A Principled Technologies report: Hands-on testing. Real-world results.



Run longer and complete everyday tasks faster with powerful Dell Latitude Chromebook Enterprise devices

Dell Latitude 5400 and 5300 2-in-1 Chromebook Enterprise devices beat five competitors on metrics including battery life, web browsing, productivity app performance, and serviceability

In the past, business users looking for enterprise-class power have turned to more traditional operating systems. And users looking for a Chrome experience have had to settle for devices with less storage, less RAM, and less powerful processors than traditional PCs. In 2019, Google introduced the first Chromebook[™] Enterprise devices in partnership with Dell[™].¹ These Dell Latitude[™] 5400 and 5300 2-in-1 Chrome devices unite Dell's business-grade Latitude platform with the capabilities of Chrome OS[™] for Enterprise. Can these new devices meet the needs of business users?

To find out, we compared the performance of Latitude 5400 and 5300 2-in-1 Chrome devices to that of five other business-class Chromebooks. We tested across a range of performance measures, including battery life, web browsing, performance on common productivity apps, and serviceability. We found that Latitude Chromebooks provided up to 4 hours and 36 minutes more battery and offered up to 3.7 times the performance on common web-based tasks compared to the Chromebooks we tested. These performance wins could increase employee productivity and enable users to stay on the go longer and finish web-based tasks sooner.

Stay on the move longer





Increase productivity



Complete everyday tasks like using Google Slides[™] in up to **64**[%] less time*





Up to **3.7x** the performance on the Speedometer benchmark*

*compared to the competitor Chromebook devices we tested

Latitude Chromebook Enterprise devices

Dell's new Latitude 5400 and 5300 2-in-1 Chrome devices pair traditional Latitude features with Chrome OS for Enterprise. As John Solomon, Vice President of Chrome OS, wrote in an August 2019 blog post, "With Dell's trusted hardware, Chrome's modern OS, and unified endpoint management courtesy of Dell Technologies' Unified Workspace, the Dell Latitude Chromebook Enterprise devices offer a holistic solution that simplifies IT and powers the workforce."²

Dell positions their Latitude 5400 and 5300 2-in-1 Chrome devices as the world's "most powerful" Chromebook Enterprise devices.³ According to Dell, the Latitude 5300 2-in-1 Chrome passed more MIL-STD 810G tests than any other Chromebook Enterprise 2-in-1,⁴ while the Latitude 5400 Chrome is the only Chromebook Enterprise device to offer up to 32 GB of RAM.⁵ With Chrome Enterprise capabilities integrated from the beginning, these Latitude Chrome devices don't require a separate license, and both devices include one year of Dell ProSupport with Next Business Day Onsite Service.⁶



This new offering from Dell is a 13inch convertible device that enables you to use a full-featured PC on the go as a tablet with an optional pen. Dell offers eight different configurations that feature up to an Intel[®] Core[®] i7-8665U processor, 16 GB of RAM, and 512 GB of NVMe storage.⁷



About the Latitude 5400 Chrome

The Latitude 5400 Chrome is a 14-inch business laptop offering from Dell. Users can configure the Latitude 5400 Chrome with up to a quad-core Intel Core i7-8665U processor, 32 GB of RAM, and a 512GB NVMe SSD for ultrafast storage.⁸

Images provided by Dell Technologies.



How we tested

We measured the performance of two Latitude Chrome devices, each with two different configurations:

Group 1: Latitude 5300 2-in-1 Chrome

- with an Intel Core i5-8365U processor
- with an Intel Core i7-8665U processor

Group 2: Latitude 5400 Chrome

- with 8 GB of RAM
- with 16 GB of RAM

We compared the Group 1 devices to the following Chromebooks:

- Lenovo® Yoga® Chromebook C630
- HP Chromebook x360 14
- Google[™] Pixelbook[™]

We compared the Group 2 devices to the following Chromebooks:

- Lenovo Chromebook 14e
- Acer[®] Chromebook 714

We tested a wide range of performance metrics, including battery life, web-browsing benchmark performance, serviceability, and performance on apps from Google, Microsoft, Adobe, and more. We performed each test three times, then selected the median result. For more details on the configurations and testing methods we used, see the science behind the report.

Testing battery life

Users of enterprise devices like the Latitude 5300 2-in-1 and 5400 Chrome need assurance that their computer's battery life can support them through their busy workdays and on-the-go lifestyle. We tested battery life using power_LoadTest, which loads a mix of websites, email, documents, and videos in hour-long iterations until the device's battery dies.⁹ For this test, we chose the Latitude 5300 2-in-1 Chrome with a 60WHr battery, which is the largest capacity battery offered, and an Intel Core i5-8365U processor. We chose the best specifications for the competitor devices as well as the Latitude 5400 Chrome, which included 16 GB of RAM and a 68WHr battery. Of the devices we tested, only the Latitude 5400 Chrome provided the option for a 68WHr battery. The Latitude 5300 2-in-1 Chrome lasted for over 12 hours and 42 minutes, outperforming its competitors by up to 57 percent. The Latitude 5400 Chrome processed everyday tasks for over 14 hours and 30 minutes, lasting up to 47 percent longer than the other Chromebooks we tested.



Stay on the move longer

4 hours & 36 minutes more battery*

*compared to the competitor Chromebook devices we tested

With the better battery life of a Latitude Chrome device, users could:

IT decision-makers

Enhance employee mobility and

availability: Users can stay online and in touch for longer, even when they're on the go

Increase the satisfaction of employees and executives who frequently travel and/or work remotely

End users

Stay on the move for longer with up to fourteen and a half hours of battery life

Avoid hassle: Whether you're traveling or working remotely, longer battery life helps you avoid inconveniences like having to work near an outlet or always carry your charger

Testing performance on common productivity apps

For the performance testing on pages 5-12, we used the Latitude 5300 2-in-1 Chrome with an Intel Core i7-8665U processor because it reflected what an enterprise user looking to maximize performance would use. We tested the Latitude 5400 Chrome with 8 GB of RAM because its memory capacity aligned most closely with the other competitor devices. The Latitude devices outperformed the competitor devices on the majority of our tests; where they did slip to second place, they came within 1.5 seconds of the leading device.

When it comes to productivity apps like those offered by Google and Microsoft, users need a device that helps them complete a broad range of routine tasks quickly and efficiently. We modeled everyday user workflows on several Google apps, measuring how long it took to:

- Open a large Google Docs[™] document and export a document to a .docx file
- Create a new Google Sheets[™] spreadsheet and open a large spreadsheet
- Create a new Google Slides presentation, open a large presentation, and start a presentation

We then combined these results into the summary "workflow" graphs we present below. For the testing on Google apps, the Latitude Chrome devices completed these everyday tasks in up to 64 percent less time than the other Chromebook devices we tested.



Increase productivity

less time*

*compared to the competitor Chromebook devices we tested



Next, we tested the devices' performance on several common productivity apps from Microsoft. We measured how long it took to:

- Create a new document, open a large document, open the print preview of a document, and share a document as a PDF attachment in Microsoft Word
- Open a large file in Microsoft Excel
- Load a large presentation and convert a .ppt file to a PDF in Microsoft PowerPoint

Below, we present the results of this testing, combined and averaged into a single workflow where relevant. Compared to the other Chromebooks we tested, the Latitude Chrome devices offered up to 65 percent better performance.





Opening a large spreadsheet in Microsoft Excel lower is better

GROUP 1

Dell Latitude 5300 2-in-1 Chromebook Enterprise Intel Core i7

Lenovo Yoga Chromebook C630 Intel Core i5 17.2 sec HP Chromebook x360 14 G1 Intel Core i7

14.0 sec Google Pixelbook Intel Core i7 19.0 sec

GROUP 2

Dell Latitude 5400 Chromebook Enterprise 8GB RAM 16.2 sec

Lenovo Chromebook 14e 4GB RAM

Acer Chromebook 714 CB714-1WT-5427 8GB RAM 15.8 sec 46.6 sec

Microsoft Word workflow lower is better

GROUP 1

Dell Latitude 5300 2-in-1 Chromebook Enterprise Intel Core i7

18.5 sec Lenovo Yoga Chromebook C630 Intel Core i5

22.3 sec

HP Chromebook x360 14 G1 Intel Core i7 20.0 sec

Google Pixelbook Intel Core i7

22.3 sec

GROUP 2

Dell Latitude 5400 Chromebook Enterprise 8GB RAM

Lenovo Chromebook 14e 4GB RAM

Acer Chromebook 714 CB714-1WT-5427 8GB RAM 32.8 sec

25.7 sec

24.3 sec

With the productivity gains from a Latitude Chrome device, users could:

IT decision-makers

Increase your employees' output on common productivity tasks: With faster devices, employees can complete their work faster

Keep your employees happy with a Dell Latitude Chromebook Enterprise device that performs well on common Microsoft and Google apps

End users

Get your work done sooner, helping improve your performance at work and freeing up time to finish the other items on your to-do list

Stay productive with a device that performs well on a variety of web-based productivity tasks

Testing browser responsiveness

Browser performance is an important consideration on any device, but it's especially important for Chromebooks, where much of a user's work relies on an internet connection. We ran three industry-standard benchmarks to measure browser responsiveness on the devices we tested (see below for more information about these benchmarks). On the Speedometer 2.0 benchmark, the Latitude Chrome devices offered up to 3.7 times the performance of the five competitor devices. This strong performance continued on the WebXPRT and CrXPRT benchmarks, with Latitude devices outperforming their competitors by up to 166 and 154 percent, respectively.



Finish web-based tasks sooner

Up to **3.7x** the performance on the Speedometer benchmark*

*compared to the competitor Chromebook devices we tested

The benchmarks

Speedometer 2.0: A browser responsiveness benchmark that uses demo web applications to simulate user actions.

WebXPRT 3: A benchmark that shows how well a system handles web-based tasks, such as photo editing and online homework, that real-world users do every day. It includes two AI-based workloads to reflect new kinds of tasks users do on their devices.

CrXPRT: A performance and battery life benchmark application for Chrome OS[™] devices. It measures a Chromebook's speed using HTML5- and JavaScript-based workloads designed to simulate everyday tasks.

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WebXPRT 3 benchmark score higher is better

GROUP 1 Dell Latitude 5300 2-in-1 Chromebook Enterprise Intel Core i7

Lenovo Yoga Chromebook C630 Intel Core i5

HP Chromebook x360 14 G1 Intel Core i7

Google Pixelbook Intel Core i7

GROUP 2

207

193

221

219

257

167

149

Dell Latitude 5400 Chromebook Enterprise 8GB RAM

194

Lenovo Chromebook 14e 4GB RAM

73

Acer Chromebook 714 CB714-1WT-5427 8GB RAM 184

CrXPRT benchmark score higher is better

GROUP 1

Dell Latitude 5300 2-in-1 Chromebook Enterprise Intel Core i7

Lenovo Yoga Chromebook C630 Intel Core i5

HP Chromebook x360 14 G1 Intel Core i7

Google Pixelbook Intel Core i7

GROUP 2



With the web browsing performance gains from a Latitude Chrome device, users could:

IT decision-makers

Increase employees' productivity on web-based activities: With less time spent waiting for websites and apps to load, employees can spend more time on work that contributes to business growth

Get more out of your investment:

Our testing demonstrates that users could get more web browsing performance with Dell Latitude Chromebook Enterprise devices than the other Chromebooks we tested

End users

Complete web-based tasks faster, freeing up time for other activities

Enjoy a better user experience with less lag time

Testing performance on other common tasks

Performance on common photo editing apps

To gauge how well the devices could help users complete activities in common photo editing apps, we tested performance on two cloud-based applications, Adobe® Photoshop® Lightroom® and Pixlr. When we measured how long each device took to save an edited image to a gallery in Lightroom, the Latitude 5400 and 5300 2-in-1 Chrome devices both did so in under 5 seconds. The Lenovo Chromebook 14e, by contrast, took over 30 seconds to do the same task. These time increments may seem small, but when users repeatedly complete these tasks, the time savings can add up.



Performance on Linux (Beta)

For those who enjoy the flexibility offered by the Linux[®] platform, Linux (Beta) enables Chromebook users to install and use Linux applications. To measure Linux performance, we tested several applications on Linux (Beta):

- LibreOffice, an open-source suite of office software
- Visual Studio Code, a source-code editing tool
- GIMP, an open-source image editor

When we measured the time it took the devices to install LibreOffice and Visual Studio Code, the Latitude Chrome devices outperformed the competitor devices by up to 53 percent. For GIMP, we measured the time it would take users to install the program and open and export a large photo. Across this workflow, the Latitude 5400 Chrome responded in up to 53 percent less time than the competitor Chromebook devices we tested.



*compared to the competitor Chromebook devices we tested

Linux (Beta)

Linux (Beta) is a feature that enables Chromebooks to install and access a Linux terminal, as well as install and use Linux applications. Linux (Beta) offers flexibility to users looking to install coding and development tools, open source software, or applications that otherwise might not be available on the Google Chrome or Play Store. The Linux environment is also sandboxed, or isolated from the rest of the Chromebook, meaning that Linux apps can't affect the rest of the Chromebook.¹⁰



GIMP workflow on Linux (Beta) lower is better

GROUP 1

Dell Latitude 5300 2-in-1 Chromebook Enterprise Intel Core i7

194.9 sec Lenovo Yoga Chromebook C630 Intel Core i5

223.6 sec HP Chromebook x360 14 G1 Intel Core i7

193.8 sec Google Pixelbook Intel Core i7

275.1 sec

GROUP 2

Dell Latitude 5400 Chromebook Enterprise 8GB RAM 198.6 sec Lenovo Chromebook 14e 4GB RAM

Acer Chromebook 714 CB714-1WT-5427 8GB RAM 235.6 sec 421.8 sec

With the web-based performance gains from a Latitude Chrome device, users could:

IT decision-makers

Satisfy employees in creative fields with faster performance on common photo editing programs

Meet user demands for more flexibility and access to Linux

End users

Complete graphics-based work in Adobe Photoshop Lightroom, Pixlr, and GIMP faster

Enjoy the flexibility of the Linux platform—and access open-source apps—from your Dell Latitude Chromebook Enterprise device

Serviceability

Changing out common components can help extend the lifespan of a device and give users more flexibility. Of all the devices we tested, only the Latitude Chrome devices allowed users to replace the common components listed below.

	Group 1			
	Dell Latitude 5300 2-in-1 Chromebook Enterprise	Lenovo Yoga Chromebook C630	HP Chromebook x360 14 G1	Google Pixelbook
Customer- replaceable SSD	*	×	×	×
Customer- replaceable RAM	*	×	×	×
Customer- replaceable battery	*	×	×	×
Customer- replaceable WLAN	*	×	×	×
	Group 2			
	Dell Latitude 5400 Chromebook Enterprise	Lenovo Chromebook 14e	Acer Chromebook 714	
Customer- replaceable SSD	*	×	×	
Customer- replaceable RAM	*	×	×	
Customer- replaceable battery	*	×	×	
Customer- replaceable WLAN	*	×	×	

Service devices more easily

Only the Latitude Chrome devices we tested allowed users to replace battery, memory, storage, and WLAN

With the serviceability of a Latitude Chrome device, users could:

IT decision-makers

Reduce employee downtime with faster component replacements, helping increase overall productivity

Save IT and maintenance costs: Avoid the costs of outsourcing or sending devices back to the manuacturer; your IT team can easily replace HDD, RAM, battery, and WLAN in-house

Minimize the need for expensive new purchases: With the ability to replace HDD, RAM, battery, and WLAN, you could extend the lifespan of your employees' devices

End users

Extend the lifespan of your device with the ability to replace common components as your device ages

Increase flexibility and allow customization: Make the modifications you want to the HDD, RAM, battery, and WLAN of your Dell Latitude Chromebook Enterprise device

Summary: The benefits of using Latitude Chrome devices

Stay on the move longer	Up to 4 hours & 36 minutes more battery*
Increase	Complete everyday tasks like using Google Slides in up to 64%
productivity	less time*
Complete	Up to 65%
tasks sooner	faster performance on common Microsoft apps like Excel*
Finish	Up to
web-based	3.7x
tasks sooner	the performance on the Speedometer benchmark*
Edit and	Up to
sort photos	6 X
with ease	the speed saving edited images to a gallery in Lightroom*
Complete Linux-based tasks sooner	Up to 53% better performance in GIMP and LibreOffice*
Service devices more easily	Only the Latitude Chrome devices we tested allowed users to replace battery, memory, storage, and WLAN

*compared to the competitor Chromebook devices we tested



Conclusion

When it comes to enterprise-level Chromebooks, IT decision-makers and end users alike need a device that balances power with long-lasting battery. We tested Dell Latitude 5400 and 5300 2-in-1 Chromebook Enterprise devices on tasks including battery life, web browsing, productivity app performance, and serviceability. The Latitude Chrome devices outperformed the other business Chromebooks on most of our tests, providing up to 4 hours and 36 minutes more battery life and up to 3.7 times the performance on common web-based tasks. With these Latitude Chrome devices, users could complete work faster, stay mobile longer, and improve productivity.

- 2 John Solomon, "Making the modern OS accessible for every enterprise," accessed December 17, 2019.
- 3 Dell Technologies, accessed December 17, 2019, https://www.dellemc.com/en-us/chromebookenterprise/index.htm.
- 4 Dell Technologies, "Latitude 5300 2-in-1 Chromebook Enterprise," accessed December 17, 2019, https://www.dell.com/en-us/work/shop/cty/pdp/spd/latitude-13-5300-2-in-1-chrome-laptop.
- 5 Dell Technologies, "Latitude 5400 Chromebook Enterprise," accessed December 17, 2019, https://www.dell.com/en-us/work/shop/cty/pdp/spd/latitude-14-5400-chrome-laptop.
- 6 John Solomon, "Making the modern OS accessible for every enterprise," accessed December 17, 2019.
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- 8 Dell Technologies, "Dell Latitude 5400 Chromebook Enterprise," accessed December 17, 2019, https://www.dell.com/en-us/work/shop/ dell-laptops-and-notebooks/dell-latitude-5400-chromebook-enterprise/spd/latitude-14-5400-chrome-laptop/.
- 9 Google, "Power testing," accessed December 17, 2019, https://chromium.googlesource.com/chromiumos/third_party/autotest/+/refs/ heads/master/client/site_tests/power_LoadTest/README.md.
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Read the science behind this report at http://facts.pt/kl286wj





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This project was commissioned by Dell Technologies.

¹ John Solomon, "Making the modern OS accessible for every enterprise," accessed December 17, 2019, https://cloud.google.com/blog/ products/chrome-enterprise/making-the-modern-os-accessible-for-every-enterprise.