# Workshop 03 Operating Systems

## Operating System and Software Essentials

With our Operating System (OS) installed now it's time to explain what an OS is. We will look at why Creative Community Computing (CCC) is based on Free and Open Source software (FOSS), and customise our Xubuntu installation

Part One

- *Operating Systems Explained*

Part Two

- *Why a FOSS Operating System*
- *Introducing Xubuntu*

## What is an Operating System (OS)?

All computers, from the biggest supercomputers to the smallest smartphone run an Operating System.

The Operating System or OS is the first and most important computer program your computer will run.

## What does an Operating System do?

Tasks that your operation system will do include:

- Booting - we explored this in workshop 01
- Controlling your mouse, keyboard and other peripherals
- Providing a graphical user interface (GUI) and a desktop environment
- Managing system resources - like the Central Proccess Unit (CPU) and the (GPU).
- Interacting with and storing files
- Communicating over networks

## Operating Systems Compared

Operating Systems can be designed for one user at a time (single user) or be accessed by more than one user (multiuser) at the same time.

Desktop computers, like the ones we use in our workshops, are typically single user.

Supercomputers used by universities, governments and large companies allow multiuser access.

# Multitasking

Operating Systems can be multitasking, meaning the computer can perform more than one task at a time.

- The computers that provide web pages and other services over the internet are multitasking.

  Some of these can **serve** millions of web pages at the same time.

- A desktop computer that has multiple programs running is multitasking.

A single-tasking OS restricts the computer to one task at a time.

- iOS used on Apple phones was originally a single-tasking OS.
- Single-tasking OSs are less popular due to the increase in power and number of cores in modern CPUs.

# Why Use a Free and Open Source Operating System?

There are many different Operating Systems in use, and some have a history dating back to the 1970s.

> If you are interested in this history, and what exactly FOSS means you can explore in Train the Trainer, or download A Brief History of Desktop Operating Systems and Why Free and Open Source Software ?.

We've chosen an Linux based OS, called Xubuntu, but one question we are often asked

**'If CCC is giving away free computers, why not include an OS like Windows 7 with it?'**

This comes back to the vision for the CCC program; digital literacy and ICT self-sufficiency.

Any closed source OS we give away will:

- Have a restrictive license attached
- Require updates and eventually be out-of-date and unsupported

As much as we would like to, we cannot support our workshops beyond the delivery.

## Free and Open Source

With a Free and Open Source Software (FOSS) operating system we can expose and freely distribute an OS. In the same way we can take the hardware apart we can also:

- Choose an operating system
- Choose a desktop environment

- Choose creative applications, productivity apps and system tools
- Make our own unique version of an operating system
- Copy it
- Distribute it
- Install it on as many machines as we like, whenever, wherever we like

The repos for Linux OS contain thousands of free applications of every type.

Developers all around the world are constantly adding to the world of open source software.

With the Linux kernel being constantly developed, we can expect a stable, continually supported, freely available kernel for years to come.

Skills learned in Linux can be used to:

- Create a media server at home with a raspberry pi
- Set up your own web server
- Learn to program or develop for the web

As we've discovered, Linux is open source and free. It also comes in many variations. We could find a variation of Linux to suit just about any kind of computer, from the oldest, slowest desktop to the latest smartphone.


# Why Choose Xubuntu

For our workshops we are not looking at supercomputers or smartphones, we are looking for a desktop version or distribution (distro) of Linux that fills our needs. Some well-known Linux distributions we looked at include:

- Fedora
- Gentoo
- Knoppix
- Mandriva
- PCLinuxOS
- Slackware
- Ubuntu

Our research on this narrowed down to two candidates - Fedora and Ubuntu.

Both are well supported by a large user base, with a well established company backing each - Canonical in case of Ubuntu, and Red Hat for Fedora.

Software for both systems is available all over the internet, with Ubuntu having the edge in popularity.

After installing and testing both on a typical CCC computer in early 2014, we realised that the standard desktop environments for both these distributions are too resource heavy for our older computers.


Both OSs are also moving towards the touch screen type GUI that cursed Windows 8 to failure. But

this is FOSS software right, so surely some folk out there have come to the same decision and have the skills to do something about it?

We then searched for variations of these OSs, called *flavours* (on Ubuntu) or *spins* (on Fedora) that would be a little more gentle on our system and came upon Xubuntu.

# Introducing Xubuntu

According to the Xubuntu project website:

- Xubuntu is a community developed operating system
- Xubuntu is an elegant and easy-to-use operating system
- Xubuntu comes with Xfce, which is a stable, light and configurable desktop environment
- Xubuntu is perfect for those who want the most out of their desktops, laptops and netbooks with a modern look and enough features for efficient, daily usage
- It works well on older hardware too

After installing and trialing Xubuntu we realised it has the right balance of performance, familiarity and stability we need for CCC. The final choice we needed to make is which version of Xubuntu to choose?

## Software Versions

All big software is released as *versions*. This means that the software that is maintained and updated, and usually follows a *release schedule*. Each new release is given version number, and is supported for a length of time. To make the most use of our OS we've chosen Xubuntu 14.04 LTS.

This was the latest version when we were piloting CCC and followed a Long Term Release (LTS) schedule of three years.

## Getting Around Xubuntu Visually

Xubuntu is based upon the xfce desktop environment.

Xfce is a lightweight desktop environment for UNIX-like operating systems. It aims to be fast and low on system resources, while still being visually appealing and user friendly.

In the top left hand corner you can access the whisker menu, similar to the Windows start menu.

Here you can access all the programs Xubuntu has pre-installed, and the settings for our desktop environment.
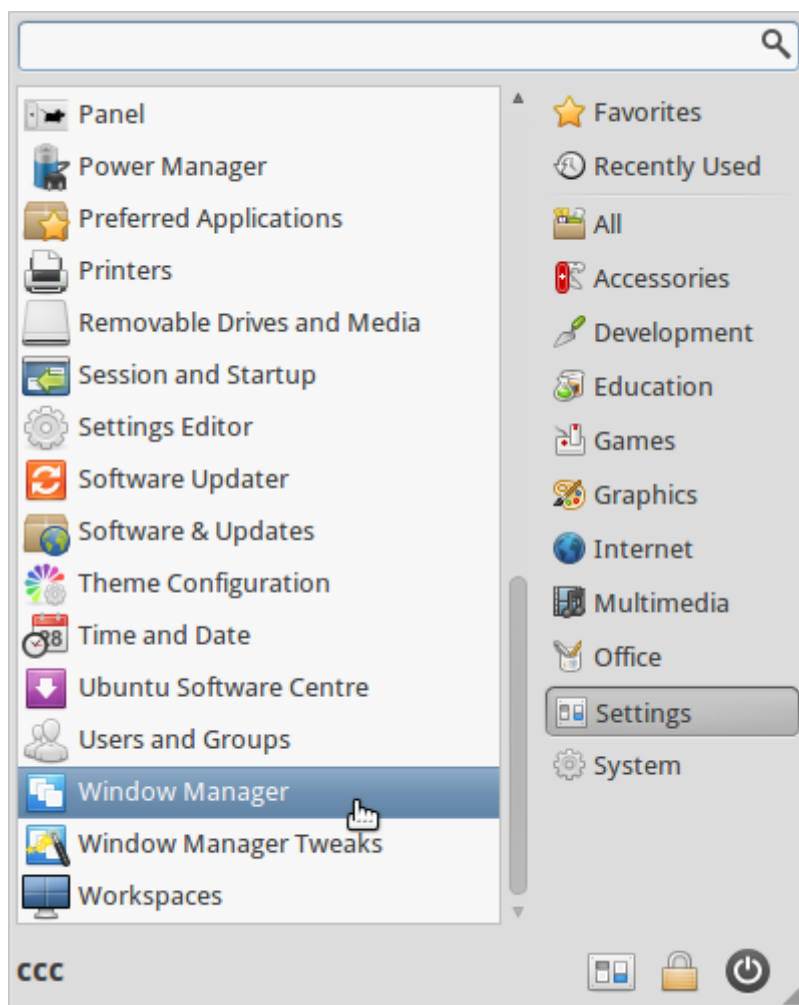
# Customising your Desktop

Our first task is to customise our window manager. We will increase the size of the window borders to make it easier to grab and resize windows.
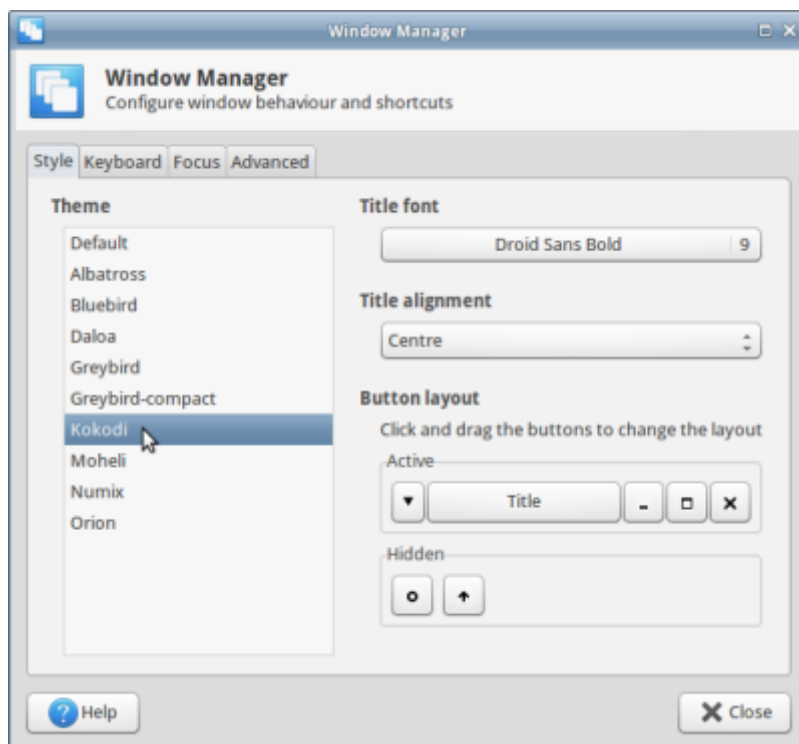
Go to the whisker menu, and select 'settings'.
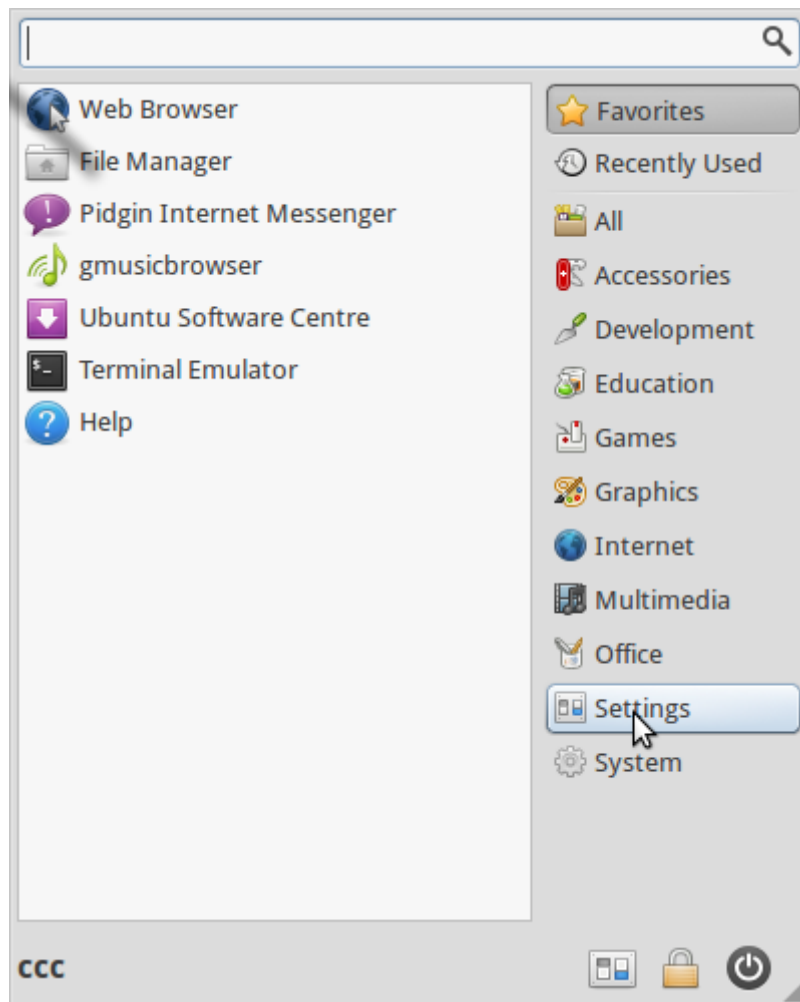


Scroll down and select 'window manager'.

Select the 'kokodi' theme - this theme has larger handles on the corners of the windows.
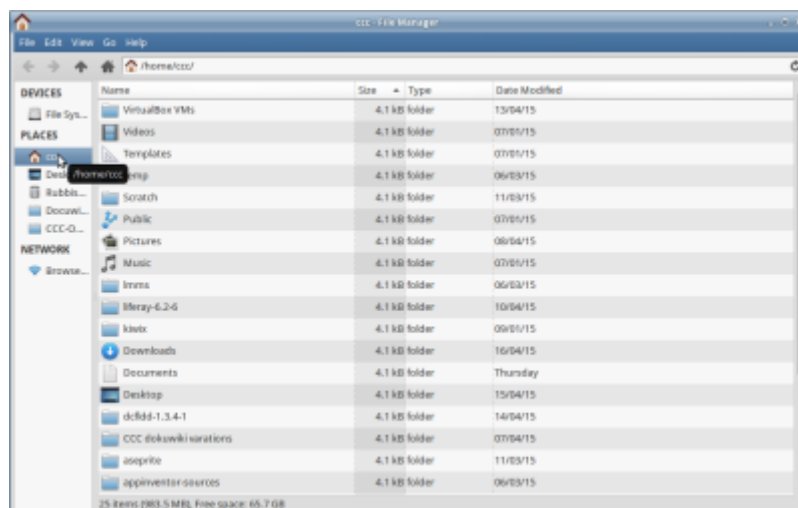
# The File Manager

Next, we'll use the file manager, and find our way around the files and folders. If you are used to using Microsoft Windows or Apple OSX then the layout and icons used will be familiar.

Go up to the whisker menu and select the 'File Manager'.
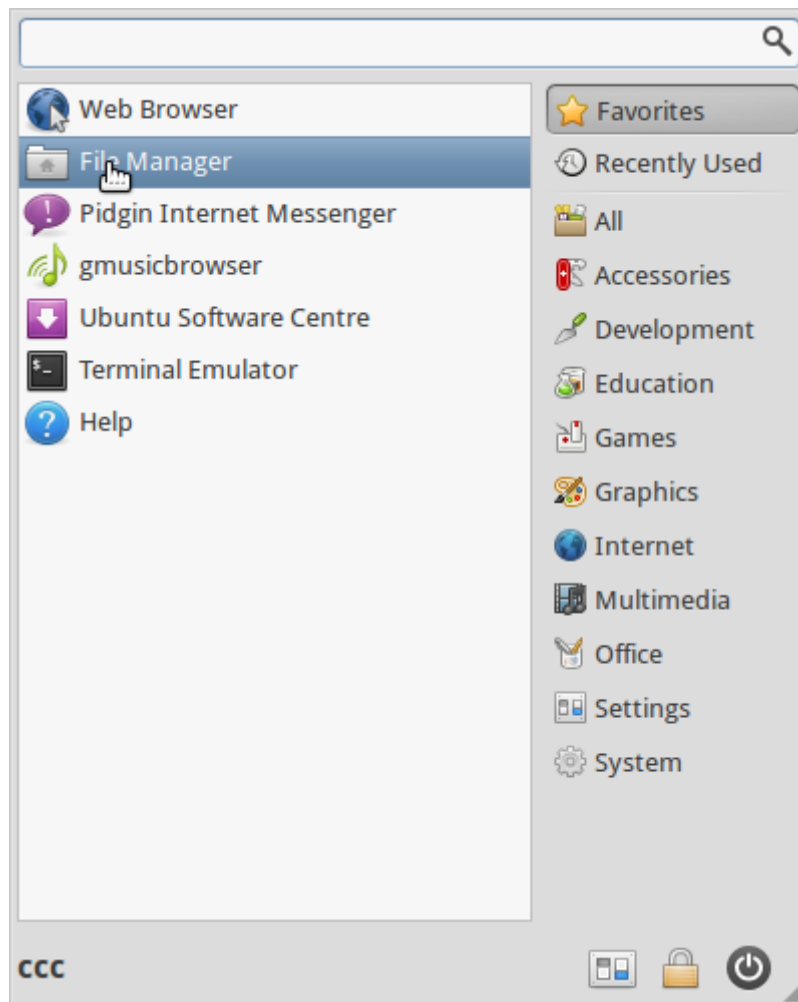


The File Manager defaults to opening a window in your home folder. On the left-hand side you see your Hardware Devices, your commonly used Places and the local Network.

You can change the way you view files and folders in the menu.
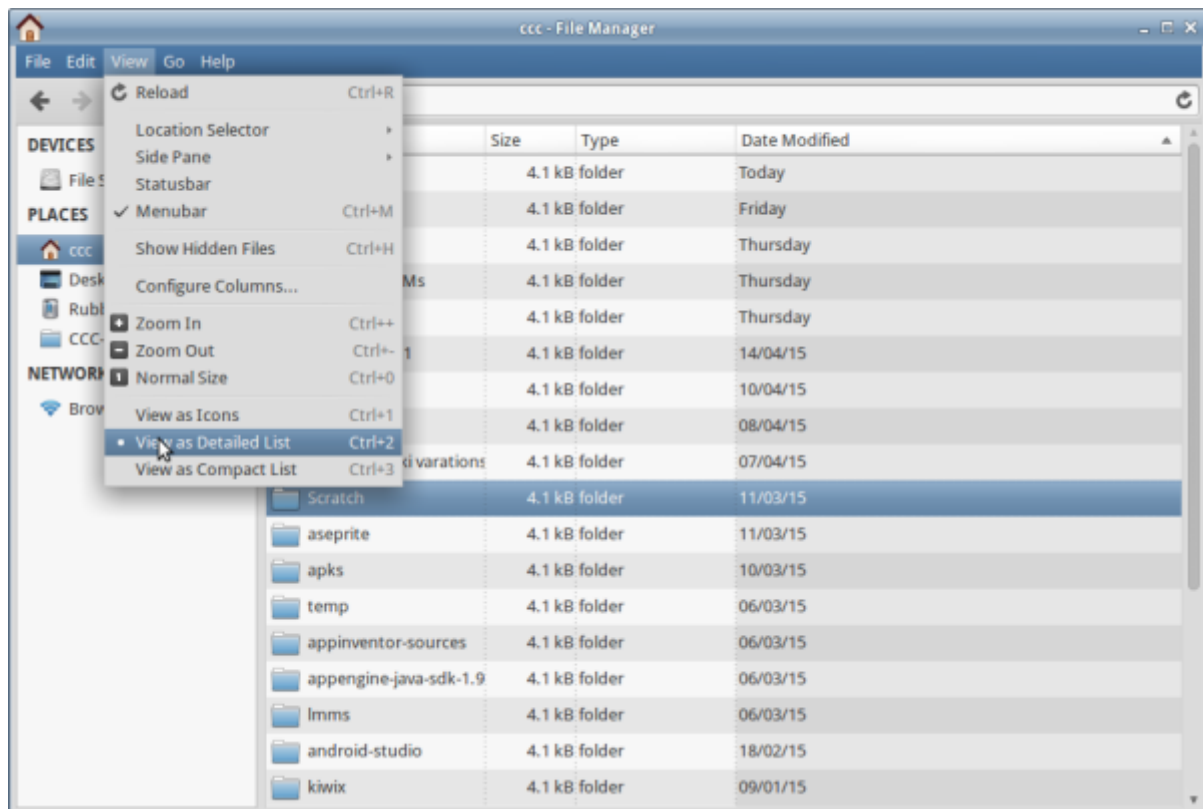


At the top of your File Manager you can see your location in your computer.


It's a concept we'll also cover in our command line exploring.
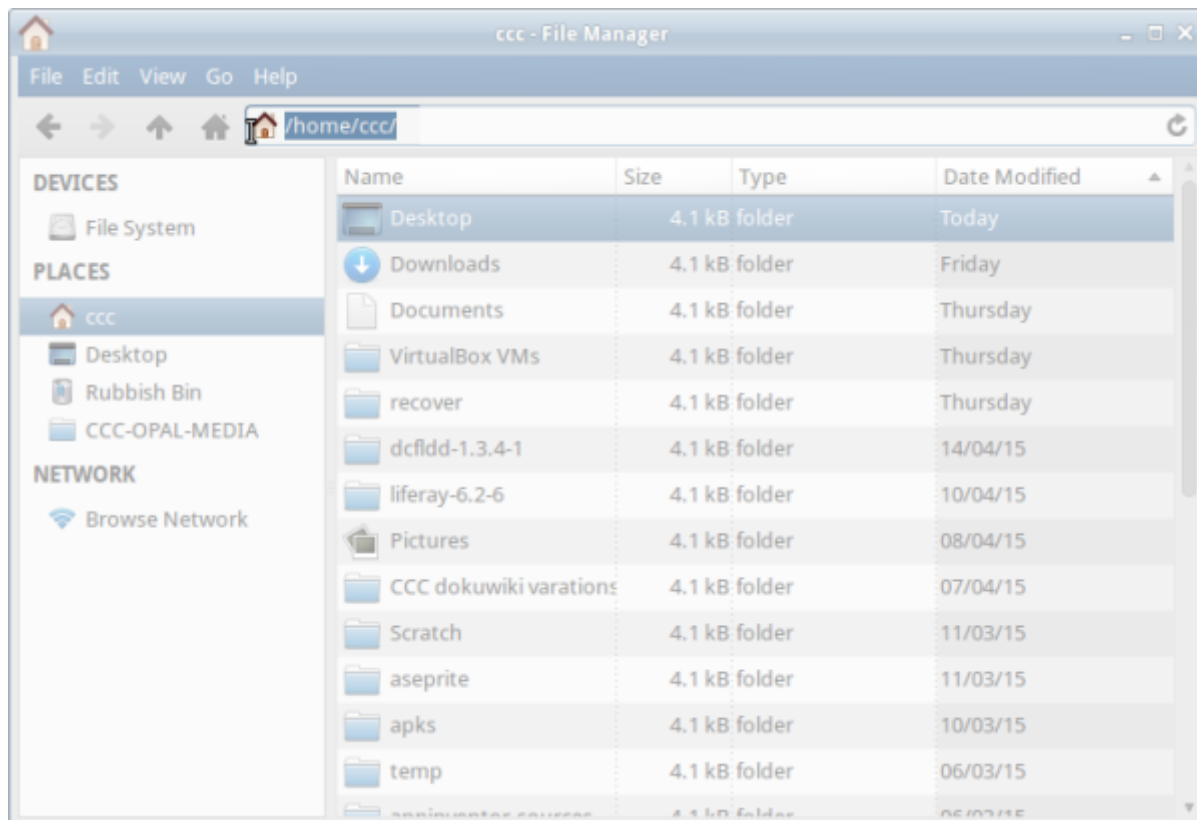
# A New Desktop Background

Now let's add a custom desktop background. If you have a phone with you, try plugging it in. It should appear in your file manager.
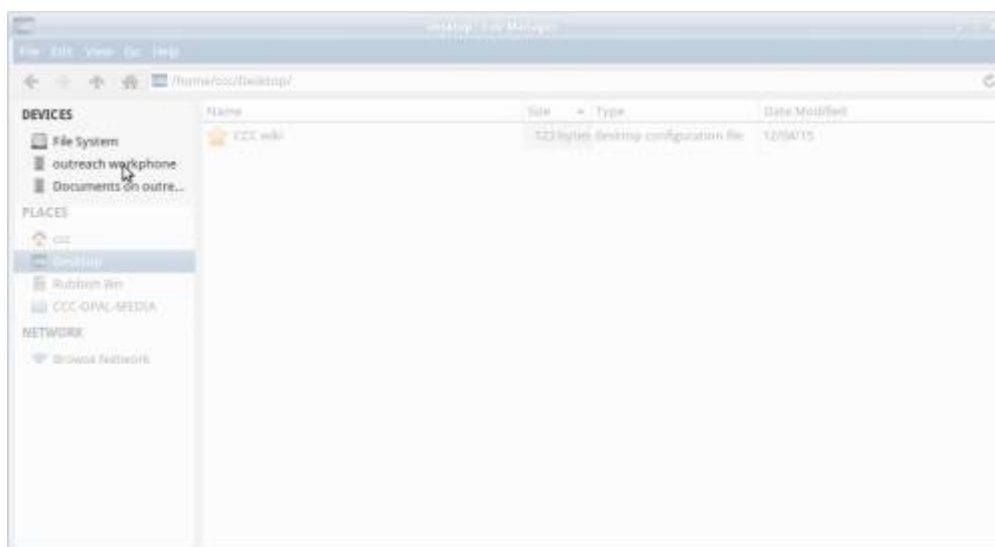


Navigate to the DCIM directory - this is the usual directory name for digital photos. There may be a couple of other directories there.
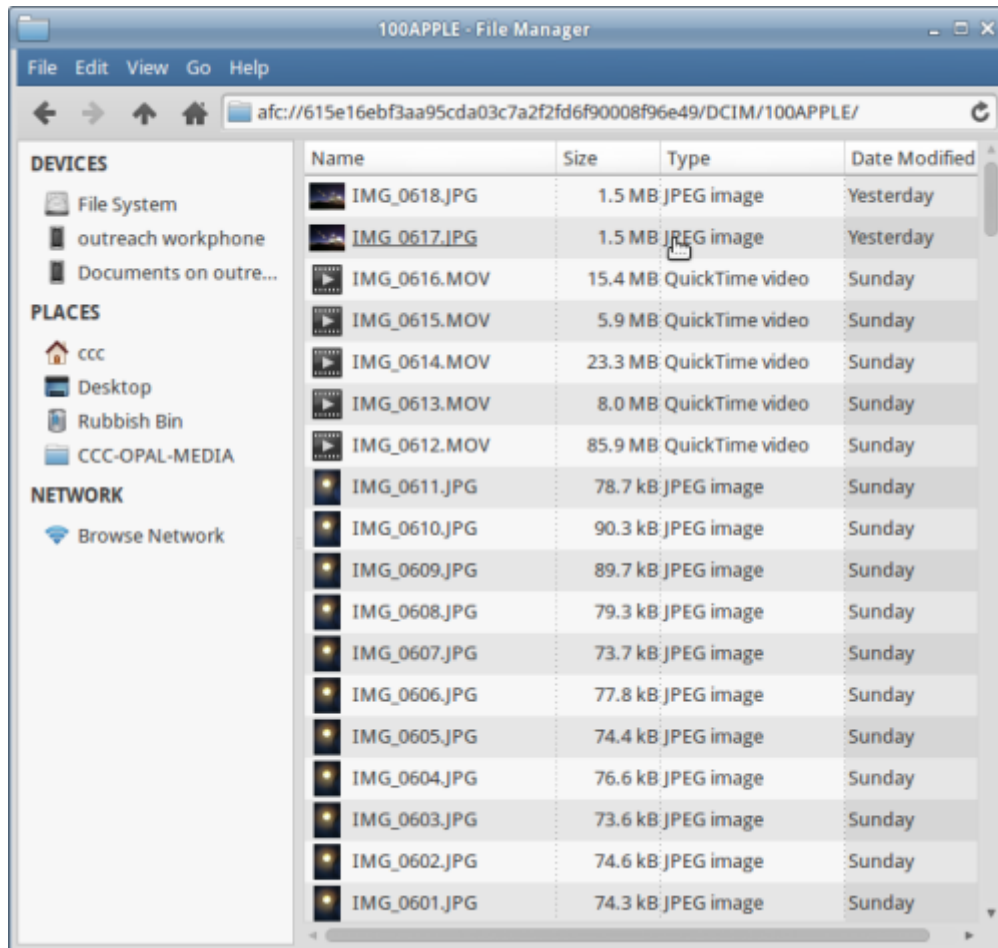
If you double click to open a photo, it will open in your default image viewing program. In this case it opens in Ristretto Image Viewer.
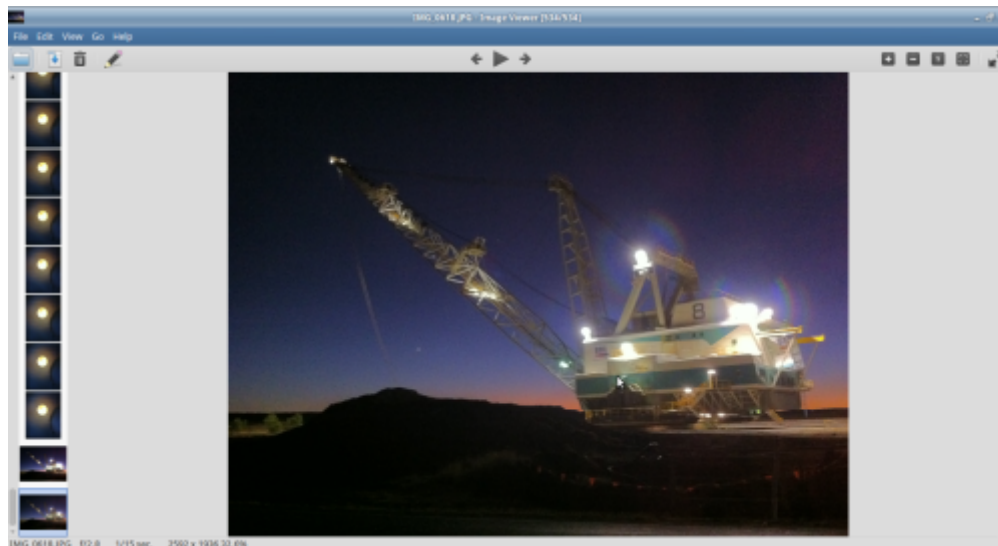


You can grab it and drag and drop onto your desktop or into a folder.
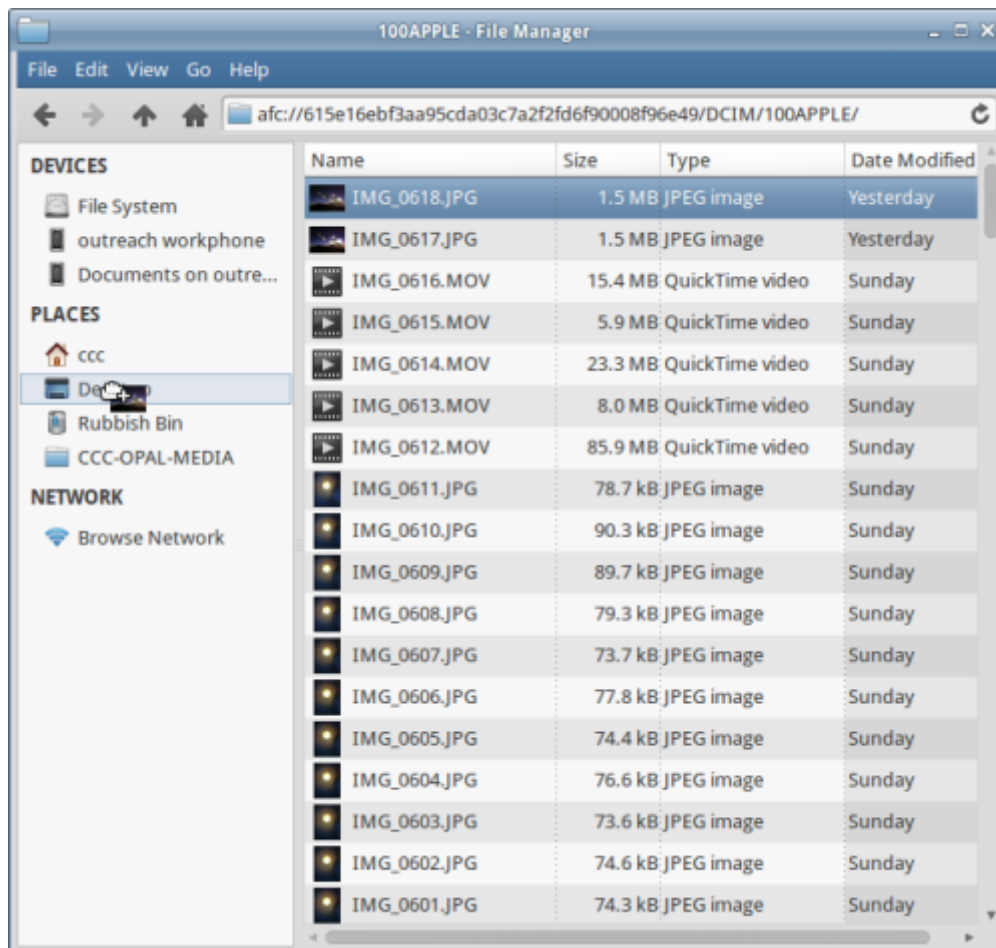
Then right click and set it as your desktop.
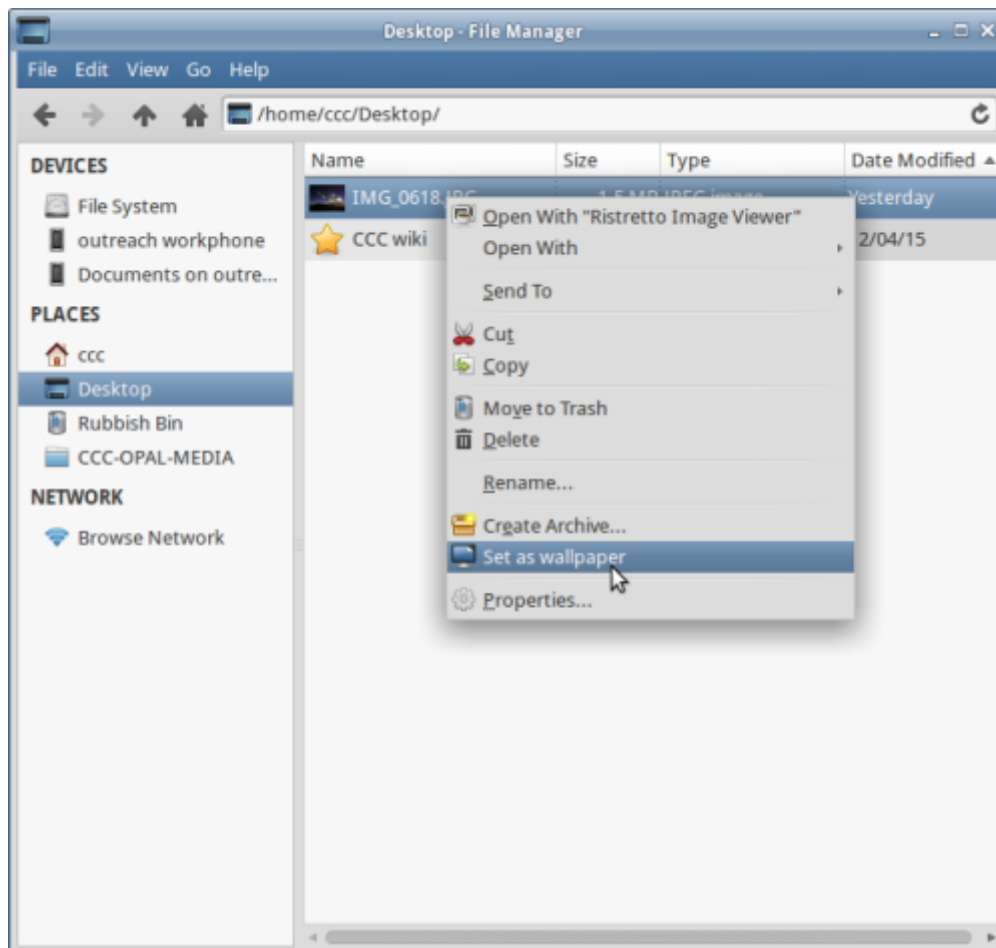
Done!
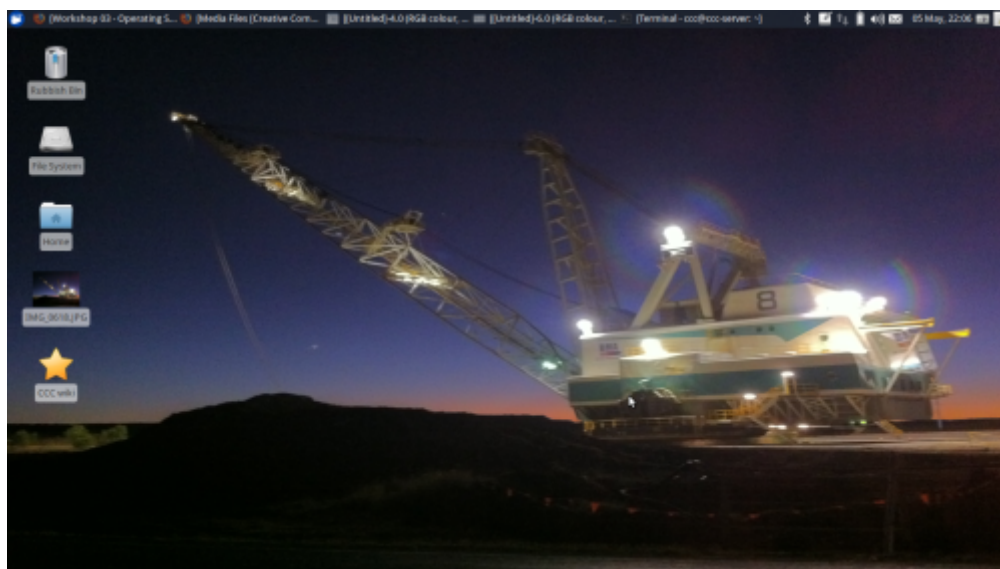


# Let's Make a Dock

If you are used to using an Apple computer you will be familiar with the dock - a small menu on the desktop. You can add a menu to the bottom of the screen, which will act like a dock.
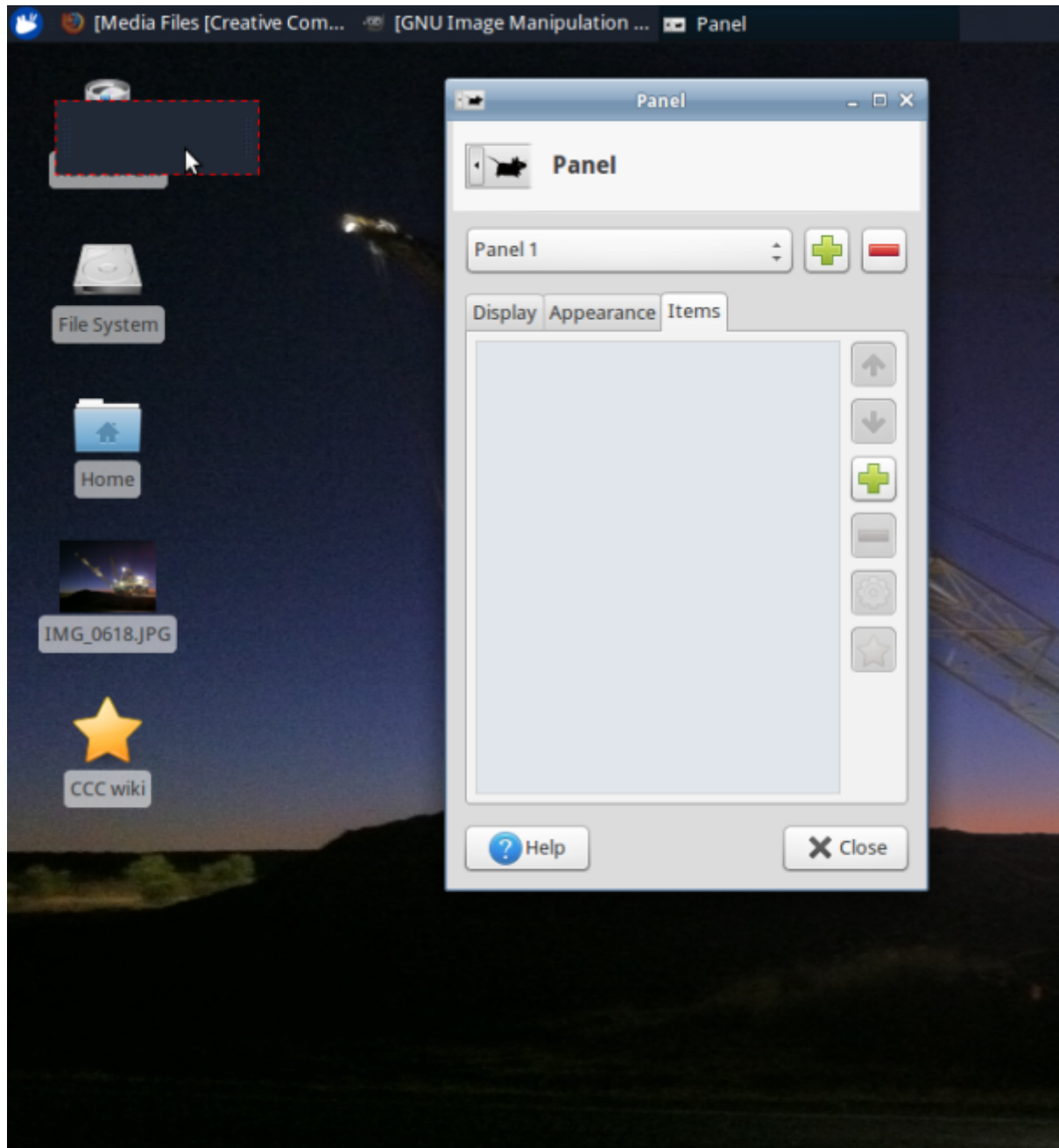
The Xubuntu desktop uses panels to create menus. There is already a panel at the top of your desktop. Right click this panel on the blank section (or the clock) to bring up the panel preferences
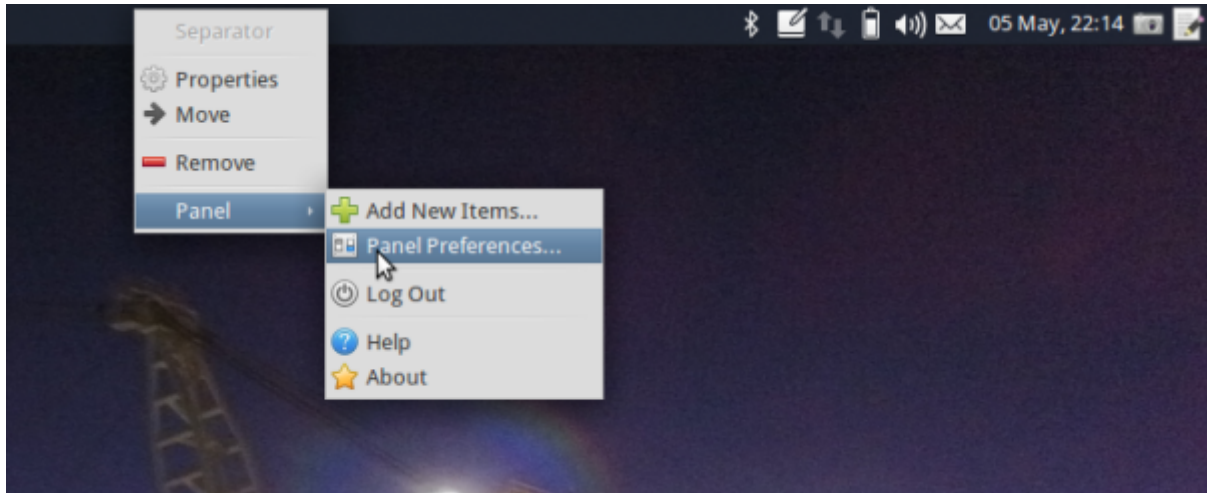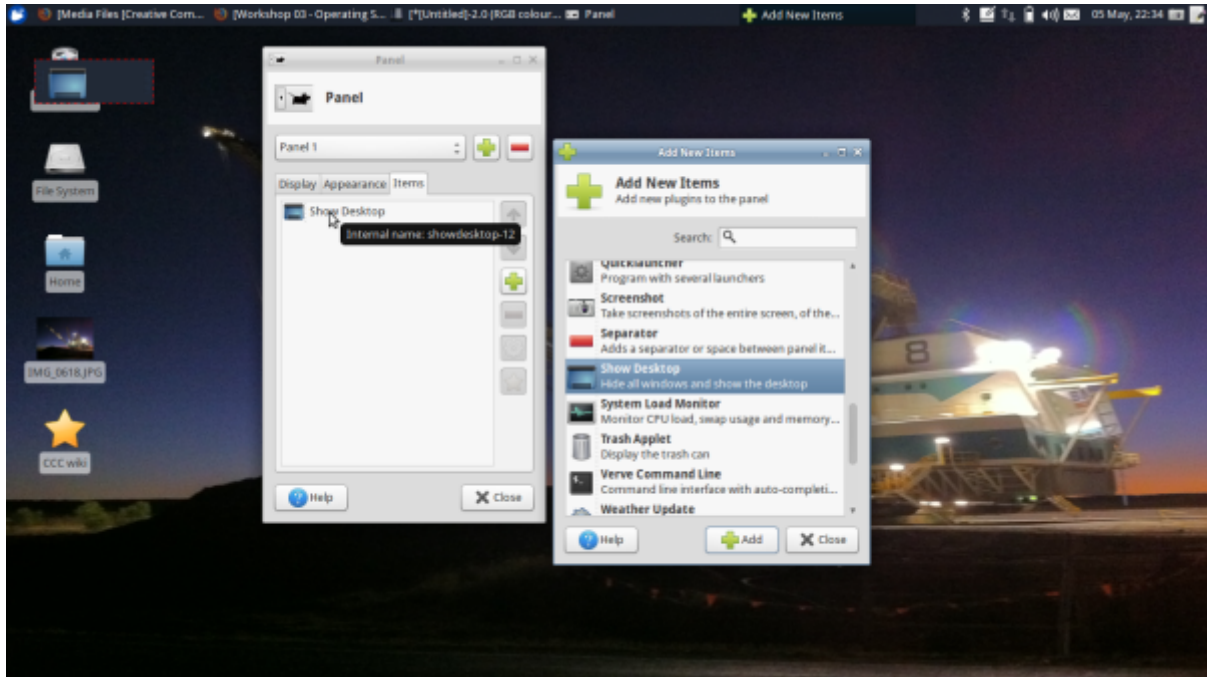
The preferences let you add another panel with the + sign.
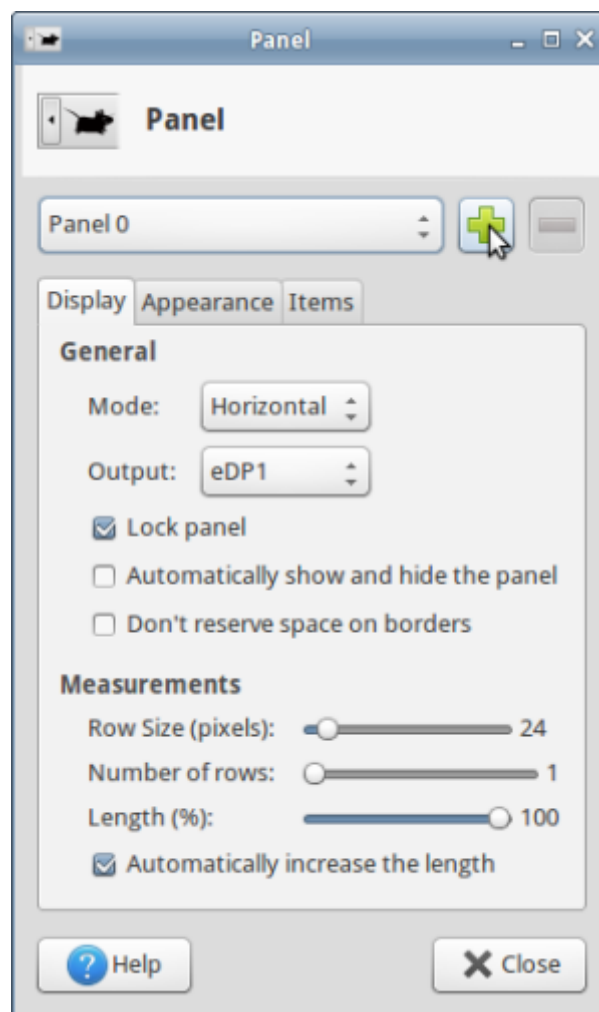


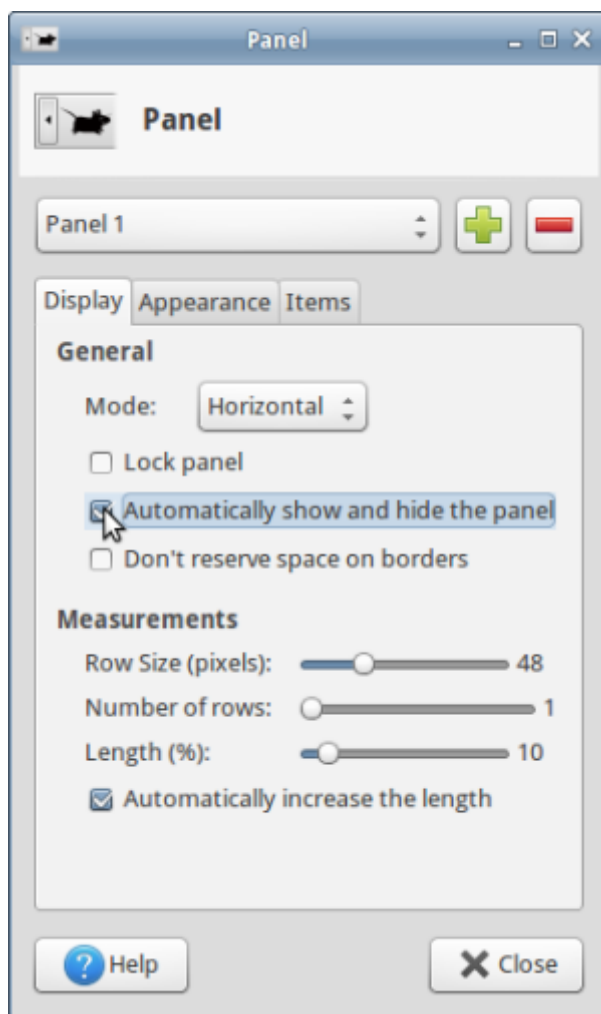The new panel will appeal at the top left, empty and ready to be added too.

You can click on the plus sign to add a new item - we'll add a link to the desktop.

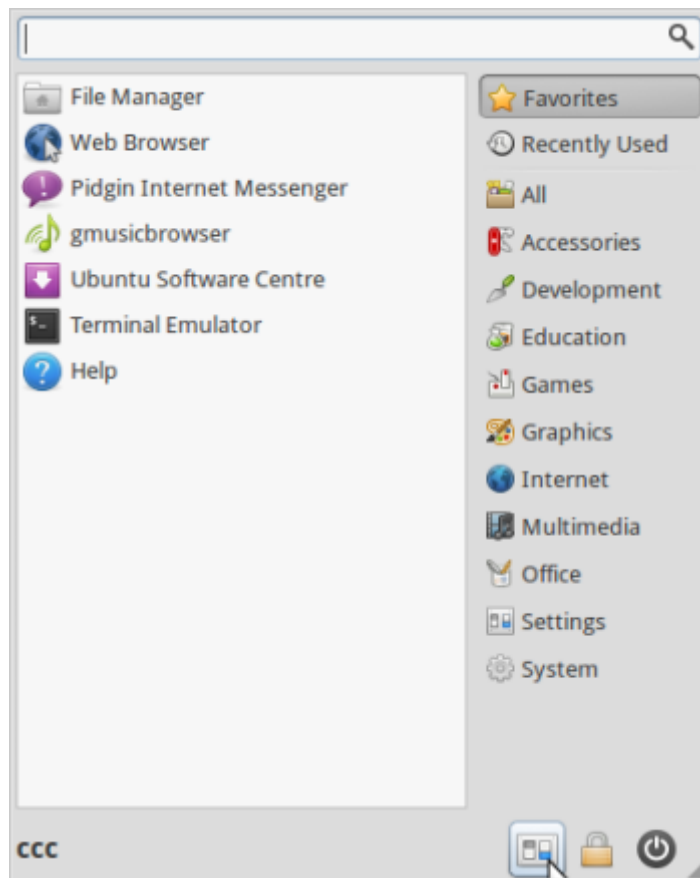Then drag it down to the bottom of the screen.
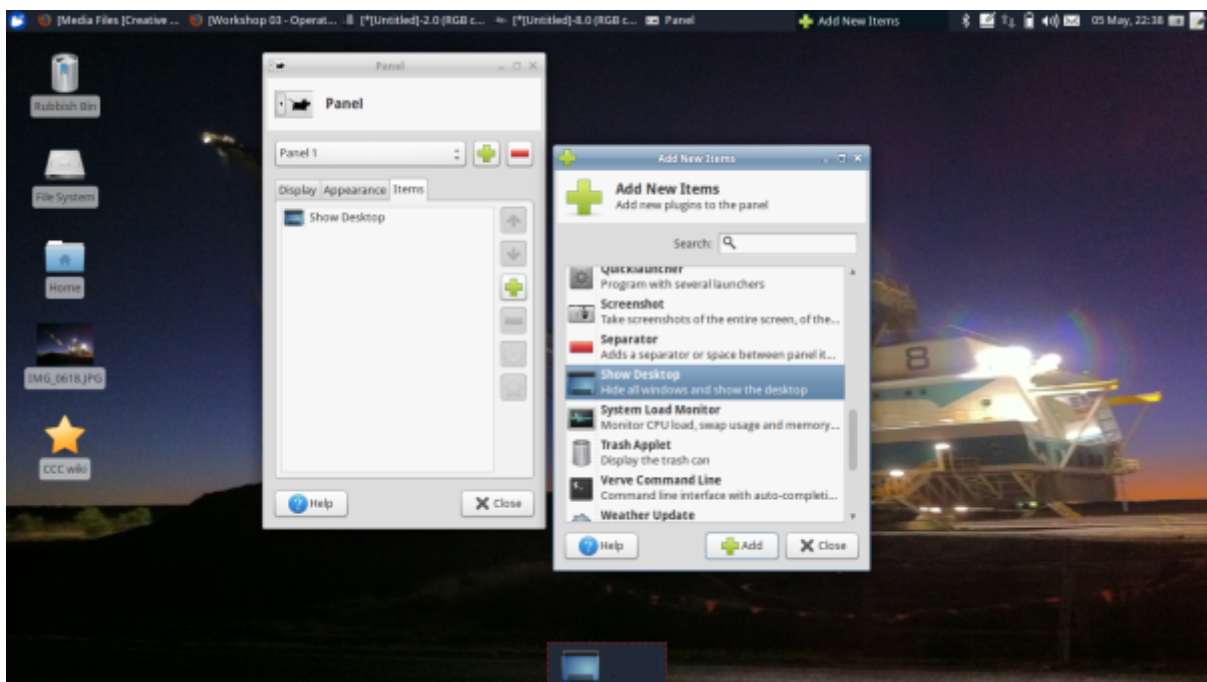


Finally, you can choose to show and hide the dock.

Now close the preferences and we are done.
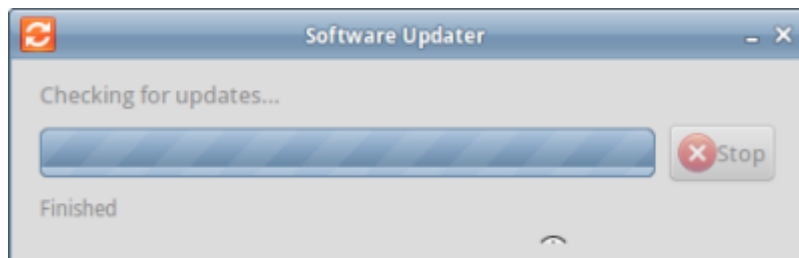
# Getting Up to Date

Our first task with our new network is to update our system and the existing software installed. The easiest way to do this is by using the settings panel in the whisker menu.
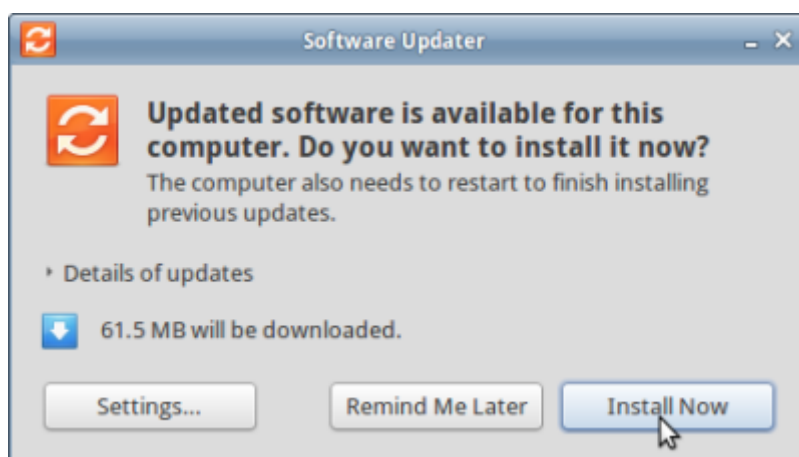
Scroll down and select 'Software Updater'.



Your computer will check for updates, and go to the CCC laptop to find them.

Don't worry if there are a few updates missing, this is because our CCC server laptop doesn't have all the software possible to install. Just click 'install now'.



Enter your password and your system will begin to update. You can open up the little triangle to watch the progress.
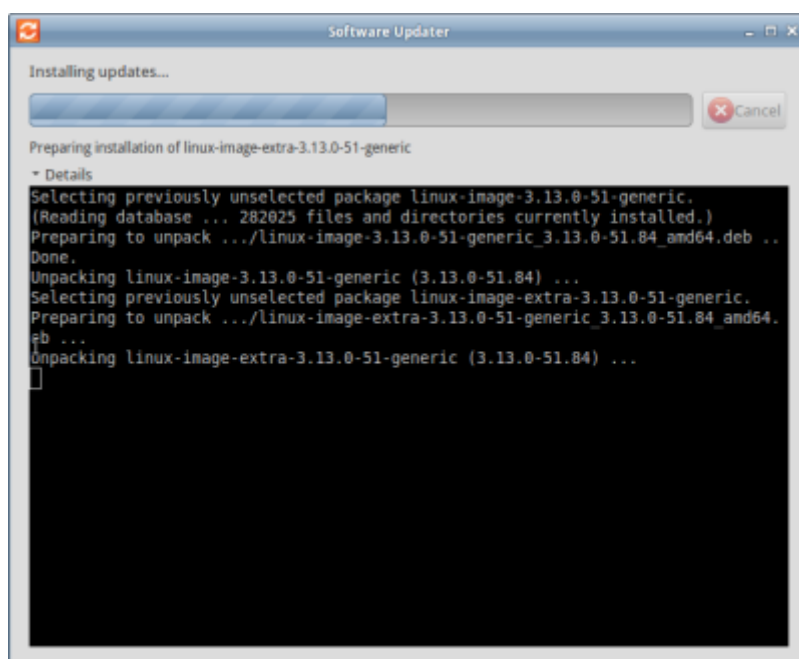


Don't forget to restart your computer before we start the next workshop.
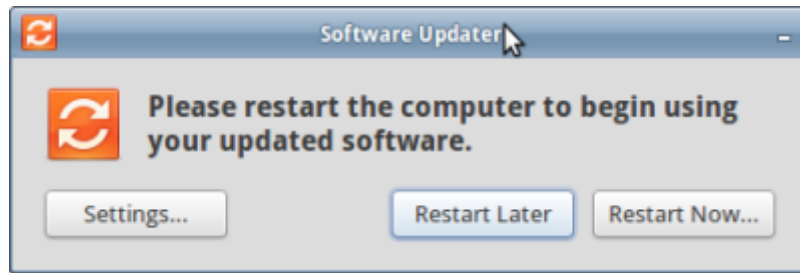
# End of Workshop 03

NEXT WORKSHOP --->