



Prepare print
preview in 47%
less time
in Google Sheets™



Open Microsoft® Excel®
spreadsheet in
48% less time
in Google Sheets

Get more work done with a Chromebook powered by an Intel Core m3 processor

An Intel Core m3 processor-powered Chromebook enabled us to finish tasks in less time than with a Chromebook powered by an Intel Celeron N3150 processor

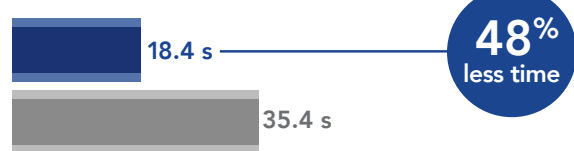
In the workplace, maintaining your flow is key to getting as much work done as possible. When the device you use allows you to complete tasks in good time, you'll see the benefits in the work you finish—and sometimes, in the time you have left over.

At Principled Technologies, we carried out tasks in office-productivity Android™ apps on two Chromebooks: one powered by an Intel Core m3 processor, and the other powered by an Intel Celeron® N3150 processor. In our tests, the Intel Core m3 processor-powered device enabled us to finish tasks—such as opening spreadsheets and PDF documents—in less time than with the Intel Celeron N3150 processor-powered device.

Opening Excel file preview

in Google Drive

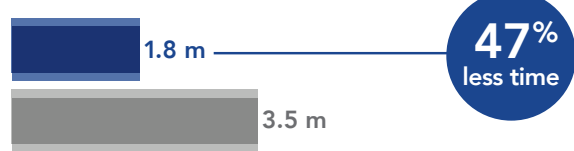
Time (sec)
lower is better



Preparing print preview for large file

in Google Sheets

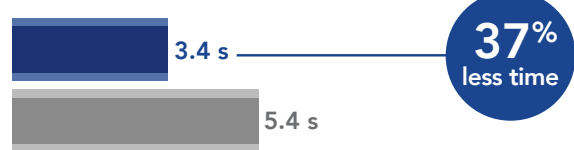
Time (min)
lower is better



Opening Excel file

in Google Drive

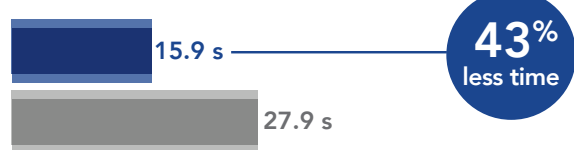
Time (sec)
lower is better



Opening large Excel document

in Google Sheets

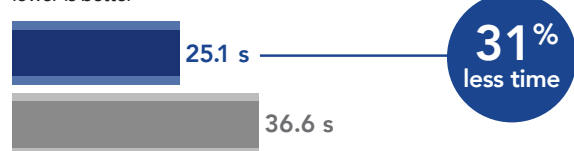
Time (sec)
lower is better



Saving large Excel document

in Google Sheets

Time (sec)
lower is better



Chromebook with Intel Core m3 processor

Chromebook with Intel Celeron N3150 processor

Dealing with spreadsheets

When we tested how each Chromebook behaved during tasks with spreadsheets, we found that the Intel Core m3 processor-powered Chromebook saved a considerable amount of time over the Intel Celeron processor-based alternative. For example, preparing a print preview of a large spreadsheet took 1.7 fewer minutes with the Intel Core m3 processor-powered device. (For information on the Chromebooks we used, see [Appendix A](#) on page 5.)

Imagine receiving a Microsoft Excel spreadsheet from a client to edit. You open a preview of the document in Google Sheets to get a brief overview before opening it in Google Sheets to begin your work. When you finish, you save the document as an Excel spreadsheet again so you can send it back to the client for their review. With the Intel Core m3 processor-powered device, each of these tasks took less time compared to when we used a Chromebook powered by the Intel Celeron N3150 processor.

The more often you complete these tasks, the more your time savings will stack and grow; minutes saved every day could translate to hours saved by the end of the month.



Working with PDFs

PDFs are an easy way of sharing documents across many platforms. If a normal workweek finds you opening and printing many PDFs, an Intel Core m3 processor-powered Chromebook could help you get these tasks moving faster. For example, opening a large PDF in Adobe Acrobat Reader was over a minute faster with the Intel Core m3 processor-powered Chromebook than with the Chromebook powered by an Intel Celeron N3150 processor.

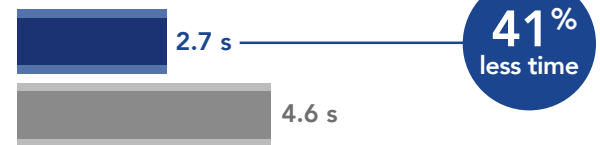
Conclusion: Invest in a Chromebook that can fast-track your work

If you're looking for a Chromebook to help get work done in the office, one powered by an Intel Core m3 processor could be just what you need. In our tests, the Intel Core m3 processor-powered Chromebook enabled us to complete many daily office tasks in less time compared to doing the same tasks on a Chromebook powered by the Intel Celeron N3150 processor. The time you save on these tasks compounds the more you do them—so as you spend more time working with your Intel Core m3 processor-powered Chromebook, you'll spend less time waiting on it.



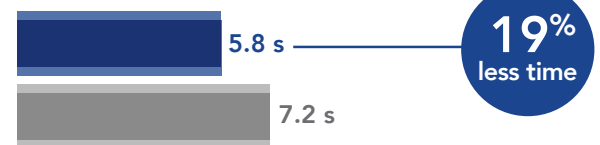
Previewing PDF in Microsoft OneDrive

Time (sec)
lower is better



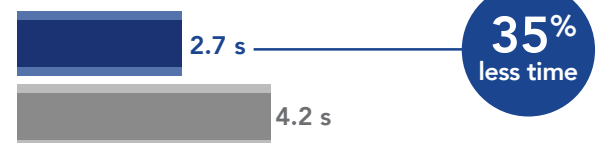
Loading preview of eBook PDF in Google Drive

Time (sec)
lower is better



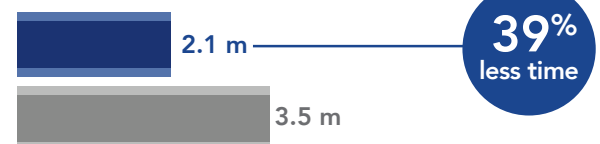
Opening PDF in Google Docs

Time (sec)
lower is better



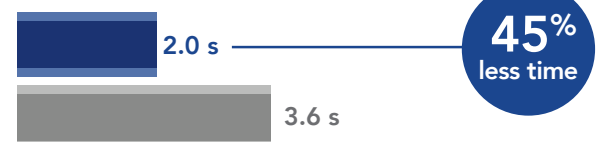
Opening 50 MB PDF in Adobe Acrobat Reader

Time (min)
lower is better



Attaching image in Evernote

Time (sec)
lower is better



Chromebook with Intel
Core m3 processor

Chromebook with Intel
Celeron N3150 processor

On June 12, 2017, we finalized the hardware and software configurations we tested. Updates for current and recently released hardware and software appear often, so unavoidably these configurations may not represent the latest versions available when this report appears. For older systems, we chose configurations representative of typical purchases of those systems. We concluded hands-on testing on June 13, 2017.

Appendix A: System configuration information

System	Samsung Chromebook Pro	Acer Chromebook R 11
Processor	Intel Core m3-6Y30	Intel Celeron N3150
Processor freq (GHz)	0.9-2.2	1.6-2.08
Processor cores	2	4
Memory (GB)	4	4
Storage (GB)	32	32
Battery type	Li-Ion	Li-Ion
Battery capacity (Wh)	39	36
Display	12.3" 2,400 x 1,600	11.6" 1,366 x 768
Wireless	802.11 AC	802.11 AC
Bluetooth	4.0	4.0
USB ports	2x USB-C	1x USB 3.0, 1x USB 2
System weight (lbs.)	2.38	2.71
OS (version)	60.0.3112.20 dev (64-bit)	61.0.3163.38 dev (64-bit)
Build/firmware	Caroline.7820.286.0	Cyan.7287.57.125

Appendix B: How we tested

Creating the background workload

To simulate typical Chromebook use, we ran a combination of news, email, chat, document viewing, music, and social media websites in the background. For websites that required accounts, we created test profiles and logged in the users on each device.

1. From the shelf, open Chromebook settings.
2. Navigate to the On Startup section of the settings, and select Open a specific page or set of pages.
3. Insert the following URLs, and click OK.
 - forbes.com
 - markets.ft.com/data
 - arstechnica.com
 - mail.google.com
 - slack.com
 - drive.google.com
 - docs.google.com
 - youtube.com/feed/music
 - sheets.google.com
 - twitter.com
 - facebook.com
4. Restart the Chromebook. Before testing, navigate through each tab to ensure that both devices have fully loaded all the same content.

Testing each application

Google Sheets

Saving a large Google Sheet as an Excel document

1. From the Google Play™ store, install Google Sheets, and pin the app to the shelf.
2. From the shelf, launch the app, and click Skip to skip the tutorial.
3. Close the app, and reopen it by clicking on the Sheets icon on the shelf.
4. From the recent files screen, click the test Sheet to open it.
5. Click the menu icon from the top navigation bar.
6. Click Share & export, and click Save As...
7. With Excel (.xlsx) selected, start the timer, and click OK.
8. When the save dialog closes, stop the timer.

Preparing a print preview of a large document

1. From the shelf, click the Google Sheets icon to launch the app.
2. From the recent files screen, click the test Sheet to open it.
3. Click the menu icon from the top navigation bar.
4. Click Share & export, start the timer, and click Print.
5. When the print preview fully loads, stop the timer.

Opening a large-sized Excel spreadsheet

1. From the shelf, click the Google Sheets icon to launch the app.
2. From the recent files screen, start the timer, and click the test Excel sheet to open it.
3. When the Excel sheet fully loads, stop the timer.

Google Docs

Opening a PDF

1. From the shelf, click the Google Docs icon to launch the app.
2. Start the timer, and click the test PDF from the files list.
3. When the PDF fully loads, stop the timer.

Adobe Acrobat Reader

Open downloaded PDF

1. From the Google Play Store, install Adobe Acrobat Reader, and pin the app to the shelf.
2. Launch the app from the shelf, and click the Local tab.
3. Click Allow to enable access to local device storage.
4. Start the timer, and click the test PDF file.
5. When the PDF fully loads, stop the timer.

Google Drive

Opening an Excel Sheet in Google Sheets

1. From the shelf, launch the app.
2. From the files list, click the dropdown menu icon next to the test Excel sheet.
3. Start the timer, and click Open With.
4. When the sheet fully loads, stop the timer.

Opening an Excel Sheet preview

1. From the shelf, launch the app.
2. From the files list, start the timer, and click the test Excel sheet thumbnail.
3. When the sheet fully loads, stop the timer.

Loading a print preview for eBook PDF

1. From the shelf, launch the app.
2. From the files list, click the thumbnail for the test PDF.
3. When the PDF loads, click the dropdown menu icon.
4. Start the timer, and click Print.
5. When the print preview fully loads, stop the timer.

Evernote

Attaching an image to a note

1. From the Google Play Store, install Evernote, and pin the app to the shelf.
2. From the shelf, launch the app, and click Continue with Google.
3. Click the test account.
4. Close and relaunch the app from the shelf.
5. Click the green + icon, and click Text Note.
6. Click the attachment icon.
7. Click Photo.
8. Select the test image.
9. Start the timer, and click Open.
10. When the image fully loads, stop the timer.

Microsoft OneDrive

Printing a PDF

1. From the Google Play store, install Microsoft OneDrive, and pin the app to the shelf.
2. From the shelf, launch the app.
3. From the Files list, click the test PDF document.
4. When the PDF loads, click the dropdown menu icon.
5. Click Print.
6. From the Print dialog screen, start the timer, and click Print.
7. When the print preview fully loads, stop the timer.

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Benchmark results were obtained prior to implementation of recent software patches and firmware updates intended to address exploits referred to as "Spectre" and "Meltdown". Implementation of these updates may make these results inapplicable to your device or system.