



<b>Subject:</b>	<b>Unix Lab(SE ITL402)</b>		
<b>Class:</b>	<b>SE IT / Semester – IV (CBCGS) / Academic year: 2017-18</b>		
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<b>Roll No:</b>	<b>28</b>	<b>Date of performance (DOP) :</b>	
<b>Assignment/Experiment No:</b>	<b>03</b>	<b>Date of checking (DOC) :</b>	
<b>Title: To implement UNIX Networking and File System commands</b>			
<b>Marks:</b>		<b>Teacher's Signature:</b>	

**1. Aim:** To study UNIX networking and file system commands.

**2. Prerequisites:**

C Programming Language and Operating System

**3. Hardware Requirements:**

- PC with minimum 2GB RAM

**4. Software Requirements:**

- Fedora installed.

**5. Learning Objectives:**

To learn network UNIX command.

**6.Course Objectives Applicable: LO1,LO2,LO5,LO6**

**7. Program Outcomes Applicable: PO2,PO3,PO4**

**8. Program Education Objectives Applicable: PEO2,PEO3,PEO4**

## 9. Theory:

### 1. Hostname

Description: It is a label assigned to a device connected to a computernetwork & is used to identify the device in various forms.

Syntax: hostname :displays machine host name.  
hostname -f :displays fully qualified host and domain name.  
hostname -i :displays ip address of current machine.

Output:

```
[students@localhost ~]$ hostname
localhost.localdomain
[students@localhost ~]$ hostname -f
localhost
[students@localhost ~]$ hostname -i
::1 127.0.0.1
```

### 2. Ping

Description: It is a basic internet program that allows a user to verify that a particular ip address exists & can accept requests. If you do ping www.google.com it will display its ip address. Use ctrl+c to stop.

Syntax: ping website \_address

Output:

```
[students@localhost ~]$ ping www.google.com
PING www.google.com (216.58.196.68) 56(84) bytes of data.
64 bytes from bom05s11-in-f4.1e100.net (216.58.196.68): icmp_seq=1 ttl=57 time=306 ms
64 bytes from bom05s11-in-f4.1e100.net (216.58.196.68): icmp_seq=2 ttl=57 time=273 ms
64 bytes from bom05s11-in-f4.1e100.net (216.58.196.68): icmp_seq=3 ttl=57 time=272 ms
64 bytes from bom05s11-in-f4.1e100.net (216.58.196.68): icmp_seq=4 ttl=57 time=348 ms
64 bytes from bom05s11-in-f4.1e100.net (216.58.196.68): icmp_seq=5 ttl=57 time=321 ms
64 bytes from bom05s11-in-f4.1e100.net (216.58.196.68): icmp_seq=6 ttl=57 time=275 ms
^C
--- www.google.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5000ms
rtt min/avg/max/mdev = 272.144/299.513/348.880/28.769 ms
```

### 3. Netstat

Description: Most useful and very versatile tool for finding connection to and from the host.

Syntax: netstat  
netstat -a :Displays all the connections.  
netstat -l :Lists only listening ports.  
netstat -g :Display all multicast network subscribed by host.

Output:

```
[students@localhost ~]$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost.localdo:60116 mirror.math.Prince:http ESTABLISHED
tcp        0      80 localhost.localdo:59910 proxy01.fedoraproj:http ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node  Path
unix    2      [ ]         DGRAM                    23883    /run/user/1000/systemd/notify
unix    3      [ ]         DGRAM                    1359     /run/systemd/notify
unix   20      [ ]         DGRAM                    10335    /run/systemd/journal/dev-log
unix    7      [ ]         DGRAM                    1377     /run/systemd/journal/socket
unix    2      [ ]         DGRAM                    21861    /run/user/42/systemd/notify
unix    3      [ ]         STREAM      CONNECTED    27870
unix    3      [ ]         STREAM      CONNECTED    27440
unix    2      [ ]         DGRAM                    25970
unix    3      [ ]         STREAM      CONNECTED    23136    @/tmp/dbus-S8yRJ7wN
unix    3      [ ]         STREAM      CONNECTED    24430    /run/user/1000/bus
unix    2      [ ]         DGRAM                    23540
unix    3      [ ]         STREAM      CONNECTED    23054
unix    3      [ ]         STREAM      CONNECTED    20258    /run/systemd/journal/stdout
unix    3      [ ]         STREAM      CONNECTED    25164    /run/user/1000/bus
unix    3      [ ]         STREAM      CONNECTED    26242    /run/user/1000/bus
unix    3      [ ]         STREAM      CONNECTED    18251
unix    3      [ ]         STREAM      CONNECTED    29486    /run/systemd/journal/stdout
unix    3      [ ]         STREAM      CONNECTED    29830    /run/user/1000/bus
unix    3      [ ]         STREAM      CONNECTED    27962
unix    2      [ ]         DGRAM                    17333
unix    3      [ ]         STREAM      CONNECTED    24354    /run/user/1000/pulse/native
```

```
[students@localhost ~]$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:ipp            0.0.0.0:*               LISTEN
tcp6       0      0 [::]:mysql               [::]:*                  LISTEN
tcp6       0      0 [::]:ftp                  [::]:*                  LISTEN
tcp6       0      0 localhost:ipp            [::]:*                  LISTEN
udp        0      0 0.0.0.0:35391            0.0.0.0:*               *
udp        0      0 0.0.0.0:mdns              0.0.0.0:*               *
udp6       0      0 [::]:37448                [::]:*                  *
udp6       0      0 [::]:mdns                  [::]:*                  *
raw        4608    0 0.0.0.0:icmp              0.0.0.0:*               7
raw       4608    0 0.0.0.0:icmp              0.0.0.0:*               7
raw6      2304    0 [::]:ipv6-icmp            [::]:*                  7
raw6      2304    0 [::]:ipv6-icmp            [::]:*                  7
raw6       0      0 [::]:ipv6-icmp            [::]:*                  7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type       State         I-Node  Path
unix    2      [ ACC ]     STREAM     LISTENING    24240    @/tmp/.ICE-unix/1521
unix    2      [ ACC ]     STREAM     LISTENING    21896    /var/lib/mysql/mysql.sock
unix    2      [ ACC ]     STREAM     LISTENING    26650    @/tmp/dbus-08BvfEr7
unix    2      [ ACC ]     STREAM     LISTENING    20245    /tmp/.X11-unix/X1024
unix    2      [ ACC ]     STREAM     LISTENING    25111    /run/user/1000/keyring/pkcs11
unix    2      [ ACC ]     STREAM     LISTENING    25113    /run/user/1000/keyring/ssh
unix    2      [ ACC ]     STREAM     LISTENING    24349    /tmp/.esd-1000/socket
unix    2      [ ACC ]     STREAM     LISTENING    20253    /run/user/42/wayland-0
unix    2      [ ACC ]     STREAM     LISTENING    20221    @/tmp/.ICE-unix/1254
unix    2      [ ACC ]     STREAM     LISTENING    24352    /run/user/1000/pulse/native
unix    2      [ ACC ]     STREAM     LISTENING    26051    @/tmp/.X11-unix/X0
unix    2      [ ACC ]     STREAM     LISTENING    26983    @/tmp/dbus-T5qJQgUS
unix    2      [ ACC ]     STREAM     LISTENING    18473    /var/run/mcelog-client
unix    2      [ ACC ]     STREAM     LISTENING    17725    /run/dbus/system_bus_socket
unix    2      [ ACC ]     STREAM     LISTENING    17728    /var/run/libvirt/virtlogd-sock
unix    2      [ ACC ]     STREAM     LISTENING    17732    /var/run/libvirt/virtlockd-sock
unix    2      [ ACC ]     STREAM     LISTENING    17734    /var/run/cups/cups.sock
unix    2      [ ACC ]     STREAM     LISTENING    18247    /run/gssproxy.sock
unix    2      [ ACC ]     STREAM     LISTENING    21000    @/tmp/dbus-M3ylMrdd
unix    2      [ ACC ]     STREAM     LISTENING    17736    /var/run/pcscd/pcscd.comm
unix    2      [ ACC ]     STREAM     LISTENING    17731    @ISCSID_UID_ABSTRACT_NAMESPACE
unix    2      [ ]         DGRAM                    23883    /run/user/1000/systemd/notify
```

```
[students@localhost ~]$ netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp6       0      0 [::]:mysql              [::]:*                  LISTEN
tcp6       0      0 [::]:ftp                 [::]:*                  LISTEN
tcp6       0      0 localhost:ipp           [::]:*                  LISTEN
udp        0      0 0.0.0.0:35391           0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:mdns            0.0.0.0:*               LISTEN
udp6       0      0 [::]:37448              [::]:*                  LISTEN
udp6       0      0 [::]:mdns                [::]:*                  LISTEN
raw        4608    0 0.0.0.0:icmp            0.0.0.0:*               7
raw        4608    0 0.0.0.0:icmp            0.0.0.0:*               7
raw6       2304    0 [::]:ipv6-icmp          [::]:*                  7
raw6       2304    0 [::]:ipv6-icmp          [::]:*                  7
raw6       0      0 [::]:ipv6-icmp          [::]:*                  7

Active UNIX domain sockets (only servers)
Proto RefCnt Flags   Type       State       I-Node    Path
unix   2      [ ACC ] STREAM    LISTENING   24240     @/tmp/.ICE-unix/1521
unix   2      [ ACC ] STREAM    LISTENING   21896     /var/lib/mysql/mysql.sock
unix   2      [ ACC ] STREAM    LISTENING   26650     @/tmp/dbus-08BvfEr7
unix   2      [ ACC ] STREAM    LISTENING   20245     /tmp/.X11-unix/X1024
unix   2      [ ACC ] STREAM    LISTENING   25111     /run/user/1000/keyring/pkcs11
unix   2      [ ACC ] STREAM    LISTENING   25113     /run/user/1000/keyring/ssh
unix   2      [ ACC ] STREAM    LISTENING   24349     /tmp/.esd-1000/socket
unix   2      [ ACC ] STREAM    LISTENING   20253     /run/user/42/wayland-0
unix   2      [ ACC ] STREAM    LISTENING   20221     @/tmp/.ICE-unix/1254
unix   2      [ ACC ] STREAM    LISTENING   24352     /run/user/1000/pulse/native
unix   2      [ ACC ] STREAM    LISTENING   26051     @/tmp/.X11-unix/X0
unix   2      [ ACC ] STREAM    LISTENING   26983     @/tmp/dbus-T5qJQgUS
unix   2      [ ACC ] STREAM    LISTENING   18473     /var/run/mcelog-client
unix   2      [ ACC ] STREAM    LISTENING   17725     /run/dbus/system_bus_socket
unix   2      [ ACC ] STREAM    LISTENING   17728     /var/run/libvirt/virtlogd-sock
unix   2      [ ACC ] STREAM    LISTENING   17732     /var/run/libvirt/virtlockd-sock
unix   2      [ ACC ] STREAM    LISTENING   17734     /var/run/cups/cups.sock
unix   2      [ ACC ] STREAM    LISTENING   18247     /run/gssproxy.sock
unix   2      [ ACC ] STREAM    LISTENING   21000     @/tmp/dbus-M3ylMrrd
unix   2      [ ACC ] STREAM    LISTENING   17736     /var/run/pcscd/pcscd.comm
```

```
[students@localhost ~]$ netstat -g
IPv6/IPv4 Group Memberships
Interface      RefCnt Group
-----
lo              1      all-systems.mcast.net
enp3s0          1      224.0.0.251
enp3s0          1      all-systems.mcast.net
lo              1      ff02::1
lo              1      ff01::1
enp3s0          1      ff02::fb
enp3s0          1      ff02::1:ff7e:7e85
enp3s0          1      ff02::1
enp3s0          1      ff01::1
[students@localhost ~]$ nslookup www.google.com
```

#### 4.Name Server Lookup

Description:It is useful tool for finding information about a named domain.

Syntax:           nslookup website\_address   :Displays name & address.  
                   nslookup ip\_address       :Displays address & name.

OUTPUT:

```
[students@localhost ~]$ nslookup www.google.com
Server:      8.8.4.4
Address:     8.8.4.4#53

Non-authoritative answer:
Name:   www.google.com
Address: 216.58.196.68
```

```
[students@localhost ~]$ nslookup 8.8.4.4
Server:      8.8.8.8
Address:     8.8.8.8#53

Non-authoritative answer:
4.4.8.8.in-addr.arpa    name = google-public-dns-b.google.com.

Authoritative answers can be found from:
```

## 5. Trace Route

Description: Trace the route the packets take between your system & the host named. A hand utility to view no of hops & response time to get a remote system or website is traceroute, you need an internet connection to make use of this tool.

Syntax: traceroute website :Displays the all possible roots.

Output:

```
[students@localhost ~]$ traceroute www.google.com
traceroute to www.google.com (216.58.203.196), 30 hops max, 60 byte packets
 1  103.76.103.185 (103.76.103.185)  305.812 ms  305.238 ms  305.987 ms
 2  45.119.30.81 (45.119.30.81)  306.508 ms  306.884 ms  307.170 ms
 3  10.2.2.21 (10.2.2.21)  314.127 ms  314.262 ms  314.664 ms
 4  103.76.100.10 (103.76.100.10)  315.699 ms  315.204 ms  315.911 ms
 5  * 108.170.248.193 (108.170.248.193)  316.268 ms  108.170.248.209 (108.170.248.209)  316.388 ms
 6  209.85.246.5 (209.85.246.5)  316.768 ms  253.884 ms  263.927 ms
 7  bom07s12-in-f4.1e100.net (216.58.203.196)  304.745 ms  306.100 ms  304.296 ms
```

## 6.Trace Path

Description: It shows the shortest path for reaching to that website.

Syntax: tracepath website

OUTPUT:

```
[students@localhost ~]$ tracepath www.google.com
1?: [LOCALHOST]                                pmtu 1500
1:  gateway                                    103.724ms pmtu 1404
1:  103.76.103.185                             247.349ms
2:  45.119.30.81                               267.855ms
3:  10.2.2.21                                  348.812ms
4:  no reply
```



## 7. Interface configuration

Description: ifconfig is a system administration utility in UNIX like OS for network interface configuration. It displays current network configuration information.

Syntax: ifconfig

Output:

```
[students@localhost ~]$ ifconfig
enp3s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.16.5.132 netmask 255.255.0.0 broadcast 172.16.255.255
    inet6 fe80::b0ac:5883:917e:7e85 prefixlen 64 scopeid 0x20<link>
    ether dc:fe:07:50:b8:92 txqueuelen 1000 (Ethernet)
    RX packets 92200 bytes 30768469 (29.3 MiB)
    RX errors 0 dropped 3155 overruns 0 frame 0
    TX packets 11106 bytes 833202 (813.6 KiB)
    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
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1 (Local Loopback)
    RX packets 21 bytes 2113 (2.0 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 21 bytes 2113 (2.0 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

## 8. Findsmb

Description: It is used to list information about machines that respond to SMB name queries.

e.g: Windows based machines sharing their hard disks.

Syntax: findsmb

Output:

```
[students@localhost ~]$ findsmb

                                     *=DMB
                                     +=LMB
IP ADDR          NETBIOS NAME      WORKGROUP/OS/VERSION
-----
```

## 11. Learning Outcomes Achieved

Learned general UNIX networking and file system commands.

## 12. Conclusion:

Thus we have studied general UNIX networking and file system commands.

### 13. Experiment/Assignment Evaluation

SR	Parameters	Weight	Excellent	Good	Average	Poor	Not as per requirement
		Scale Factor ->	5	4	3	2	0
1	Technical Understanding	25					
2	Performance / Execution	25					
3	Question Answers	20					
4	Punctuality	20					
5	Presentation	10					
	Total out of 100 --> #(to be converted as per term-work evaluation applicable to the subject)		$\Sigma (\text{Weight} * \text{Scale Factor})/5 = \underline{\hspace{2cm}}$				

### References:

- [1] Unix, concepts and applications by Sumitabha Das, McGraw-Hill
- [2] Mastering Shell Scripting, Randal. K. Michael, Second Edition, Wiley Publication

### Viva Questions

- What are UNIX networking and file system commands?