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IFT 259: Introduction to Internet Networking

Lab 20
Troubleshooting Utilities

After you complete each step, put a '√' or 'x' in the completed box

- We need to test the network for connectivity i.e. connectivity to the servers, gateway/router etc.
- Use ip config, ping, tracert, nslookup, netstat

1. Open the command prompt and type in **ipconfig**

```
Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : home
   Link-local IPv6 Address . . . . . : fe80::3112:94c6:b789:177f%3
   IPv4 Address. . . . . . . . . . . : 192.168.1.5
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1
```

2. This command shows the IP address, Subnet Mask and default gateway. It is useful if you set the client up to DHCP as you cannot see this information by going to the NIC and right clicking and looking at properties (you cannot see what IP address you received). However, we do not see our DNS servers for examples

Completed ☒

3. Now type **ipconfig /all** (allows us to see more stuff e.g. more servers, IPv6 information)

```
Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : home
   Description . . . . . . . . . . . : Qualcomm Atheros AR9485 802.11b/g/n WiFi
Adapter
   Physical Address. . . . . . . . . : 18-CF-5E-26-D8-35
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::3112:94c6:b789:177f%3(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.1.5(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Lease Obtained. . . . . . . . . . : Monday, December 15, 2014 10:14:54 AM
   Lease Expires . . . . . . . . . . : Tuesday, December 16, 2014 10:14:54 AM
   Default Gateway . . . . . . . . . : 192.168.1.1
   DHCP Server . . . . . . . . . . . : 192.168.1.1
   DHCPv6 IAID . . . . . . . . . . . : 51957598
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-1B-23-C2-F6-A0-D3-C1-3E-CA-8D

   DNS Servers . . . . . . . . . . . : 192.168.1.1
```

Completed ☒

4. **Ping:** allows you to see if we are connected in the network e.g. if you can get a response from your routers. Allows you ping other computers on the network and see if they are reachable,

5. Ping the default gateway (based on the address your got from running the ipconfig /all command)

```
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time=2ms TTL=64
Reply from 192.168.1.1: bytes=32 time=3ms TTL=64
Reply from 192.168.1.1: bytes=32 time=3ms TTL=64
Reply from 192.168.1.1: bytes=32 time=15ms TTL=64

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 15ms, Average = 5ms
```

Completed ☒

6. You can even ping domain names (ping yahoo.com)

```
C:\>ping yahoo.com

Pinging yahoo.com [98.138.253.109] with 32 bytes of data:
Reply from 98.138.253.109: bytes=32 time=141ms TTL=53
Reply from 98.138.253.109: bytes=32 time=62ms TTL=53
Reply from 98.138.253.109: bytes=32 time=63ms TTL=53
Reply from 98.138.253.109: bytes=32 time=61ms TTL=53

Ping statistics for 98.138.253.109:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 61ms, Maximum = 141ms, Average = 81ms
```

Completed ☒

7. **Tracert:** almost like ping but much more detailed. As the request for replies travel across the Internet, each router along the way will send a return message back (tracert yahoo.com)

```
C:\>tracert yahoo.com

Tracing route to yahoo.com [98.138.253.109]
over a maximum of 30 hops:

  1     2 ms     2 ms     2 ms  Wireless_Broadband_Router.home [192.168.1.1]
  2    10 ms     7 ms     7 ms  L100.BSTNMA-UFTTP-94.verizon-gni.net [98.118.10
.1]
  3    15 ms    17 ms    10 ms  G0-5-5-2.BSTNMA-LCR-22.verizon-gni.net [130.81.
10.30]
  4    13 ms    30 ms    22 ms  ae4-0.BOS-BB-RTR2.verizon-gni.net [130.81.151.8
]
  5    30 ms    29 ms    30 ms  0.ae11.XL4.NYC1.ALTER.NET [152.63.20.117]
  6    23 ms    22 ms    24 ms  0.xe-9-0-0.BR1.NYC1.ALTER.NET [152.63.19.213]
  7     *        *        *     Request timed out.
  8   106 ms   175 ms   187 ms  ae-1-3501.edge4.Chicago3.Level3.net [4.69.203.2
4]
  9    41 ms    65 ms    40 ms  YAHOO-INC.edge4.Chicago3.Level3.net [4.53.98.50]

 10    61 ms    60 ms    62 ms  ae-7.pat2.nez.yahoo.com [216.115.104.126]
 11    58 ms    62 ms    56 ms  ae-1.msr1.ne1.yahoo.com [216.115.100.5]
 12    57 ms    57 ms    58 ms  UNKNOWN-98-138-97-X.yahoo.com [98.138.97.3]
 13    59 ms    55 ms    57 ms  UNKNOWN-98-138-97-X.yahoo.com [98.138.97.45]
 14    61 ms    58 ms    58 ms  po-12.bas2-7-prd.ne1.yahoo.com [98.138.240.26]
 15    65 ms    63 ms    63 ms  ir1.fp.vip.ne1.yahoo.com [98.138.253.109]

Trace complete.
```

Completed ☒

8. **Nslookup** (Name Server lookup): resolves a name to an IP address. When we pinged yahoo.com, we got messages back but behind the scenes, DNS was resolving these names to IP addresses. Nslookup allows us to find those IP addresses straight away.

```
C:\>nslookup yahoo.com
Server:  Wireless_Broadband_Router.home
Address:  192.168.1.1

Non-authoritative answer:
Name:    yahoo.com
Addresses:  98.139.183.24
          98.138.253.109
          206.190.36.45
```

Completed ☒

9. **Netstat:** useful for seeing whether we have listening TCP ports or network connections on our system.

```
C:\>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.1.5:49216      bn1wns2011805:https    ESTABLISHED
  TCP    192.168.1.5:49235      HP9D2C2E:8080          ESTABLISHED
  TCP    192.168.1.5:49269      nyc-8:5222             ESTABLISHED
  TCP    192.168.1.5:49273      bn1msgr2010611:https   ESTABLISHED
  TCP    192.168.1.5:49275      213.199.179.162:40007  ESTABLISHED
  TCP    192.168.1.5:49276      157.56.116.202:12350   ESTABLISHED
  TCP    192.168.1.5:52163      cloud:https            ESTABLISHED
  TCP    192.168.1.5:52188      lga15s44-in-f26:http   TIME_WAIT
  TCP    192.168.1.5:52373      lga15s43-in-f27:http   TIME_WAIT
  TCP    192.168.1.5:52393      lga15s43-in-f27:https  TIME_WAIT
  TCP    192.168.1.5:52394      lga15s44-in-f28:https  TIME_WAIT
  TCP    192.168.1.5:52483      134.170.184.137:https  TIME_WAIT
  TCP    192.168.1.5:52513      bbc-vip014:http        TIME_WAIT
  TCP    192.168.1.5:52514      us:http                TIME_WAIT
  TCP    192.168.1.5:52565      Wireless_Broadband_Router:2555  TIME_WAIT
  TCP    192.168.1.5:52566      us:http                TIME_WAIT
```

Completed ☐