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Assignment No	2

Assignment Number - 02

Title : Study of Linux and Windows Network commands

Problem Statement Studying Linux and Windows network commands. [ping, pathping, ipconfig/ifconfig, arp, netstat, nbtstat, nslookup, route, traceroute/tracert, nmap, etc]

Try to execute following commands on linux terminal or Windows command prompt.

- ipconfig / ifconfig
- ping
- Tracert/Traceroute/Tracepath
- NSlookup
- Netstat
- Hostname
- Port Scan / nmap
- Arp Route
- Whois
- Write description of each command and take snapshot of execution of command through terminal / command prompt and add after command description.

Theory :**1) ipconfig / ifconfig**

Displays information about network interfaces, IP addresses, subnet masks, and default gateways.

```

arun@kali: ~
File Actions Edit View Help

(arun@kali)-[~]
$ ifconfig
eth0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 08:8f:c3:73:46:ad txqueuelen 1000 (Ethernet)
    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

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 4 bytes 240 (240.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 4 bytes 240 (240.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.181.88 netmask 255.255.255.0 broadcast 192.168.181.255
    inet6 2401:4900:560e:9491:f899:cbef:f0c4:db8f prefixlen 64 scopeid 0<global>
    inet6 fe80::84e:936b:1d37:4bc6 prefixlen 64 scopeid 0<link>
    ether b0:3c:dc:e4:14:98 txqueuelen 1000 (Ethernet)
    RX packets 29 bytes 3616 (3.5 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 50 bytes 9719 (9.4 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
  
```

2) ping

Checks network connectivity to a remote host by sending ICMP echo requests.

```

(arun@kali)-[~]
$ ping google.com
PING google.com (2404:6800:4007:82d::200e) 56 data bytes
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=1 ttl=115 time=71.4 ms
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=2 ttl=115 time=92.0 ms
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=3 ttl=115 time=90.7 ms
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=4 ttl=115 time=88.7 ms
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=5 ttl=115 time=87.6 ms
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=6 ttl=115 time=94.2 ms
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=7 ttl=115 time=167 ms
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=8 ttl=115 time=85.1 ms
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=9 ttl=115 time=213 ms
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=10 ttl=115 time=85.5 ms
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=11 ttl=115 time=82.1 ms
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=12 ttl=115 time=177 ms
64 bytes from maa05s28-in-x0e.1e100.net (2404:6800:4007:82d::200e): icmp_seq=13 ttl=115 time=199 ms
^C
  — google.com ping statistics —
  13 packets transmitted, 13 received, 0% packet loss, time 12017ms
  rtt min/avg/max/mdev = 71.407/118.049/213.169/48.848 ms

(arun@kali)-[~]
$
  
```

3) Tracert/Traceroute/Tracepath

Traces the route packets take to reach a destination, showing hops along the way.

```
(arun@kali)~$ sudo traceroute google.com
traceroute to google.com (142.251.42.78), 30 hops max, 60 byte packets
 1 192.168.181.170 (192.168.181.170) 10.101 ms 10.079 ms 10.073 ms
 2 100.64.0.100 (100.64.0.100) 206.769 ms 206.763 ms 206.733 ms
 3 192.168.28.157 (192.168.28.157) 207.044 ms 192.168.28.153 (192.168.28.153) 207.020 ms 207.013 ms
 4 192.168.31.18 (192.168.31.18) 207.027 ms 207.020 ms 207.014 ms
 5 192.168.31.33 (192.168.31.33) 207.008 ms 207.001 ms 206.982 ms
 6 10.188.79.99 (10.188.79.99) 206.654 ms 25.733 ms 10.188.79.90 (10.188.79.90) 25.657 ms
 7 nsg-corporate-74.218.187.122.airtel.in (122.187.218.74) 25.636 ms 25.118 ms 28.078 ms
 8 nsg-corporate-73.218.187.122.airtel.in (122.187.218.73) 79.533 ms nsg-corporate-77.218.187.122.airtel.in (122.187.218.77) 38.216 ms nsg-corporate-73.218.187.122.airtel.in (122.187.218.73) 79.520 ms
 9 182.79.239.147 (182.79.239.147) 38.313 ms 116.119.121.112 (116.119.121.112) 111.976 ms 182.79.177.107 (182.79.177.107) 48.324 ms
10 72.14.213.254 (72.14.213.254) 38.667 ms 38.661 ms 38.651 ms
11 * * *
12 142.250.214.100 (142.250.214.100) 32.693 ms 142.251.64.12 (142.251.64.12) 26.341 ms 192.178.86.248 (192.178.86.248) 37.197 ms
13 192.178.110.248 (192.178.110.248) 37.805 ms 142.250.208.226 (142.250.208.226) 37.046 ms 142.251.69.103 (142.251.69.103) 38.284 ms
14 192.178.110.207 (192.178.110.207) 43.079 ms bom12521-in-f14.1e100.net (142.251.42.78) 36.503 ms 192.178.110.109 (192.178.110.109) 37.026 ms
```



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4) NSlookup

Queries DNS servers to find information about domain names or IP addresses.

```
(arun@kali)-[~]
$ nslookup google.com
Server:      192.168.181.170
Address:     192.168.181.170#53

Non-authoritative answer:
Name:   google.com
Address: 142.251.42.78
Name:   google.com
Address: 2404:6800:4007:82d::200e
```

5) Netstat

Displays network connections, listening ports, routing tables, interface statistics, and more.

```
File Actions Edit View Help
(arun@kali)-[~]
$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 192.168.181.88:47236    47.164.160.34:https     ESTABLISHED
tcp        0      0 192.168.181.88:43508    207-182-151-170:https   ESTABLISHED
tcp        0      0 192.168.181.88:60438    ec2-13-127-247-21:https SYN_SENT
tcp        0      0 192.168.181.88:43494    207-182-151-170:https   ESTABLISHED
tcp        0      0 192.168.181.88:56104    148.72.104.12:40443     ESTABLISHED
tcp        0      0 192.168.181.88:51958    ec2-44-262-72-120:https ESTABLISHED
tcp        0      0 192.168.181.88:56114    148-72-104-12:40443     ESTABLISHED
tcp        0      0 192.168.181.88:47252    ec2-34-216-46-211:https ESTABLISHED
tcp        0      0 192.168.181.88:60430    ec2-13-127-247-21:https SYN_SENT
tcp6       0      0 :::13716                :::*                     LISTEN
tcp6       0      0 2401:4980:560e:94:57850 sd-in-f86-1e100.n:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:35428 2a04:4e42::649:https    ESTABLISHED
tcp6       0      0 2401:4980:560e:94:58036 bom12a01-in-x03.1:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:18332 2a04:4e42::600:6a:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:56978 bom07532-in-x01.1:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:57828 bom12513-in-x04.1:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:59288 2600:9000:264c:ba:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:57824 sd-in-f86-1e100.n:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:55188 maa03a43-in-x04.1:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:60098 2600:9000:264c:fa:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:44628 bom12a01-in-x03.1:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:51236 2600:9000:21fe:d0:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:41666 bom12515-in-x03.1:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:56078 2600:9000:264c:b0:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:16854 2600:9000:8002:::https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:34708 maa03a47-in-x0e.1:https TIME_WAIT
tcp6       0      0 2401:4980:560e:94:57810 sd-in-f86-1e100.n:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:37834 sc-in-f106-1e100.n:5220 ESTABLISHED
tcp6       0      0 2401:4980:560e:94:41002 bom07511-in-x04.1:https ESTABLISHED
tcp6       0      0 2401:4980:560e:94:48310 maa03a28-in-x0e.1:https ESTABLISHED
udp        0      0 2401:4980:560e:94:20254 2600:9000:2650:d4:https ESTABLISHED
udp        0      0 mdns.mcast.net:mdns    0.0.0.0:*
udp6       0      0 192.168.181.88:bootpc   192.168.181.170:bootps ESTABLISHED
udp6       0      0 :::13716                :::*
raw6       0      0 :::13716-icmp           :::*
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type       State       I-Node   Path
unix 3      [ ]         STREAM    CONNECTED  11392
unix 3      [ ]         STREAM    CONNECTED  19354
unix 3      [ ]         STREAM    CONNECTED  16783  /run/dbus/system_bus_socket
unix 2      [ ]         STREAM    CONNECTED  2609   /run/user/1000/at-spi-bus_0
unix 3      [ ]         STREAM    CONNECTED  19025  /run/dbus/system_bus_socket
unix 3      [ ]         STREAM    CONNECTED  2783
unix 3      [ ]         STREAM    CONNECTED  542    @/tmp/.X11-unix/X0
unix 3      [ ]         STREAM    CONNECTED  14708  /run/dbus/system_bus_socket
unix 3      [ ]         STREAM    CONNECTED  18603  @/tmp/.ICE-unix/1165
unix 3      [ ]         STREAM    CONNECTED  18962
unix 3      [ ]         STREAM    CONNECTED  16744  @/tmp/.ICE-unix/1165
unix 3      [ ]         DGRAM     CONNECTED  17871
unix 3      [ ]         STREAM    CONNECTED  12725
unix 3      [ ]         STREAM    CONNECTED  19026  /run/user/1000/at-spi-bus_0
unix 3      [ ]         STREAM    CONNECTED  10581
unix 3      [ ]         STREAM    CONNECTED  17083
unix 3      [ ]         STREAM    CONNECTED  9861   /run/user/1000/bus
```

6) Hostname

Displays the current hostname of the system.

```
(arun@kali)-[~]  
$ hostname -a  
arun@kali: ~  
(arun@kali)-[~]  
$ hostname -A  
arun@kali: ~  
(arun@kali)-[~]  
$
```

hostname command in Linux with ex



7) Port Scan / nmap

Scans a network or host for open ports.

```
(arun@kali)-[~]
$ nmap google.com
Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-07-30 19:51 IST
Nmap scan report for google.com (142.250.183.78)
Host is up (0.13s latency).
Other addresses for google.com (not scanned): 2404:6800:4009:822::200e
rDNS record for 142.250.183.78: bom12s12-in-f14.1e100.net
Not shown: 998 filtered tcp ports (no-response)
PORT      STATE SERVICE
80/tcp    open  http
443/tcp   open  https

Nmap done: 1 IP address (1 host up) scanned in 14.42 seconds

(arun@kali)-[~]
$
```

8) Arp Route

Displays the ARP cache, which maps IP addresses to physical addresses (MAC addresses).

```
(arun@kali)-[~]
$ arp -n
Address                  HWtype  HWaddress           Flags Mask            Iface
192.168.181.170          ether    9e:d5:5f:9f:29:68    C                     wlan0
```

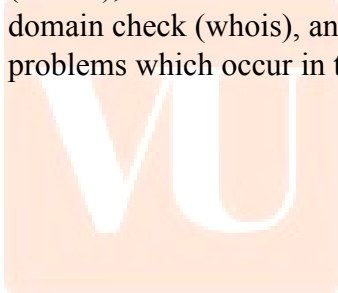
9) Whois

Looks up information about a domain name or IP address.

```
arun@kali: ~  
$ whois google.com  
Domain Name: GOOGLE.COM  
Registry Domain ID: 2151814_DOMAIN_COM-VRSN  
Registrar WHOIS Server: whois.markmonitor.com  
Registrar URL: http://www.markmonitor.com  
Updated Date: 2019-09-09T15:39:04Z  
Creation Date: 1997-09-15T04:00:00Z  
Registry Expiry Date: 2028-09-14T04:00:00Z  
Registrar: MarkMonitor Inc.  
Registrar IANA ID: 292  
Registrar Abuse Contact Email: abusecomplaints@markmonitor.com  
Registrar Abuse Contact Phone: +1.2086851758  
Domain Status: clientDeleteProhibited https://icann.org/epp#clientDeleteProhibited  
Domain Status: clientTransferProhibited https://icann.org/epp#clientTransferProhibited  
Domain Status: clientUpdateProhibited https://icann.org/epp#clientUpdateProhibited  
Domain Status: serverDeleteProhibited https://icann.org/epp#serverDeleteProhibited  
Domain Status: serverTransferProhibited https://icann.org/epp#serverTransferProhibited  
Domain Status: serverUpdateProhibited https://icann.org/epp#serverUpdateProhibited  
Name Server: NS1.GOOGLE.COM  
Name Server: NS2.GOOGLE.COM  
Name Server: NS3.GOOGLE.COM  
Name Server: NS4.GOOGLE.COM  
DNSSEC: unsigned  
URL of the ICANN Whois Inaccuracy Complaint Form: https://www.icann.org/wicf/  
>>> Last update of whois database: 2024-07-30T14:27:27Z <<<  
  
For more information on Whois status codes, please visit https://icann.org/epp  
  
NOTICE: The expiration date displayed in this record is the date the  
registrar's sponsorship of the domain name registration in the registry is  
currently set to expire. This date does not necessarily reflect the expiration  
date of the domain name registrant's agreement with the sponsoring  
registrar. Users may consult the sponsoring registrar's Whois database to  
view the registrar's reported date of expiration for this registration.  
  
TERMS OF USE: You are not authorized to access or query our Whois  
database through the use of electronic processes that are high-volume and  
automated except as reasonably necessary to register domain names or  
modify existing registrations; the Data in VeriSign Global Registry  
Services' ("VeriSign") Whois database is provided by VeriSign for  
information purposes only, and to assist persons in obtaining information  
about or related to a domain name registration record. VeriSign does not  
guarantee its accuracy. By submitting a Whois query, you agree to abide  
by the following terms of use: You agree that you may use this data only  
for lawful purposes and that under no circumstances will you use this data  
to: (1) allow, enable, or otherwise support the transmission of mass  
unsolicited, commercial advertising or solicitations via e-mail, telephone,  
or facsimile; or (2) enable high volume, automated, electronic processes  
that apply to VeriSign (or its computer systems). The compilation,  
repackaging, dissemination or other use of this Data is expressly  
prohibited without the prior written consent of VeriSign. You agree not to  
use electronic processes that are automated and high-volume to access or  
query the Whois database except as reasonably necessary to register  
domain names or modify existing registrations. VeriSign reserves the right  
to restrict your access to the Whois database in its sole discretion to ensure  
operational stability. VeriSign may restrict or terminate your access to the  
Whois database for failure to abide by these terms of use. VeriSign  
reserves the right to modify these terms at any time.  
  
The Registry database contains ONLY .COM, .NET, .EDU domains and
```

```
arun@kali: ~  
$ whois google.com  
Registrant Organization: Google LLC  
Registrant State/Province: CA  
Registrant Country: US  
Registrant Email: Select Request Email Form at https://domains.markmonitor.com/whois/google.com  
Admin Organization: Google LLC  
Admin State/Province: CA  
Admin Country: US  
Admin Email: Select Request Email Form at https://domains.markmonitor.com/whois/google.com  
Tech Organization: Google LLC  
Tech State/Province: CA  
Tech Country: US  
Tech Email: Select Request Email Form at https://domains.markmonitor.com/whois/google.com  
Name Server: ns2.google.com  
Name Server: ns4.google.com  
Name Server: ns1.google.com  
Name Server: ns3.google.com  
DNSSEC: unsigned  
URL of the ICANN WHOIS Data Problem Reporting System: http://wdprs.internic.net/  
>>> Last update of WHOIS database: 2024-07-30T14:23:55+0000 <<<  
  
For more information on WHOIS status codes, please visit:  
https://www.icann.org/resources/pages/epp-status-codes  
  
If you wish to contact this domain's Registrant, Administrative, or Technical  
contact, and such email address is not visible above, you may do so via our web  
form, pursuant to ICANN's Temporary Specification. To verify that you are not a  
robot, please enter your email address to receive a link to a page that  
facilitates email communication with the relevant contact(s).  
  
Web-based WHOIS:  
https://domains.markmonitor.com/whois  
  
If you have a legitimate interest in viewing the non-public WHOIS details, send  
your request and the reasons for your request to whoisrequest@markmonitor.com  
and specify the domain name in the subject line. We will review that request and  
may ask for supporting documentation and explanation. (Example: I am the former owner of  
the data in MarkMonitor's WHOIS database is provided for information purposes,  
and to assist persons in obtaining information about or related to a domain  
name's registration record. While MarkMonitor believes the data to be accurate,  
the data is provided "as is" with no guarantee or warranties regarding its  
accuracy.  
  
By submitting a WHOIS query, you agree that you will use this data only for  
lawful purposes and that, under no circumstances will you use this data to:  
(1) allow, enable, or otherwise support the transmission by email, telephone,  
or facsimile of mass, unsolicited, commercial advertising, or spam; or  
(2) enable high volume, automated, or electronic processes that send queries,  
data, or email to MarkMonitor (or its systems) or the domain name contacts (or  
its systems).  
  
MarkMonitor reserves the right to modify these terms at any time.  
  
By submitting this query, you agree to abide by this policy.  
  
MarkMonitor Domain Management(TM)  
Protecting companies and consumers in a digital world.  
  
Visit MarkMonitor at https://www.markmonitor.com  
Contact us at +1.800.759.2229  
In Europe, at +44.2083300220
```


Conclusion : In this assignment I learned about various critical utility commands over a network that became handy for diagnosis and management of network connections. These commands display information about network configuration (ipconfig/ifconfig), connectivity to a host (ping), path trace to a destination (tracert/traceroute), DNS querying (nslookup), information about the state of the network (netstat), resolution of addresses (arp), routing information (route), scanning over a network (nmap), domain check (whois), and the source name (hostname). All these commands help one diagnose the problems which occur in the network and therefore manage the network settings more effectively.



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