Working Remotely, part 2

EE 107S: Introduction to Linux

Lecture 4

Terminal multiplexer: `tmux`

- Provides many features, some of which are
  - Multiple windows/panes in one session
  - Persistent sessions (even if you disconnect SSH)
  - Simple collaboration
- As if Vim wasn't hard enough, here's another thousand keyboard shortcuts

Tmux operations

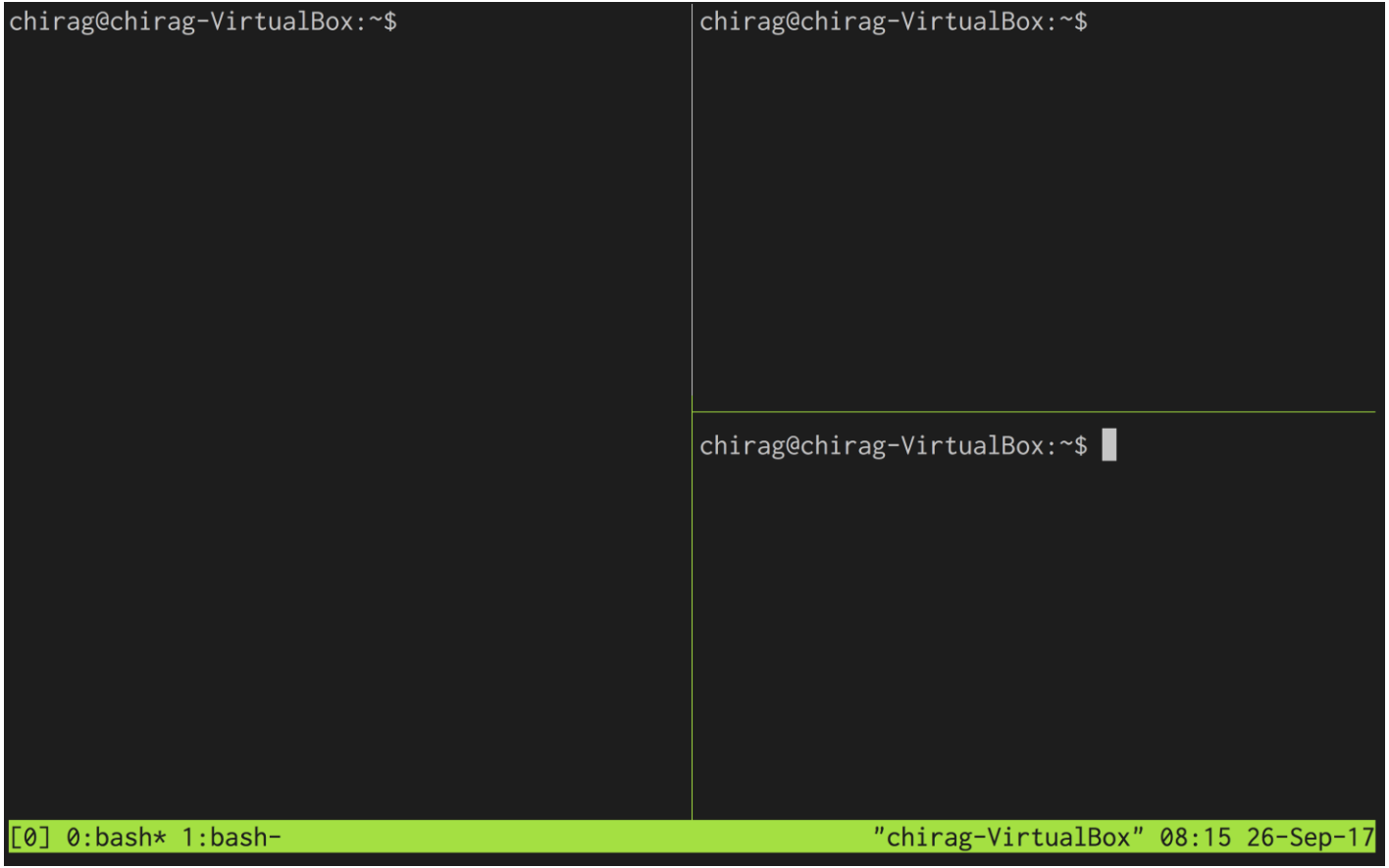
- Operations start with a prefix (default `ctrl+b`)
- Press prefix, then a keyboard shortcut for an operation
  - Operations include creating a new window, entering a tmux command, etc.

Windows

- `ctrl+b, c` - create new window
- `ctrl+b, n` - move to next window
- `ctrl+b, p` - move to previous window
- `ctrl+b, number` - move to window number

Panes

- `ctrl+b, "` - new horizontal pane
- `ctrl+b, %` - new vertical pane
- `ctrl+b, arrows` - move to different pane



Exercise

Create this structure

Possible Solution

```
ctrl+b, %
ctrl+b, “
ctrl+b, c
ctrl+b, 0
```

Managing sessions

- `ctrl+b, d` - detach session (i.e. hide tmux)
- `tmux list-sessions`
- `tmux new -s session-name`
- `tmux attach -t session-name`

Common desktop environments

- GNOME
- Unity
- Xfce
- i3 WM

Preparing for remote GUI

`sudo apt install xfce4 tightvncserver`
`sudo startxfce4` (not from a GUI terminal!)

- To access a non-GUI terminal, press `ctrl+alt+1`

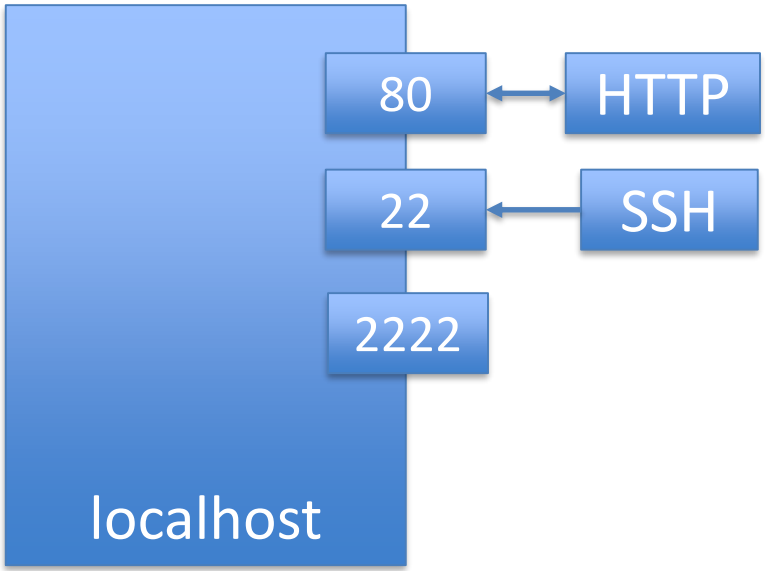
VNC Viewers

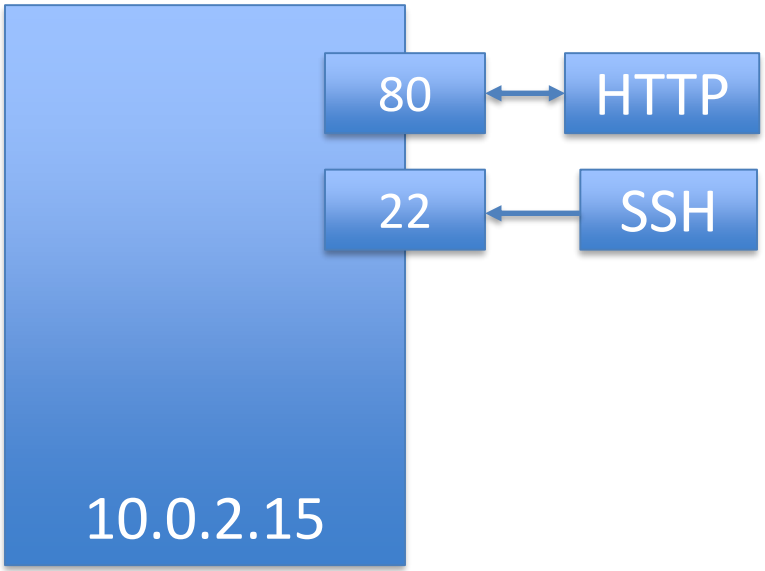
- VNC Viewer for Google Chrome
- RealVNC
- TightVNC

Remote GUI: `vncserver`

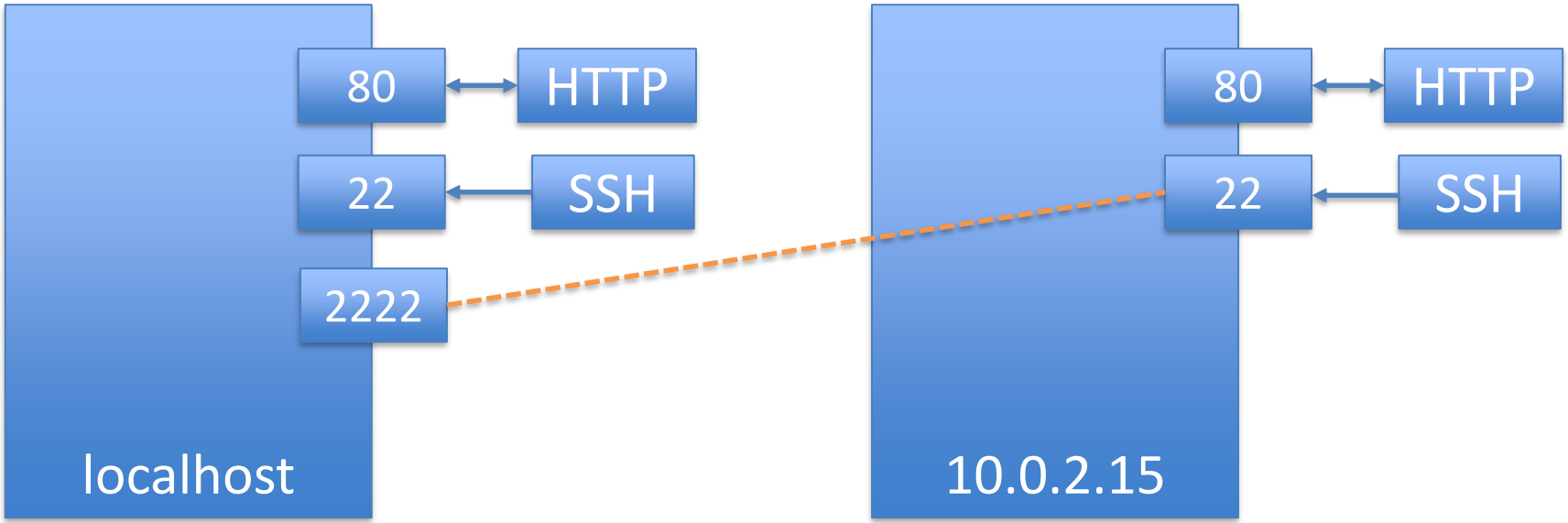
- `vncserver`
- It’s just that easy!
- No it’s not

Ports

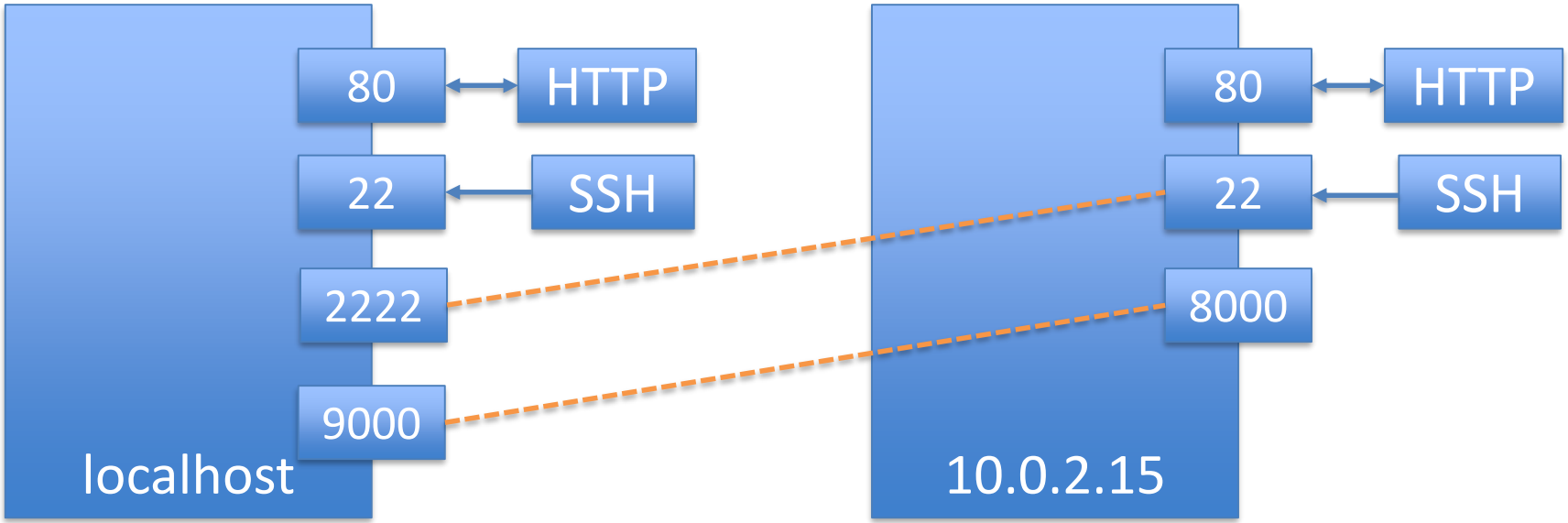




Port Forwarding



Reverse Tunneling



Reverse Tunneling

From the host machine!

```
ssh -L 9000:localhost:8000 <remote>
```

- In our case, remote machine happens to be `localhost` too…

Back to VNC

- VNC launches a DISPLAY number
  - By default, lowest available number ≥ 1
- Each DISPLAY number corresponds to a port
- DISPLAY :1 corresponds to 5901, DISPLAY :2 corresponds to 5902, etc.

Tying it together

- From VM
  - vncserver
- From host
  - `ssh -L 9000:localhost:5901 -p 2222 localhost`
  - Connect via VNC client to `localhost:9000`

We're connected! But the screen is grey!

- VNC just starts X on Ubuntu 16.04 LTS
- We need to give it a "launch script"
- Script is located in `~/.vnc/xstartup`
  - Make sure it has execute privilege

Launch Script

~/.vnc/xstartup

```
#!/bin/bash
xrdb $HOME/.Xresources
xsetroot -solid grey
startxfce4 &
```

Restarting VNC

`vncserver -kill :1` (or whatever DISPLAY)
`vncserver`