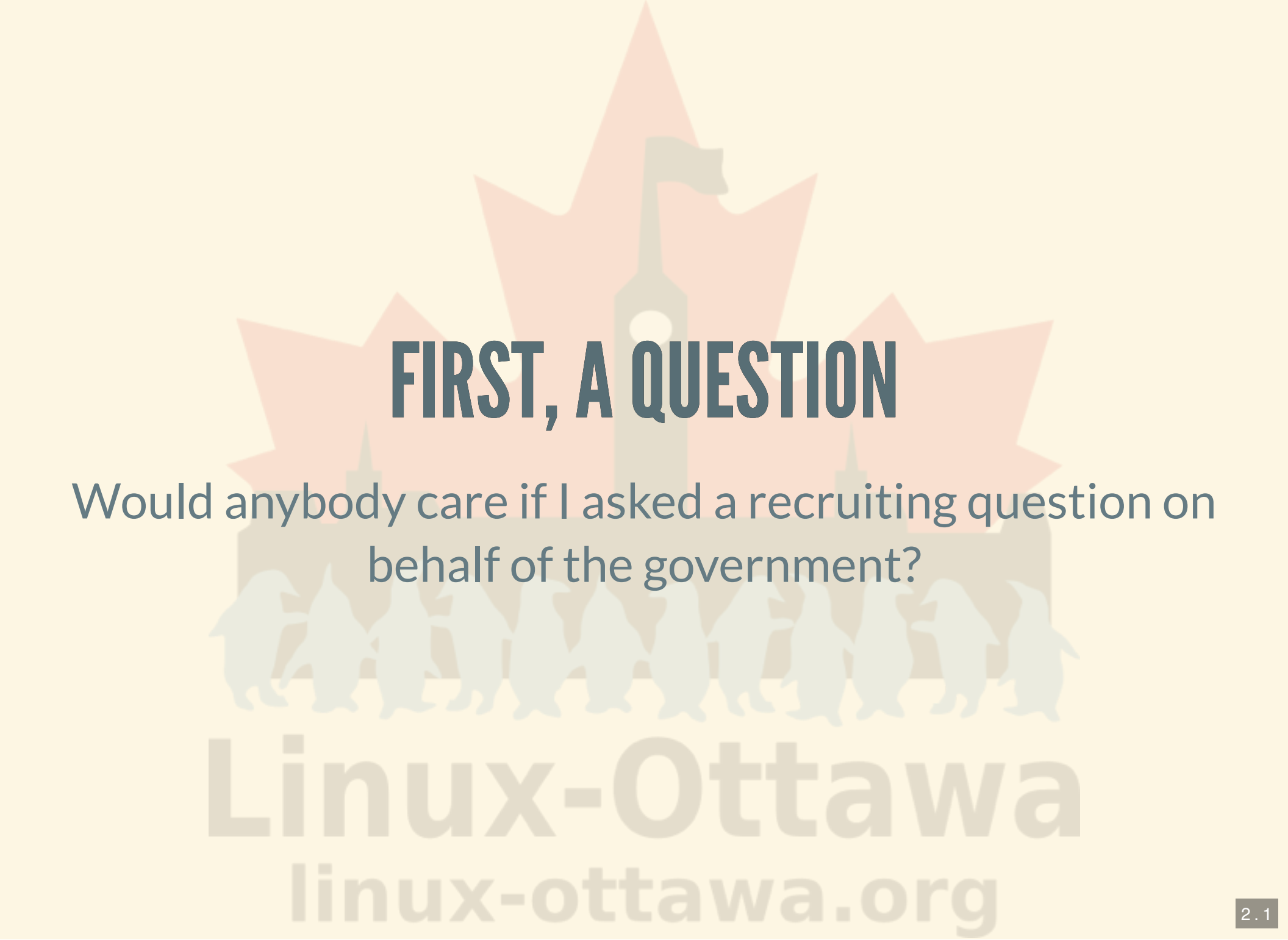




CONVERTING A CHROME BOOK

Scott Murphy





FIRST, A QUESTION

Would anybody care if I asked a recruiting question on behalf of the government?

Linux-Ottawa

linux-ottawa.org

CAREER OPPORTUNITY

I was asked to see if anybody attending is looking or knows someone who is looking to either get started in their IT career, or switch to an IT career. If you know anybody who would be interested in doing something like that, Shared Services Canada is looking to fill a few Linux positions. If anyone is interested, or would like to know more, please send an email to

Mike.Frappier@ssc-spc.gc.ca

BACK TO THE TALK

Chrome book computers

- You probably have at least tried one
- You may actually have one
- They come in a wide variety of sizes and platforms



WHAT DO YOU DO WITH THEM?

In general, they are a great idea for people who like the idea of having a computer, but do not actually want to deal with the reality of having a computer.

- Read email
- Browse the web
- Document processing
- Other basic tasks

WHAT ELSE DO WE DO WITH THEM?

There are a few additional things you can do, besides the basic options Google provided, such as the apps available from the play store. There are a lot.

Specifically, I'm talking about the Linux container you can run. I have tried it and it works well enough, but it is a sandboxed environment and does not easily take the place of a development machine.

Linux-Ottawa

linux-ottawa.org

WHERE ARE THEY PRIMARILY USED?

They really hit their stride in schools and libraries, as they are basically an inexpensive, reasonably secure and low maintenance device. There are other use cases, but they are mostly filling the same niche.

As a result, there are a lot of underutilized chromebooks out there and we should do something with them.

CHROMIUM OS

While not a chromebook, this effectively turns an old laptop into a chromebook.

I converted about 25 old laptops from a company I shuttered to Chromium based systems for a friend of mine who is a school teacher. They needed them for some students and I'd like to think they got a second chance. That is a different topic and possibly a future talk, but we are talking about going the other way tonight.

CONFESSION TIME

I have two Chromebooks, an ASUS C101PA and a Google PixelBook. They are both from 2017.



MY USE CASE - ASUS C101

This was originally purchased so my wife could do quick lookups of things while she was gaming or crafting. This worked for a while, but she eventually got tired of the tiny screen and the interface.

She has a Linux box and an iMac, so she eventually found the Chromebook too limiting and stopped using it.

That is why I have now it for conversion purposes.

MY USE CASE - PIXELBOOK

This was originally purchased to act as a travel/work computer that I wouldn't care much about crossing borders with. The idea was to leave it running ChromeOS and have the content synchronized. Simple, easy, and naive.

As I mentioned before, the sandbox mode is nice, but ultimately not what I wanted and the system did not act like the quad core i7 16GB with 1TB of storage that I had expected it to be. It was a glorified tablet and it acted like it.

WHAT I AM TALKING ABOUT TONIGHT

Tonight I'll talk about the general process and the specifics of the ASUS unit.

I could discuss the PixelBook, but I have not worked on it yet. I'm waiting for a specific debugging cable to arrive. They had none in stock when I tried ordering one, and you need it to make the firmware changes.



SPECIFICATIONS

- Series: C101PA-DB02
- Brand: ASUS
- Screen Size: 10.1 Inches
- Operating System: Chrome OS
- Human Interface Input: Touchscreen
- CPU Manufacturer: Rockchip
- Card Description: Dedicated
- Color: Silver
- Hard Disk Size: 16 GB

THE USEFUL SPECIFICATIONS

- 4GB RAM
- 16GB eMMC Storage
- 6 core ARM Cortex-A53
- WiFi
- 10.1" screen

Linux-Ottawa
linux-ottawa.org

WHY DID I MENTION THAT?

I had originally picked the ASUS as the easier to do since it was arm based, so no strange firmware issues and there were several detailed writeups on it.

Unfortunately for me, ASUS made multiple versions with the same name and different specifications. I didn't notice immediately. They also use different firmware to boot.

If you visit here, you will find a lot of useful info.

[Chrome OS Developer Information](https://www.linux-ottawa.org/chrome-os-developer-information)

[linux-ottawa.org](https://www.linux-ottawa.org)

GETTING STARTED

The process is reasonably simple:

- Switch to Developer Mode
- Enable external boot
- Build out an external storage for booting
- Boot off external
- Convert the internal storage
- Install on internal storage (copy)

SWITCH TO DEVELOPER MODE

- Turn off the laptop.
- Get into Recovery mode, you hold down the ESC and Refresh keys (F3) and press the Power button.
- It will load a recovery screen. Press CTRL-D
- You need to confirm you are switching to developer mode by pressing enter. The laptop will reboot and reset the system. This takes about 10-15 minutes.

Linux-Ottawa

linux-ottawa.org

DEVELOPER MODE

After it reboots, it will be noisy and annoying before it boots.

Do not press the space bar!

When it gets to the login screen, press [CTRL]+[ALT]+T to get a **crash** shell.

ENABLE EXTERNAL BOOT

At the **crash** prompt:

- Type **shell** to get a bash shell
- Type **sudo -i** to get a root shell
- Type the following to enable USB booting:
`crossystem dev_boot_usb=1 \`
`dev_boot_signed_only=0`
- Reboot

CREATE A USB OR SD BOOT

WAIT!!!

This is where I diverged from the instructions due to the different models. I was going to do the Arch install, as it seemed easy enough to follow, but I could not boot from the SD or the USB device after creating it.

The following is easier.

Linux-Ottawa
linux-ottawa.org

DOWNLOAD A PREBUILT DEBIAN IMAGE

Get a copy of the preconfigured Debian for this unit at:

[github](#)

There are build notes, but I don't have a build system set up and I was running late for this. The presentation will have live links to click. The URL was quite long.

Linux-Ottawa
linux-ottawa.org

WRITE IT TO A REMOVABLE DEVICE

Follow the normal procedure you use for writing an image to removable storage. I normally use `dd`

```
dd if=chromebook_gru-aarch64-bullseye.img.gz of=/dev/sdc bs=4m
```

Wait for a bit (coffee time)

Linux-Ottawa

linux-ottawa.org

RUN LINUX

- Make sure it is shut down
- Plug the device in (SD card slot or USB port).
- When it comes up, press [CTRL]+U to boot from USB

Enjoy

Linux-Ottawa

linux-ottawa.org



DEMO

I'll be switching to my camera for running the demo.

Linux-Ottawa
linux-ottawa.org



DISCUSSION/QUESTIONS

SOME REFERENCES

- [Chromebook Logo](#)
- [ASUS C101 Page](#)
- [Arch on ASUS Chromebook C101PA](#)
- [Debug Keyboard Shortcuts for ChromeOS](#)

Linux-Ottawa
linux-ottawa.org

SOME MORE REFERENCES

- [PrawnOS for Chromebook](#)
- [Boot Arch on C101 \(Gru Bob\)](#)
- [Linux container on C101](#)
- [Install Debian on C101PA](#)

...AND MORE REFERENCES

- [Chrome OS Developer Information](#)
- [Linux mainline on ARM Chromebooks](#)
- [SuzyQable](#)
- [Mr. Chromebox](#)

Linux-Ottawa
linux-ottawa.org