APPS@UCU

Linux course

Tools overview

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Contents

Intro

- In this presentation, we will overview some tools that are available on all Linux distributions
- All of them have a high barrier to entry as Linux itself, but when you are there - you won't imagine your life without that tools
- Example: it's not a one-day task to learn how to move around your system, but after few months of practice working with CLI, GUI for you will be as slow as a turtle is slow in comparison with a rabbit


VIM

Vi

- So let's start with the text editor
- You have heard about vim , haven't you?
- But let's start with vi
- Vi is a part of POSIX
- It's totally CLI editor (forget that you have a mouse)
- There are shortcuts for everything
- If there is no, you can create them for yourself
- Every good enough 21'st century editor has an extension for a vi mode
- But almost nobody uses it - only on some low memory and low power machines. So we move to vim

Vim

- Vim stands for 'Vi IMproved'
- According to Linux Journal survey, 38% (in average for 2009-2018) of respondents vote for vim as the best editor
- It has much more features, than vi , including more commands, scriptable syntax highlighting and extensions, graphical interface (and a mouse support, but don't use it)
- As vi , it has six modes - normal, visual, insert, command-line, select, and ex (yes, not only NORMAL and INSERT)
- Because of a huge community (38% of world's best geeks) vim became a powerful IDE with thousands of extensions (syntax highlight, autocompletion, spell checking, project tree etc)
- The most powerful tool of vim is inside - its shortcuts. You can make your work dozens of times faster without a touchpad and a mous

NeoVim

- Neovim is just a fork of Vim with some Python extensions
- And cool logo =)
- Also Neovim is a community-driven text editor, while Vim is a project of only one person - Bram Moolenaar
- One 'expert' on reddit wrote that:
  "Neovim exists to convince Bram to push new features to Vim"
  And I mostly agree with him.

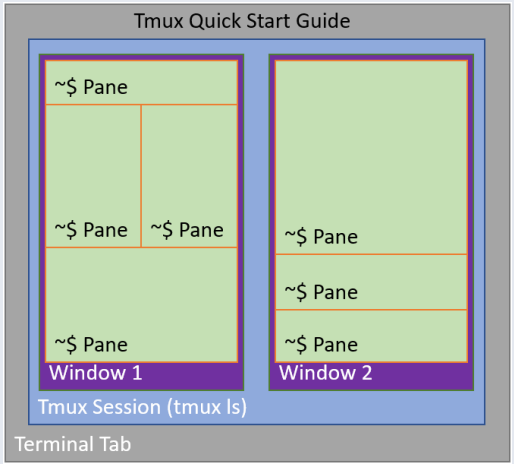

tmux

Tmux

- TMUX stands for Terminal MUltipleXer
- There are some other (screen, Konsole, etc.), but they are not so good as TMUX
- Why do we need it?
- As you continue your practice in CLI, you can notice that it's not enough to have only one terminal window
- With this much multitasking going on, we want to have more terminals. So people create a terminal multiplexor
- What TMUX can do?
  - Not only split and stack tab but also make tabs
  - Continue running programs in the background
  - With extensions you can write layout files in .yml format
  - Search through terminal output and move around with Vim shortcuts
  - Other interesting stuff

Tmux

- A Tmux Session with two tmux tabs with multiple tmux panes within each
- As vim , tmux has modes - view and command (Ctrl+b be default)
- Every pane has three modes - view, choose and copy
- To enter a copy mode - Ctrl+b [
- It allows you to use vim keys for moving around and copying text
- For more information see man tmux or linux man page



For the very beginning:

[tmux sessions] linuxacademy.local

_ new sessions

```
tmux
tmux new
tmux new-session
tmux new -s sessionname
```

_ attach sessions

```
tmux a
tmux att
tmux attach
tmux attach-session
tmux a -t sessionname
```

_ remove sessions

```
tmux kill-ses
tmux kill-session -t sessionname
```

_ key bindings

Ctrl + B + $	rename session
Ctrl + B + D	detach session
Ctrl + B +)	next session
Ctrl + B + (	previous session

[tmux windows] linuxacademy.local

_ **windows** are like tabs in a browser. Windows exist in sessions and occupy the space of a session screen.

_ key bindings

Ctrl + B + C	create window
Ctrl + B + N	move to next window
Ctrl + B + P	move to previous window
Ctrl + B + L	move to window last used
Ctrl + B + 0 .. 9	select window by number
Ctrl + B + '	select window by name
Ctrl + B + .	change window number
Ctrl + B + ,	rename window
Ctrl + B + F	search windows
Ctrl + B + &	kill window

[tmux panes] linuxacademy.local

_ **panes** are sections of windows that have been split into different screens - just like the panes of a real window!

_ key bindings

Ctrl + B + %	vertical split
Ctrl + B + "	horizontal split
Ctrl + B + →	move to pane to the right
Ctrl + B + ←	move to pane to the left
Ctrl + B + ↑	move up to pane
Ctrl + B + ↓	move down to pane
Ctrl + B + O	go to next pane
Ctrl + B + ;	go to last active pane
Ctrl + B + }	move pane right
Ctrl + B + {	move pane left
Ctrl + B + !	convert pane to window
Ctrl + B + X	kill pane

[tmux copy mode] linuxacademy.com

_ key bindings

Ctrl + B + [	enter copy mode
Ctrl + B +]	paste from buffer

_ copy mode commands

space	start selection
enter	copy selection
Esc	clear selection
g	go to top
G	go to bottom
h	move cursor left
j	move cursor down
k	move cursor up
l	move cursor right
/	search
#	list paste buffers
q	quit

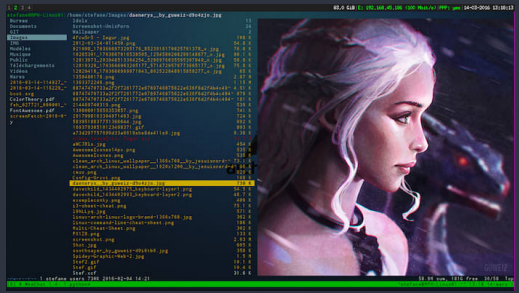

anger

Commander

- Norton - one of the very first dual pane file managers , 1984
- Norton Commander set the tone for decades of file managers (Commanders) to come
- Until then people created nothing better than that, so DP commanders are still popular
- mc (midnight commander)
  dc (double commander)
- There are a lot of both GUI and CLI examples, for Linux and Windows, but we will view cpecific one - ranger

Ranger

- Ranger is vim inspired CLI file manager, so it has vi keybindings
- It is fully customisible with just few files
- As you can see, it can open images preview right in the terminal
- The same about all text files, videos, other files too
- For more info see man ranger



i3wm

i3

- We will talk more about graphics in one of the folowing lectures
- Short explain: there are three main items in every GUI on your pc:
  - DM - Display manager
  - WM - Window manager
  - DE - Desctop envieronment
- As you can see, i3wm is a window manager
- It is quite similar to everything above in this lecture: vim shortcuts and tmux approach (but for GUI applications)
- In i3 we also have windows and panes, but also workspaces
- All settings located in one file - /.config/i3/config
- As far as there is no DE for i3, you should install everything for yourself (all applets and programs, top/bottom bar, menu)

i3wm example

- Here you can see browser and two terminal emulators opened
- Also polybar with it's applets used as a top and bottom bars
- dmenu used as a menu
- All windows located on a same z level, new windows move previous one so all opened windows are visible (as in TMUX)
- It is called tiling window manager and I recommend it because it is simpler and faster, then all other types
- For more info you can see man i3

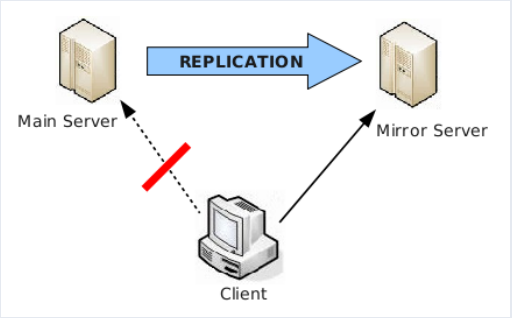
Package managers

Package managers

- This is last but not least topic for today
- Any OS is just a batch of programs
- And Package manager is a tool for installing those programs (also upgrading, configuring, removing, resolving dependencies)
- There are few core new concepts, that we need to understand how it works

Mirrors

- Mirror server (mirror) - servers that located (phisically) in different locations, but contain the same data
- For example: You want to install something, but your internet connection is too slow (or something happend to server at the US), so you dounload package for installation from server located in Germany (or other location)
- See your current list of mirrors (Arch-based): vim /etc/pacman.d/mirrorlist
- Sort them by speed: sudo fetchmirrors -c UA

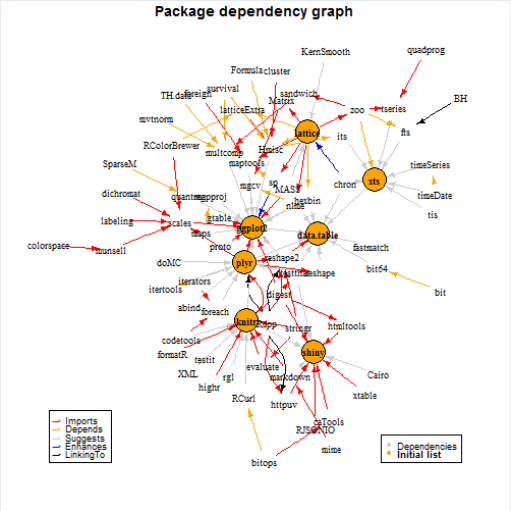


Dependencies

- Another core concept called dependency
- When you write any program, you use some exsiting libraries. So your program depend on that libraries/tools
- All that libraries have its versions
- As far as people change staff in their programs, API can be different from one to other version
- Good package managers can resolve all that dependencies easily (debian's apt can't)
- There are immidiet (your program use it) and transitive (your dependencies use it) dependencies

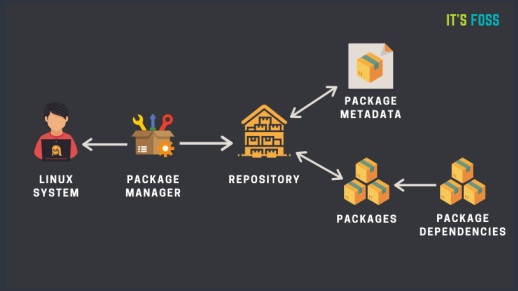
Dependencies

- A lot of programming languages has it's own package managers (pip for Python, cargo for Rust)
- Almost every Linux-based OS has it's own package manager
- All packages are archives with program itself and metadata - software's name, description of its purpose, version number, vendor, checksum, list of dependencies



Repositories

- One more important thing - repo
- There are official and side repositories
- Package manager supports Official repos by default, but to use some side repos, you should add it manually
- Defferent PacManagers have different approaches for managing repos
- Apt repos are defined in /etc/apt/sources.list and in /etc/apt/sources.list.d directory



Pacman

- Why we love Arch Linux so much? Mostly because of this guy =)
- Pacman has all settings in /etc/pacman.conf file
- Main repositories are:
  - core (main OS elements)
  - extra (not main, but important OS elements as GUI)
  - community (packages that have been adopted by Trusted Users from AUR)
  - multilib (32-bit software and libraries for old staff)
  - AUR (Arch User Repository, the best bigger Linux repo)

Releases

- Release system is the concept of frequently delivering updates to applications
- It usually depend on the OS (but also on PacManagers)
- Rolling Release . There is no such thing as Arch 1 , Gentoo 2 or Void Linux 3 . Thats because these OS's have Rolling Release model - it's repos contain all (not always stable) new programs, but also previous versions of all packages. Good for people who like test new programs or languages, real geeks. Often updates require
- Stable Release . Properly tested version of the product is released, sometimes half a year after it first appears. For example, python 3.9 was in pacman two days after official release, but in apt - more then half a year after. Good for average users, easy to maintain (updates are only every week/month)
- LTS - Long term support. For this system package manager freeze some special versions of all libraries and programs, and only minor bug or security fixes are released for a really long term (sometimes up to decades). Good for corporations, big companies. If something is not working - just reinstall the system as it was at the very beginning, and everything will work again. The easiest to maintain

Sources

Sources

- Linux journal
- Termianl Multiplexers
- Tmux tutorial
- Tmux Linux man page
- Dual pane file manager history
- Ranger github page
- Wiki package managers
- Pacman ArchWiki
- External Repositories Ubuntu
- Releases Wiki