

## CPD3 installation for station data acquisition laptop (updated 2023-05-04)

### 0) Introduction

#### 0.1 Laptop requirements:

The minimum requirements for the data acquisition computer are:

- 2 GB RAM (2GB is the minimum - 3 GB is preferred)
- the ability to run 64 bit software (this is important!)
- needs to be able to boot from USB

Pretty much any computer bought in the last 7 years should meet these criteria. Note: the computer will need to be wiped of whatever is on it, in order to install Linux so be sure you've gotten everything off it before the installation!

There are three components to the installation:

- (1) Installing Linux (Xubuntu)
- (2) Setting up the networking
- (3) Aerosol software installation and setup

All three of these things can be done in your office – they don't have to be done at the station. If the internet is better at your office or you want to be sure you have everything setup before you travel to the site then doing this at your office can be a good idea.

#### 0.2 Firewall settings for the installation:

You will need "unrestricted outgoing access" because the installation script will perform a bunch of downloads, mostly from the Ubuntu CDN, which won't have a reliable IP address. Once the setup is complete, outgoing access could be restricted again; though we recommend against that, because that would also stop it from actually getting security updates." At the end of the document (section 5) we have included some notes on firewall settings for general operations.

**Please see note at end of this document (section 4) if you are updating an existing laptop with the latest version of the cpd3 data acquisition software. Read that note BEFORE you start the update!**

### 1) Xubuntu Installation process

There are two ways to do this: (1) Using a USB stick we sent you or (2) creating your own USB stick. These instructions will explain how to make a USB stick with the software on it and then how to use it to install Xubuntu.

#### 1.1 Making the USB stick

The ISO of the Xubuntu operating system can be downloaded from this site:

<https://xubuntu.org/getxubuntu/>

But you have to follow a specific procedure to set the USB stick up properly (you cannot just copy the ISO).

Please read this tutorial about how to make a USB stick that is set up properly to install the operating system: <https://tutorials.ubuntu.com/tutorial/tutorial-create-a-usb-stick-on-windows#6>

(note: the tutorial is for Ubuntu but setting up the USB stick works the same for Ubuntu and Xubuntu)

### 1.2 Once you have the USB stick

The computer you will use for the station data acquisition laptop needs to be hooked up to the network - ethernet cable or wifi will work.

The USB stick has the Linux operating system (Xubuntu) on it (but not the aerosol software) Insert USB stick with computer off (or reboot once USB stick is installed). *The computer is probably already set to boot from USB – but if not need to go into the computer BIOS and set it so it is. Access the BIOS by pressing F12 when the booting messages mention that, otherwise try pressing Delete or F2 for the full BIOS setup and select the USB stick as the boot device.*

Start computer.

After a few seconds of a black screen with a few white icons at the bottom, you should see a black Xubuntu boot screen. If the screen seems to freeze up (blank with just a cursor and a message about waiting for the installer with a timer), type '<control><alt><F2>' then '<control><alt><F1>' several times until a screen about installing appears. Try or install Xubuntu - the top option - should be selected.

Next will then be a screen about install type - chose '**Install** Xubuntu' and continue.

Next will be the option to select keyboard type - choose the appropriate layout for you and continue.

Next will be an option about wifi - you can connect or not connect at this point.

The next screen will have two parts. The top part will give you an option to do a 'normal' or 'minimal' installation. You can select either. The bottom part asks about 'download updates' and '3<sup>rd</sup> party installation' – click both boxes. If the computer is not connected to the network during the Xubuntu installation the checkbox about "download updates" will be unselectable. Choose 'continue'.

Next screen asks about erasing disk and doing the installation. Choose 'Erase disk and install Xubuntu'. Choose install now and continue. A window will pop up about disc partitioning - accept the partitioning and click 'continue'.

Next screen asks about time zone. This the computer time but not the data logging time so you can choose local time or whatever. If you want the computer time to be UTC then you can just enter "UTC" in the box. Click 'continue'.

Next screen is to set computer name and password and login info:

We recommend:

Name: aerosol

Computer name: aerosol-xxx where xxx=station ID (like arn for El Arenosillo)

User name: aerosol

Password: the regular password (it's the cNc... one; **ask us if you don't know what it is**)

Click the option 'Log in automatically'

Choose 'continue'.

Click the 'Install Xubuntu' button.

Now you have to wait a while (takes ~30min on older computer) for the installation.

Once the install is done, you'll get a screen - choose 'restart now' option.

Remove USB stick.

The computer should reboot. If it seems like it is doing nothing after a few minutes, then use the power button and force it to reboot.

The reboot will result in a Linux desktop.

## **2) Setting up the network**

Once you've got the Xubuntu installed, it's a good time to set up the networking for the station. If the site uses DHCP networking (for example if you are setting up the computer in the aerosol lab at NOAA/GML) then you can skip the network set up. If you are doing this at your office, you will want to wait to set the station network settings until you are at the station. Wherever you are, you need to be connected to the network when you install the aerosol software.

If the site is not using DHCP networking, go to upper right corner and click on the side to side

icon:  06 Aug, 14:56

→Choose 'edit connections'.

→Highlight the appropriate connection (ethernet or wifi) and press enter.

→Choose the tab to edit **IPv4** settings.

→Change the method from 'automatic (DHCP)' to 'manual'

→Click on the add button near the address table. This will bring up a text box.

→Add the appropriate IP address, netmask (netmask = 'subnet mask') and gateway (gateway = 'default route'). Use the tab key to switch between regions in text box.

→In the DNS servers field below enter the appropriate DNS server values.

→save and close

## **3) Aerosol software installation and setup**

Open a terminal window by clicking on 'terminal' in the upper left pulldown menu. The following stages require networking and downloading ~300 MB of software, so they should wait until you have high speed connectivity.

Type the following to install DAOS (aerosol software) on the blank Linux install:

```
wget -O - ftp://aftp.cmdl.noaa.gov/aerosol/software/daos/bootstrap.sh | sh -
```

Note that the preceding line must be typed *exactly* as written above. There are 3 hyphens in this line. The first hyphen has a space before it and is followed by the letter 'O'. The second hyphen has a space before and after it. The final hyphen, at the end of the line, has a space in front of it but no space after it.

At this point a second terminal window will pop up asking for the password. This is the password set during the installation process (cNc ...). The DAOS install takes ~30 min on an older computer. When it's done **you may be prompted for the password once more.**

On one of the open terminal windows you'll be prompted to enter the 3 letter ID for your station, e.g., BND for Bondville, MLO for Mauna Loa, etc. Please do so. This will get the configuration that is specific to your station. You will then be prompted to choose several settings which depend on internet quality. The recommended settings if the station has good internet are:

1 - Use averaged realtime data

1 - Basic telemetry reported semi-frequently

These are the defaults so you can also just hit enter and continue.

You will then be asked if you want the NOAA tunnel to be always open - again this is recommended - type 'Y'.

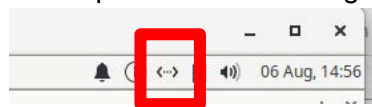
This will take a few minutes as things are installed. You will be prompted to reboot.

Reboot the computer now. **You may be prompted for the password again.** You will now have a window once again asking for the station (should already be filled in). Click through the rest of the windows. When you are done the blue CPD screen will come up. you will have a **desktop with the NOAA logo.**

#### **4) Updating the software at a station**

This section is specific to someone who is updating the software at a station - i.e., putting a newer version of the software on a laptop that is running an old version of cpd.

First thing to do before doing anything is to take a photo or write down the internet connection settings of the current computer so you can reenter them for the upgraded software. Those settings can be found by clicking on the side to side arrow icon in the upper right corner of the desktop and then choosing the menu option 'connection information'.



The connection information will look something like this:

When you get to the part of the installation process in Step II where you need to type in the settings use the values you recorded or photographed to fill in the connection info. Two notes since the labels in the fill-in form aren't exactly the same as what is in the connection info photo.

*Netmask = Subnet Mask*

*Default Route = Gateway*

The data acquisition system uses IPv4 settings, so for the above example in the photograph you would want:

*IP address: 172.16.247.153*

*subnet mask: 255.255.255.0*

*gateway: 172.16.247.252*

(The numbers will be different for each station so use the numbers for your station!)

Again, if you are at a place that uses DHCP (for example in the aerosol lab at NOAA/GMD) then you don't have to worry about this - it happens automatically.

## **5) Firewall settings for general operations**

The laptop needs all ports access to awftp.cmdl.noaa.gov (140.172.200.32) in order to be able to send data. Also of note is that, eventually, the basic file transfer process will be moving to a transfer protocol via <https://gml.noaa.gov> (replacing the FTP server) so it's a good idea to make sure that access to <https://gml.noaa.gov> works sooner rather than later, but it's not yet a requirement.

Additionally, the laptop will need a functional DNS (correctly configured on the laptop, if it's not available in general). This is required so the laptop can actually find (turn into a numerical address) the FTP server host name (to awftp.cmdl.noaa.gov) or <https://gml.noaa.gov>.

For new versions of the DAOS software, there's an option for an 'automatic tunnel' which will allow NOAA automatic and manual access to the data acquisition laptop (e.g., for software updates and troubleshooting) so long as the laptop can access *gml.noaa.gov port 443* (meaning <https://gml.noaa.gov>). If the laptop has general internet access enabled then access to <https://gml.noaa.gov> should be a given. If the 'automatic tunnel' feature is not selected then the ssh described below is the only option for NOAA remote access.

NOAA remote access can also take place through an ssh connection. The ssh connection is actually our preferred method as it tends to be more robust than the automatic tunnel but it is good to have both options. For the ssh option to work the firewall needs to allow an ssh connection from NOAA (from vortex.cmdl.noaa.gov (140.172.192.209)) via port 22. Additionally, there needs to be a public IP address that can be connected to for remote access. The router running on that public IP address must be configured to forward port 22 so the remote connection can occur.

There is a system to determine the public IP address of the laptop, but it requires internet access (meaning the computer can reach arbitrary web sites (or can at least reach <https://gml.noaa.gov>)). Basically, you should be able to open a web browser on the laptop, type 'whatsmyip' in the address field, and the result will tell you what the laptop's public IP address is.

We should note that if internet access on the laptop is blocked, then the laptop's software update process will not work, so the laptop will not receive CPD3 (data acquisition) or OS (operating system) updates.