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Lab 1: Network Commands & IP Addressing

Checking Physical (MAC) Address

1. What command shows all network details including the physical (MAC) address?
 - ipconfig /all

```
C:\WINDOWS\system32\cmd.exe
C:\Users\smart>ipconfig /all

Windows IP Configuration

Host Name . . . . . : DESKTOP-Q0SF6A9
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : home

Ethernet adapter Ethernet:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : Intel(R) Ethernet Connection I219-LM
Physical Address. . . . . : 28-F1-0E-39-A8-4E
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. . . . . : 48-45-20-08-02-47
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 10:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
Physical Address. . . . . : 4A-45-20-08-02-46
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi:

Connection-specific DNS Suffix . : home
Description . . . . . : Intel(R) Dual Band Wireless-AC 7265
Physical Address. . . . . : 48-45-20-08-02-46
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
IPv6 Address. . . . . : fd9c:69d1:47d2:1000:320a:b4c6:d444:86f6(Preferred)
Temporary IPv6 Address. . . . . : fd9c:69d1:47d2:1000:6961:110:2b8c:8535(Preferred)
Link-local IPv6 Address . . . . . : fe80::9b2:9ca7:6c5:42c2K12(Preferred)
IPv4 Address. . . . . : 192.168.1.11(Preferred)
```

2. How can you see your device's MAC address?
 - Getmac

```
C:\WINDOWS\system32\cmd.exe

C:\Users\smart>getmac

Physical Address      Transport Name
-----
28-F1-0E-39-A8-4E    Media disconnected
48-45-20-08-02-46    \Device\NPF{9A281FAC-3A98-4BF5-92B6-DC00BCD572E3}

C:\Users\smart>
```

Activate Windows
Go to Settings to activate Windows

3. How can you show the MAC address with more details?

- `getmac /v`

```
C:\WINDOWS\system32\cmd.exe

C:\Users\smart>getmac /v

Connection Name Network Adapter Physical Address      Transport Name
-----
Ethernet        Intel(R) Ethernet 28-F1-0E-39-A8-4E    Media disconnected
Wi-Fi           Intel(R) Dual Band Wireless-B 48-45-20-08-02-46    \Device\NPF{9A281FAC-3A98-4BF5-92B6-DC00BCD572E3}

C:\Users\smart>
```

Activate Windows
Go to Settings to activate Windows

APIPA & IP Configuration

4. What is the default APIPA address when the device fails to get an IP from DHCP?
- 169.254.95.224

```
C:\WINDOWS\system32\cmd.exe
C:\Users\smart>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 10:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    IPv6 Address. . . . . : fd9c:69d1:47d2:1000:320a:b4c6:d444:86f6
    Temporary IPv6 Address. . . . . : fd9c:69d1:47d2:1000:6961:110:2b8c:8535
    Link-local IPv6 Address . . . . . : fe80::9b2:9ca7:6c5:42e2%12
    Autoconfiguration IPv4 Address. . : 169.254.95.224
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . :
```

5. What command shows your current IP settings?
- Ipconfig

```
C:\WINDOWS\system32\cmd.exe

C:\Users\smart>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 10:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . : home
    IPv6 Address. . . . . : fd9c:69d1:47d2:1000:320a:b4c6:d444:86f6
    Temporary IPv6 Address. . . . . : fd9c:69d1:47d2:1000:6961:110:2b8c:8535
    Link-local IPv6 Address . . . . . : fe80::9b2:9ca7:6c5:42e2%12
    IPv4 Address. . . . . : 192.168.1.11
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1

C:\Users\smart>
```

6. How do you release your current IP address?

- ipconfig /release

```
C:\WINDOWS\system32\cmd.exe

C:\Users\smart>ipconfig /release

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Local Area Connection* 1 while it has its media disconnected.
No operation can be performed on Local Area Connection* 10 while it has its media disconnected.

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 10:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    IPv6 Address. . . . . : fd9c:69d1:47d2:1000:320a:b4c6:d444:86f6
    Temporary IPv6 Address. . . . . : fd9c:69d1:47d2:1000:6961:110:2b8c:8535
    Link-local IPv6 Address . . . . . : fe80::9b2:9ca7:6c5:42e2%12
    Default Gateway . . . . . :

C:\Users\smart>
```

7. How do you request a new IP address from DHCP?

ipconfig /renew

```
C:\Users\smart>ipconfig /renew

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Local Area Connection* 1 while it has its media disconnected.
No operation can be performed on Local Area Connection* 10 while it has its media disconnected.

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 10:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . : home
    IPv6 Address. . . . . : fd9c:69d1:47d2:1000:320a:b4c6:d444:86f6
    Temporary IPv6 Address. . . . . : fd9c:69d1:47d2:1000:6961:110:2b8c:8535
    Link-local IPv6 Address . . . . . : fe80::9b2:9ca7:6c5:42e2%12
    IPv4 Address. . . . . : 192.168.1.11
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1

C:\Users\smart>
```

Ping Commands

9. How do you test connection to an IP address?

- ping [IP address]

```
C:\WINDOWS\system32\cmd.exe

C:\Users\smart>ping 127.0.0.1

Pinging 127.0.0.1 with 32 bytes of data:
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 127.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\smart>
```

10.

How do you test connection to a website (URL)?

- ping www.example.com

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

Pinging www.google.com [142.250.185.100] with 32 bytes of data:
Reply from 142.250.185.100: bytes=32 time=63ms TTL=112
Reply from 142.250.185.100: bytes=32 time=63ms TTL=112
Reply from 142.250.185.100: bytes=32 time=64ms TTL=112
Reply from 142.250.185.100: bytes=32 time=62ms TTL=112

Ping statistics for 142.250.185.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 62ms, Maximum = 64ms, Average = 63ms

C:\Users\smart>
```

11.

How do you send a ping with a specific data size?

- ping [IP] -l [size]

```
C:\Users\smart>ping 8.8.8.8 -i 8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 192.178.99.215: TTL expired in transit.
Reply from 192.178.99.215: TTL expired in transit.
Reply from 192.178.99.215: TTL expired in transit.
Reply from 192.178.99.215: TTL expired in transit.

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

C:\Users\smart>
```

12. How do you send a specific number of ping requests?

- o ping [IP] -n [count]

```
C:\WINDOWS\system32\cmd.exe

C:\Users\smart>ping www.google.com -n 6

Pinging www.google.com [142.251.209.36] with 32 bytes of data:
Reply from 142.251.209.36: bytes=32 time=67ms TTL=108
Reply from 142.251.209.36: bytes=32 time=67ms TTL=108
Reply from 142.251.209.36: bytes=32 time=63ms TTL=108
Reply from 142.251.209.36: bytes=32 time=61ms TTL=108
Reply from 142.251.209.36: bytes=32 time=62ms TTL=108
Reply from 142.251.209.36: bytes=32 time=62ms TTL=108

Ping statistics for 142.251.209.36:
    Packets: Sent = 6, Received = 6, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 61ms, Maximum = 67ms, Average = 63ms

C:\Users\smart>
```

13. How do you send continuous ping requests until you stop it manually?

- o ping [IP] -t

```
C:\Users\smart>ping www.google.com -t

Pinging www.google.com [142.250.185.100] with 32 bytes of data:
Reply from 142.250.185.100: bytes=32 time=63ms TTL=112
Reply from 142.250.185.100: bytes=32 time=61ms TTL=112
Reply from 142.250.185.100: bytes=32 time=89ms TTL=112
Reply from 142.250.185.100: bytes=32 time=62ms TTL=112
Reply from 142.250.185.100: bytes=32 time=67ms TTL=112
Reply from 142.250.185.100: bytes=32 time=61ms TTL=112
Reply from 142.250.185.100: bytes=32 time=63ms TTL=112
Reply from 142.250.185.100: bytes=32 time=94ms TTL=112
Reply from 142.250.185.100: bytes=32 time=65ms TTL=112
Reply from 142.250.185.100: bytes=32 time=69ms TTL=112
Reply from 142.250.185.100: bytes=32 time=61ms TTL=112
Reply from 142.250.185.100: bytes=32 time=61ms TTL=112
Reply from 142.250.185.100: bytes=32 time=62ms TTL=112
Reply from 142.250.185.100: bytes=32 time=63ms TTL=112
Reply from 142.250.185.100: bytes=32 time=62ms TTL=112
Reply from 142.250.185.100: bytes=32 time=62ms TTL=112
Reply from 142.250.185.100: bytes=32 time=63ms TTL=112
Reply from 142.250.185.100: bytes=32 time=69ms TTL=112
Reply from 142.250.185.100: bytes=32 time=70ms TTL=112
Reply from 142.250.185.100: bytes=32 time=65ms TTL=112
Reply from 142.250.185.100: bytes=32 time=63ms TTL=112
Reply from 142.250.185.100: bytes=32 time=62ms TTL=112
Reply from 142.250.185.100: bytes=32 time=62ms TTL=112

Ping statistics for 142.250.185.100:
    Packets: Sent = 23, Received = 23, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 61ms, Maximum = 94ms, Average = 66ms
Control-C
^C
C:\Users\smart>
```

Netstat

19. How do you show all active connections?
 - o netstat -a


```
C:\WINDOWS\system32\cmd.exe
C:\Users\smart>netstat -a

Active Connections

Proto Local Address           Foreign Address         State
TCP    0.0.0.0:135              DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:445              DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:623              DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:1386             DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:13860            DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:5357             DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:8090             DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:16992            DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:13660            DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:49604            DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:49605            DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:49606            DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:49607            DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:49608            DESKTOP-Q0SF6A0:0      LISTENING
TCP    0.0.0.0:49671            DESKTOP-Q0SF6A0:0      LISTENING
TCP    127.0.0.1:12025          DESKTOP-Q0SF6A0:0      LISTENING
TCP    127.0.0.1:12110          DESKTOP-Q0SF6A0:0      LISTENING
TCP    127.0.0.1:12119          DESKTOP-Q0SF6A0:0      LISTENING
TCP    127.0.0.1:12143          DESKTOP-Q0SF6A0:0      LISTENING
TCP    127.0.0.1:12405          DESKTOP-Q0SF6A0:0      LISTENING
TCP    127.0.0.1:12561          DESKTOP-Q0SF6A0:0      LISTENING
TCP    127.0.0.1:12993          DESKTOP-Q0SF6A0:0      LISTENING
TCP    127.0.0.1:12995          DESKTOP-Q0SF6A0:0      LISTENING
TCP    127.0.0.1:27275          DESKTOP-Q0SF6A0:0      LISTENING
TCP    127.0.0.1:49670          DESKTOP-Q0SF6A0:0      LISTENING
TCP    127.0.0.1:49677          DESKTOP-Q0SF6A0:49678 ESTABLISHED
TCP    127.0.0.1:49678          DESKTOP-Q0SF6A0:49677 ESTABLISHED
TCP    127.0.0.1:49686          DESKTOP-Q0SF6A0:49687 ESTABLISHED
TCP    127.0.0.1:49687          DESKTOP-Q0SF6A0:49686 ESTABLISHED
TCP    127.0.0.1:49688          DESKTOP-Q0SF6A0:49689 ESTABLISHED
TCP    127.0.0.1:49689          DESKTOP-Q0SF6A0:49688 ESTABLISHED
TCP    192.168.1.11:139         DESKTOP-Q0SF6A0:0      LISTENING
TCP    192.168.1.11:53401       52.112.122.48:https     ESTABLISHED
TCP    192.168.1.11:53408       98.66.133.185:https     ESTABLISHED
TCP    192.168.1.11:53412       104.18.39.21:https      ESTABLISHED
TCP    192.168.1.11:53414       20.215.74.205:https     ESTABLISHED
TCP    192.168.1.11:53430       20.50.201.205:https     ESTABLISHED
TCP    192.168.1.11:53439       whatsapp-cdn-shv-01-hbe1 ESTABLISHED
TCP    192.168.1.11:53443       52.123.135.185:https    ESTABLISHED
C:\Users\smart>
```

20. How do you show active connections with numbers only?

- o netstat -n

```
C:\WINDOWS\system32\cmd.exe
C:\Users\smart>netstat -n 4

Active Connections

Proto Local Address           Foreign Address         State
TCP    127.0.0.1:49677          127.0.0.1:49678         ESTABLISHED
TCP    127.0.0.1:49678          127.0.0.1:49677         ESTABLISHED
TCP    127.0.0.1:49686          127.0.0.1:49687         ESTABLISHED
TCP    127.0.0.1:49687          127.0.0.1:49686         ESTABLISHED
TCP    127.0.0.1:49688          127.0.0.1:49689         ESTABLISHED
TCP    127.0.0.1:49689          127.0.0.1:49688         ESTABLISHED
TCP    192.168.1.11:53401       52.112.122.48:443       ESTABLISHED
TCP    192.168.1.11:53408       98.66.133.185:443       ESTABLISHED
TCP    192.168.1.11:53414       20.215.74.205:443       ESTABLISHED
TCP    192.168.1.11:53430       20.50.201.205:443       ESTABLISHED
TCP    192.168.1.11:53439       102.132.97.54:5222      ESTABLISHED
TCP    192.168.1.11:53443       52.123.135.185:443       ESTABLISHED
TCP    192.168.1.11:53447       52.108.240.61:443       ESTABLISHED
TCP    192.168.1.11:53453       34.76.221.58:7590       ESTABLISHED
TCP    192.168.1.11:53464       98.66.133.186:443       ESTABLISHED
TCP    192.168.1.11:53470       173.194.69.188:5228     ESTABLISHED
TCP    192.168.1.11:53479       20.54.232.160:443       TIME_WAIT
TCP    192.168.1.11:53493       64.213.184.188:5228     ESTABLISHED
TCP    192.168.1.11:53494       74.242.255.116:443      ESTABLISHED
TCP    192.168.1.11:53495       52.108.9.12:443         ESTABLISHED
TCP    192.168.1.11:53503       52.113.194.133:443      ESTABLISHED
TCP    192.168.1.11:53504       52.113.194.132:443      ESTABLISHED
TCP    192.168.1.11:53505       52.108.240.63:443       ESTABLISHED
TCP    192.168.1.11:53506       95.101.35.113:443       ESTABLISHED
TCP    192.168.1.11:53507       98.66.133.185:443       ESTABLISHED
TCP    192.168.1.11:53508       52.108.9.12:443         ESTABLISHED
TCP    192.168.1.11:53509       104.18.32.47:443        ESTABLISHED
TCP    192.168.1.11:53510       104.18.39.21:443        ESTABLISHED
TCP    192.168.1.11:53515       34.117.223.223:443      TIME_WAIT
TCP    192.168.1.11:53516       34.160.176.28:443       TIME_WAIT
TCP    192.168.1.11:53517       104.18.32.47:443        ESTABLISHED
TCP    192.168.1.11:53519       34.160.176.28:443       TIME_WAIT
TCP    192.168.1.11:53521       34.117.223.223:443      TIME_WAIT
Active Connections
Proto Local Address           Foreign Address         State
TCP    127.0.0.1:49677          127.0.0.1:49678         ESTABLISHED
TCP    127.0.0.1:49678          127.0.0.1:49677         ESTABLISHED
TCP    127.0.0.1:49686          127.0.0.1:49687         ESTABLISHED
TCP    127.0.0.1:49687          127.0.0.1:49686         ESTABLISHED
TCP    127.0.0.1:49688          127.0.0.1:49689         ESTABLISHED
TCP    192.168.1.11:53401       52.112.122.48:443       ESTABLISHED
```

21. What command shows MAC addresses of other devices on the network?

arp -a

```
C:\Users\smart>arp -a

Interface: 192.168.1.11 --- 0xc
    Internet Address      Physical Address      Type
    192.168.1.1           9c-69-d1-47-d2-10     dynamic
    192.168.1.13          e6-14-84-03-48-ca     dynamic
    224.0.0.22            01-00-5e-00-00-16     static

C:\Users\smart>
```

22. What command deletes the ARP cache?

arp -d

```
Microsoft Windows [Version 10.0.19045.6466]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>arp -d

C:\WINDOWS\system32>
```

23. To know which IP address belongs to a domain name:

nslookup Domain_Name

Example:

nslookup Yahoo.com

```
C:\Users\smart>nslookup Yahoo.com
Server:  UnKnown
Address:  fe80::1

DNS request timed out.
    timeout was 2 seconds.
DNS request timed out.
    timeout was 2 seconds.
Non-authoritative answer:
Name:     Yahoo.com
Addresses: 2001:4998:124:1507::f000
           2001:4998:44:3507::8001
           2001:4998:24:120d::1:1
           2001:4998:124:1507::f001
           2001:4998:24:120d::1:0
           2001:4998:44:3507::8000
           74.6.231.20
           74.6.231.21
           98.137.11.163
           98.137.11.164
           74.6.143.25
           74.6.143.26

C:\Users\smart>_
```

24. To know which domain name belongs to a specific IP address:

Type this command:

nslookup IP_address

Example:

nslookup 87.248.113.14

```
C:\Users\smart>nslookup 87.248.113.14
Server:  UnKnown
Address:  fe80::1

Name:    et23-1.bas1-1-edg.amb.yahoo.com
Address: 87.248.113.14

C:\Users\smart>
```