



Get better desktop performance at a lower cost with the latest hardware from HP and Intel

## Intel Optane memory made an HP EliteDesk 800 G4 desktop faster and less expensive to operate than an older desktop with more RAM

### The productivity gains from this affordable system accelerator add up to great cost-of-ownership savings

Up to **86%** less time to perform everyday tasks

When shopping for new employee desktops, your role as IT decision-maker is to find the right balance between cost and performance. While you might be tempted to purchase last year's desktop on the cheap, you should know the latest hardware from HP and Intel could deliver better desktop performance at a lower cost.

**11%** lower purchase price

The secret? Intel® Optane™ memory—a system accelerator that improves overall system responsiveness. With Intel Optane, Intel claims that users will find that many everyday tasks are faster to complete.<sup>1</sup> 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 G3 with 32GB RAM, no Intel Optane<sup>2</sup>

Potential savings of **\$4,761,738** across 1,000 users over three years<sup>3</sup>

Across a range of tasks in common applications, the newer desktop with Intel Optane memory outperformed the previous-generation desktop with 32GB RAM, completing tasks in up to 86.7 percent less time.

We also analyzed the ownership costs that a hypothetical company purchasing systems for 1,000 employees could expect. In our model, Intel Optane decreased costs by \$4.7 million over three years. Ninety-five percent of that figure comes from the value of improved productivity, with lower hardware costs rounding out the remainder.<sup>4</sup> As you weigh upgrade options for desktop systems, our test results could make your decision an easy one.

## A desktop that improves productivity at a lower cost

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.

In our hands-on tests, the HP EliteDesk 800 G4 with 16GB RAM and Intel Optane performed tasks as much as 86.7 percent faster than the older desktop with 32GB RAM. This time savings could allow your employees to do their work faster. Furthermore, as pricing data from HP shows, the performance improvement comes at a lower cost:<sup>5</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>.

### 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>.

	HP EliteDesk 800 G3 with 16GB RAM	HP EliteDesk 800 G4 with 16GB RAM
Cost of base system	\$1,546	\$1,632
Cost of additional memory	<b>16GB RAM</b>	<b>16GB Intel Optane</b>
	\$380	\$74
<b>Total cost</b>	<b>\$1,926</b>	<b>\$1,706</b>

In our detailed cost analysis on page four, we use these per-unit costs in combination with our performance test results to estimate how productivity could affect the total cost of ownership for these devices. To summarize, the HP EliteDesk 800 G4 configuration’s better performance and lower hardware cost means a 1,000-employee company could save \$4.7 million over three years compared to the HP EliteDesk 800 G3 desktop with 32GB RAM.

### Read on to learn more.

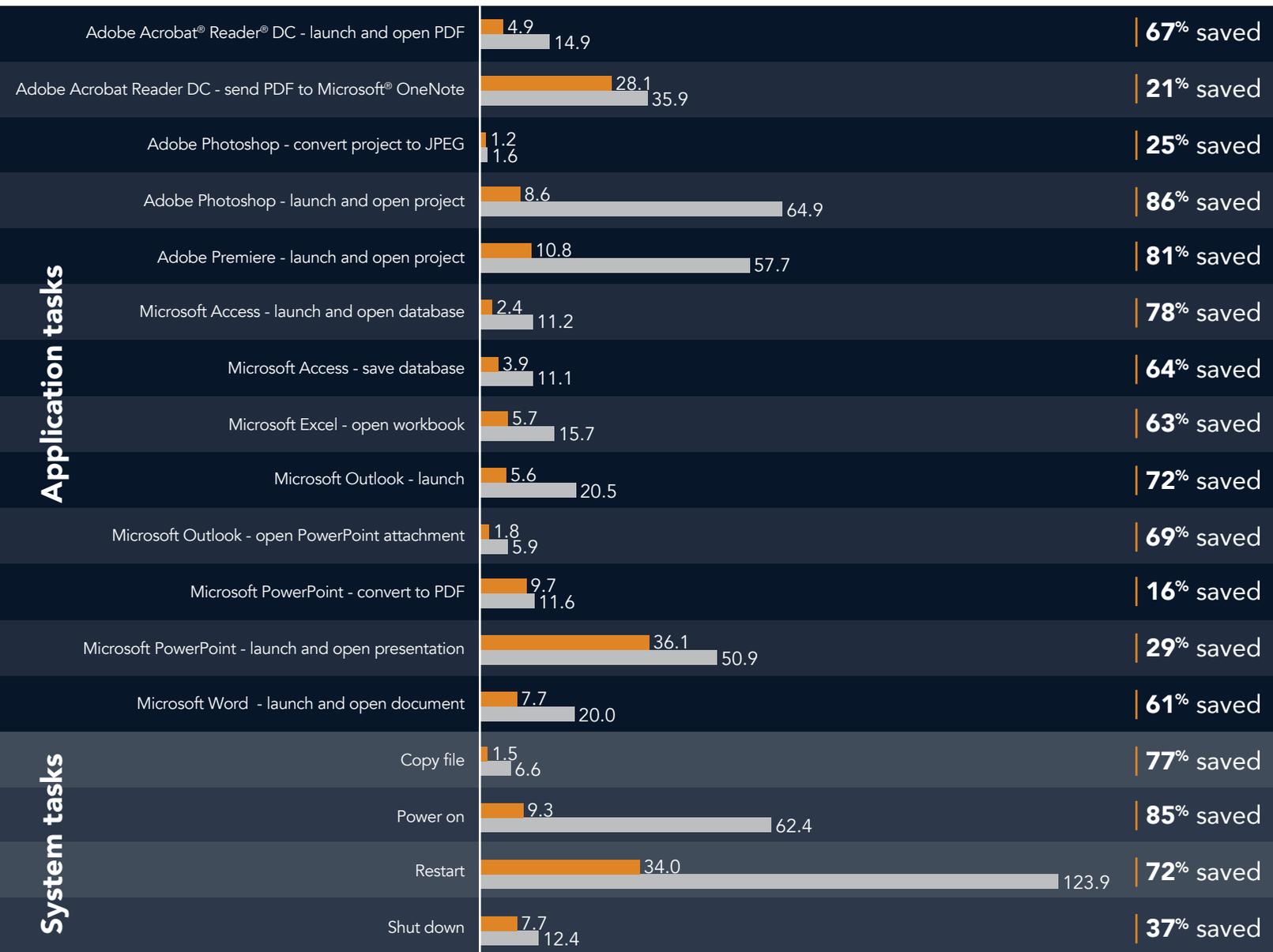


## Finish tasks faster with Intel Optane memory

The chart below shows the time it took our two test systems to complete a range of system and application tasks. The EliteDesk 800 G4 with Intel Optane delivered especially strong results when launching Adobe® apps, saving 56.3 seconds (86.7 percent) for Adobe Photoshop® and 46.9 seconds (81.2 percent) for Adobe Premiere®. For system tasks, even with 32GB RAM, it took over 60 seconds for the EliteDesk 800 G3 to boot up. The G4 device with Intel Optane booted in just nine 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 G3,  
32GB RAM

## How productivity gains turn into savings

**Savings of  
\$4,761,738  
over three years  
with Intel Optane**



A company might think buying last year's desktops will save money, and that giving the desktops additional RAM will make up for not having the latest hardware.

However, by choosing a current-gen desktop with Intel Optane memory, a company can save in two ways: (1) by spending considerably less on hardware, and (2) 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>

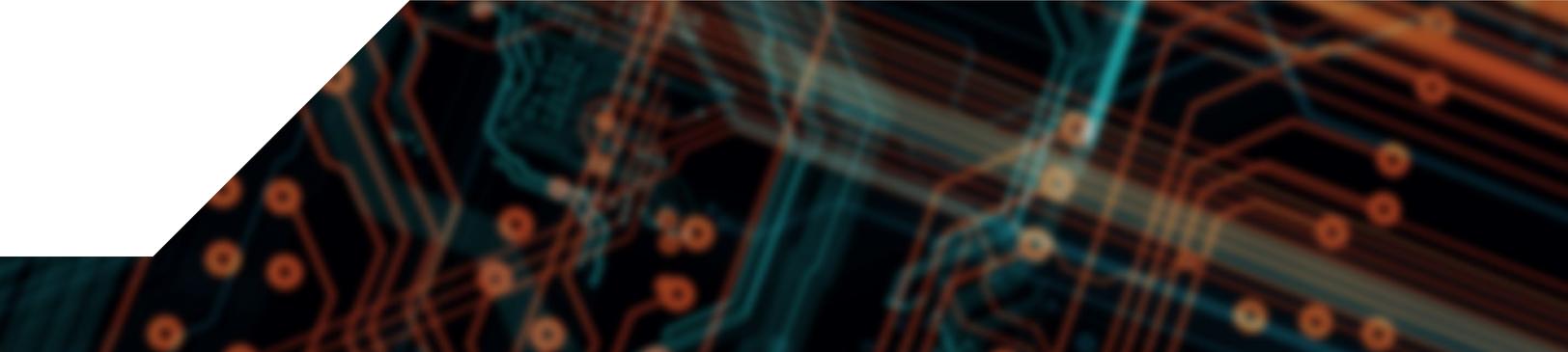
We calculated the weekly productivity cost for each task on each device by multiplying the following:

- Task frequency per week across all 1,000 users
- Median time (in seconds) to complete the tasks
- 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 weeks 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 G3, 32GB RAM	HP EliteDesk 800 G4, 16GB RAM + 16GB Intel Optane	Estimated savings with Intel Optane
<b>Productivity cost estimate for 1,000 users over 3 years for tested tasks (USD)</b>	\$6,197,870	\$1,656,132	\$4,541,738
<b>Desktop hardware costs for 1,000 systems (USD)</b>	\$1,926,000	\$1,706,000	\$220,000
<b>Total cost</b>	\$8,123,870	\$3,362,132	\$4,761,738

As the table above shows, the three-year cost for these 1,000 workers in our model was \$4,761,738 lower for the HP EliteDesk 800 G4 with 16GB RAM + 16GB Intel Optane than it was for the HP EliteDesk 800 G3 with 32GB RAM.



## Conclusion

Our hands-on tests with Intel Optane show high-performing desktops don't have to carry an exorbitant cost. An HP EliteDesk 800 G4 with 16GB RAM and 16GB Intel Optane memory saved enough time on common office tasks to offer millions in productivity savings over the course of three years. That combined with the 11 percent lower hardware cost means a business could save \$4.7 million over three years compared to purchasing previous-generation desktops and outfitting them with additional RAM.



- 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 and detail 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 HP online store, accessed October 25, 2018, <https://store.hp.com/us/en>.
- 6 See endnote 4.
- 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 increases productivity, we used 80 percent of this figure.

Read the science behind this report at <http://facts.pt/36uqui7> ►



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