



“Chromebook 2020”

**Grand Computers Club
New Tech SIG
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Talking points

- **Background**
- **What is Chrome OS?**
- **Chromebook buying guide**
- **Project Athena**
- **Component breakdown**
- **Useful websites**
- **Q & A**



Background

Definition:

A Chromebook is a laptop running the Linux-based Chrome OS as its operating system. The devices were originally designed to be used primarily while connected to the Internet, with most applications and data utilizing Cloud technology. The original Chromebook was an example of a thin client.

[Wikipedia](#)

Background

Early models

- **Announced at Google I/O conference in May 2011**
- **Shipped starting June 15, 2011**
- **1st models by Acer and Samsung**
- **Chromebox (desktop) in May 2012**
- **Models from Lenovo, HP and Google in 2013**

Background

Other facts

- **In 2012 schools are largest sector**
- **Marketed to home & 1st time users**
- **Most successful Linux computers**
- **1.75M units (B2B sales Jan-Nov 2013) represent 21% of all US laptop sales**
- **Google Pixel - \$1200 high-end unit Feb 2013**

Background

Specifications

- **Chrome OS – Linux kernel**
- **Chrome browser**
- **Limited offline capability**
- **Fast boot time**
- **Extensive use of web apps**
- **Multi-layer security**

Background

Specifications continued

- **Support for USB (plug & play like)**
- **Specialized keyboard**
- **Offline mode for Gmail, Calendar, Google Drive, music player, photo editor, PDF & MS Office doc viewers**
- **Most data stored on the cloud**
- **Current prices start below \$300**

Background

Specifications continued

- **Less than 2.8 pounds**
- **Plastic case; 0.75 inch thick**
- **Free apps from Google Chrome Store**
- **Automatic updates**
- **Built-in security & virus protection**
- **No moving parts; cooling fan on some models**
- **100 GB Google Drive free for 2 years**

Background

How did it get here?

- **2011 - 1st Chromebooks sold \$349-\$499**
- **2012 - Chromebox (desktop)**
- **2012 - Chromebook price reduced \$199-\$249**
- **2012 - 400,000 units sold**
- **2013 - 1,760,000 units sold - 21% laptop market**
- **2013 - Chromebook Pixel by Google - \$1299**
- **2016 - Android apps available via Google Play**

[Wikipedia](#)

Background

How did it get here?

Chrome OS

- **Conceived in 2009 - Linux kernel**
- **Cloud based apps & data**
- **Browser (Chrome) access**
- **Initially a web “thin client”**
- **Open source as Chromium OS**
- **Goal to boot up in 7 seconds**
- **[Chrome OS Video](#)**

[Wikipedia](#)

Background

What is it now?

Hardware

- **CPU - x86 or ARM**
- **Main storage 32GB SSD - OS is ~2% of Windows**
- **Low memory requirements 4GB RAM**
- **SD slot for external memory**
- **Supports multiple monitors (HDMI)**
- **Now supports most USB and network printers**
- **Remote desktop support**

[Wikipedia](#)

Background

What is it now?

Chromebook security

- **Verified boot**
- **Trusted Platform Module ([TPM](#))**
- **Automatic (background) updates using 2nd partition which is activated on next boot**
- **Wide use of sandbox isolation**

[Wikipedia](#)

Background

What is it now?

Customize

- **Developer mode to use/boot other Linux OS**
- **Chrome OS shell - crosh; runs in browser**
- **Full bash in developer mode**

[Wikipedia](#)

Background

What is it now?

Reasons to buy:

- **Price: <\$300; \$300-\$600; >\$600**
- **Simplicity: No A/V; easy to be support for others**
- **Automatic updates: done in background; next reboot**
- **Security: no Windows malware; verified boot; sandbox isolation**
- **Apps: Access to Google Play on newer units (2016+)**

[HowToGeek](#)

Background

What is it now?

Chrome OS applications

Productivity

- **Microsoft Office – Word, Excel, PowerPoint, etc.**
- **Google Docs**
- **Evernote**
- **Google Drive**

Entertainment

- **Netflix**
- **Google Play/Music; Spotify; Pandora**

Background

What is it now?

Chrome OS applications

Social media

- Facebook
- Snapchat

Video playback

- VLC

Chrome Browser Extensions

- LastPass
- AdBlock

Chrome Browser

Statistics - (StatCounter)

Most popular

- **63.72% Worldwide**
- **50% US**

**(Most modern browsers
have similar features and
compete well)**

What is Chrome OS?

- **An operating system developed and owned by Google**
- **Based on Linux**
- **Open source**
- **Free to use**
- **Desktop GUI; like Windows, OS X**
- **Web browser-based core (Chrome)**
- **Access to Google Play Store; >2017**

What is Chrome OS?

Chrome OS vs Chrome browser

- **Chrome browser accesses the web**
- **Chrome browser has similar look on all OSes**
- **Chrome browser is most popular; 65% world**
- **Chrome OS powers Chromebooks**
- **Chrome OS includes the Chrome browser**
- **Chrome OS runs browser-based apps**
- **Chrome OS runs Android apps**
- **Chrome OS can save files locally or in the cloud**

What is Chrome OS?

Who is the Chromebook user?

- **Average user; browse web, watch videos, play games, use smartphone (Android) apps**
- **Students that have school districts committed to Chromebook and Google Classroom environments**



What is Chrome OS?

Chromebook Pros

- **Simple to use**
- **Fast boot time <10 seconds**
- **Inexpensive**
- **Support Android apps**
- **Good security features**
- **Cloud based services**
 - **Google Doc; Google Drive; Google Photos**
 - **Access from any Internet connected device**

What is Chrome OS?

Chromebook Pros

- **Weight**
- **Battery life**

What is Chrome OS?

Chromebook Cons

- **Software compatibility**
- **Not for high-end games**
- **Small local storage space; can add SD card**
- **Limited offline mode**
- **Limited MS Office; can run mobile version**

Chromebook Buying Guide

Chromebook Brands

- **Acer**
- **Asus**
- **Dell**
- **HP**
- **Lenovo**
- **Samsung**
- **Others**



chrome

Chromebook Buying Guide

Chromebook End of Life

- **Newest units get 8 years of updates**
- **Older units get 5-6.5 years from first released**
- **Check end of life for model [here](#)**

Chromebook Buying Guide

3 levels of Chromebook levels

- **Entry level \$300 or less**
- **Mid-range \$300-\$600**
- **High-end >\$600**

Chromebook Buying Guide

Entry level \$300 or less

- **Intel Celeron processor**
- **4GB RAM**
- **11.6-14" screen**
- **1366 x 768 resolution**
- **May have touch screen; non-backlit keyboard**
- **32GB-64GB local storage**
- **Plastic case**
- **2-3 USB ports**
- **Wi-Fi 5 (802.11ac); Bluetooth 4**

Chromebook Buying Guide

Mid-range \$300-\$600

- **Intel Pentium i3-i5 processor; 8th gen or better**
- **8GB of RAM**
- **13"-15.6" screen**
- **1920 x 1080 resolution**
- **Touch screen; backlit keyboard**
- **64GB-128GB local storage eMMC or NVMe**
- **Plastic or metal case**
- **3-4 USB ports; HDMI out**
- **Wi-Fi 5 or 6 (802.11ac or ax); Bluetooth 4 or 5**

Chromebook Buying Guide

High-end >\$600

- **Intel Pentium i5-i7 processor; 10th gen or better**
- **8GB-16GB of RAM**
- **13"-15.6" screen**
- **1920 x 1080 resolution; 3840 x 2160 (4K)**
- **Touch screen; backlit keyboard**
- **64GB-256GB local storage - NVMe**
- **Metal case**
- **4+ USB ports; HDMI out**
- **Wi-Fi 6 (802.11ax); Bluetooth 5**
- **Possibly Project Athena compliant**

Project Athena

**Joint venture with Intel and hardware manufacturers
Google and Intel to produce high-end Chromebooks**

Goals & objectives:

- **Lucid sleep < 1 second**
- **Biometric login**
- **Core i5 or i7 processor**
- **Consistent response on battery power**
- **8GB dual channel RAM**
- **256GB+ NVMe**

Project Athena

Goals & objectives:

- **Intel Optane action**
- **AI adaptive support**
- **16+ hours battery life**
- **9+ hours wireless browsing**
- **Charge to 4 hours battery in < 30 minutes**
- **Thunderbolt support**
- **Wi-Fi 6**
- **Gigabit LTE option**

Project Athena

Goals & objectives:

- **Ultra Slim 2 in 1 clamshell**
- **12-15" at 1080p with touch display**
- **Backlit keyboard**
- **Precision touchpad and pen support**

Tips on Making It Work

What a Chromebook is NOT good at:

- **Running Windows/Mac/iOS apps**
- **It's not a Windows/OS X/ Linux machine**
- **High-end photo & video editing**
- **Advanced computer programming**
- **High-end video gaming**

Tips on Making It Work

What a Chromebook is good at:

- **Inexpensive**
- **Fast**
- **Secure**
- **Battery life**
- **Sync**
- **Connects to Google apps & accounts**
- **Great browser apps**

My Chromebooks

Acer Chromebook R11 2-in-1 convertible

- **\$250**
- **Intel N3160 2.24GHz quad-core**
- **4 GB ddr3 RAM**
- **32 GB eMMC drive**
- **11.6" touchscreen 1366x768**
- **Intel HD graphics**
- **720p webcam**
- **10 hour battery; 2.8 lbs.;**
802.11ac

My Chromebooks

Acer Chromebox CXI3

- **\$535**
- **Intel Kaby Lake 8th generation**
- **Intel i5-8250U 3.4GHz quad-core/8 thread**
- **8 GB ddr4 RAM**
- **64 GB SSD drive eMMC**
- **Intel UHD 620 graphics; 4K**
- **microSD slot; 802.11ac; Bluetooth 4.2;**
- **1-USB 3.1 type C; 5-USB 3.0 type A; HDMI**

Hardware Choices

	Low-end	Average	High-end
Model example	Acer Chromebook 315	Dell Inspiron 7486	Google Pixelbook Go
Screen size	15.6"	14"	13.3"
Processor	Celeron N4020	Intel i3 8130U	Intel i7 8500Y
Memory (RAM)	4GB	4GB	16GB
Video Resolution	1920 x 1080 DP2HDMI	1920 x 1080	3480 x 2160 (4K)
Storage (SSD)	64GB eMMC	128GB eMMC	256GB NVMe
Battery life	12.5 hours	8 hours	12 hours
USB types	2 x USB-C & 2- 3.1	2 x USB-C; 5-3.	USB-C
Bluetooth	BT 5.0	BT 4.0	BT 4.0
Wi-Fi	802.11ac Wi-Fi 5	802.11ac Wi-Fi 5	802.11ac Wi-Fi 5
Price range	\$199	\$539-\$599	\$1399

Joe's Wishlist

	High-end	My Chromebox	Chromebook Wish
Model example	Google Pixelbook Go	Acer Chromebox CX13	Joe's Wish
Screen size	13.3"	HDMI out	12-14"
Processor	Intel i7 8500Y	Intel i5 8250U	Intel i5/i7
Memory (RAM)	16GB	8GB	8/16GB
Video Resolution	3480 x 2160 (4K)	3480 x 2160 (4K)	3480 x 2160 (4K)
Storage (SSD)	256GB NVMe	64GB eMMC	128/256GB NVMe
Battery life	12 hours	N/A	12 hours
USB types	USB-C	1 x USB-C; 5-3.0	USB-C; USB 3.0
Bluetooth	BT 4.0	BT 4.2	BT 5.0
Wi-Fi	802.11ac Wi-Fi 5	802.11ac Wi-Fi 5	802.11ax Wi-Fi 6
Price range	\$1399	\$535-\$567	~\$600-\$700

Useful Sites

[What is Chrome OS and who is it for?](#)

[Getting your first Chromebook? Here's a buying guide of what to look for](#)

[How to use a Google Chromebook 2019](#)

Useful Sites

- [Chromebook End-of-Life](#)
- [Chromebook Buying Guide](#)
- [How to replace your PC with a Chromebook](#)
- [Why I switched from MacBook to Chromebook!](#)
- [Why Use a Chromebook](#)
- [What To Do When Your Chromebook Reaches the End of Its Life](#)

Useful Sites

[You Can Now Run Microsoft Office Apps on Your Chromebook](#)

[Chrome OS Systems Supporting Android Apps](#)

[Best Chrome apps to supercharge your Chromebook](#)

[Chromebooks vs. Windows 10 Laptops: What Should You Buy?](#)

[Should I Buy a Chromebook? Buying Guide and Advice](#)

[How Chromebooks became the go-to laptops for security experts](#)



Questions???

**Next
Meeting**

“To Be Determined”

Thursday August 20, 2020

3:30-5:00pm

Virtual Meeting