



## Get smoother Android app gameplay and faster load times

### Gaming experience on an Intel Core m3 processor-powered Chromebook versus an ARM processor-based Chromebook

At Principled Technologies, we compared the Android™ gaming experience of the Intel® Core™ m3 processor-powered Asus Chromebook™ Flip C302CA versus that of the ARM® Rockchip OP1 processor-based Samsung® Chromebook Plus.

On each system, we ran three popular Android games: Asphalt 8: Airborne, Need for Speed™ No Limits, and Modern Combat 5: eSports FPS. We configured both systems to have access to the Google Play™ Store beta and simulated a background workload that accessed popular websites. Then, we downloaded and launched the first game on both systems. We used a camera to capture gameplay and recorded our results. We repeated this process for each game, shutting off the Chromebooks between games. (For more on our methodologies, see [Appendix B](#).)

Across all three games, the Intel Core m3 processor-powered Chromebook consistently delivered faster load times and smoother gameplay compared to the ARM-based Chromebook. See the videos of what we found:

- Asphalt 8: Airborne: [facts.pt/qPeh6A](https://facts.pt/qPeh6A)
- Need for Speed No Limits: [facts.pt/djbRdw](https://facts.pt/djbRdw)
- Modern Combat 5: eSports FPS: [facts.pt/gC6SQf](https://facts.pt/gC6SQf)

On June 8, 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 27, 2017.

## Appendix A: System configuration information

System	Asus Chromebook Flip C302CA	Samsung Chromebook Plus
Processor	Intel Core m3-6Y30	OP1 (Rockchip RK3399-C)
Processor freq (GHz)	2.2	2
Processor cores	2	2-6 (big.LITTLE configuration)
Memory (GB)	4	4
Storage (GB)	64	32
Storage (GB)	64	32
Battery type	Li-Ion	Li-Ion
Battery capacity (Wh)	39	39
Display	12.5" 1,920x1,080	12.3" 2,400x1,600
Wireless	802.11 AC	802.11 AC
Bluetooth	4.0	4.0
USB ports	2x USB-C	2x USB-C
System weight (lbs.)	2.65	2.38
OS (version)	59.0.3071.57 beta (64-bit)	59.0.3071.57 beta (32-bit)
Build/firmware	Cave.7820.288.0	Kevin.8785.178.0

# Appendix B: How we tested

## Creating the background workload

To simulate typical usage of a Chromebook, we ran a combination of news, email, chat, document viewing, music, and social media websites. 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. Select Open a specific page or set of pages, 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 Asphalt 8: Airborne

1. Before testing, go to the shelf, and open the Google Play Store beta.
2. Search for Asphalt 8: Airborne.
3. Click to open the app page, and click Install.
4. When the game is finished installing, pin the app to the shelf, and open the app.
5. The first-time launch will require downloading and installing an additional 1375 MB worth of data. To begin the download, click Yes.
6. When the download completes, enter an age and gender, and click Accept.
7. Close the What's New menu, and log into the Google Play Games service.
8. Click Play, and decline the tutorial.
9. Exit the game, and prepare for testing.
10. On the shelf, click the Asphalt 8: Airborne icon.
11. When the game loads, click once to exit the controls overlay.
12. Click Play.
13. Click Career.
14. Select the Nevada Classic map.
15. To confirm map selection, click Next.
16. At the car select screen, select the Dodge Dart GT once. Use the arrow keys to spin the 3D model 360 degrees. To return to car selection, click the back arrow.
17. Select the Dodge Dart GT once, and click Next.
18. Click Start Race. The opening cinematics will play. When the race starts, with default controls, the car will automatically drive, and complete the course.
19. After the race, view the closing cinematics. After the cinematics have played for some time, click Next.
20. At the score summary page, click Next.
21. To skip uploading the ghost racer, click Skip.
22. At the rewards screen, click Skip.
23. Exit the game, and power off the Chromebook.

## Testing Need for Speed No Limits

1. Before testing, go to the shelf, and open the Google Play Store beta.
2. Search for Need for Speed No Limits.
3. Click to open the app page, and click Install.
4. When the game is finished installing, pin the app to the shelf, and open the app.
5. To accept the user agreement, click Accept.
6. Complete the on-screen prompts to finish the first-start tutorial.
7. When the tutorial completes, connect to the Google Play Games service, and complete the introductory dialog.
8. Exit the game, and prepare for testing.
9. On the shelf, click the Need for Speed No Limits icon.
10. Select Campaign from the map.
11. Click through the dialog, and select Genesis: Chapter 1.
12. Click Car Select.
13. Select the Subaru BRZ, and click Race Easy.
14. To start the race, press the gas pedal. When the race starts, with default controls, the car will automatically drive, and complete the course.
15. After the race, exit the game, and power off the Chromebook.

## Testing Modern Combat 5: eSports FPS

1. Before testing, go to the shelf, and open the Google Play Store beta.
2. Search for Modern Combat 5: eSports FPS.
3. Click to open the app page, and click Install.
4. When the game is finished installing, pin the app to the shelf, and open the app.
5. The first-time launch will require downloading and installing an additional 859 MB worth of data. To begin the download, click Yes.
6. When the download completes, the tutorial mission will begin. Complete the tutorial mission, sign in to the Google Play Games service, close the app, and prepare for testing.
7. On the shelf, click the Modern Combat 5: eSports FPS icon.
8. When the game loads, click Campaign.
9. From the Campaign menu, select 01. Awakening, and click Start.
10. To begin the campaign, press any button.
11. Use a controller to play through the level. When you complete the level, exit the game, and power off the Chromebook.

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