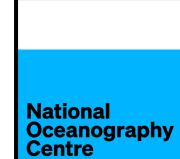


Abhishek Dasgupta, Colin Sauze, Jannetta Steyn

The Carpentries Offline: Teaching Foundational Data Science and Coding Skills with little or no Internet Access



Who are we?

Here today:

- Jannetta Steyn (Newcastle University)
- Abhishek Dasgupta (University of Oxford)
- Colin Sauze (National Oceanography Centre)

The other guys:

- Samantha Finnigan (Durham University)
- Ethan White (University of Florida)
- Virnaliz Cruz (University of Florida)
- Frances Turner (Newcastle University)
- Andrew Gill (Stellenbosch University)

What is the Carpentries?



“ We teach foundational coding and data science skills to researchers worldwide. ”

- **Vision:** to be the leading inclusive community teaching data and coding skills.
- **Workshops:** Software Carpentry, Data Carpentry, and Library Carpentry
- **Roles:** Instructors, helpers, Trainers, Maintainers, Mentors, and Core Team
- **Technologies:** Web based course notes, etherpad for shared notes, Github, Jupyter Notebooks

How it all started

- Software Sustainability Institute Collaborations Workshop Hackday 2021
- Running workshops without Internet access
- Use Raspberry Pi as an access point and web server
- Hackday winner
- SSI Fellowship 2022



Original Team:

- Flic
- Alison
- Abhishek
- Emily
- Irma
- Jannetta
- Rebecca
- Sam
- Talia

Offlinedatasci

Offlinedatasci mirrors installers and repositories to enable offline installation

```
pip install offlinedatasci  
offlinedatasci install all /install/path
```

Developed by a team at University of Florida
(Ethan White and Virnaliz Cruz) and us.

What we mirror

- Installers for Python and R
- Partial mirrors of PyPI, CRAN (packages can be customised)
- Carpentries online material
- Installers for data science IDEs (RStudio)

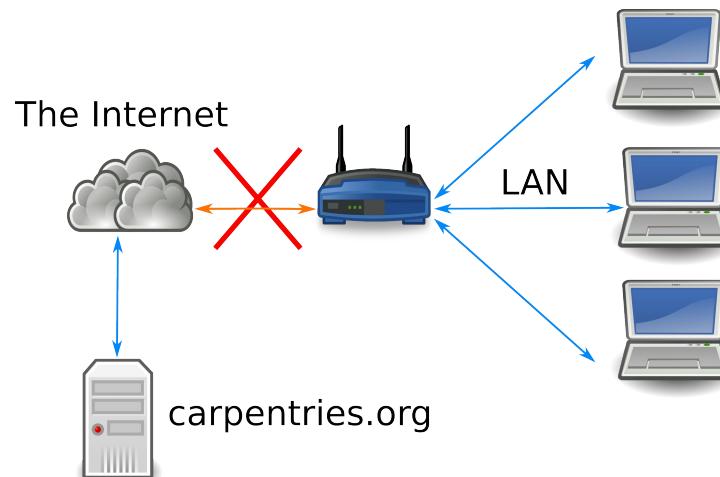
Three threads to our project

- Using a Raspberry Pi
- Using a bootable flash drive
- A mini HPC for HPC workshops

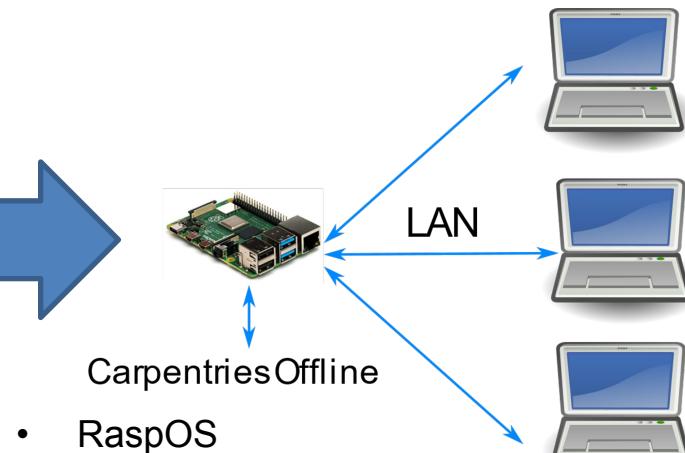
Option 1



The Problem

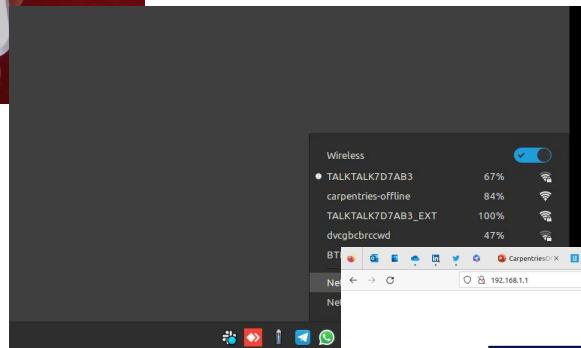


The Solution



- RaspOS
- Gitea
- Etherpad
- Lesson Mirrors
- CRAN and PyPi mirrors

What it looks like



Building the Raspberry Pi Image

- Entire build process is scripted.
- Building images on the Raspberry Pi is a manual and slow process.
- Cloud based GitHub actions build in a Raspberry Pi emulator (Qemu).
 - Emulators are slow! Takes 2+ hours to build
 - Some hacks to speed things up!

CarpentriesOffline in the Cloud

- Docker container using CarpentriesOffline build script
- Originally intended for testing.
- Much faster than using a Raspberry Pi or an emulator.
- Useful for when the Carpentries website/etherpad goes down during your workshop!
- Can be hosted in intranet

The Need for Alternatives

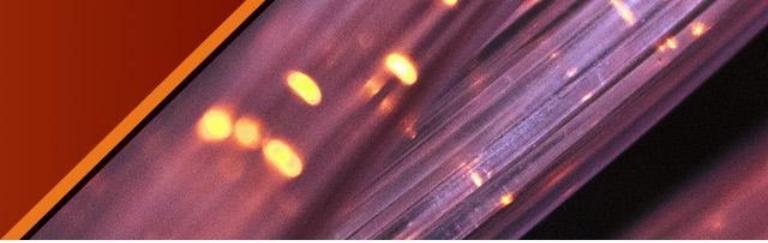
- RPis are impossible to get hold of since Covid
- RPis cost money
- I already have a laptop

Option 2



- Bootable flash drive
- Slax Linux
- Apache2 (web server)
- Gitea (alternative to GitHub)
- OfflineDataSci – our python package for scraping all Carpentries lessons

The Need For A miniHPC



- Hardware more visible
- Hit resource limitations more easily so more obvious
- No accounts to be setup on a real HPC
- No interfering with real HPC
 - users less afraid to try stuff
 - less likely to break anything important
 - no access to a real HPC
- Access problems
- Networks access

miniHPC Specs

Pixie the Prototype

- 3 x Raspberry Pi 4 B
- 1 x Raspberry Pi 4 B head/login node
- Raspberry Pi OS Lite (64 bit)(Debian Bullseye)
- Head node acts as WiFi access point

RockPi

- 8 x Rock 4C+ (Dual ARM Cortex-72 @1.5GHz per node)
- 1 x Rock 4SE head/login node
- 8 x Power over Ethernet hats
- *Raxda* build of Debian Bullseye
- Head node acts as WiFi access



HPC Software

- Slurm
 - Lsmod
 - Munge
 - NFS
 - PXE
 - EasyBuild
- dnsmasq
 - DHCP
 - tftp
 - mpich
 - gcc
 - python

3D Printing Credit

- https://www.printables.com/@TaylorSteinf_1252185
- <https://www.printables.com/model/717134-mini-caliper-10-cm>
- <https://www.printables.com/model/271563-printable-precision-measuring-tools>
- <https://www.thingiverse.com/thing:2424354>
- <https://www.printables.com/model/44122-customizable-belt-buckle>



Links and Credits and Contacts

- **Raspberry Pi Image download:**
<https://github.com/carpentriesoffline/carpentriesoffline-installer/releases>
- **Find Us:**
<https://carpentriesoffline.org>
- **Slack channel**
<https://carpentries.slack.com/archives/C03KYQ3PX99>

