

WEEK-1 ASSIGNMENT

BASIC NETWORKING COMMANDS

1. arp -a

Description: Displays the Address Resolution Protocol table, which maps IP addresses to MAC Addresses. It's crucial for local network communication and troubleshooting connectivity issues. Helps identify devices involved in IP conflicts.

Output:

```
C:\Users\shrut> arp -a  
Interface: 192.168.29.205 --- 0x8
```

Internet Address	Physical Address	Type
192.168.29.1	f0-ed-b8-68-b0-69	dynamic
192.168.29.255	ff-ff-ff-ff-ff-ff	static
224.0.0.22	01-00-5e-00-00-16	static
224.0.0.251	01-00-5e-00-00-fb	static
224.0.0.252	01-00-5e-00-00-fc	static
239.255.255.250	01-00-5e-7f-ff-fa	static
255.255.255.255	ff-ff-ff-ff-ff-ff	static

2. hostname

Description: The command returns the computer's hostname, which is crucial for troubleshooting in networked environments, especially in larger organizations. Helps identify the computer's name on a network.

Output:

```
C:\Users\shrut> hostname  
WIN-SHRU
```

3. ipconfig

Description: Displays basic information about the TCP/IP configuration of your computer.

Output:

```
C:\Users\shrut> ipconfig  
Wireless LAN adapter Wi-Fi:  
    Connection-specific DNS Suffix . :  
    IPv6 Address.....: 2405:201:801b:1867:dda6:f9f1:8aa8:a812  
    Temporary IPv6 Address.....: 2405:201:801b:1867:  
    dc35:6cb0:601f:4d4f  
    Link-local IPv6 Address.....: fe80::57bc:196:bd3a:d0f5%8  
    IPv4 Address.....: 192.168.29.205  
    Subnet Mask .....: 255.255.255.0  
    Default Gateway.....: fe80::f2ed:b8ff:fe68:b069%8 192.168.29.1
```

4. ipconfig /all

Description: Displays detailed TCP/IP configurations, including the information about the DHCP server, DNS, gateway and adapters.

Output:

C:\Users\shrut> ipconfig /all

Windows IP Configuration

Host Name : WIN-SHRU
Primary Dns Suffix :
Node Type : Mixed
IP Routing Enabled. : No
WINS Proxy Enabled. : No

Ethernet adapter Ethernet:

Media State : Media disconnected
Connection-specific DNS Suffix :
Description : Realtek PCIe FE Family Controller
Physical Address. : 98-E7-43-4A-7C-25
DHCP Enabled. : Yes
Autoconfiguration Enabled : Yes

Wireless LAN adapter Local Area Connection* 1:

Media State : Media disconnected
Connection-specific DNS Suffix :
Description : Microsoft Wi-Fi Direct Virtual Adapter
Physical Address. : 4E-EB-BD-AD-FA-A3
DHCP Enabled. : Yes
Autoconfiguration Enabled : Yes

Wireless LAN adapter Local Area Connection* 2:

Media State : Media disconnected
Connection-specific DNS Suffix :
Description : Microsoft Wi-Fi Direct Virtual Adapter #2
Physical Address. : 5E-EB-BD-AD-FA-A3
DHCP Enabled. : Yes
Autoconfiguration Enabled : Yes

Wireless LAN adapter Wi-Fi:

Connection-specific DNS Suffix :
Description : Qualcomm QCA9377 802.11ac Wireless Adapter
Physical Address. : 4C-EB-BD-AD-FA-A3
DHCP Enabled. : Yes
Autoconfiguration Enabled : Yes
IPv6 Address. : 2405:201:801b:1867:dda6:f9f1:8aa8:a812(Preferred)
Temporary IPv6 Address. : 2405:201:801b:1867:dc35:6cb8:601f:4d4f(Preferred)
Link-local IPv6 Address : fe80::57bc:196:bd3a:d0f5%8(Preferred)
IPv4 Address. : 192.168.29.205(Preferred)
Subnet Mask : 255.255.255.0
Lease Obtained. : 01 March 2025 07:47:27
Lease Expires : 02 March 2025 11:51:15
Default Gateway : fe80::f2ed:b8ff:fe68:b069%8
192.168.29.1
DHCP Server : 192.168.29.1
DHCPv6 IAID : 105704381
DHCPv6 Client DUID. : 00-01-00-01-2E-CC-5A-1B-98-E7-43-4A-7C-25
DNS Servers : 2405:201:801b:1867::c0a8:1d01
192.168.29.1

5. ipconfig /renew

Description: Renews the IP address lease from the DHCP servers (useful if you're having connection issues).

Output:

```
C:\Users\shrut> ipconfig /renew  
Windows IP Configuration
```

Ethernet adapter Ethernet Instance 0:

```
Connection-specific DNS Suffix . :  
Link-local IPv6 Address . . . . . : fe80::a6b1:43cf:9495:9d85%9  
IPv4 Address . . . . . : 192.168.122.28  
Subnet Mask . . . . . : 255.255.255.0  
Default Gateway . . . . . : 192.168.122.1
```

6. ipconfig /release

Description: Releases the current DHCP lease, effectively disconnecting from the network.

Output:

```
C:\Users\shrut> ipconfig /release  
Windows IP Configuration
```

Ethernet adapter Ethernet Instance 0:

```
Connection-specific DNS Suffix . :  
Link-local IPv6 Address . . . . . : fe80::a6b1:43cf:9495:9d85%9  
Default Gateway . . . . . :
```

7. ipconfig /flushdns

Description: clears the DNS cache. Use this if one is facing DNS resolution issues (e.g. website not loading correctly).

Output:

C:\Users\shrut> ipconfig /flushdns

8. netdiag

Description: A network diagnostic tool that tests a variety of network functions. It's not installed by default on Windows, but can be manually installed from the Windows XP CD.

Output:

C:\Users\shrut> netdiag

9. netstat

Description: Displays current network connections and active ports on the computer.

Output:

C:\Users\shrut> netstat

Active Connections

Proto	Local Address	Foreign Address	State
TCP	192.168.29.205:51323	202:4070	ESTABLISHED
TCP	192.168.29.205:51773	20.50.73.13:https	ESTABLISHED
TCP	192.168.29.205:51788	20.37.198.118:https	ESTABLISHED
TCP	192.168.29.205:51789	52.182.141.63:https	ESTABLISHED
TCP	[2405:201:801b:1867:dc35:6cb0:601f:4d4f]:50714	[2603:1040:a06:6::2]:https	ESTABLISH
TCP	[2405:201:801b:1867:dc35:6cb0:601f:4d4f]:50734	[2603:1040:a06:6::2]:https	ESTABLISH
TCP	[2405:201:801b:1867:dc35:6cb0:601f:4d4f]:50830	[2603:1040:a06:6::2]:https	ESTABLISH
TCP	[2405:201:801b:1867:dc35:6cb0:601f:4d4f]:50838	sc-in-xbc:5228	ESTABLISHED

10. nslookup

Description: Used to query DNS servers to find the IP address for a domain name.

Output:

```
C:\Users\shrut> nslookup www.google.com
```

Server: reliance.reliance

Address: 2405:201:801b:1867::c0a8:1d01

Non-authoritative answer:

Name: www.google.com

Addresses: 2404:6800:4002:81e::2004

142.250.192.132

11. ping

Description: Sends packet to another computer on the network and waits for reply.

Output:

```
C:\Users\shrut> ping www.google.com
```

Pinging www.google.com [2404:6800:4009:82b::2004] with 32 bytes of data:

Reply from 2404:6800:4009:82b::2004: time=46ms

Reply from 2404:6800:4009:82b::2004: time=46ms

Reply from 2404:6800:4009:82b::2004: time=47ms

Reply from 2404:6800:4009:82b::2004: time=47ms

Ping statistics for 2404:6800:4009:82b::2004:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 46ms, Maximum = 47ms, Average = 46ms

12. route

Description: Displays or modifies the routing table.
Helps in troubleshooting access to other computers.

Output:

C:\Users\shrut> route print

Interface List

15...98 e7 43 4a 7c 25	Realtek PCIe FE Family Controller
12...4e eb bd ad fa a3	Microsoft Wi-Fi Direct Virtual Adapter
3...5e eb bd ad fa a3	Microsoft Wi-Fi Direct Virtual Adapter #2
8...4c eb bd ad fa a3	Qualcomm QCA9377 802.11ac Wireless Adapter
1.....	Software Loopback Interface 1

IPv4 Route Table

Active Routes:

Network Destination	Netmask	Gateway	Interface	Metric
0.0.0.0	0.0.0.0	192.168.29.1	192.168.29.205	35
127.0.0.0	255.0.0.0	On-link	127.0.0.1	331
127.0.0.1	255.255.255.255	On-link	127.0.0.1	331
127.255.255.255	255.255.255.255	On-link	127.0.0.1	331
192.168.29.0	255.255.255.0	On-link	192.168.29.205	291
192.168.29.205	255.255.255.255	On-link	192.168.29.205	291
192.168.29.255	255.255.255.255	On-link	192.168.29.205	291
224.0.0.0	240.0.0.0	On-link	127.0.0.1	331
224.0.0.0	240.0.0.0	On-link	192.168.29.205	291
255.255.255.255	255.255.255.255	On-link	127.0.0.1	331
255.255.255.255	255.255.255.255	On-link	192.168.29.205	291

IPv6 Route Table

Active Routes:

If Metric	Network Destination	Gateway
8 51 ::/0		fe80::f2ed:b8ff:fe68:b069
1 331 ::1/128		On-link
8 51 2405:201:801b:1867::/64		On-link
8 291 2405:201:801b:1867:dc35:6cb0:601f:4d4f/128		On-link
8 291 2405:201:801b:1867:dda6:f9f1:8aa8:a812/128		On-link
8 291 fe80::/64		On-link
8 291 fe80::57bc:196:bd3a:d0f5/128		On-link
1 331 ff00::/8		On-link
8 291 ff00::/8		On-link

Persistent Routes:

None

13. tracert

Description: Traces path of packets to a destination from your computer.

Output:

C:\Users\shrut> tracert www.google.com

Tracing route to www.google.com [2404:6800:4009:811::2004]
over a maximum of 30 hops:

1	2 ms	2 ms	2 ms	2405:201:801b:1867:f2ed:b8ff:fe68:b069
2	*	*	*	Request timed out.
3	8 ms	7 ms	7 ms	2405:200:801:500::71
4	*	*	*	Request timed out.
5	4 ms	6 ms	5 ms	2405:200:816:3168:61::4
6	*	*	*	Request timed out.
7	7 ms	5 ms	6 ms	2405:200:801:500::caa
8	*	*	*	Request timed out.
9	89 ms	7 ms	7 ms	2405:200:100::1:0:59e
10	*	*	*	Request timed out.
11	*	*	*	Request timed out.
12	29 ms	*	30 ms	2404:6800:80a3::1
13	29 ms	28 ms	30 ms	2001:4860:0:1::168c
14	31 ms	31 ms	28 ms	2001:4860:0:1::78c0
15	28 ms	31 ms	37 ms	2001:4860::9:4001:67bd
16	63 ms	49 ms	56 ms	2001:4860::9:4001:7734

14. pathping

Description: A combination of ping and tracert. Traces the route to a destination.

Output:

C:\Users\shrut> pathping www.google.com

Tracing route to www.google.com [2404:6800:4009:811::2004]
over a maximum of 30 hops:

0 WIN-SHRU [2405:201:801b:1867:dc35:6cb0:601f:4d4f]
1 2405:201:801b:1867:f2ed:b8ff:fe68:b069
2 *

Computing statistics for 25 seconds...

Hop	RTT	Source to Here	This Node/Link	Address
0				WIN-SHRU [2405:201:801b:1867:dc35:6cb0:601f:4d4f]

1	3ms	0/ 100 = 0%	0/ 100 = 0%	2405:201:801b:1867:f2ed:b8ff:fe68:b069
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Trace complete. |

5 hops
0.4103ms