

ASSIGNMENT # 2

LINUX LAB

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Provide all commands (or as many commands as you can find) with snapshots of output, for any **three** topics of your choice:

Topic 3

Working with output file operator (>)

Commands

1. The stdout is redirected with a '>' greater than sign. When shell meets the '>' sign, it will clear the file (as you already know).

Example: **echo Hello everyone. > afile.txt**

below the echo command output is directed to a file1

```
C:\Users\Dell>docker run -d -it --name ubunt ubuntu
71a945c6feb2b9e8eb4ec706681419ad237db3143cda24fa0e76030186adc7e8

C:\Users\Dell>docker container exec -it ubunt bash
root@71a945c6feb2:/# ls
bin boot dev etc home lib lib32 lib64 libx32 media mnt opt proc root run sbin srv sys tmp usr var
root@71a945c6feb2:/# echo hello output redirection > file1.txt
root@71a945c6feb2:/# cat file1.txt
hello output redirection
root@71a945c6feb2:/#
```

2. In output redirection, during scanning of a command line, shell will encounter through '>' sign and will clear the file.

Example: **zcho Welcome > afile.txt**

Even if wrong command the > output redirect will modify the file1.txt as show below

```
root@71a945c6feb2:/# cat file1.txt
hello output redirection
root@71a945c6feb2:/# xcho welcome > file1.txt
bash: xcho: command not found
root@71a945c6feb2:/# cat file1.txt
root@71a945c6feb2:/#
```

Noclobber

We can prevent file deletion while using '>' sign with the help of noclobber option.

3. To ensure that > output does not affect/change existing file we can use

Syntax:

set -o noclobber (To prevent overwrite)
set +o noclobber (To overwrite)

Example: **echo Learn Linux. > newfile.txt**

set -o noclobber (To prevent overwrite) As show in below example

```
root@71a945c6feb2:/# echo hello there > file1.txt
root@71a945c6feb2:/# cat file1.txt
hello there
root@71a945c6feb2:/# set -o noclobber
root@71a945c6feb2:/# echo Bye > file1.txt
bash: file1.txt: cannot overwrite existing file
```

4. set +o noclobber (To overwrite)

```
root@71a945c6feb2:/# echo hello there > file1.txt
root@71a945c6feb2:/# cat file1.txt
hello there
root@71a945c6feb2:/# set -o noclobber
root@71a945c6feb2:/# echo Bye > file1.txt
bash: file1.txt: cannot overwrite existing file
root@71a945c6feb2:/# set +o noclobber
root@71a945c6feb2:/# echo Bye bye > file1.txt
root@71a945c6feb2:/# cat file1.txt
Bye bye
root@71a945c6feb2:/#
```

5. Overruling noclobber

Overruling noclobber means you can overwrite an existing file while noclobber is set by using '>|' sign.

Syntax: **command >| <fileName>**

Example: **echo Welcome to JavaTpoint. >| newfile.txt**

The >| operator allows you to override the Bash “noclobber” option as shown below

```
root@71a945c6feb2:/# set -o noclobber
root@71a945c6feb2:/# echo "this is a line" >| file1.txt
root@71a945c6feb2:/# cat file1.txt
this is a line
root@71a945c6feb2:/# echo "this is a line" > file1.txt
bash: file1.txt: cannot overwrite existing file
root@71a945c6feb2:/#
```

6. Append >>

Syntax: **command >> <fileName>**

Example: **echo You all are welcome here. >> newfile.txt**

We can append in existing file using >> as shown below

```
root@71a945c6feb2:/# cat file1.txt
Bye bye
root@71a945c6feb2:/# echo not yet! >> file1.txt
root@71a945c6feb2:/# cat file1.txt
Bye bye
not yet!
root@71a945c6feb2:/#
```

7. Storing output of ls in new file

```
root@71a945c6feb2:/# ls >list.txt
root@71a945c6feb2:/# cat list.txt
archlinux-2018.06.01-x86_64.iso
bin
boot
code.c
code.sh
cond.sh
conv.sh
debian-9.4.0-amd64-netinst.iso
```

8. Use the printf command to create a complex output:

```
root@71a945c6feb2:/# printf "Hello, I'm %s.\n" $USER > file.txt
root@71a945c6feb2:/# cat file.txt
Hello, I'm .
```

9. If you want to write multiple lines to a file, use the Here document (Heredoc) redirection. For example, you can pass the content to the cat command and write it to a file:

```
root@71a945c6feb2:/# cat << eof > newfile.txt
> lets start
> this is a good match
> the end
> eof
root@71a945c6feb2:/# cat newfile.txt
lets start
this is a good match
the end
root@71a945c6feb2:/#
```

10. To append the lines, change > with >> before the file name:

```
root@71a945c6feb2:/# cat << EOF >> file.txt
> The current working directory is: $PWD
> You are logged in as $(whoami)
> EOF
root@71a945c6feb2:/# cat file.txt
Hello, I'm .
The current working directory is: /
You are logged in as root
root@71a945c6feb2:/#
```

11. You can write the output of any command to a file:

```
root@71a945c6feb2:/# date +"Year: %Y, Month: %m, Day: %d" > file5.txt
root@71a945c6feb2:/# cat file5.txt
Year: 2022, Month: 02, Day: 14
root@71a945c6feb2:/#
```

Topic 4

Working with the pipe operator (|)

Commands:

1. Below the stdout of ls-lr becomes stdin of grep

```
root@71a945c6feb2:/# ls -lR | grep drwx
drwxr-xr-x  2 root root 4096 Apr 15  2020 boot
drwxr-xr-x  5 root root  360 Feb 12  05:24 dev
drwxr-xr-x  1 root root 4096 Feb 12  05:24 etc
drwxr-xr-x  2 root root 4096 Apr 15  2020 home
drwxr-xr-x  2 root root 4096 Jan 13  16:47 media
drwxr-xr-x  2 root root 4096 Jan 13  16:47 mnt
drwxr-xr-x  2 root root 4096 Jan 13  16:47 opt
drwx----- 2 root root 4096 Jan 13  16:50 root
drwxr-xr-x  5 root root 4096 Jan 13  16:50 run
drwxr-xr-x  2 root root 4096 Jan 13  16:47 srv
drwxrwxrwt  2 root root 4096 Jan 13  16:50 tmp
drwxr-xr-x 13 root root 4096 Jan 13  16:47 usr
drwxr-xr-x 11 root root 4096 Jan 13  16:50 var
drwxrwxrwt  2 root root   40 Feb 12  05:24 mqueue
drwxr-xr-x  2 root root    0 Feb 12  05:24 pts
```

2. Here the output of program grep drwx becomes stdin input to wc which displays its result

```
drwxr-xr-x 2 root root 4096 Jan 13 16:50 apt
root@71a945c6feb2:/# ls -lR | grep drwx | wc -l
2057
root@71a945c6feb2:/#
```

3. The output of ls become input of wc

```
root@71a945c6feb2:/# ls | wc -l
22
root@71a945c6feb2:/#
```

4. Here the output of cat becomes input of sort command

```
root@71a945c6feb2:/# echo -e "Bob Jones\nLeslie Smith\nDana David \nSusan Gee\nLeonard Schmidt\nTerry Jones\nColin Doe\nJenny Case" > file3.txt
root@71a945c6feb2:/# cat file3.txt
Bob Jones
Leslie Smith
Dana David
Susan Gee
Leonard Schmidt
Terry Jones
Colin Doe
Jenny Case
root@71a945c6feb2:/# cat file3.txt | sort
Bob Jones
Colin Doe
Dana David
Jenny Case
Leonard Schmidt
Leslie Smith
Susan Gee
Terry Jones
root@71a945c6feb2:/#
```

5. The output of ls becomes input to head and it display first 5 files as shown below

```
root@71a945c6feb2:/# ls | head -5
bin
boot
dev
etc
file1.txt
root@71a945c6feb2:/# ls
bin    dev  file1.txt  file3.txt  lib    lib64  media  opt   root  sbin  sys  usr
boot  etc  file2.txt  home      lib32  libx32  mnt    proc  run   srv   tmp  var
root@71a945c6feb2:/#
```

6. Another example using piping 2 levels where ls output is head's input & head's output is tails input

```
root@71a945c6feb2:/# ls | head -5
bin
boot
dev
etc
file1.txt
root@71a945c6feb2:/# ls
bin    dev    file1.txt  file3.txt  lib      lib64    media  opt    root  sbin  sys  usr
boot   etc    file2.txt  home       lib32    libx32   mnt    proc   run   srv   tmp  var
root@71a945c6feb2:/# ls | head -5 | tail -2 > myoutput
root@71a945c6feb2:/# cat myoutput
etc
file1.txt
root@71a945c6feb2:/# ls | head -5 | tail -2
etc
file1.txt
root@71a945c6feb2:/#
```

7. The tee command's default behavior is to overwrite the specified file, same as the > operator. To append the output to the file, invoke the command with the -a (--append) option:

```
root@71a945c6feb2:/# echo "this is a line" | tee -a file6.txt
this is a line
root@71a945c6feb2:/# cat file6.txt
this is a line
root@71a945c6feb2:/# echo "this is a line" | tee -a file6.txt
this is a line
root@71a945c6feb2:/# cat file6.txt
this is a line
this is a line
root@71a945c6feb2:/#
```

8. In this example we will feed the output of a program into the program less so that we can view it easier.

```
root@71a945c6feb2:/# ls -l /etc | less
root@71a945c6feb2:/# ls | less
```

9. You can also perform complex tasks using pipes. To list the process IDs (PIDs) for all systemd-related processes:

```
root@71a945c6feb2:/# ps -ef | grep systemd | awk '{ print $2 }'
98
```


10. Listing all files and directories and give it as input to more command.

```
root@71a945c6feb2:/# ls -l | more
total 1491108
-rw-r--r-- 1 root root      369 Feb 12 13:03 archlinux-2018.06.01-x86_64.iso
lrwxrwxrwx 1 root root        7 Jan 13 16:47 bin -> usr/bin
drwxr-xr-x 2 root root    4096 Apr 15  2020 boot
-rw-r--r-- 1 root root   1669 Feb 12 15:04 code.c
-rwx----- 1 root root      8 Feb 13 09:59 code.sh
-rw-r--r-- 1 root root    120 Feb 13 18:46 cond.sh
-rw-r--r-- 1 root root     99 Feb 13 11:04 conv.sh
-rw-r--r-- 1 root root    279 Feb 12 13:03 debian-9.4.0-amd64-netinst.iso
```

11. Use sort and uniq command to sort a file and print unique values.

```
root@71a945c6feb2:/# cat file3.txt
Bob Jones
Leslie Smith
Dana David
Susan Gee
Leonard Schmidt
Terry Jones
Colin Doe
Jenny Case
Jenny Case
root@71a945c6feb2:/# sort file3.txt | uniq
Bob Jones
Colin Doe
Dana David
Jenny Case
Leonard Schmidt
Leslie Smith
Susan Gee
Terry Jones
root@71a945c6feb2:/#
```

Topic 6

Using curl and wget commands (for web based access)

Commands:

1. Updating and Installing curl

```
root@71a945c6feb2:/# apt update
Get:1 http://archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Get:2 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:3 http://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:4 http://archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:5 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 Packages [25.8 kB]
Get:6 http://archive.ubuntu.com/ubuntu focal/universe amd64 Packages [11.3 MB]
Get:7 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [961 kB]
Get:8 http://security.ubuntu.com/ubuntu focal-security/universe amd64 Packages [839 kB]
Get:9 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [1546 kB]
Get:10 http://archive.ubuntu.com/ubuntu focal/restricted amd64 Packages [33.4 kB]
Get:11 http://archive.ubuntu.com/ubuntu focal/multiverse amd64 Packages [177 kB]
Get:12 http://archive.ubuntu.com/ubuntu focal/main amd64 Packages [1275 kB]
Get:13 http://archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [1030 kB]

root@71a945c6feb2:/# apt install curl
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ca-certificates krb5-locales libasn1-8-heimdal libbrotli1 libcurl4 libgssapi-krb5-2 libgssapi3-heimdal
  libhcrypto4-heimdal libheimbase1-heimdal libheimntlm0-heimdal libhx509-5-heimdal libk5crypto3 libkeyutils1
  libkrb5-26-heimdal libkrb5-3 libkrb5support0 libldap-2.4-2 libldap-common libnghttp2-14 libpsl5 libroken18-heimdal
  librtmp1 libsasl2-2 libsasl2-modules libsasl2-modules-db libsasl2-modules-gssapi-mit libsasl2-modules-gssapi-heimdal
  libsasl2-modules-ldap libsasl2-modules-otp libsasl2-modules-sql
Suggested packages:
  krb5-doc krb5-user libsasl2-modules-gssapi-mit | libsasl2-modules-gssapi-heimdal libsasl2-modules-ldap
  libsasl2-modules-otp libsasl2-modules-sql
The following NEW packages will be installed:
  ca-certificates curl krb5-locales libasn1-8-heimdal libbrotli1 libcurl4 libgssapi-krb5-2 libgssapi3-heimdal
  libhcrypto4-heimdal libheimbase1-heimdal libheimntlm0-heimdal libhx509-5-heimdal libk5crypto3 libkeyutils1
  libkrb5-26-heimdal libkrb5-3 libkrb5support0 libldap-2.4-2 libldap-common libnghttp2-14 libpsl5 libroken18-heimdal
  librtmp1 libsasl2-2 libsasl2-modules libsasl2-modules-db libsasl2-modules-gssapi-mit libsasl2-modules-gssapi-heimdal
  libsasl2-modules-ldap libsasl2-modules-otp libsasl2-modules-sql
0 upgraded, 32 newly installed, 0 to remove and 9 not upgraded.
Need to get 5447 kB of archives.
After this operation, 16.7 MB of additional disk space will be used.
Get:12 http://archive.ubuntu.com/ubuntu focal/main amd64 Packages [1275 kB]
```

2. To save the result of the curl command, use either the -o or -O option.

Lowercase -o saves the file with a predefined filename

Uppercase -O saves the file with its original filename:

```
root@71a945c6feb2:/# curl -o vue-v2.6.10.js https://cdn.jsdelivr.net/npm/vue/dist/vue.js
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload    Total   Spent    Left  Speed
100 335k    0 335k    0     0 1731k      0  --:--:-- --:--:-- --:--:-- 1731k
root@71a945c6feb2:/# curl -O https://cdn.jsdelivr.net/npm/vue/dist/vue.js
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload    Total   Spent    Left  Speed
100 335k    0 335k    0     0 2349k      0  --:--:-- --:--:-- --:--:-- 2349k
```

3. To download multiple files at once, use multiple -O options, followed by the URL to the file you want to download.

In the following example we are downloading the Arch Linux and Debian iso files:

```
root@71a945c6feb2:/# curl -O http://mirrors.edge.kernel.org/archlinux/iso/2018.06.01/archlinux-2018.06.01-x86_64.iso \
> -O https://cdimage.debian.org/debian-cd/current/amd64/iso-cd/debian-9.4.0-amd64-netinst.iso
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload  Total   Spent    Left   Speed
100  369  100  369    0    0   506      0 --:--:-- --:--:-- --:--:--   506
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload  Total   Spent    Left   Speed
100  279  100  279    0    0   167      0 0:00:01 0:00:01 --:--:--   167
root@71a945c6feb2:/#
```

4. Use the -I option to fetch only the HTTP headers of the specified resource:

```
root@71a945c6feb2:/# curl -I --http2 https://www.ubuntu.com/
HTTP/2 301
server: nginx/1.14.0 (Ubuntu)
date: Sat, 12 Feb 2022 14:02:54 GMT
content-type: text/html
content-length: 175
location: https://ubuntu.com/
link: <https://assets.ubuntu.com>; rel=preconnect; crossorigin, <https://assets.ubuntu.com>; rel=preconnect, <https://res.cloudinary.com>; rel=preconnect
x-cache-status: MISS from content-cache-il3/2
```

5. The --limit-rate option allows you to limit the data transfer rate. The value can be expressed in bytes, kilobytes with the k suffix, megabytes with the m suffix, and gigabytes with the g suffix. In the following example curl will download the Go binary and limit the download speed to 1 mb:

```
root@71a945c6feb2:/# curl --limit-rate 1m -O https://dl.google.com/go/go1.10.3.linux-amd64.tar.gz
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload  Total   Spent    Left   Speed
 8  126M    8 10.1M    0    0 1025k      0 0:02:06 0:00:10 0:01:56 1026k
```

6. The --verbose option with curl is useful for debugging and displaying what is going on during the call to the URL.

```
Connection #0 to host cdn.jsdelivr.net left intact
root@71a945c6feb2:/# curl --verbose https://cdn.jsdelivr.net/npm/vue/dist/vue.js
```

Wget

7. Installing wget

```
root@71a945c6feb2:/# apt install wget
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  wget
0 upgraded, 1 newly installed, 0 to remove and 9 not upgraded.
Need to get 348 kB of archives.
After this operation, 1012 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 wget amd64 1.20.3-1ubuntu2 [348 kB]
Fetched 348 kB in 6s (55.5 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package wget.
(Reading database ... 4660 files and directories currently installed.)
Preparing to unpack .../wget_1.20.3-1ubuntu2_amd64.deb ...
Unpacking wget (1.20.3-1ubuntu2) ...
Setting up wget (1.20.3-1ubuntu2) ...
root@71a945c6feb2:/#
```

8. In its simplest form, when used without any option, wget will download the resource specified in the [url] to the current directory.

In the following example, we are downloading the Linux kernel tar archive:

```
root@71a945c6feb2:/# wget https://cdn.kernel.org/pub/linux/kernel/v4.x/linux-4.17.2.tar.xz
--2022-02-12 16:57:20-- https://cdn.kernel.org/pub/linux/kernel/v4.x/linux-4.17.2.tar.xz
Resolving cdn.kernel.org (cdn.kernel.org)... 151.101.193.176, 151.101.129.176, 151.101.65.176, ...
Connecting to cdn.kernel.org (cdn.kernel.org)|151.101.193.176|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 102167060 (97M) [application/x-xz]
Saving to: 'linux-4.17.2.tar.xz'

linux-4.17.2.tar.xz      32%[=====>] 31.99M  526KB/s  eta 82s
```

9. To save the downloaded file under a different name, pass the -O option followed by the chosen name:

```
root@71a945c6feb2:/# wget -O latest-hugo.zip https://github.com/gohugoio/hugo/archive/master.zip
--2022-02-12 17:16:58-- https://github.com/gohugoio/hugo/archive/master.zip
Resolving github.com (github.com)... failed: Temporary failure in name resolution.
wget: unable to resolve host address 'github.com'
root@71a945c6feb2:/# wget -O latest-hugo.zip https://github.com/gohugoio/hugo/archive/master.zip
--2022-02-12 17:17:21-- https://github.com/gohugoio/hugo/archive/master.zip
Resolving github.com (github.com)... failed: Temporary failure in name resolution.
wget: unable to resolve host address 'github.com'
root@71a945c6feb2:/# wget -P /mnt/iso http://mirrors.mit.edu/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1804.iso
--2022-02-12 17:18:07-- http://mirrors.mit.edu/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1804.iso
Resolving mirrors.mit.edu (mirrors.mit.edu)... failed: Temporary failure in name resolution.
wget: unable to resolve host address 'mirrors.mit.edu'
root@71a945c6feb2:/# wget -O latest-hugo.zip https://github.com/gohugoio/hugo/archive/master.zip
--2022-02-12 17:53:53-- https://github.com/gohugoio/hugo/archive/master.zip
Resolving github.com (github.com)... 13.234.210.38
Connecting to github.com (github.com)[13.234.210.38]:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://codeload.github.com/gohugoio/hugo/zip/master [following]
--2022-02-12 17:53:54-- https://codeload.github.com/gohugoio/hugo/zip/master
Resolving codeload.github.com (codeload.github.com)... 13.127.152.42
Connecting to codeload.github.com (codeload.github.com)[13.127.152.42]:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [application/zip]
Saving to: 'latest-hugo.zip'

latest-hugo.zip          [          ] 28.15M  466KB/s   in 74s
2022-02-12 17:55:10 (390 KB/s) - 'latest-hugo.zip' saved [29517902]

root@71a945c6feb2:/#
```

10. To limit the download speed, use the --limit-rate option. By default, the speed is measured in bytes/second. Append k for kilobytes, m for megabytes, and g for gigabytes.

The following command will download the Go binary and limit the download speed to 1MB:

```
root@71a945c6feb2:/# wget --limit-rate=1m https://dl.google.com/go/go1.10.3.linux-amd64.tar.gz
--2022-02-12 18:06:24-- https://dl.google.com/go/go1.10.3.linux-amd64.tar.gz
Resolving dl.google.com (dl.google.com)... 216.58.208.238, 2a00:1450:4019:805::200e
Connecting to dl.google.com (dl.google.com)[216.58.208.238]:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 132489256 (126M) [application/octet-stream]
Saving to: 'go1.10.3.linux-amd64.tar.gz.1'

go1.10.3.linux-amd64.tar.gz.1 14%[====>] 18.20M  970KB/s   eta 2m 2s
```

11. To download in the background, use the -b option. In the following example, we are downloading the OpenSuse iso file in the background:

```
root@71a945c6feb2:/# wget -b https://download.opensuse.org/tumbleweed/iso/openSUSE-Tumbleweed-DVD-x86_64-Current.iso
Continuing in background, pid 2952.
Output will be written to 'wget-log'.
root@71a945c6feb2:/#
```

Topic 8 (Bonus)

Configuring and analyzing networking (LAN, Wifi etc.)

Commands:

1. Installing ifconfig

```
root@71a945c6feb2:/# apt install net-tools -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  net-tools
0 upgraded, 1 newly installed, 0 to remove and 9 not upgraded.
Need to get 196 kB of archives.
After this operation, 864 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu focal/main amd64 net-tools amd64 1.60+git20180626.aebd88e-1ubuntu1 [196 kB]
Fetched 196 kB in 2s (88.2 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package net-tools.
(Reading database ... 4671 files and directories currently installed.)
Preparing to unpack ../net-tools_1.60+git20180626.aebd88e-1ubuntu1_amd64.deb ...
Unpacking net-tools (1.60+git20180626.aebd88e-1ubuntu1) ...
Setting up net-tools (1.60+git20180626.aebd88e-1ubuntu1) ...
root@71a945c6feb2:/#
```

```
root@71a945c6feb2:/# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.17.0.2 netmask 255.255.0.0 broadcast 172.17.255.255
    ether 02:42:ac:11:00:02 txqueuelen 0 (Ethernet)
    RX packets 1069809 bytes 1551363914 (1.5 GB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 402071 bytes 21735754 (21.7 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@71a945c6feb2:/#
```


2. ifconfig with interface (eth0) command only shows specific interface details like IP Address, MAC Address, etc. with -a option will display all available interface details if it is disabled also.

```
root@71a945c6feb2:/# ifconfig eth0
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.17.0.2 netmask 255.255.0.0 broadcast 172.17.255.255
    ether 02:42:ac:11:00:02 txqueuelen 0 (Ethernet)
    RX packets 1135970 bytes 1647223228 (1.6 GB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 430322 bytes 23261224 (23.2 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@71a945c6feb2:/#
```

3. Install iproute2

```
root@71a945c6feb2:/# apt install iproute2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libatm1 libbsd0 libcap2 libcap2-bin libelf1 libmnl0 libpam-cap libxtables12
Suggested packages:
  iproute2-doc
The following NEW packages will be installed:
  iproute2 libatm1 libbsd0 libcap2 libcap2-bin libelf1 libmnl0 libpam-cap libxtables12
0 upgraded, 9 newly installed, 0 to remove and 9 not upgraded.
Need to get 1060 kB of archives.
After this operation, 3679 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu focal/main amd64 libbsd0 amd64 0.10.0-1 [45.4 kB]
Get:2 http://archive.ubuntu.com/ubuntu focal/main amd64 libcap2 amd64 1:2.32-1 [15.9 kB]
```

4. To display a list of all network interfaces and the associated ip address type the following command:

```
root@71a945c6feb2:/# ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
2: tunl0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/ipip 0.0.0.0 brd 0.0.0.0
3: sit0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/sit 0.0.0.0 brd 0.0.0.0
44: eth0@if45: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:11:00:02 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.17.0.2/16 brd 172.17.255.255 scope global eth0
        valid_lft forever preferred_lft forever
root@71a945c6feb2:/#
```

References:

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