

# Linux for Network Engineers: How to Get Started

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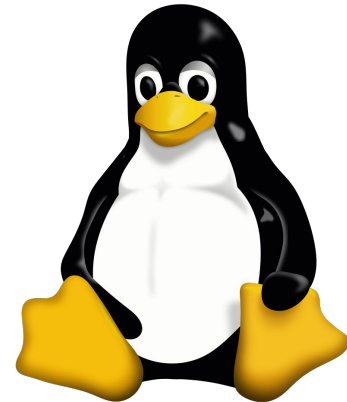


# Agenda

- I. Why learn Linux
- II. How to get started
- III. What can you accomplish
- IV. Practical examples
  - A. How to install software packages
  - B. Port and host scanning
  - C. Bandwidth performance testing

# Why Learn Linux?

- Networking and application stack boundaries becoming blurred
- Many network OS are Linux based or have a Linux shell
- White-label networking hardware runs Linux (OpenWrt, CumulusVX)
- Free open source software



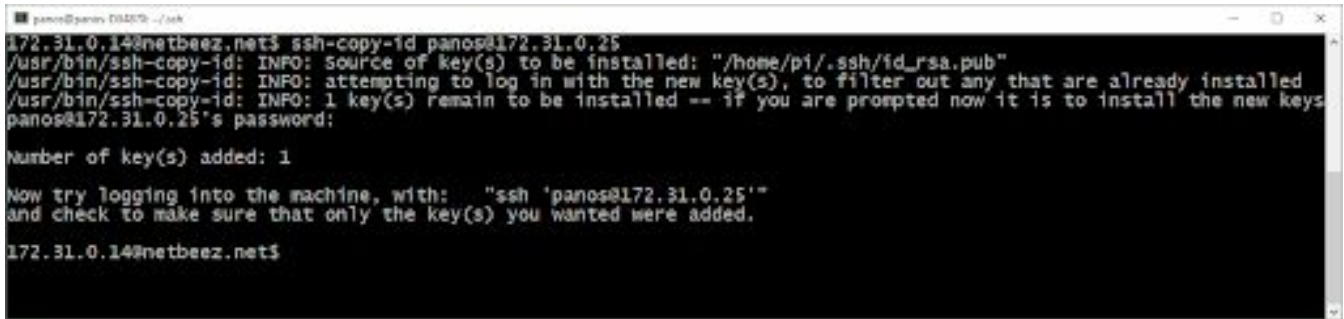
# How to get access to Linux

- Mac OS: Terminal
- Windows 10: Cygwin/Ubuntu Bash
- AWS/Azure/GCP Free Tiers
- Nano Pi/Raspberry Pi/Odroid/Old laptop



# What can be gained?

- Career advancement
- New technology adoption
- Prototype and automate faster (Bash, Python, Ansible, Chef)



```
panos@panos DMZ07 ~/$
172.31.0.14@netbeez.net$ ssh-copy-id panos@172.31.0.25
/usr/bin/ssh-copy-id: INFO: source of key(s) to be installed: "/home/pi/.ssh/id_rsa.pub"
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
panos@172.31.0.25's password:

Number of key(s) added: 1

Now try logging into the machine, with: "ssh 'panos@172.31.0.25'"
and check to make sure that only the key(s) you wanted were added.

172.31.0.14@netbeez.net$
```

# Network Scanning with nmap

- Scan vlan
- Scan host
- Scan OS host



```
80/tcp    open    http
81/tcp    open    hosts2-nc
10.0.0.1  [mobile]
11 # nmap -u -sS -O 10.2.2.2
11
13 Starting nmap U. 2.54NBETA25
13 insufficient responses for TCP sequencing (3), OS detection
13 accurate
14 Interesting ports on 10.2.2.2:
44 (The 1539 ports scanned but not shown below are in state: cl
51 Port      State      Service
51 22/tcp    open      ssh
58
68 No exact OS matches for host
68
74 Nmap run completed -- 1 IP address (1 host up) scanned
50 # sshnuke 10.2.2.2 -rootpw="210ND101"
Connecting to 10.2.2.2:ssh ... successful.
Re Attempting to exploit SSHv1 CRC32 ... successful.
IP Resetting root password to "210ND101".
System open: Access Level (9)
# ssh 10.2.2.2 -l root
root@10.2.2.2's password: █
```

RTF CONTROL  
ACCESS GRANTED

# Bandwidth Monitoring with Speedtest

Goal: run an hourly speedtest and log the results in a file

- Bash script
- Loop
- Command line speedtest
- Log results in a file in CSV

# Pseudocode

Loop forever

    Run speedtest

    Log results in a file

    Wait for 1 hour

End Loop



# Vlan scanning

```
netbeez.net $nmap -sP 172.31.0.0/24
```

```
Starting Nmap 6.40 ( http://nmap.org ) at 2019-02-20  
10:44 EST
```

```
Nmap scan report for 172.31.0.1
```

```
Host is up (0.00094s latency).
```

```
....
```

```
Nmap done: 256 IP addresses (10 hosts up) scanned in  
2.24 seconds
```



# Operating System Scan

```
netbeez.net$ nmap -O 172.31.0.1
```

```
PORT      STATE SERVICE
```

```
22/tcp    open  ssh
```

```
25/tcp    open  smtp
```

```
111/tcp   open  rpcbind
```

```
MAC Address: 00:01:C0:15:A3:32 (CompuLab)
```

```
Device type: general purpose
```

```
Running: Linux 2.6.X|3.X
```

```
OS CPE: cpe:/o:linux:linux_kernel:2.6 cpe:/o:linux:linux_kernel:3
```

```
OS details: Linux 2.6.32 - 3.2
```



# Advanced scanning

```
netbeez.net$ nmap -A 172.31.0.1
```

```
PORT      STATE SERVICE VERSION
```

```
22/tcp    open  ssh      OpenSSH 5.9p1 Debian 5ubuntu1.4 (Ubuntu Linux;  
protocol 2.0)
```

```
| ssh-hostkey: 1024 00:7d:84:36:36:23:e5:0f:6f:1c:1b:ed:88:30:54:b9 (DSA)
```

# Speedtest

Result ID: 8055873999

SHARE [Twitter] [Facebook] [More]

RESULTS [Settings]

PING ms: 26

DOWNLOAD Mbps: 8.52

UPLOAD Mbps: 6.20

GO

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Details



# Command Line Speedtest

```
netbeez.net$ apt-get install speedtest-cli
```

```
netbeez.net$ speedtest-cli
```

Testing from AT&T U-verse (99.35.xx.xx)...

Hosted by Mimosa Networks (San Jose, CA) [4.42 km]: 26.765 ms

Testing download speed.....

Download: 60.71 Mbit/s

Testing upload speed.....

Upload: 60.22 Mbit/s



# Bash

```
#!/bin/bash
```

```
while true ;
```

```
do
```

```
    speedtest-cli --csv >> /home/netbeez/speedtest.log
```

```
    sleep 3600
```

```
done
```



# Output log

```
netbeez.net$ cat /home/netbeez/speedtest.log
```

```
10384,Speedtest.net,"San Jose,  
CA",2019-02-20T05:56:29.587745Z,4.420662584395968,29.902,41753262  
.367058255,60705533.72853958,,99.35.16.139
```



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