

**ITM-301 Lab/Assignment-1****Part A: Assignment-1**

I recommend a peer-to-peer network as it allows each computer to have some level of authority as well as its own resources. This network also enables the computers to have direct communication with other devices. The main advantages of utilizing this network model are that it's less expensive in comparison to other models and it has a simple configuration. The peer-to-peer network model is usually observed to be not necessarily secure. However, the company is not concerned with the security of the information. Thus, this model perfectly fits the company's needs and requirements. Lastly, the company can also benefit from this model, as it doesn't require large installations.

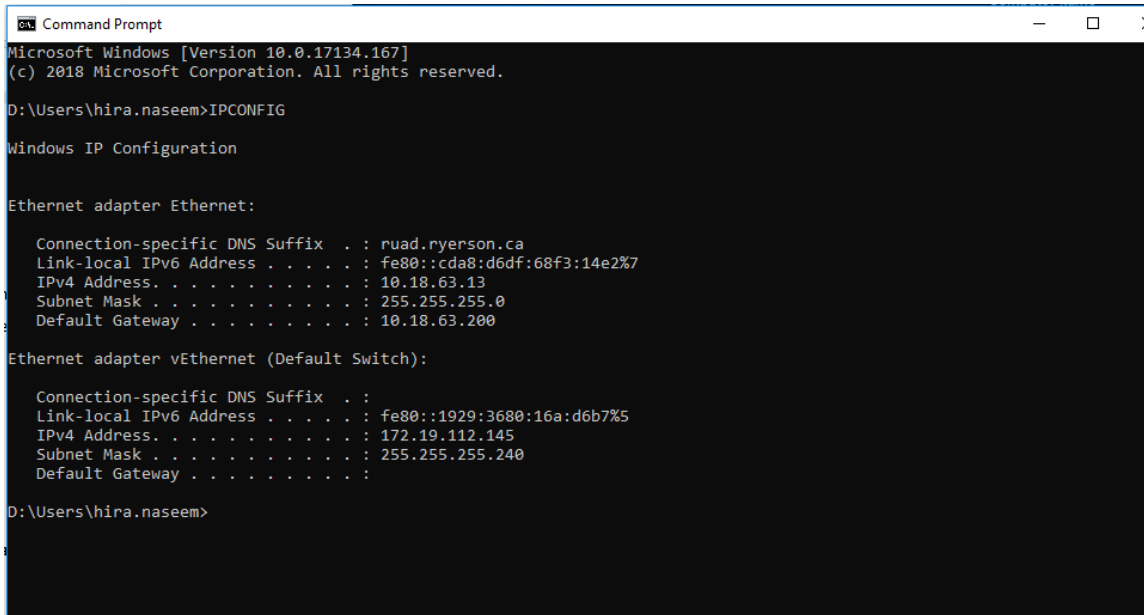
Thrift Towne would have to purchase a network hub, which will act as a connecting point for all the devices (4 PCs and printer) in the network.

In order to effectively set a peer-to-peer network within the company, it is important to have connectivity through a hub. Moreover, the PCs should be assigned names such as PC1, PC2, PC3, and PC4. Each of the 4 workstations will work in correspondence to each other and have direct communication.

The company can use a hub with a wireless connection. Thus, Thrift Towne will be able to connect to the network's additional devices through a wireless connection. In other words, the printer can be connected to the workstation through a hub with the help of a wireless connection such as WIFI.

In order to improve and further enhance the communication between workstations, it is recommended that the Thrift Towne renews existing network interface card (NIC) or add one to the workstations if one doesn't already exist.

**Part B: Assignment-1**



**Figure 1 - IPCONFIG**

IPCONFIG	IPCONFIG /all
IPV4 address: 10.18.63.13	IPV4 address: 10.18.63.13 (preferred)
NIC: Ethernet and vEthernet	NIC: Ethernet and vEthernet
DHCP enabled: n/a	DHCP enabled: yes
Gateway address: 10.18.63.200	Gateway address: 10.18.63.200
MAC Address: n/a	MAC Address: Ethernet: 50-9A-4C-56-0D-27 vEthernet: 02-15-03-18-FA-D6

Table 1 – Differences between IPCONFIG and IPCONFIG /all

As can be observed in Table 1, the main difference between IPCONFIG and IPCONFIG /all is the amount of information provided. IPCONFIG presents lack of information by delivering information only related to the IP address, NIC, and default gateway for all adapters. In comparison, IPCONFIG /all provides further information regarding the physical (MAC) address, DHCP connections, as well as IPV6.

```
D:\Users\hira.naseem>IPCONFIG /all

Windows IP Configuration

Host Name . . . . . : TRS3148-013
Primary Dns Suffix . . . . . : ruad.ryerson.ca
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : ruad.ryerson.ca

Ethernet adapter Ethernet:

Connection-specific DNS Suffix . : ruad.ryerson.ca
Description . . . . . : Intel(R) Ethernet Connection (5) I219-V
Physical Address. . . . . : 50-9A-4C-56-0D-27
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::cda8:d6df:68f3:14e2%7(Preferred)
IPv4 Address. . . . . : 10.18.63.13(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : Monday, September 17, 2018 8:12:51 AM
Lease Expires . . . . . : Tuesday, September 25, 2018 8:12:51 AM
Default Gateway . . . . . : 10.18.63.200
DHCP Server . . . . . : 10.111.16.33
DHCPv6 IAID . . . . . : 105945676
DHCPv6 Client DUID. . . . . : 00-01-00-01-23-16-8F-F1-50-9A-4C-56-0D-27
DNS Servers . . . . . : 10.111.15.28
                        10.111.15.30
                        10.111.15.27
NetBIOS over Tcpi. . . . . : Enabled

Ethernet adapter vEthernet (Default Switch):

Connection-specific DNS Suffix . :
Description . . . . . : Hyper-V Virtual Ethernet Adapter
Physical Address. . . . . : 02-15-03-1B-FA-D6
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::1929:3680:16a:d6b7%5(Preferred)
IPv4 Address. . . . . : 172.19.112.145(Preferred)
Subnet Mask . . . . . : 255.255.255.240
Default Gateway . . . . . :
DHCPv6 IAID . . . . . : 201332061
DHCPv6 Client DUID. . . . . : 00-01-00-01-23-16-8F-F1-50-9A-4C-56-0D-27
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                        fec0:0:0:ffff::2%1
                        fec0:0:0:ffff::3%1
NetBIOS over Tcpi. . . . . : Disabled

D:\Users\hira.naseem>
```

Figure 2 - IPCONFIG /all

```
D:\Users\hira.naseem>ping 10.111.15.28

Pinging 10.111.15.28 with 32 bytes of data:
Reply from 10.111.15.28: bytes=32 time=1ms TTL=124
Reply from 10.111.15.28: bytes=32 time=4ms TTL=124
Reply from 10.111.15.28: bytes=32 time=1ms TTL=124
Reply from 10.111.15.28: bytes=32 time=1ms TTL=124

Ping statistics for 10.111.15.28:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 4ms, Average = 1ms

D:\Users\hira.naseem>
```

**Figure 3 - DNS Server**

Through pinging the DNS, we were able to determine if we could reach the target DNS and how long it took to reach the target. For instance, in Figure 3, it can be seen that the minimum time it took was 1ms. The max amount of time it took was 4ms and on average it takes 1ms to reach the target DNS. There were 4 packets sent and 4 received, thus there was a 0% loss.

```
D:\Users\hira.naseem>ping www.facebook.com

Pinging star-z-mini.c10r.facebook.com [31.13.80.38] with 32 bytes of data:
Reply from 31.13.80.38: bytes=32 time=4ms TTL=54
Reply from 31.13.80.38: bytes=32 time=3ms TTL=54
Reply from 31.13.80.38: bytes=32 time=2ms TTL=54
Reply from 31.13.80.38: bytes=32 time=2ms TTL=54

Ping statistics for 31.13.80.38:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 4ms, Average = 2ms

D:\Users\hira.naseem>ping www.instagram.com

Pinging z-p15-instagram.c10r.facebook.com [31.13.80.32] with 32 bytes of data:
Reply from 31.13.80.32: bytes=32 time=2ms TTL=54
Reply from 31.13.80.32: bytes=32 time=1ms TTL=54
Reply from 31.13.80.32: bytes=32 time=2ms TTL=54
Reply from 31.13.80.32: bytes=32 time=2ms TTL=54

Ping statistics for 31.13.80.32:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

**Figure 4 - IP Addresses For Facebook and Instagram**

IP Address for [www.facebook.com](http://www.facebook.com): 31.13.80.38

IP Address for [www.instagram.com](http://www.instagram.com): 31.13.80.32

```
D:\Users\hira.naseem>HOSTNAME
TRS3148-013
```

**Figure 5 - Computer's NetBIOS Name**

NetBIOS Name (Hostname): TRS3148-013

```
D:\Users\hira.naseem>arp -a

Interface: 172.19.112.145 --- 0x5
  Internet Address      Physical Address      Type
  224.0.0.2             01-00-5e-00-00-02    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

Interface: 10.18.63.13 --- 0x7
  Internet Address      Physical Address      Type
  10.18.63.1            50-9a-4c-56-40-cc    dynamic
  10.18.63.3            50-9a-4c-56-0e-b5    dynamic
  10.18.63.5            50-9a-4c-56-40-97    dynamic
  10.18.63.9            50-9a-4c-56-0e-d0    dynamic
  10.18.63.15           50-9a-4c-56-0e-9a    dynamic
  10.18.63.17           50-9a-4c-56-0b-86    dynamic
  10.18.63.23           50-9a-4c-56-0f-26    dynamic
  10.18.63.25           50-9a-4c-56-10-92    dynamic
  10.18.63.26           50-9a-4c-56-0b-bc    dynamic
  10.18.63.43           50-9a-4c-56-f9-9f    dynamic
  10.18.63.46           50-9a-4c-56-44-46    dynamic
  10.18.63.48           50-9a-4c-56-0f-77    dynamic
  10.18.63.50           50-9a-4c-56-f8-0c    dynamic
  10.18.63.106          50-9a-4c-56-43-c5    dynamic
  10.18.63.200          00-00-5e-00-01-3f    dynamic
  10.18.63.255          ff-ff-ff-ff-ff-ff    static
  224.0.0.2             01-00-5e-00-00-02    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
```

**Figure 6 - ARP**

Address resolution protocol maps Internet protocol addresses to Ethernet physical (MAC) addresses. Thus, the physical addresses registered in device A are IP addresses of device B, converted to physical addresses so that the local network can easily recognize them. In other words, ARP is able to depict layer 2 addresses to layer 3 addresses. ARP cache is a depository of ARP entries (generally dynamic), where the hostname is processed as an IP address, which is then resolved to a MAC address. The purpose of this is so that the computer can easily recognize and communicate with the IP addresses

without the need of DNS. The ARP cache is refreshed after a short period of time (dynamic).

```
D:\Users\hira.naseem>netstat -o

Active Connections

Proto Local Address           Foreign Address         State           PID
TCP   10.18.63.13:1647        acds-01:402            ESTABLISHED    4296
TCP   10.18.63.13:1658        EUCAV-MS1:8194         ESTABLISHED    4564
TCP   10.18.63.13:1659        acds-01:7725           ESTABLISHED    2116
TCP   10.18.63.13:1729        TRS3148-013:8194       ESTABLISHED    4428
TCP   10.18.63.13:6969        52.165.170.112:https   ESTABLISHED    4448
TCP   10.18.63.13:7680        TRS3148-048:2148       ESTABLISHED    7876
TCP   10.18.63.13:7692        acfs-01:microsoft-ds   ESTABLISHED    4
TCP   10.18.63.13:7820        10.111.16.19:49158     ESTABLISHED    4000
TCP   10.18.63.13:8194        TRS3148-013:1729       ESTABLISHED    4564
TCP   10.18.63.13:8194        EUCAV-MS1:54512        ESTABLISHED    4564
TCP   10.18.63.13:8829        172.217.0.106:https   ESTABLISHED    7864
TCP   10.18.63.13:8836        EUCMON-01:5985         TIME_WAIT      0
TCP   10.18.63.13:8842        13.78.180.90:https    ESTABLISHED    7876
TCP   10.18.63.13:8844        ec2-34-194-109-26:https ESTABLISHED    4688
TCP   10.18.63.13:8845        acds-01:5985           ESTABLISHED    4612
TCP   127.0.0.1:1550          TRS3148-013:1551       ESTABLISHED    5324
TCP   127.0.0.1:1551          TRS3148-013:1550       ESTABLISHED    5324
TCP   127.0.0.1:1655          TRS3148-013:1656       ESTABLISHED    4564
TCP   127.0.0.1:1656          TRS3148-013:1655       ESTABLISHED    4564
TCP   127.0.0.1:1726          TRS3148-013:1727       ESTABLISHED    4428
TCP   127.0.0.1:1727          TRS3148-013:1726       ESTABLISHED    4428
TCP   127.0.0.1:1731          TRS3148-013:1732       ESTABLISHED    4428
TCP   127.0.0.1:1732          TRS3148-013:msiccp     ESTABLISHED    4564
TCP   127.0.0.1:7168          TRS3148-013:8787       FIN_WAIT_2     7864
TCP   127.0.0.1:7168          TRS3148-013:8791       FIN_WAIT_2     7864
TCP   127.0.0.1:7168          TRS3148-013:8825       TIME_WAIT      0
TCP   127.0.0.1:7168          TRS3148-013:8828       ESTABLISHED    7864
TCP   127.0.0.1:8787          TRS3148-013:7168       CLOSE_WAIT     9104
TCP   127.0.0.1:8791          TRS3148-013:7168       CLOSE_WAIT     9104
TCP   127.0.0.1:8828          TRS3148-013:7168       ESTABLISHED    9104
TCP   [::1]:1672              TRS3148-013:1674       ESTABLISHED    7732
TCP   [::1]:1674              TRS3148-013:1672       ESTABLISHED    7732
```

**Figure 7 - Netstat command**

Netstat, or network statistics, is a command line network utility tool that presents information regarding the network connections between computers and/or network devices. It displays information related to the status of TCP/IP, routing tables, network interfaces, and statistics relevant to the network protocol in use.

```
D:\Users\hira.naseem>tracert www.google.ca

Tracing route to www.google.ca [172.217.9.35]
over a maximum of 30 hops:

  1  *      *      *      Request timed out.
  2  *      *      *      Request timed out.
  3  <1 ms  <1 ms  <1 ms  172.29.1.141
  4  1 ms   1 ms   1 ms   172.29.1.49
  5  2 ms   1 ms   1 ms   172.29.1.35
  6  2 ms   2 ms   2 ms   172.29.1.1
  7  3 ms   3 ms   2 ms   ut-hub-ryerson-if-re.gtanet.ca [205.211.94.153]
  8  41 ms  2 ms   2 ms   66.97.23.57
  9  4 ms   3 ms   3 ms   66.97.16.22
 10 2 ms   2 ms   2 ms   74.125.48.230
 11 2 ms   2 ms   2 ms   108.170.250.242
 12 17 ms  18 ms  17 ms  74.125.252.132
 13 17 ms  16 ms  17 ms  209.85.249.137
 14 17 ms  17 ms  17 ms  108.170.243.193
 15 18 ms  17 ms  16 ms  72.14.239.113
 16 16 ms  16 ms  16 ms  172.217.9.35

Trace complete.
```

**Figure 8- Tracert command**

IP address for Google: 172.217.9.35

It took 16 hops to reach the Google server.