

PRACTICE LAB 1 & TROUBLESHOOTING

PRESENTATION: Welcome to NIT

“Smallness of means, greatness of purpose and Astounding Results”

1



PING Command NIT ACADEMY

In this tutorial, we will all about how to use the ping command

- ❑ Ping stands for **P**acket **I**nternet **G**roper. A software application, utility or tool used to test and diagnose connectivity-related issues on a network
- ❑ Ping is based on **ICMP** protocol
- ❑ System Admins use it test if a remote server is reachable

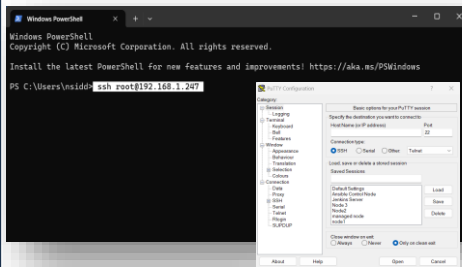
PRACTICE LAB 1 - PING

NOTE: All of these locations are REMOTE LOCATIONS

Nexus Office



HOME



VPN, Tunnel, OpenVPN

Client

DATA CENTER
"on-prem"

worker-P01 Server

1

SSH

CISCO ROUTER

Arista Switch

2

Labnit0001-PROD-1.academy

From

1

we will PING

2

Server

Ping Resolution Flow Diagram

Date: Aug-17th-2025

- **ping localhost (127.0.0.1 / ::1):** Tests only the OS TCP/IP stack via loopback (**green**).
- **ping <machine_IP>:** Adds test of NIC hardware & driver (**blue**).
- **ping 8.8.8.8:** Full path test: NIC → Router → ISP → Internet (**red**).
- **ping google.com:** Adds DNS resolution to full path (**purple**).

Command	What it Tests	What it Confirms	What it Does NOT Test
ping localhost (127.0.0.1 or ::1)	Loopback interface + local IP stack inside the kernel	<ul style="list-style-type: none"> ✓ TCP/IP stack is up ✓ ICMP works locally ✓ OS networking is functional 	<ul style="list-style-type: none"> ✗ Physical NIC ✗ Router ✗ Internet connectivity
ping <machine_IP> (e.g. 192.168.1.250)	Local NIC + driver + OS network stack	<ul style="list-style-type: none"> ✓ NIC card is working ✓ OS can talk through its own interface ✓ IP assigned correctly 	<ul style="list-style-type: none"> ✗ Router connectivity ✗ Internet access
ping 8.8.8.8 (Google DNS)	End-to-end connectivity	<ul style="list-style-type: none"> ✓ Local NIC works ✓ Router/gateway works ✓ ISP path to Internet works 	<ul style="list-style-type: none"> ✗ DNS resolution (since IP is given directly)
ping google.com	End-to-end + DNS resolution	<ul style="list-style-type: none"> ✓ Local NIC works ✓ Router/ISP path works ✓ Internet reachable ✓ DNS is working 	<ul style="list-style-type: none"> ✗ Nothing major — this is the <i>full test</i>

PRACTICE LAB

Date: August-26th-2025

Test only the OS TCP/IP stack – Loop Back

[root@worker-P01~]# ping 127.0.0.1

What file contains the host addresses?

[root@worker-P01~]# cat /etc/hosts

Test NIC (Network Adapter Card) & Driver by pinging the machines own IP

[root@worker-P01~]# ping 192.168.1.250

Test full path (NIC -> Router -> ISP -> Internet) – using googles public DNS as a reliable target

[root@worker-P01~]# ping 8.8.8.8

Test full path + DNS resolution

[root@worker-P01~]# ping google.com

PRACTICE LAB

Date: August-26th-2025

By Default, ping sends messages every 1 second, let us change that:

```
[root@worker-P01~]# ping -i 4 www.google.com
```

By Default, once you ping it goes on forever! Let us change that to only sending 4 packets:

```
[root@worker-P01~]# ping -c 4 www.google.com
```

Super User/ Root can Test Transmission Speed

```
[root@worker-P01~]# ping -f www.google.com (then press "ctrl+c")
```

To view a complete list of all supported options, use the following command

```
[root@worker-P01~]# ping -- help
```

2



DATE / UPTIME / HOSTNAME / HOST IP
NIT ACADEMY

Date: August-26th-2025

- ☐ Date validates or work.
- ☐ Uptime is part of the the TOP command
- ☐ Uptime tells the System Admin a lot of things
 - ☐ How long has the server been “running”?
 - ☐ Maybe SSH Services have failed?
 - ☐ Maybe httpd services are not running?
- ☐ Hostname and its IP also help us validate our work

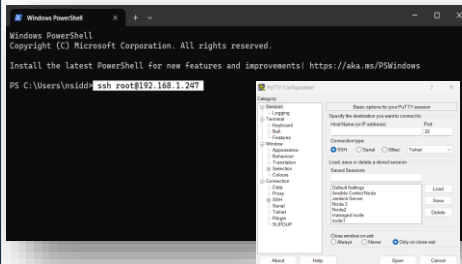
PRACTICE LAB 2 - UPTIME

NOTE: All of these locations are REMOTE LOCATIONS

PROD1 was shutdown for patching



HOME



VPN, Tunnel, OpenVPN

Client

DATA CENTER
"on-prem"

worker-P01 Server

1

CISCO ROUTER

SSH

Arista Switch

SSH

2

Labnit0001-PROD-1.academy

How Long has it been since
this server was UP?

1

2

Server

PRACTICE LAB

Date: July-26th-2025

Login into the Worker Node and SSH into PROD Machine

```
[root@worker-P01~]# ssh root@labnit0001-PROD-1.academy
```

How do you make sure you are working ON the correct server?

```
[root@labnit0001-PROD~]# hostname
```

Have you verified the Server IP?

```
[root@labnit0001-PROD~]# hostname -i
```

This server was “booted” and is now “Running” for sometime. How long has it been running?

```
[root@labnit0001-PROD~]# uptime
```

On what date did you do all this work

```
[root@labnit0001-PROD~]# date
```

3



VALUABLE COMMANDS

Date: August-26th-2025

- ☐ You will be asked in an interview how do you check the kernel version?
- ☐ You will be asked in an interview how do you check the **number of CPU's**
- ☐ You will be asked in an interview how do you check **memory?**
- ☐ You will be asked in an interview how do you check **disk usage?**
- ☐ What is the difference between **“ip a”** and **“hostname -i”**?

Date: July-25th-2025

LINUX LINE COMMANDS



1 [root@vm1~]#uname -a

```
oot@servera ~]# date
i Jul 25 05:05:53 AM CDT 2025
oot@servera ~]# hostname
rvera
oot@servera ~]# uptime
5:06:03 up 7 days, 19:32, 2 users, load average: 0.00, 0.01, 0.05
oot@servera ~]# cal
    July 2025
Mo Tu We Th Fr Sa
 1  2  3  4  5
 7  8  9 10 11 12
14 15 16 17 18 19
21 22 23 24 25 26
```

Binaries

[root@vm1~]# pwd

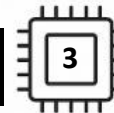
7

2 [root@vm1~]#uname -r

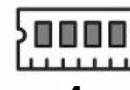
2 LINUX KERNEL

PROCESS
MANAGEMENTMEMORY
MANAGEMENT

FILESYSTEMS

DEVICE
DRIVERS

CPU



memory



disk



network

3

[root@vm1~]#lscpu

4

[root@vm1~]#free -m

5

[root@vm1~]#df -h

6

[root@vm1~]#ip a

PRACTICE LAB

Date: July-26th-2025

You must always make sure you have SSH into the correct server

```
[root@worker-P01~]# ssh root@labnit0001-PROD-1.academy
```

Check how many Virtual CPU's you have; note "core", "socket" and "thread"

```
[root@labnit0001-PROD~]# lscpu
```

Let us check how our memory is doing

```
[root@labnit0001-PROD~]# free -m
```

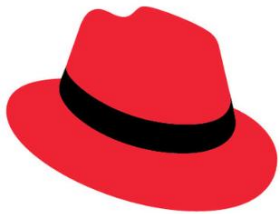
Let us check the filesystem to see our disk usage

```
[root@labnit0001-PROD~]# df -hT
```

How do you check the IP Address of your machine?

```
[root@labnit0001-PROD~]# ip address (or ip a)
```

3



RHCSA EXAM QUESTIONS

Date: August-26th-2025

- ☐ How do you set a new name of a host?
- ☐ How do you set static IP?
- ☐ How do you recover the password of a machine
- ☐ How do you create files?
- ☐ How do you create directories?
- ☐ How do you copy files with the Linux Filesystem
- ☐ How do you rename files?
- ☐ How do you delete files and directories?
- ☐ What is the difference between “cat” and “cd” commands



SETTING HOSTNAME

Date: August-26th-2025

You must always make sure you have SSH into the correct server
[root@worker-P01~]# **ssh root@labnit0001-PROD-1.academy**

Let us use change the name of the server to “myservera”
[root@labnit0001-PROD~]# **hostnamectl set-hostname myservera**

In which “file” does the “hostnamectl set-hostname command” write that change?
[root@labnit0001-PROD~]# **/etc/hostname**

Method 1 => to see this change
[root@labnit0001-PROD~]# **/bin/bash** (or “**exec /bin/bash** OR “**su - \$USER**”
[root@myservera~]# **/bin/bash**

Method 2 => to see this change is to logout and login
[root@labnit0001-PROD~]# **logout**



SET STATIC IP

Date: August-26th-2025

You must always make sure you have SSH into the correct server

```
[root@worker-P01~]# ssh root@labnit0001-PROD-1.academy
```

Let us install the NetworkManager Package

```
[root@labnit0001-PROD~]# dnf install NetworkManager -y
```

Start and Enable the service "NetworkManager"

```
[root@labnit0001-PROD~]# systemctl enable --now NetworkManager
```

Verify installation

```
[root@labnit0001-PROD~]# nmcli --version
```

Let us see all the settings/configurations for the connection interface "enp0s3" that we need:

```
[root@labnit0001-PROD~]# nmcli connection show enp0s3
```



SET STATIC IP

Date: August-26th-2025

Check if an IP Address you plan to use is available

```
[root@worker-P01~]# ping 192.x.x.x
```

Let us configure / specify the ip address (ipv4):

```
[root@labnit0001-PROD~]# nmcli con mod enp0s3 ipv4.addresss 192.x.x.250
```

Let us configure gateway

```
[root@labnit0001-PROD~]# nmcli con mod enp0s3 ipv4.gateway 192.x.x.254
```

Verify installation

```
[root@labnit0001-PROD~]# nmcli con mod enp0s3 ipv4.dns 192.x.x.254
```

Let us see all the settings/configurations for the connection interface "enp0s3"

```
[root@labnit0001-PROD~]# nmcli con mod enp0s3 ipv4.method manual
```




SET STATIC IP

Date: August-26th-2025

Let us now check our connection of the interface card = Network Interface Card (NIC)

```
[root@ labnit0001-PROD~ ]# nmcli connection show
```

Let us turn the NIC card “off” by bringing the connection “down”

```
[root@labnit0001-PROD~ ]# nmcli connection down enp0s3
```

Let us turn the NIC card “on” by bringing the connection “UP”

```
[root@labnit0001-PROD~ ]# nmcli con up enp0s3
```

Verify and validate the STATIC IP . Once you exit this machine you can ping this machine!

```
[root@worker-P01~ ]# route -n (or “ip a”)
```

ALTERNATIVELY (MUCH EASIER ON THE EXAM)

```
[root@labnit0001-PROD~ ]# nmtui
```



PASSWORD RECOVERY

Date: August-26th-2025

```
# You must always make sure you have SSH into the correct server  
[root@worker-P01~]# ssh root@labnit0001-PROD-1.academy
```

```
# Let us install the NetworkManager Package  
[root@labnit0001-PROD~]# hostnamectl set-hostname myservera
```

CREATE DIRECTORIES AND SOFT LINK

Date: August-26th-2025



You must always make sure you have SSH into the correct server

```
[root@worker-P01~]# ssh root@labnit0001-PROD-1.academy
```

Let us create a Nested DIRECTORY

```
[root@labnit0001-PROD~]# mkdir -p /data/app
```

```
[root@labnit0001-PROD~]# ls -l /
```

```
[root@labnit0001-PROD~]# cd /data
```

```
[root@labnit0001-PROD data]# pwd  
/data
```

```
[root@labnit0001-PROD data]# mkdir dir1/dir2/dir3/dir4
```

Let us create a soft link

```
[root@labnit0001-PROD data]# ln -s /data/dir1/dir2/dir3/dir4 /tmp/database
```

CREATE FILE AND HARD LINK



Date: August-26th-2025

You must always make sure you have SSH into the correct server

```
[root@worker-P01~]# ssh root@labnit0001-PROD-1.academy
```

Let us create a File or Files

```
[root@labnit0001-PROD~]# touch file1
```

```
[root@labnit0001-PROD~]# ls -l
```

```
[root@labnit0001-PROD~]# touch file{1..5}
```

Let us create a Hard link

```
[root@labnit0001-PROD ~]# ln /data/dir1/dir2/dir3/dir4 /tmp/database
```

INTERVIEW QUESTION 1: HOW DO YOU RECOVER ROOT PASSWORD

Date: August-26th-2025

Interrupt the boot process to set the root password as "**redhat**" and gain access to System. Procedure :

1. Start (Power on) the System.
2. Wait for GRUB menu to appear and then press **e** to edit.
3. Find the line starting with linux and type the **rd.break** at the end.
4. Press Ctrl+x to boot the system with these Kernel boot parameters.
5. Root file system is mounted on the disk as read only (this can be verified by mount command) mode => /sysroot [this is a chroot jail environment and must be remounted with r/w permissions].
6. To mount the root file system with r/w permissions
7. **#mount -o remount,rw /sysroot**
8. Activate chrooted root environment.
9. **#chroot /sysroot**
10. To set the root password
11. **#passwd**
12. To relabel the Selinux contexts (This step is important !)
13. **#touch /.autorelabel**
14. **exit** (To exit chrooted jail environment)
15. **exit** (To exit emergency maintenance mode)

PRODUCTION SERVER PERFORMANCE

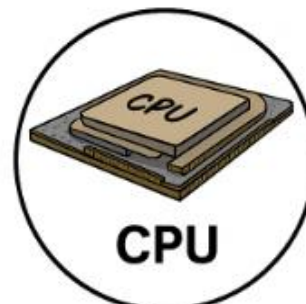
Date: August-26th-2025

Production Server



Labnit0001-PROD-1.academy

TOP command



CPU SATURATION



MEMORY LEAKAGE / USAGE



Disk Full

PROPERTY OF