Tools, Workflow and Resources

About Lab3 HSRW

Lab3

IoTlab
internet
of things
lab

More info: IoT Lab

Dronelab
drones and
robots
lab

More info: IoT Lab

EOlab
earth
observation
lab

More info: EO Lab

Our main place for information: Wiki

About Workshop

Basics Tools
- Terminology
- Shells
- Terminal emulators
- Terminal multiplexers
- Scripting for integration

Manage configs
- Dotfiles
- SSH Keys
- Automation
- Tiling window manager (bonus)

Documentation (of your work)
- Markups
- Hosting Docs
- Diagrams
- Screenshots

Disclaimer: In this workshop we will not cover anything related to code editors or code editor extensions.

Let’s Start

```
>> launch workshop
```

Basics 1

First part of the workshop

Terminology

`Shell != Terminal != Console`

Terminology

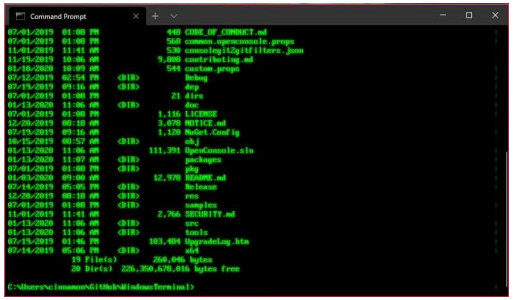
Console

The original meaning of *console* as it related to computers was (1) an instrument panel containing the controls for a computer.

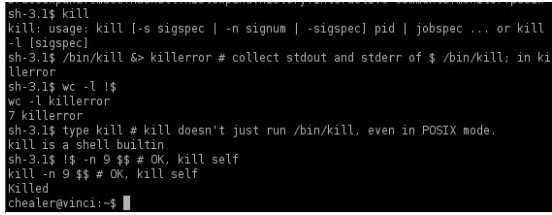
IBM 2260

Terminal

"A *terminal window*, also referred to as a *terminal emulator*, is a text-only *window* in a *graphical user interface* (GUI) that emulates a *console*."



Shell

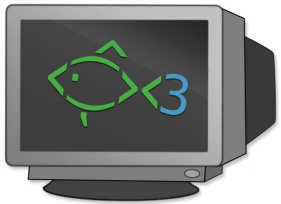


"A *shell* is a program that provides the traditional, text-only user interface for Linux and other Unix-like operating systems. Its primary function is to read commands that are typed into a *console* (i.e., an all-text display mode) or *terminal window* (an all-text window) in a GUI (graphical user interface) and then *execute* (i.e., run) them."

Definitions from the Linux Information Project

Shells

[Bash]



[Fish]

[Ksh]

[Zsh or Z Shell]

Terminal Emulators

- Konsole: KDE’s desktop environment
- kitty (not KiTTY): GPU based terminal emulator
- Alacritty (cross-platform): GPU based terminal emulator
- Terminator: GNOME’s desktop environment
- PuTTY (for windows): Mainly ssh and telnet connection
- Windows Terminal (for window)
- Find more here

To the Terminal and Beyond

Terminal Multiplexers

Terminal Multiplexers

Why don't just use Tabs?

Because it depends on a graphical environment

```
>> launch demo
```

Terminal Multiplexers

Create a new session
```
> screen -S mysession
```
Detach session
```
> `C-a d`
```
List of sessions
```
> screen -ls
```
Attach session
```
> screen -r mysession
```

Split display horizontally
```
> `C-a S`
```
Split display vertically
```
> `C-a |`
```
Jump to next display
```
> `C-a tab`
```
Remove current region
```
> `C-a X`
```

Create a window
```
> `C-a c`
```

GNU screen

>> launch demo

Terminal Multiplexers

The main problem of `screen`

It does not provide graphical feedback

Tmux

Terminal Multiplexers

A little bit of terminology first !!

Terminal Multiplexers

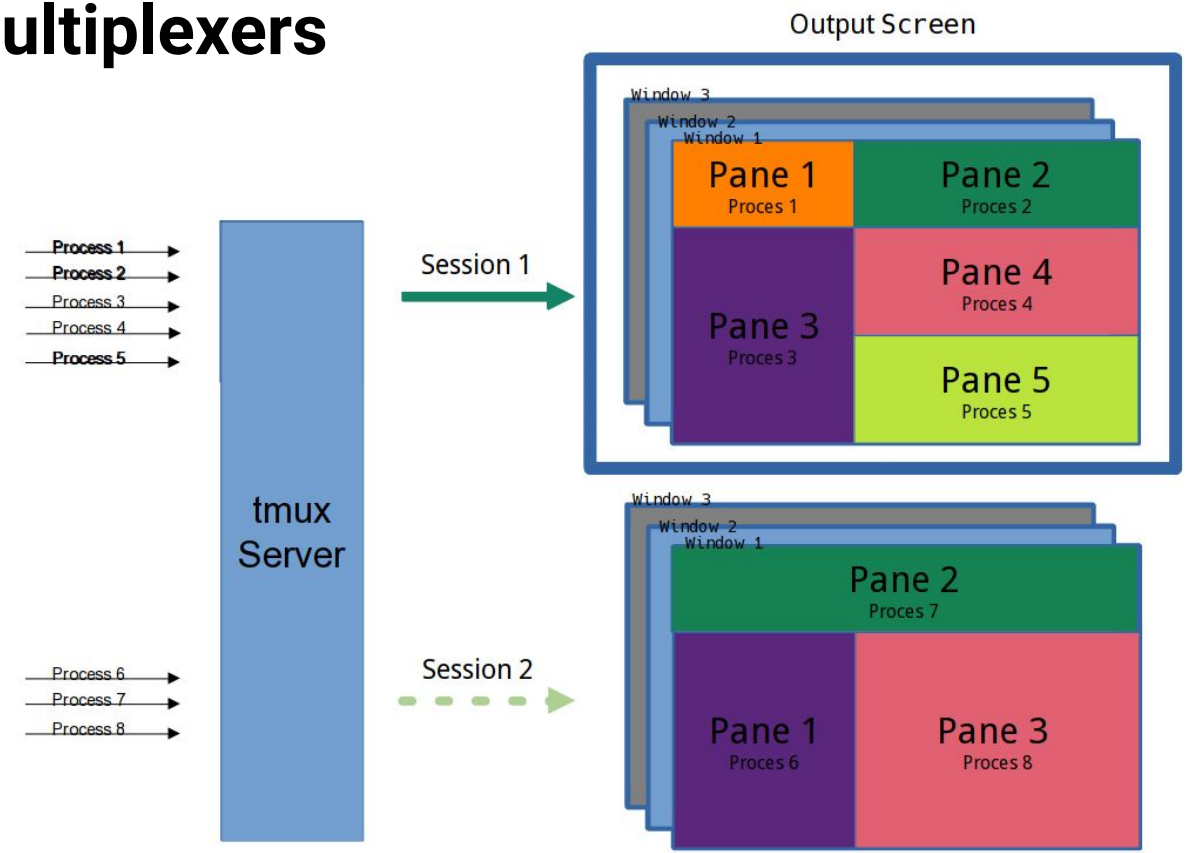


Image source: arcolinux.com

Terminal Multiplexers

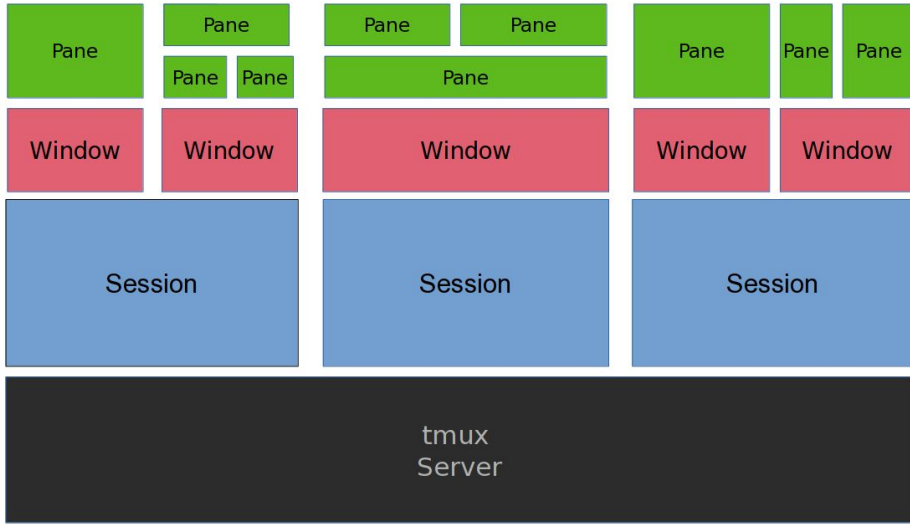


Image source: arcolinux.com

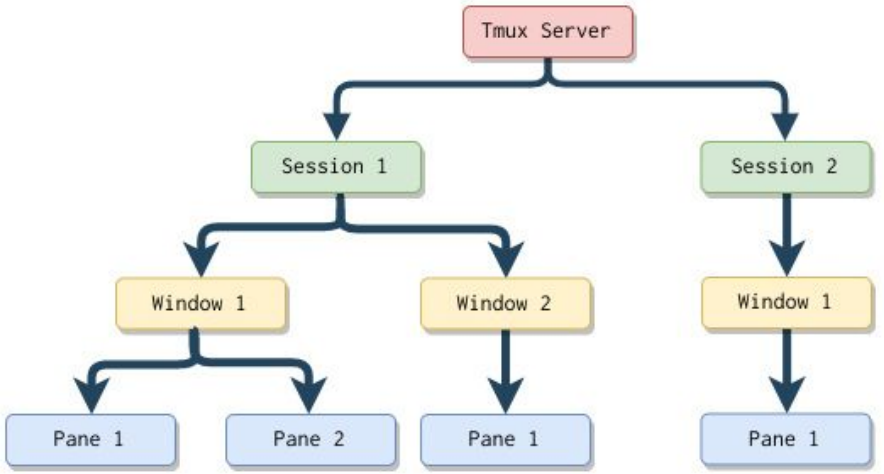


Image source: thevaluable.dev

Terminal Multiplexers

Demo Time

```
>> tmux
```

Part 1: Basics tools

Terminal Multiplexers

Run new session
> tmux
Run new session with name
> tmux new -s mysession

Detach
`C-b d`
List all sessions
> tmux ls

Attach session
> tmux a -t mysession

Next session
`C-b )`

Previous session
`C-b (`

Create window
`C-b c`
Move to next window
`C-b n`
Move to previous window
`C-b p`

Panes
Vertical Split
`C-b %`
Horizontal split
`C-b “`
Move to pane
`C-b arrow`

Scripting for integration

Let’s make something cool

Prerequisites:

- Tmux
- fzf (A command-line fuzzy finder)

Scripting for integration

A simple example first

```
>> hello
```

A hello bash script

Scripting for integration

```
#!/bin/bash

DIRECTORIES=$(cat ~/.tmux-dirs | tr "\n" " ")

if [[ $# -eq 1 ]]; then
    SELECTED=$1 && [[ "$SELECTED" == '.' ]] && SELECTED="$PWD"
else
    SELECTED=$(find $DIRECTORIES -mindepth 1 -maxdepth 1 -type d | fzf)
fi

if [[ -z $SELECTED ]]; then
    exit 0
fi

SELECTED_NAME=$(basename "$SELECTED" | tr . _)
SELECTED_NAME=${SELECTED_NAME:0:8}

if [[ -n $TMUX ]]; then
    # inside tmux
    tmux switch-client -t "$SELECTED_NAME" || \
    tmux new-session -ds "$SELECTED_NAME" -c "$SELECTED" && \
attach -t "$SELECTED_NAME"
fi
```

Scripting for integration

```
#!/bin/bash

# Bash profile
[[ -f ~/.bashrc ]] && . ~/.bashrc

addToPath() {
    if [[ "$PATH" != *"$1"* ]]; then
        export PATH=$PATH:$1
    fi
}

addToPath $HOME/.local/bin

bind '"\C-f":"\C-k \C-utmux-sessionizer\n"'
bind '"\C-h":"\C-k \C-ucht.sh\n"'
```

Manage configs 2

Second part of the workshop

Dotfiles

Dotfiles

```
>> source ~/.bashrc
```

User-specific application configuration is traditionally stored in so called dotfiles (files whose filename starts with a dot).

Definition from wiki.archlinux.org

Dotfiles

Exploring some dotfiles

```
>> cat ~/.bashrc
```

Ssh keys

SSH keys

Secure Shell Protocol

Example: link

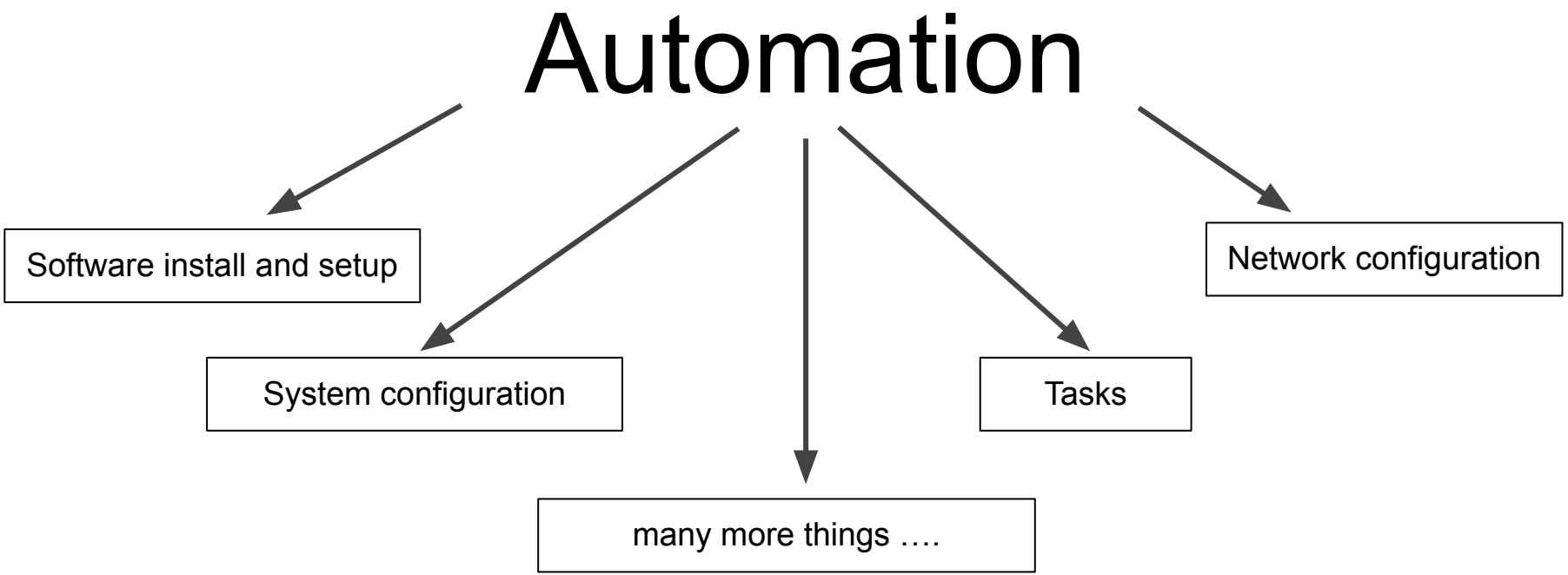
Bad practice:

- Plain text in your computer
- Plain text in Github !!! (internet)
- Plain text in emails

Never use plain text to storage ssh keys!!

- Generate new SSH keys per system and service
- Store the keys in an encrypted format
- Use tools for SSH keys management

Automation


Automation
Software install and setup
System configuration
many more things ….
Tasks
Network configuration

Automation

Bash scripting for automation?

```
>> bash my_script.sh
```

Automation

Ansible

```
>> ansible-playbook programs.yml
```

Ansible is a suite of software tools that enables infrastructure as code.

Part 2: Manage configs

Automation

```yaml
- host: localhost
  tasks:
    - name: Install my Core System Package
      become: true
      apt:
        name: ["build-essential", "cmake", "pkg-config", "libpthread-stubs0-dev"]
      tags:
        - core
        - software

    - name: Install my tools
      become: true
      apt:
        name: [ "curl", "htop", "python3-pip" ]
      tags:
        - software
        - tools
```

Ansible playbook

Part 2: Manage configs

Automation

```
#!/bin/bash

sudo apt-get update && \
apt-get install -y \
    build-essential \
    cmake \
    pkg-config \
    libpthread-stubs0-dev

sudo apt-get install -y \
    curl \
    htop \
    python3-pip
```

Bash script

Part 2: Manage configs

Automation

```yaml
- host: localhost
  tasks:
    - name: Install my Core System Package
      become: true
      apt:
        name: ["build-essential", "cmake", "pkg-config", "libpthread-stubs0-dev"]
      tags:
        - core
        - software

    - name: Install my tools
      become: true
      apt:
        name: [ "curl", "htop", "python3-pip" ]
      tags:
        - software
        - tools
```

Ansible playbook

```bash
#!/bin/bash

sudo apt-get update && \
apt-get install -y \
    build-essential \
    cmake \
    pkg-config \
    libpthread-stubs0-dev

sudo apt-get install -y \
    curl \
    htop \
    python3-pip
```

Bash script

Part 2: Manage configs

Automation

```yaml
- host: localhost
  tasks:
    - name: Install my Core System Package
      become: true
      apt:
        name: ["build-essential", "cmake", "pkg-config", "libpthread-stubs0-dev"]
      tags:
        - core
        - software

    - name: Install my tools
      become: true
      apt:
        name: [ "curl", "htop", "python3-pip" ]
      tags:
        - software
        - tools
```

Ansible playbook

```bash
#!/bin/bash

ARG_TAG="-tag"
ARG_HELP="-h"
COLOR_OFF="\033[0m"
COLOR_RED="\033[0;31m"

sudo apt-get update

help(){
    cat << EOF
NAME
       Shell script to install my sofware

SYNOPSIS
       bash automation2.sh [OPTIONS <string>]

OPTIONS
       -tag     Install software base on tags
                - core: install core Packages
                - tools: install tools
                - software: install all

       -h       Show help
EOF
}

install_core(){
    echo "Install my Core System Packages"
    apt-get install -y \
        build-essential \
        cmake \
        pkg-config \
        libpthread-stubs0-dev

}

install_tools(){
    echo "Install my tools"
    apt-get install -y \
        curl \
        htop \
        python3-pip
}

install_with_tag(){
    if [[ $1 = $ARG_TAG && $2 = "core" ]]; then
        install_core
    elif [[ $1 = $ARG_TAG ]] && [[ $2 = "tools" ]]; then
        install_tools
    elif [[ $1 = $ARG_TAG ]] && [[ $2 = "software" ]]; then
        install_core
        install_tools
    elif [[ $1 = $ARG_HELP ]]; then
        echo "HELP"
        help
    else
        echo -e "${COLOR_RED}ERROR: Invalid tag${COLOR_OFF}"
        help
    fi
}


if [ $# -eq 0 ]
then
    install_core
    install_tools
else
    if [ $# -eq 2 ]; then
        install_with_tag $1 $2
    else
        echo -e "${COLOR_RED}ERROR: Invalid syntax${COLOR_OFF}"
        help
    fi
fi
```

Automation

Ansible for ssh key :D

Tiling Window Managers (bonus)

Tiling?
window?
managers?

Tiling Window Managers (bonus)

Some Tiling Window Managers

i3	bug.n	Amethyst
For linux	For Windows	For MacOS

Check more about tiling window managers in Wikipedia

Docs 3

Third part of the workshop

Markups

Lightweight

Markup

languages

Lightweight Markup Languages are designed to be easy to write using any generic text editor and easy to read in its raw form

- Markdown
- MediaWiki
- DokuWiki
- reStructuredText
- AsciiDoc
- Many others…

Markups

```markdown
# This is a title

**Lorem ipsum** dolor sit amet, consectetur adipiscing elit, *sed do eiusmod* tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, **quis nostrud** exercitation ullamco laboris nisi ut aliquip ex ea commodo `consequat`

- Item
- Other item
- Last item
```

Markdown

```html
<h1>This is a title</h1>

<p><b>Lorem ipsum</b> dolor sit amet, consectetur adipiscing elit, <i>sed do eiusmod</i> tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, <b>quis nostrud</b> exercitation ullamco laboris nisi ut aliquip ex ea commodo <code>consequat</code></p>

<ul>
  <li>Item</li>
  <li>Other item</li>
  <li>Last item</li>
</ul>
```

HTML

Hosting Docs

Hosting docs

- A readme or set of .MD files in the repository
- Wikis: Doku Wiki, MediaWiki …
- SSGs (Static Site Generator): GitHub pages, Gitlab pages, etc…

Diagrams

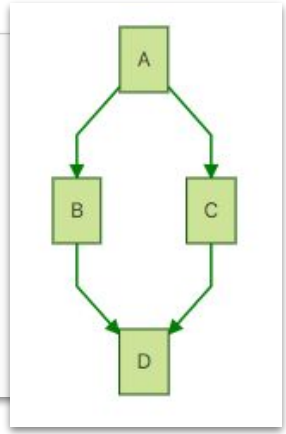
Diagrams

Draw.io

There are not plans to add LaTeX support

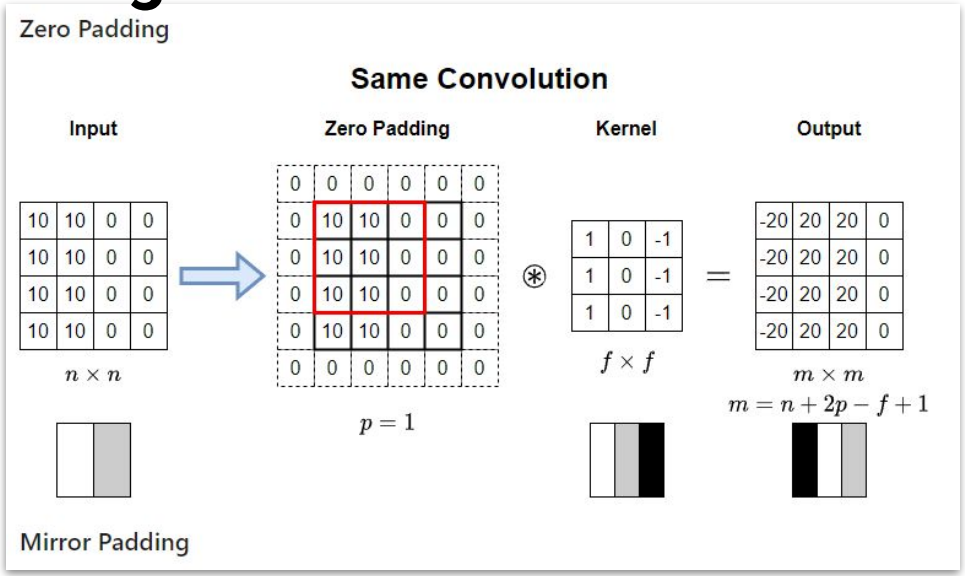
Mermaid

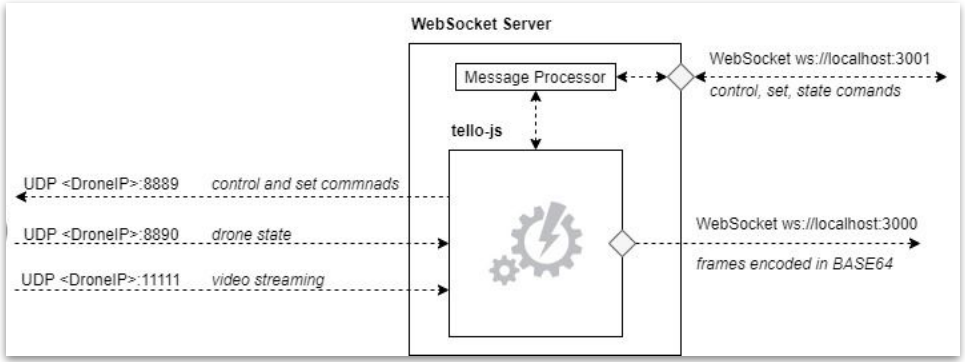
```
graph TD;
    A-->B;
    A-->C;
    B-->D;
    C-->D;
```

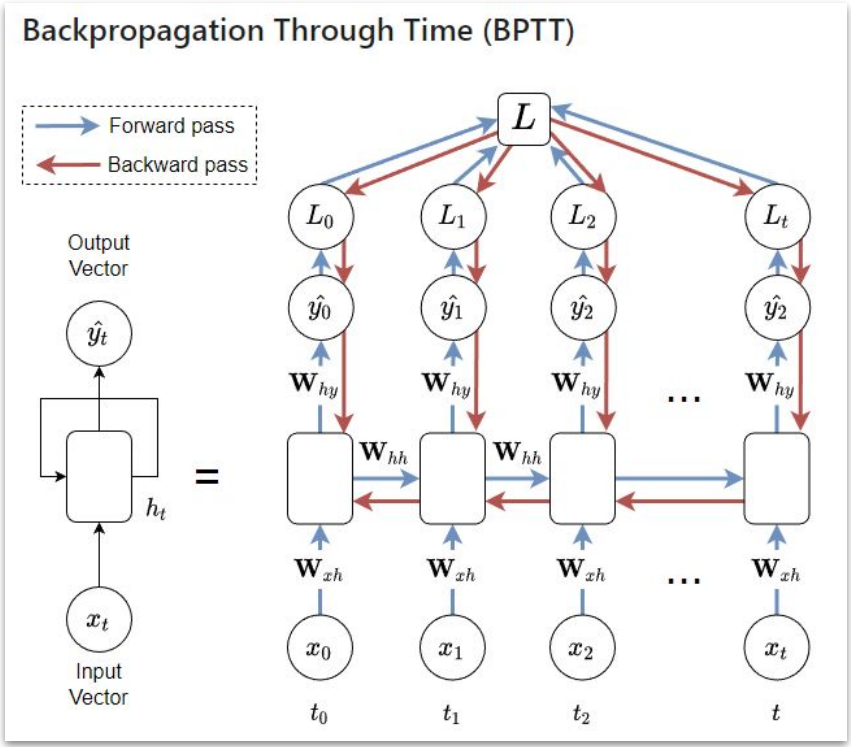


Part 3: Documentation

Diagrams







Screenshots ?

- Basics: Text, annotations, shapes
- Add arrows ?
- Number counter ?
- Blur ?

Screenshots

Flameshot

Part 4: Extras resources for coding

Resources

Generals

Design patterns:

- Design patterns by refactoring guru
- Design patterns infographic

Refactoring

- Refactoring by refactoring guru

Git branching strategies

- A successful Git branching model (GitFlow)
- GitHub Flow
- Trunk-based
- Comparison git flows vs trunk-based

Python development

Coding Style guides

- PEP 8 – Style Guide for Python Code
- Google Python Style Guide
- Extra: PEP 1 – PEP Purpose and Guidelines

Javascript development

Coding Style guides

- Google JavaScript Style Guide
- Airbnb JavaScript Style Guide
- JavaScript Standard Style

C/C++ (for embedded systems)

- Embedded C Coding Standard