

# Tmux

## Terminal multiplexer

Manuel Behrendt, USM/LMU Code Coffee 02.06.2020

# Motivation

## Handle remote sessions

- **Several terminals connected to your server**  
-> need to connect each terminal via ssh separately
- **Want to keep sessions alive** -> after logout or connection abortion sessions are lost -> have to reconnect, restart programs

```
Session 1
$ top
Tasks: 664 / 4518 thr: 1 running
Load average: 1.38 4.13 5.98
Uptime: 1 day, 22:46:36
PID USER PRI NI VIRT RES %CPU %MEM TIME+ COMMAND
532 node 24 0 4232M 1.594 0 0.1 2455.77 /System/Library/PrivateFrameworks/UniversalAccess.framework/Versions/A/Resources/AXVisualSupportAgent
544 node 17 0 4232M 1.594 0 0.1 2455.77 /System/Library/PrivateFrameworks/UniversalAccess.framework/Versions/A/Resources/AXVisualSupportAgent
547 node 0 0 4569M 29M 2 0.6 1.2 7:53:44 /Applications/Google Chrome.app/Contents/MacOS/Google Chrome -npn 0.45967
16946 node 17 0 8969M 153M 2 0.6 1.9 7:53:47 /Applications/Google Chrome.app/Contents/MacOS/Google Chrome -npn 0.45967
17599 node 0 0 4249M 744M 0.3 0.1 0:00:27 /usr/sbin/screencapture -zs1s_esp-con.apple.screenshot.launcher -Upli
17600 node 17 0 4249M 744M 0.3 0.1 0:00:27 http://
12356 node 0 0 4932M 3294M 0.2 0.2 0:40:48 /Applications/rzddashare.app/Contents/MacOS/rzddashare
889 node 17 0 4369M 1.548 0 0.1 6:52:56 /Library/Application Support/Logitech/localized/Logitech Presentation.localized/Papers
8667 node 24 0 7534M 282M 0 0.1 1.7 15:26:58 /Applications/Papers.app/Contents/MacOS/Papers
9067 node 17 0 4149M 18M 0 0.1 1.1 1:04:19 /Applications/Julia-1.3.app/Contents/Resources/julia/bin/julia -l --startup-file=yes --color=yes -pr
831 node 17 0 4655M 51M 0 0.1 0:00:01 /Applications/GoogleCloudPlatformComponents/macOS/Monet
7737 node 17 0 4655M 51M 0 0.1 0:00:01 /Applications/GoogleCloudPlatformComponents/macOS/Monet
759 node 17 0 4472M 2.899 0 0.1 0:50:00 /Applications/Google Chrome.app/Contents/Google Chrome Framework.framework/Versions/80.0.3
871 node 17 0 6136M 1.889 0 0.1 1:05:52 /Applications/SnippetsLab.app/Contents/MacOS/snippetsLab
669 node 24 0 4350M 1.820 0 0.1 0.4 4:54:15 /System/Library/Frameworks/WebKit.framework/Versions/A/WKServices/com.apple.WebKit.Networking.xpc/Co
529 node 17 0 8048M 4328M 0 0.1 0:00:01 /System/Library/Frameworks/WebKit.framework/Versions/A/WKServices/com.apple.WebKit.Networking.xpc/Co
13435 node 17 0 4196M 1.548 0 0.8 0:00:03 8:14:56 /System/Library/Frameworks/WebKit.framework/Versions/A/WKServices/com.apple.WebKit.WebContent.xpc/Co
562 node 17 0 4233M 498 0 0.8 0:22:59 /System/Library/CoreServices/SafariSupport.bundle/Contents/MacOS/SafariCloudSyncAgent
815 node 17 0 4362M 14328 0 0.8 0.3 2:19:51 com.maccpu.CleanMyMac4.Menu
888 node 17 0 4292M 11780 0 0.8 0.1 2:18:16 com.maccpu.CleanMyMac4.HealthMonitor
9035 node 17 0 4228M 2.836 0 0.8 0.2 0:20:24 /Users/edbe/oracleos3/lin/python3.7 /Users/edbe/oracleos3/lin/python3.7
13514 node 17 0 4233M 1.312 0 0.8 0:18:59 /Library/Apple/System/Library/CoreServices/Safari Support.bundle/Contents/MacOS/SafariCloudSyncAgent
893 node 8 0 4254M 3936 0 0.8 0.2 1:18:17 /Library/Apple/System/Library/CoreServices/Safari Support.bundle/Contents/MacOS/SafariBookmarks.launched -
784 node 17 0 4269M 212 0 0.8 0.0 0:03:58 /System/Library/UniversalAccess/launched -
1775 node 17 0 4269M 212 0 0.8 0.0 0:03:58 /System/Library/UniversalAccess/launched -
Session 2
$ ls -1
Scanned Image 1.jpeg
Scanned Image 2.jpeg
Scanned Image 3.jpeg
Scanned Image 4.jpeg
Scanned Image 5.jpeg
Scanned Image 6.jpeg
Scanned Image 7.jpeg
Scanned Image 8.jpeg
Scanned Image 9.jpeg
Scanned Image 10.jpeg
Scanned Image 11.jpeg
Scanned Image 12.jpeg
Scanned Image 13.jpeg
Scanned Image 14.jpeg
Scanned Image 15.jpeg
Scanned Image 16.jpeg
Scanned Image 17.jpeg
Scanned Image 18.jpeg
Scanned Image 19.jpeg
Scanned Image 20.jpeg
Scanned Image 21.jpeg
Scanned Image 22.jpeg
Scanned Image 23.jpeg
Scanned Image 24.jpeg
Scanned Image 25.jpeg
Scanned Image 26.jpeg
Scanned Image 27.jpeg
Scanned Image 28.jpeg
Scanned Image 29.jpeg
Viduote Free Video Converter
Session 3
$ ./tmux_install_local.sh
#!/bin/bash
# https://github.com/tmux/tmux
TMUX_VERSION="2.5"
LIBEVENT_VERSION="2.3.8"
NURSES_VERSION="5.9"
# Script for installing tmux on systems where you don't have root access.
# tmux will be installed in $HOME/local/bin.
# It's assumed that wget and a C/C++ compiler are installed.
# exit on error
set -e
# create our directories
mkdir -p $HOME/local $HOME/tmux_tap
cd $HOME/tmux_tap
# download source files for tmux, libevent, and nurses
wget -O tmux-$TMUX_VERSION.tar.gz http://sourceforge.net/projects/tmux/files/tmux/tmux-$TMUX_VERSION.tar.gz/download
wget https://github.com/tmux/tmux/releases/download/$TMUX_VERSION/tmux-$TMUX_VERSION.tar.gz
wget https://github.com/libevent/libevent/releases/download/$LIBEVENT_VERSION-stable/libevent-$LIBEVENT_VERSION-stable.tar.gz
wget https://github.com/nurses/nurses/releases/download/$NURSES_VERSION/nurses-$NURSES_VERSION.tar.gz
# extract files, configure, and compile
tar xf tmux-$TMUX_VERSION.tar.gz
tar xf libevent-$LIBEVENT_VERSION-stable.tar.gz
tar xf nurses-$NURSES_VERSION.tar.gz
# libevent #
#####
# on mac install 'brew install openssl' if:
# ./configure openssl=c6d1b8: fatal error: 'openssl/bio.h' file not found
# cd $HOME/local/include
# ./configure
# make
# make install
# cd ..
#####
# nurses #
#####
tar xf nurses-$NURSES_VERSION.tar.gz
cd nurses-$NURSES_VERSION
./configure --prefix=$HOME/local
make
make install
cd ..
#####
# tmux #
#####
tar xf tmux-$TMUX_VERSION.tar.gz
cd tmux-$TMUX_VERSION
./configure CFLAGS="-I$HOME/local/include -L$HOME/local/include/nurses" LDFLAGS="-L$HOME/local/lib -L$HOME/local/include/nurses -L$HOME/local/include"
CPPFLAGS="-I$HOME/local/include -I$HOME/local/include/nurses" LDFLAGS="-static -L$HOME/local/include -L$HOME/local/include/nurses -L$HOME/local/lib"
make
cp tmux $HOME/local/bin
cd ..
#####
# cleanup
rm -rf $HOME/tmux_tap
*tmux_install_local.sh* 7L, 217C
```

# Solution

## Tmux

- One ssh-connection for several terminal sessions
  - Several windows and panes within a single terminal window
  - Sessions stay alive after logout or connection abortion
  - full keyboard support

## **Further features:**

- mouse support
  - Sessions can be “restored” after a server restart
  - Session sharing with multiple users

```
myuser@master:~$ myuser@node01:~$  
  
Open Grid Scheduler/Condor cheat sheet:  
* qstat/condor_q - show status of batch jobs  
* qhost/condor_status - show status of hosts, queues, and jobs  
* qsub/condor_submit - submit batch jobs (e.g. qsub -cwd ./jobscript.sh)  
* qdel/condor_rm - delete batch jobs (e.g. qdel 7)  
* qconf - configure Open Grid Scheduler system  
  
Current System Stats:  
System load: 0.0 Processes: 78  
Usage of /: 31.4% of 9.84GB Users logged in: 2  
Memory usage: 26% IP address for eth0: 10.243.115.201  
Swap usage: 0%  
  
myuser@node02:~$ [starclust 0:all@* 1:master 2:node01 3:node02- "master" 17:22 27-Dec-11]  
myuser@node03:~$
```

# Live Demonstration

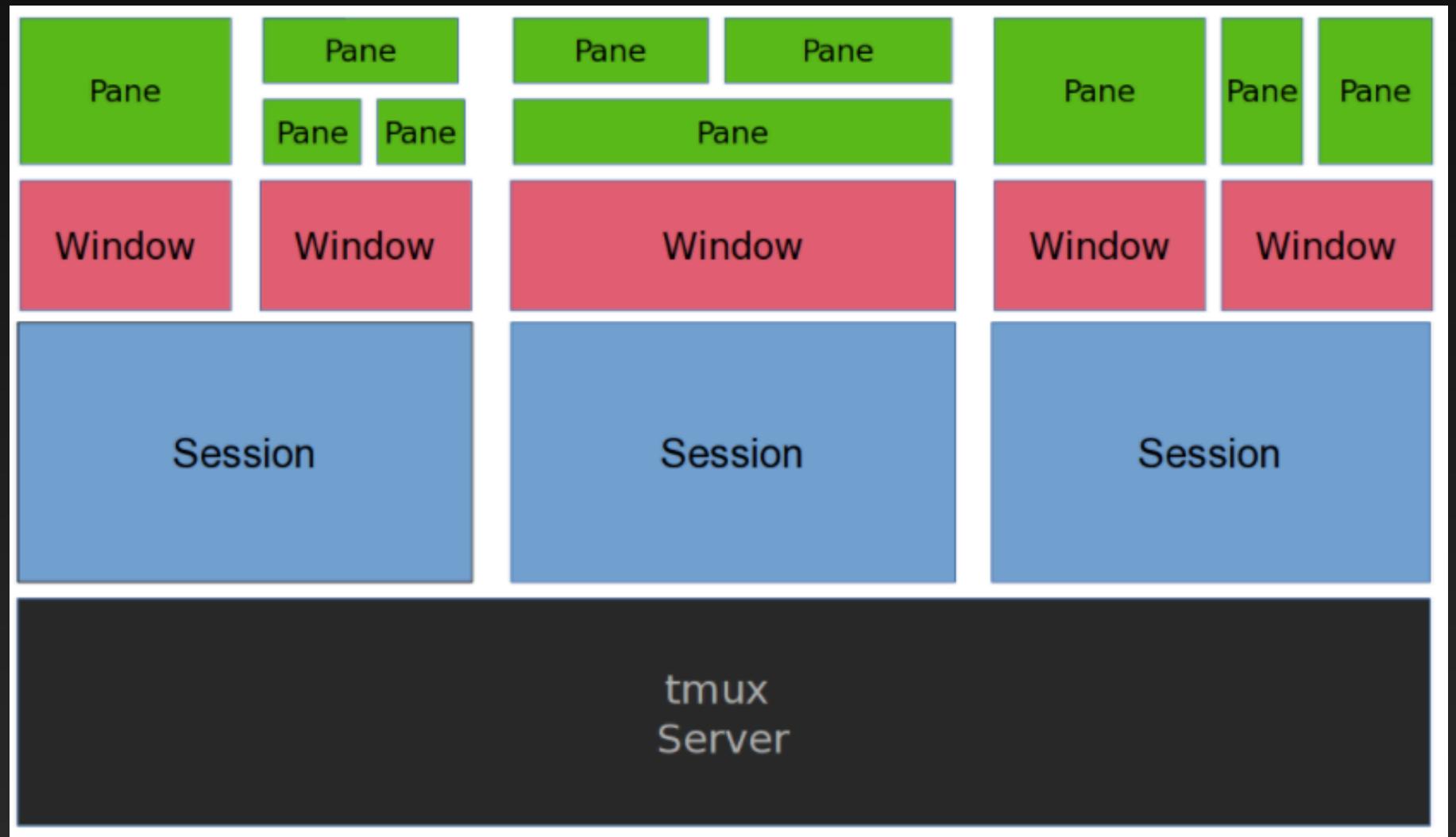
## On a Raspberry Pi

### Basics

- **Session:** Saves collection of **windows**, **panes**, programs you left running inside
- **Attaching:** Enter a running session
- **Detaching:** Exit a running session (without killing it)
- **Window:** Comparable to a tab in your browser
- **Pane:** Split a window into several “sub-windows”; visible at the same time
- **Taskbar**

### Advanced

- Copy mode
- Configuration options
- Plugins: <https://github.com/tmux-plugins>
- Scripts: Send multiple programs to tmux that run in the background (“parallel computing”)



# Installation

## A few examples for different systems

### **Ubuntu and Debian**

```
sudo apt install tmux
```

### **CentOS and Fedora**

```
sudo yum install tmux
```

### **macOS**

```
brew install tmux
```

### **On Linux locally**

<https://gist.github.com/7f4d2f86182b836e7806d777a19a8292.git>

### **More Examples**

<https://leanpub.com/the-tao-of-tmux/read>

# Screen /Tmux Comparison

<https://hyperpolyglot.org/multiplexers>

# Resources

## Links

- <https://github.com/tmux/tmux/wiki>
- <https://leanpub.com/the-tao-of-tmux/read>
- <https://tmuxcheatsheet.com>
- <https://www.barbarianmeetscoding.com/blog/2019/12/25/jaimes-guide-to-tmux-the-most-awesome-tool-you-didnt-know-you-needed>
- <https://github.com/rothgar/awesome-tmux>
- <https://github.com/tmux-plugins/tpm>
- Installation script: <https://gist.github.com/7f4d2f86182b836e7806d777a19a8292.git>