

# #AdoptYourOwnPenguin

Linux Install Party

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# Table of contents

## 1 Introduction to Linux

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- Some information
- Advantages of Linux
- The pieces of a Linux operating system
- Linux distributions

## 2 A selection of noteworthy distributions

---

- Debian
- Ubuntu and Linux Mint
- Arch Linux and Manjaro

## 3 Desktop environments

---

- Some information
- KDE, MATE, GNOME, Cinnamon, Xfce, and Budgie

## 4 Installing and working with a Linux system

---

- Installing Linux
- Basics of your new Linux system
- Installing and updating software
- Troubleshooting

## 5 References

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# Introduction to Linux





# Some information about Linux

- Operating systems based on the Linux kernel[5]
- The Linux kernel is part of the UNIX family
- (Mostly) open source
- Fit for a range of different use cases:
  - Desktop computers
  - Server
  - Smartphones
  - TVs
  - Tablets
  - IoT devices
  - ...
- Around since the mid-1990s
- Many of the supporting system software and libraries are provided by the GNU project[2]
- Tux the penguin is the official mascot of Linux





# Advantages of Linux

- Free
- Open source
  - Freedom to run the program for whatever purpose
  - Freedom to redistribute copies of the program
  - Freedom to study the inner workings of the program
  - Freedom to make changes to the program
  - Freedom to distribute copies of the modified versions
- A system under your exclusive control
- Multi-purpose
- Extremely customisable
- Package managers
- Fewer viruses and malware
- ...

There are some closed source programs. Most distributions give you the option whether or not to use them. Furthermore there are some paid for Linux distributions but they mainly come into play for server operating systems.



# The pieces of a Linux operating system

## 1. **Bootloader:**

The software managing the boot process of your computer and thus responsible for starting the operating system.

## 2. **Kernel:**

The actual Linux. It manages the CPU, the memory and all peripheral devices.

## 3. **Init system:**

Bootstraps the user space and controls the daemons. Takes over after the bootloader is done.

## 4. **Daemons:**

Background services like printing, sound, or scheduling.

## 5. **Graphical Server:**

Renders and displays all graphics.

## 6. **Desktop environment:**

The piece the user interacts with. There are a few different environments to choose from (GNOME, KDE, Mate, XFCE, etc.).

## 7. **Applications:**

Software that is not included with any of the previous pieces. Can be installed via a package manager or by hand.



# Linux distributions

## Well known distros:

- Debian
- Ubuntu
- Arch Linux
- Manjaro
- openSUSE
- Red Hat
- Fedora
- Kali
- Linux Mint
- ...

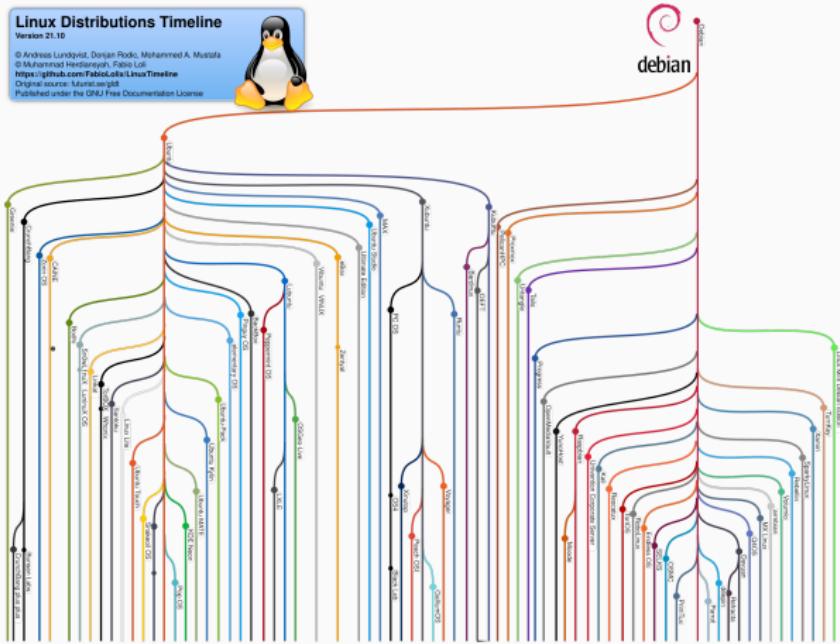


Figure: Excerpt from the Linux distro tree for Debian [4]

See DistroWatch[6] for a comprehensive list of all Linux distributions.

# A selection of noteworthy distributions





- Around since 1993
- Comes with over 50,000 packages
- Supported desktop environments:
  - XFCE
  - GNOME
  - KDE
  - MATE
  - Cinnamon
  - LXDE
  - MATE
- Release cycle
  - A stable version is released every 2 years
  - Each version will receive updates for 3 years
  - Those updates will only contain security updates and fixes
  - After that the version will receive security updates for 2 more years
  - oldoldstable – oldstable – **stable** – testing – unstable – experimental
- Package manager: `dpkg` / `apt`





# Ubuntu and Linux Mint

## Ubuntu

- Around since 2004
- Derivative of Debian
- Very new-user-friendly
- Default desktop: GNOME
- Packages are based on packages from Debian's unstable branch
- Release cycle
  - New version every 6 months
  - Long-term support version every 2 years
  - LTS version updates for 5 years
- Package manager: apt

## Linux Mint

- Around since 2006
- Derivative of Ubuntu
- Also very new-user-friendly
- Default desktop: Cinnamon / MATE / Xfce
- Full out-of-the-box multimedia support
- Release cycle same as Ubuntu
- Package manager: *dpkg* / *Flatpak* / *apt*



Ubuntu





# Arch Linux and Manjaro

## Arch Linux

- Around since 2002
- Release cycle:
  - Rolling release model
  - Latest stable versions of most software
  - **stable** – testing – unstable
  - Quick access to new versions of software
- Package manager: `pacman`
- Additional package repository called **Arch User Repository**
- Get the package manager `yay` if you can
- No visual installation!



## Manjaro

- Around since 2011
- Derivative of Arch Linux
- Default desktop: Xfce / KDE Plasma / GNOME / Phosh
- Focus on user-friendliness and accessibility
- Still most of the benefits of Arch
- Visual installer
- Uses the same package repositories as Arch
- Package manager: `pacman`



# Desktop environments





# Some information about desktop environments

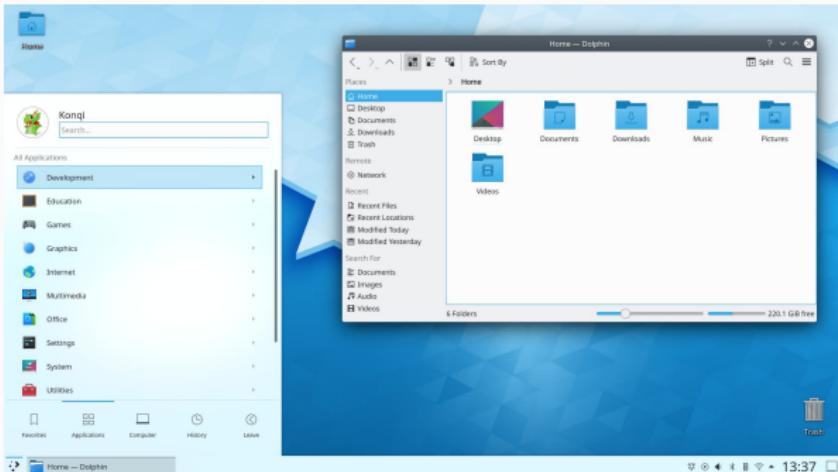
- Desktop environments are separate from operating systems
- Most distributions have a wide array of available desktops
- If a distribution doesn't support your preferred desktop, you might still be able to install it by hand
- Unlike Windows and macOS, Linux desktops are far more customizable
- You may have multiple desktop environments installed at once
- If you have multiple desktops installed, you can change between them on the login screen
- Choose a desktop that fits your needs and try to work with it (don't switch as soon as something doesn't work or look exactly as you'd like)
- Desktop Chooser[3] (sadly not as good as the Distro Chooser):  
<https://www.knetfeder.de/linux/linux-desktop-chooser/>

Remember it's not permanent!

You can easily install another desktop, either keeping the previous one or removing it.



# KDE Plasma desktop environment



## Advantages:

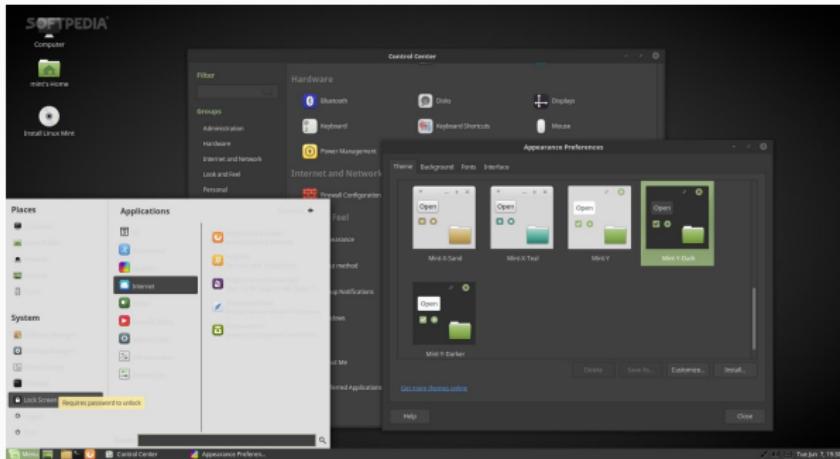
- Highly customisable
- KDE Connect (connect your phone to the computer)
- Modern and polished user interface
- Several useful tools built-in

## Disadvantages:

- Customization options can be overwhelming
- Not suitable for older computers



# MATE desktop environment



## Advantages:

- Suitable for almost everyone
- Easy to use, robust experience, and lightweight
- Simple yet Customizable
- Collection of basic applications and built-in useful tools

## Disadvantages:

- Does not offer the most intuitive user experience
- Not that modern-looking



# GNOME desktop environment



## Advantages:

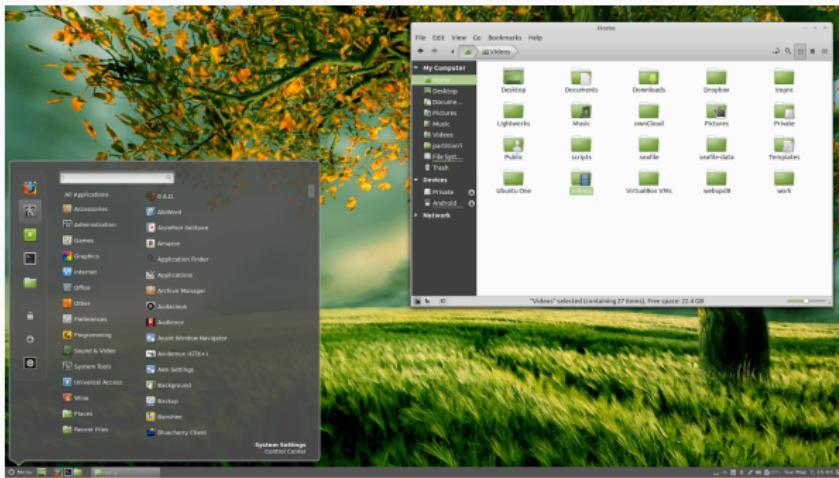
- Easy to use and customizable
- Modern and touch-friendly UI
- User interface aims to provide a unique experience
- Can extend functionalities with GNOME Shell Extensions

## Disadvantages:

- Not suitable for older computers
- User Interface isn't tailored for a Windows user



# Cinnamon desktop environment



## Advantages:

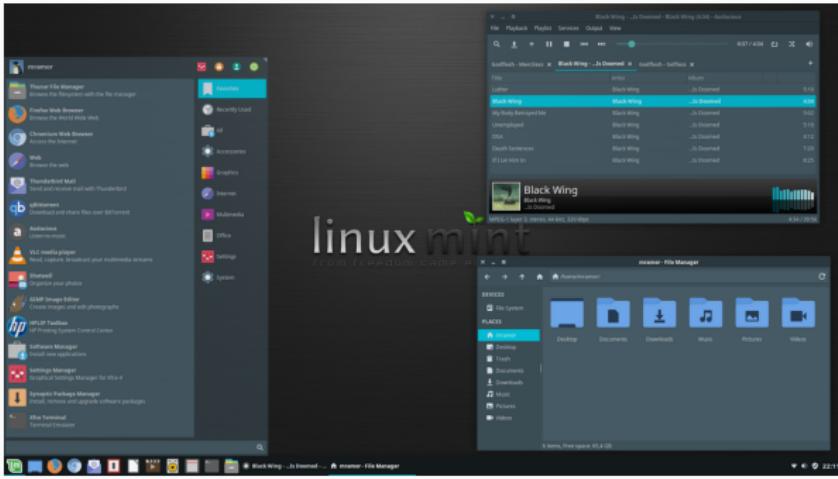
- Default desktop environment for Linux Mint
- Similar to the Windows user interface
- Sleek and polished look
- Pretty customizable

## Disadvantages:

- Does not offer the most intuitive user experience
- Not that modern-looking



# Xfce Plasma desktop environment



## Advantages:

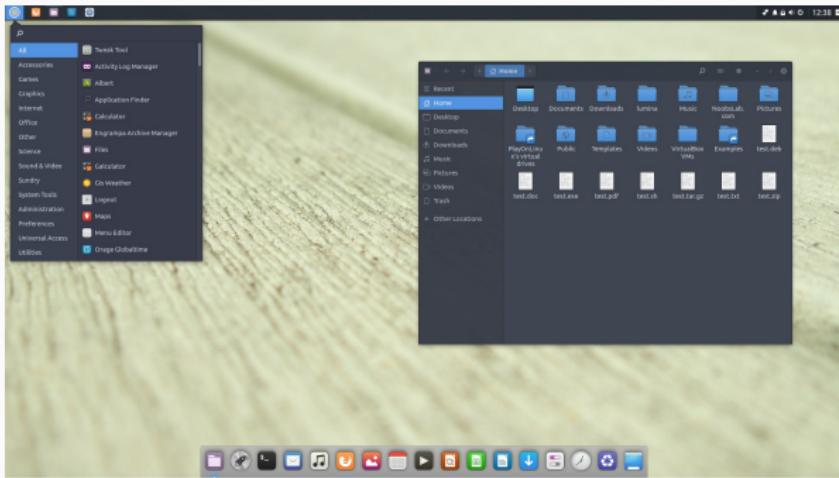
- Lightweight and adaptable to old hardware
- Modern and visually appealing
- Windows-like familiar UI
- Feature-rich user experience

## Disadvantages:

- No advanced customizations
- User experience could be better



# Budgie desktop environment



## Advantages:

- Solid and intuitive
- Modern UI and elegant looks
- Seamless desktop experience
- Mixed of modern UI and a traditional user interface

## Disadvantages:

- Not lightweight
- Available only on few distributions

# Installing and working with a Linux system





# Installing Linux

Unsure which distro to install?

The Distro Chooser[1] tool can help you find the distro that fits your needs.

## Installation steps

1. Choose the distro you want to install.
2. Make sure your machine meets the requirements for installation.
3. Download the .iso-file you want.
4. Write the .iso-file to USB-stick.
5. Start your computer and enter the boot loader menu.
6. Boot using the USB-stick as boot medium.
7. Go through all installer steps and wait for the installation to finish.

Well done, you've got yourself a Linux!

Take good care of your penguin!



# Basics of your new Linux system

- If you need superuser permissions to execute a command use

```
> sudo [command]
```

- To log in as the superuser use the command

```
> su
```

- Superuser permissions are needed to use your package manager.
- To get some information about a command use

```
> man [command]
```



# Installing and updating software

## Debian/Ubuntu/Mint

- Get all new updates  
**> apt update**
- Install the updates  
**> apt upgrade**
- Install a package  
**> apt install [package]**
- Remove a package  
**> apt remove [package]**
- Search for a package  
**> apt search [package]**

## Arch/Manjaro

- Get and install all updates  
**> pacman -Syu**
- Install a package  
**> pacman -S [package]**
- Remove a package  
**> pacman -R [package]**
- Search for a package  
**> pacman -Ss [package]**
- Clean cache files  
**> pacman -Sc**



# Troubleshooting

## Keep calm ...

... and search for the origin of your error.

## Steps to take

- Most likely someone else already had the same problem. So throw the information you've got about the error into a search machine of your choice.
- Wikis are a great source for help
  - <https://wiki.ubuntuusers.de/>
  - <https://wiki.archlinux.org/>
- Mailing lists can also contain valuable information.
- Ask people you know with some knowledge of Linux.
- Only clear the cache of your package manager when you're sure everything works. You might need the older versions of packages stored there.

## And don't forget ...

... to make regular **backups!**



# References

- [1] Distro Chooser contributors.  
**Distro Chooser.**  
<https://distrochooser.de/>.
- [2] Free Software Foundation.  
**GNU operating system.**  
<https://www.gnu.org/>.
- [3] S. Hayden, F. Fuhlbrück, D. Schneider, and M. Lerch.  
**The Linux® desktop chooser.**  
<https://www.knetfeder.de/linux/linux-desktop-chooser/>.
- [4] J. Klooster.  
**Linux distribution graph.**  
<https://github.com/jappeace/distrowatch1graph1svg>.
- [5] Linux Kernel Organization.  
**The Linux kernel archives.**  
<https://www.kernel.org/>.
- [6] Unsigned Integer Limited.  
**DistroWatch.**  
<https://distrowatch.com/>.



# Flux beamer theme

Flux is a modern style beamer presentation. It is provided as a work in progress version and may suffer from inconsistencies. Sources and complementary information are available at:

[github.com/pvanberg/flux-beamer](https://github.com/pvanberg/flux-beamer)

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<http://www.gnu.org/licenses>

Flux is inspired by **Metropolis** theme from Matthias Vogelgesang:

<https://github.com/matze/mtheme>



# This presentation

The presentation can be found here:

[https://github.com/christoph-grossmann/  
AdoptYourOwnPenguin](https://github.com/christoph-grossmann/AdoptYourOwnPenguin)



This presentation draws inspiration from a presentation by Lea Laux, which you can find here:

<https://github.com/LeaRain/LinuxInstallParty>

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**Have fun with  
your new  
penguin!**

