel Optane memory products have characteristics that are fundamentally different from SSD products based on traditional NAND media. Intel Optane technology uses Intel Optane memory media and memory controller, interconnects, and Intel® storage software to deliver products highly optimized for specified markets and workloads demanding large capacity, high endurance, and fast access to storage.

Together, these building blocks deliver a robust set of features that are ideal for the following types of workloads:

- High random read and writes
- High performance for multitasking applications
- High read performance under write load
- High performance maintained over time and as the drive fills
- Low latency
- High endurance

Intel Optane technology offers many form factors for both client computing and the data center—but in all cases it redefines the rules of memory and storage technology to boost performance. Learn more about Intel Optane technology.

STELLAR PERFORMANCE

SSDs with Intel® Optane™ memory deliver the best real-world performance compared to NAND SSDs.[8]

Solution Architecture: High-Performance Storage for Compact Platforms

Intel Optane memory H10 with solid state storage is a single drive that combines Intel Optane memory and Intel® QLC 3D NAND technology. Its unique compact, single-socket M.2 form factor (see Figure 1) is ideal for thin-and-light enterprise-level systems such as all-in-ones, small-form-factor desktops, and 2-in-1 notebooks—while still providing a large storage capacity.

Far more than "just another NAND SSD," Intel Optane memory H10 speeds data access by using the revolutionary Intel Optane memory media. And it is non-volatile, meaning that even if the power goes out, cached data survives and your personalized SSD experience is not in jeopardy. You can replace your traditional TLC NAND SSD (and maybe some of your DRAM) with this single drive and significantly improve performance, such as launching applications even when background activity is high.[9]

You can choose from several capacity options, depending on your specific requirements:

- 16 GB of Intel Optane memory with a 256 GB SSD
- 32 GB of Intel Optane memory with a 512 GB SSD
- 32 GB of Intel Optane memory with a 1 TB SSD

For an optimal experience, combine Intel Optane memory H10 with an Intel® vPro™ platform.

Delivering a New Level of Performance with High-Capacity Storage

Intel® Optane™ Memory + Intel® QLC 3D NAND SSD

Figure 1. Add responsiveness and capacity to your PC with the intelligent combination of Intel® Optane™ memory and Intel® QLC 3D NAND SSD in one M.2 form factor.

Break the Chains of a Slow PC

Intel has redefined the rules for memory and storage. You can take advantage of Intel's innovation to get more done, get it done faster,[10] and reduce your exasperation when tasks take too long. The unique combination of Intel Optane memory and Intel QLC NAND SSD in a single drive delivers the high capacity and high performance you need, at a compelling price point.

Solution Benefits

- **Great multitasking performance.**[11] A new level of performance means less frustration and more work getting done. You will consider your PC as a great co-worker, not a sluggish bystander.
- **Personalized SSD experience.** The storage driver remembers and accelerates what you do the most, providing performance that is customized for your work habits.
- **Optimized for real-world workloads.** You get a PC that is good at helping you accomplish what you do every day, not one that can accelerate tasks you never perform. In fact, Intel® Optane™ memory will provide the best real-world performance compared to NAND SSDs.[12]

Learn More

You may also find the following resources useful:

- Intel® Optane™ technology website
- Intel® Optane™ memory Frequently Asked Questions
- Intel® vPro™ platform website

Find the solution that is right for your organization. Visit **solutions.intel.com** or contact your Intel representative.

[1] Intel tested. As measured by Document Launch with Background Activity (i.e., 18 GB Video File Copy), comparing 8th Gen Intel® Core™ i7-8565U processor (512 GB TLC SSD) vs. 8th Gen Intel® Core™ i7-8565U processor (32 GB+512 GB Intel® Optane™ Memory H10 with solid state storage).

Configuration 1: Intel® Core™ i7-8565U processor, PL1=15W TDP, 4C8T, Turbo up to 4.6 GHz on Intel® Reference Platform, Graphics: Intel® UHD Graphics 620, Memory: 2x 4 GB DDR4, Storage: 512 GB Intel SSD 760p, OS: Windows* 10 RS5 Version 1809, Build 17763.253, MCU 0x9A.

Configuration 2: Intel® Core™ i7-8565U processor, PL1=15W TDP, 4C8T, Turbo up to 4.6 GHz on Intel® Reference Platform, Graphics: Intel® UHD Graphics 620, Memory: 2x 4 GB DDR4, Storage: 32 GB + 512 GB Intel® Optane™ Memory H10 with solid state storage, OS: Windows* 10 RS5 Version 1809, Build 17763.253, MCU 0x9A.

Source: newsroom.intel.com/news/intel-optane-technology-intel-qlc-nand-technology-come-together-single-drive/#gs.8zn495. Performance results are based on testing as of March 21, 2019 and may not reflect all publicly available security updates.

See configurations for details. No product can be absolutely secure.

[2] Intel® Optane™ SSDs are faster as compared to NAND SSDs in the majority of the following common client use cases: As measured by a collection of benchmarks and real-world workloads with drives at 50% prefill including PCMark* 10 Benchmark (App Startup), PCMark* 8 Benchmark: Storage Bandwidth Test, Presentation Launch, Email Launch, Document Launch, Web Browser Launch, Total War* Warhammer II Game Launch, World of Warcraft* Game Launch, Fortnite* Game Launch, Total War* Warhammer II Level Load, World of Warcraft* Level Load, Multitasking Workload, Adobe Premier Pro* Launch with background activity.

The SSDs compared with are 1 TB Samsung 970 PRO*, 1 TB 970 EVO*, 1 TB 970 EVO Plus*, 1 TB Western Digital Black*, 1 TB Intel® SSD 660p, 1 TB 760p, 1 TB OCZ RD4000*, 1 TB HP EX920*, 1 TB Toshiba XG5*, and 960 GB Corsair MP510*.

Configuration: 9th Gen Intel® Core™ i9 9900K processor, PL1= 95W TDP, 8C16T, Turbo up to 5.0 GHz on ASUS Prime* Z390-A platform, Graphics: NVIDIA GeForce* RTX 2080 TI, Memory: 2x8 GB DDR4; Storage: 32 GB+1 TB Intel® Optane™ Memory H10 with Solid State Storage; Storage Driver: Intel® Rapid Storage Technology 17.2.0.1009 driver; OS: Windows* 10 RS5 Version 1809, Build 17763.253, MCU 0xA0; SSD Configurations: Same configuration with the comparison SSD as storage and Microsoft Inbox* NVMe driver as the storage driver.

Results: Intel® Optane™ Memory H10 with Solid State Storage prevails for the majority (more than 50%) of all above tests combined.

Source: newsroom.intel.com/news/intel-optane-technology-intel-qlc-nand-technology-come-together-single-drive/#gs.8zn495 Performance results are based on testing by Intel as of March 22, 2019 and may not reflect all publicly available security updates.

See configuration disclosure for details. No product can be absolutely secure.

[3] 4K Shooters, "How Much Hard Disk Space Do You Need If You Shoot in 4K?" 4kshooters.net/2014/06/25/how-much-hard-disk-space-do-you-need-shooting-4k

[4] O'Reilly.com, "Image Resolution and Memory Capacity." oreilly.com/library/view/digital-photography-the/0596008414/ch01s02.html

[5] See endnote 2.

[6] intel.com/content/dam/support/us/en/documents/memory-and-storage/ssd-software/ReleaseNotes_IMDT.pdf

[7] See endnote 1.

[8] See endnote 2.

[9] See endnote 1.

[10] See endnote 1.

[11] See endnote 1.

[12] See endnote 2.

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information visit intel.com/benchmarks.

Intel technologies' features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer or learn more at intel.com.

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