



**A new desktop with Intel Optane memory outperformed a first-gen desktop**

## **Upgrading 1,000 users to new HP EliteDesk 800 G4 desktops with Intel Optane memory could save millions in productivity costs over three years**

**Replacing older EliteDesk 800 G1 devices with current-gen desktops equipped with Intel Optane could help employees accomplish work faster**

If your employees are getting by with desktops that are a few years old, you might think you can save your company money by waiting a few more years to refresh to new devices. However, you should know the latest hardware from HP and Intel could deliver better desktop performance at a lower cost.

Intel® Optane™ memory is a system accelerator that can improve overall system responsiveness.<sup>1</sup> With Intel Optane, Intel claims that users will find many everyday tasks faster to complete. At Principled Technologies, we conducted hands-on testing to confirm just that. We tested two configurations of HP desktops:

- EliteDesk 800 G4 with 16GB RAM and 16GB Intel Optane memory
- EliteDesk 800 G1 with 32GB RAM, without Intel Optane<sup>2</sup>

Across a range of tasks in common applications, the new fourth-generation desktop with Intel Optane memory outperformed the first-generation desktop with 32GB RAM, completing tasks in up to 88.2 percent less time.

We also analyzed the ownership costs that a hypothetical company purchasing systems for 1,000 employees could expect. Even when accounting for the price of new hardware, our model's estimate saw increased work productivity yielding more than \$3.5 million in savings over three years.<sup>4</sup>

Up to **88%** less time to perform everyday tasks

Potential savings of **\$3,599,534** across 1,000 users over three years<sup>3</sup>

## About the HP EliteDesk 800 G4

According to HP, the EliteDesk 800 G4 delivers “enterprise-class productivity, plus industry-leading reliability, security, and manageability.” The HP EliteDesk 800 G4 is available in three form factors: Desktop Mini, Small Form Factor (which we used in our testing), and Tower. Learn more at <https://www8.hp.com/us/en/elite-family/elitedesk-800.html>.

## Stronger performance greatly reduces cost of ownership

You know the saying—time is money. When it comes to employee productivity, that’s measurably true. What your employees can’t get done in one day will carry over into the next. And if your employees’ desktops aren’t fast enough to keep up with their work, these delays can be exacerbated.

On the next page, we present the results of our hands-on testing, where the HP EliteDesk 800 G4 with 16GB RAM + Intel Optane performed tasks as much as 88.2 percent faster than the older device with 32GB RAM.

In our detailed cost analysis on page four, we use the performance test results to estimate how productivity could affect the total cost of ownership for these devices across three years. To summarize, the G4 configuration’s better performance means a 1,000-employee company could save more than \$3.5 million over three years compared to the G1 desktop with 32GB RAM.

**Read on to learn more.**

## About Intel Optane

Intel Optane memory is an accelerator that creates a bridge between RAM and storage to boost system responsiveness. A PC equipped with low-cost hard drives and Intel Optane can deliver both speed and capacity—and it can outperform a more expensive system configured with extra RAM.

Learn more at <https://www.intel.com/content/www/us/en/architecture-and-technology/optane-memory.html>.

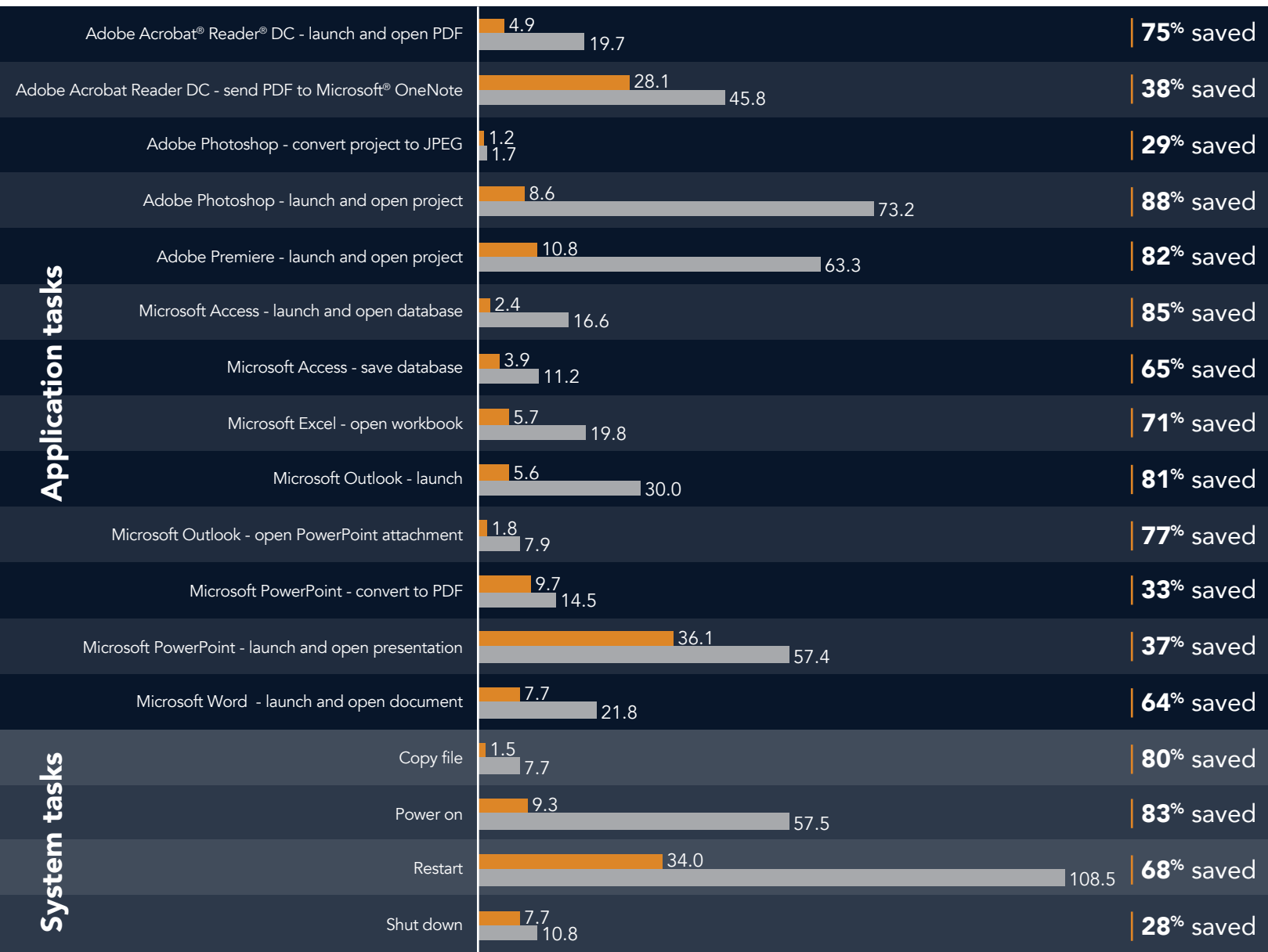


## Carry out tasks more quickly with Intel Optane memory

The chart below shows the time it took our two test systems to complete a range of application and system tasks. The EliteDesk 800 G4 with Intel Optane delivered especially strong results when launching Adobe® apps, saving 64.6 seconds (88.2 percent) for Adobe Photoshop® and 52.5 seconds (82.9 percent) for Adobe Premiere®. For system tasks, it took nearly a minute for the EliteDesk 800 G1 to boot up—even with 32GB RAM. The G4 device with Intel Optane booted in less than 10 seconds. See the full results below.

### Time in seconds to perform tasks

(lower is better)

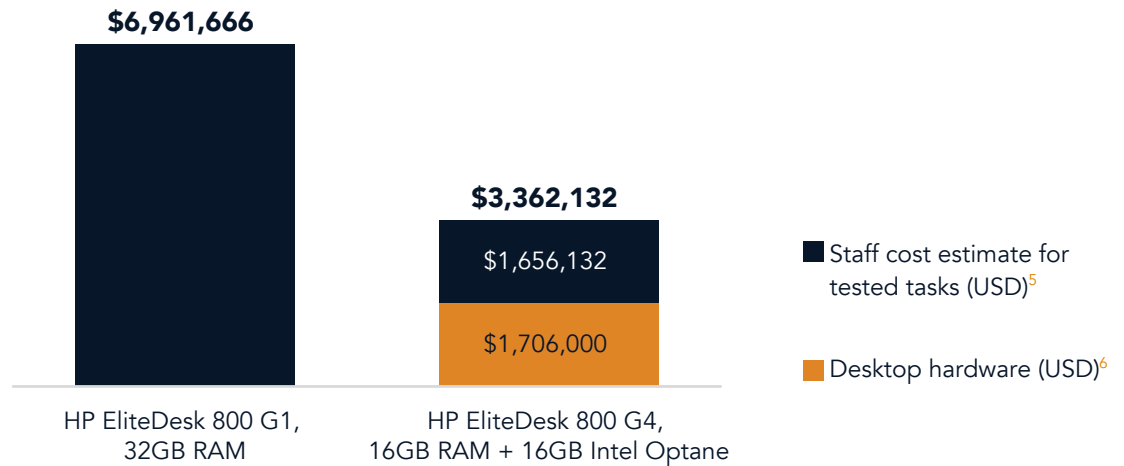


HP EliteDesk 800 G4,  
16GB RAM + 16GB Intel Optane

HP EliteDesk 800 G1,  
32GB RAM

## How the savings add up

**Savings of  
\$3,599,534  
over three years  
with Intel Optane**



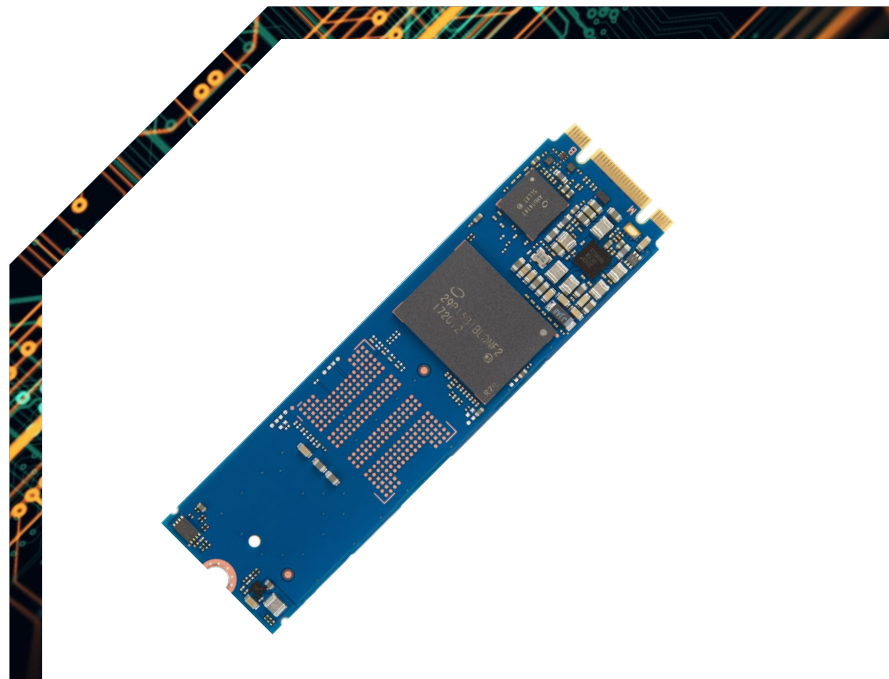
A company might resign itself to continue using older desktops, thinking that working the devices until failure will save money in the long run.

However, by choosing a current-gen desktop with Intel Optane memory, a company can save by gaining employee productivity as a result of improved performance.

To illustrate those savings, let's examine a hypothetical organization shopping for desktop systems for 1,000 professional employees.

Here's a breakdown of this company's employees:<sup>7</sup>

- **100 communicators.** These employees primarily use office applications to work with email, documents, spreadsheets, and PDFs.
- **450 content creators.** This group uses specialized applications to create video and graphic content in addition to using general office applications.
- **450 data analysts.** These employees work with specialized database applications for data analysis in addition to general office applications.



We looked at the list of tasks we tested and estimated the average frequency with which our three groups of employees would perform each task weekly. All 1,000 employees would power on and restart their systems and perform tasks related to working with email, documents, spreadsheets, and PDFs. Those in the content creation and data analysis roles would also perform tasks using specialized applications.<sup>8</sup>

We calculated the weekly productivity cost for each task on each device by multiplying the following:

- Task frequency per week across all 1,000 users
- Median time (in seconds) to complete the task
- Cost per second (calculated from estimated employer expenditure for salary and benefits)<sup>9</sup>

We then added the costs per task and device and multiplied this number by the total number of workweeks in three years. The table below shows the final productivity cost results along with the hardware costs. We combined these two to determine the total expenditures. For the full details of how we conducted our cost analysis, see the [science addendum](#) to this report.

	HP EliteDesk 800 G1, 32GB RAM	HP EliteDesk 800 G4, 16GB RAM + 16GB Intel Optane	Savings with Intel Optane
<b>Productivity cost estimate for 1,000 users over three years for tested tasks (USD)</b>	\$6,961,666	\$1,656,132	\$5,305,534
<b>Desktop hardware costs for 1,000 systems (USD)</b>	\$0	\$1,706,000	N/A
<b>Total cost</b>	\$6,961,666	\$3,362,132	\$3,599,534

As the table above shows, the estimated three-year cost for these 1,000 workers in our model was \$3,599,534 lower for the HP EliteDesk 800 G4 with 16GB RAM + 16GB Intel Optane than it was for the EliteDesk 800 G1 with 32GB RAM.

## Conclusion

Our hands-on tests with Intel Optane show that newer, high-performing desktops can boost employee productivity to the point where the machines could pay for themselves in even less than a year. In our tests, an HP EliteDesk 800 G4 with 16GB RAM and Intel Optane saved enough time on common office tasks to offer millions in productivity savings over the course of three years.

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- 1 Intel Optane memory (cache) is sold separately. Intel Optane memory system acceleration does not replace or increase the DRAM in your system. Available for HP commercial desktops and notebooks and for select HP workstations (HP Z240 Tower/SFF, Z2 Mini, ZBook Studio, 15 G5, and 17 G5) and requires a SATA HDD, 7th Gen or higher Intel Core™ processor or Intel Xeon® processor E3-1200 V6 product family or higher, BIOS version with Intel Optane supported, Windows 10 version 1703 or higher, M.2 type 2280-S1-B-M connector on a PCH Remapped PCIe Controller and Lanes in a x2 or x4 configuration with B-M keys that meet NVMe™ Spec 1.1, and an Intel Rapid Storage Technology (Intel RST) 15.5 driver.
  - 2 For complete configuration details of the two systems, see page 12 of the [science addendum](#) to this report.
  - 3 Based on the cost analysis we discuss on pages 4 and 5, detailed in the [science addendum](#) to this report.
  - 4 We have based the results of the calculations on a variety of features and functionalities under comparison and use industry figures/costs to determine the potential ROI savings customers may derive from the use of the HP products. We present these values not to represent actual savings a customer may expect to see but solely to illustrate potential savings. Many factors and variables may affect whether a customer sees any potential savings.
  - 5 See endnote 4.
  - 6 HP online store, accessed October 25, 2018, <https://store.hp.com/us/en>.
  - 7 For a detailed discussion of our assumptions and approach, see the [science addendum](#) to this report.
  - 8 The [science addendum](#) to this report provides a detailed table presenting the weekly frequency of tasks for each group of workers.
  - 9 We arrived at the \$48.39 hourly employer cost by starting with \$60.49 hourly employer cost for the “Management, professional and related” occupational group, from a September 2018 news release from the Bureau of Labor Statistics that reports data from June 2018: <https://www.bls.gov/news.release/pdf/ecec.pdf> (accessed October 25, 2018). Because not every minute or second of saved time increase productivity, we used 80 percent of this figure.

Read the science behind this report at <http://facts.pt/0n9mupr> ►



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