VICTORIA UNIVERSITY SYDNEY

NIT2222: Assignment 1

LOCAL AREA NETWORK TECHNOLOGIES

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Objective:

Demonstrate knowledge and skills acquired from week 1 to 5 that include:

- IP address planning
- Local Area Network Technologies
- Implement and configure Local Area Network of medium complexity in Cisco Packet Tracer

Scenario:

Design and develop a network for a number of buildings for the Sydney Wonderers manufacturing company.

Figure 1 below shows the location of different departments within the buildings and the location of main servers of the computer networks.

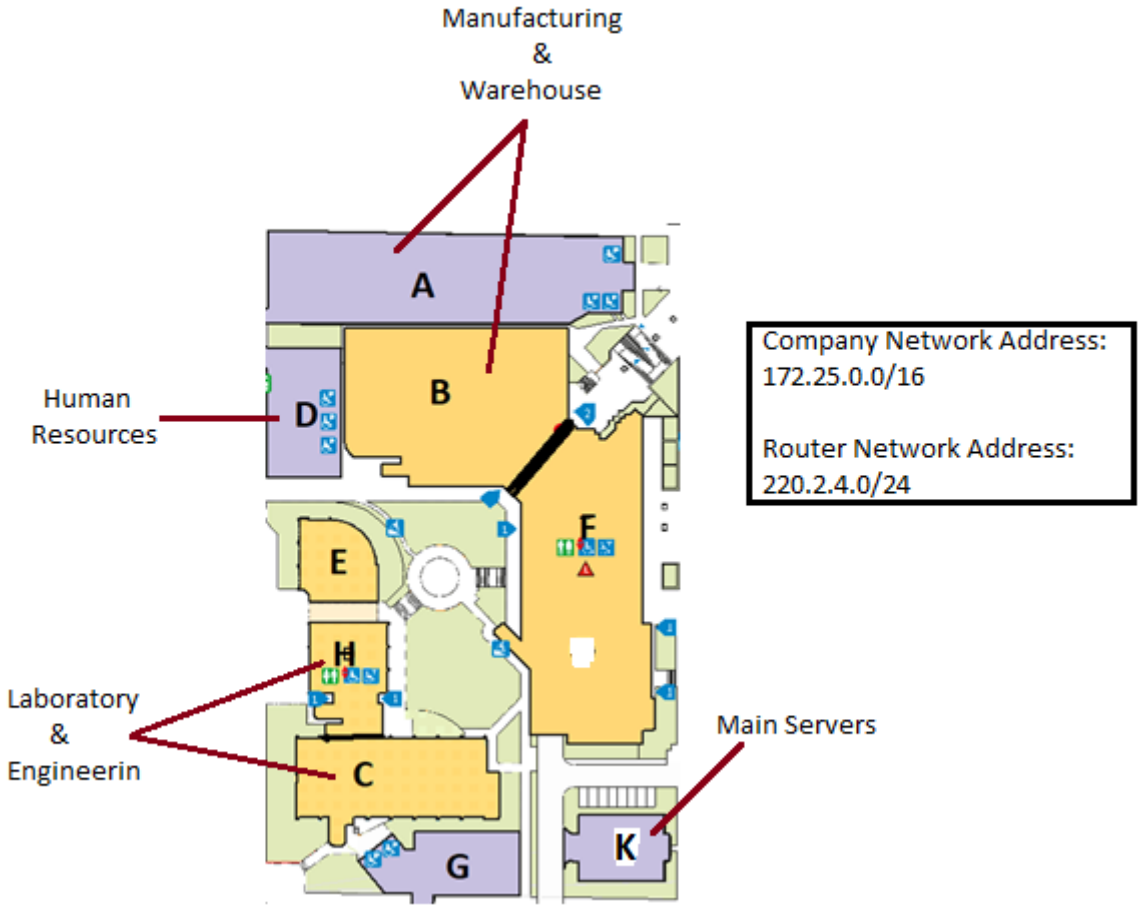

Figure 1: Building, Departments and Servers location

Specific Requirements:

Question 1 & 3: Network Topology with corresponding subnets & IP addresses

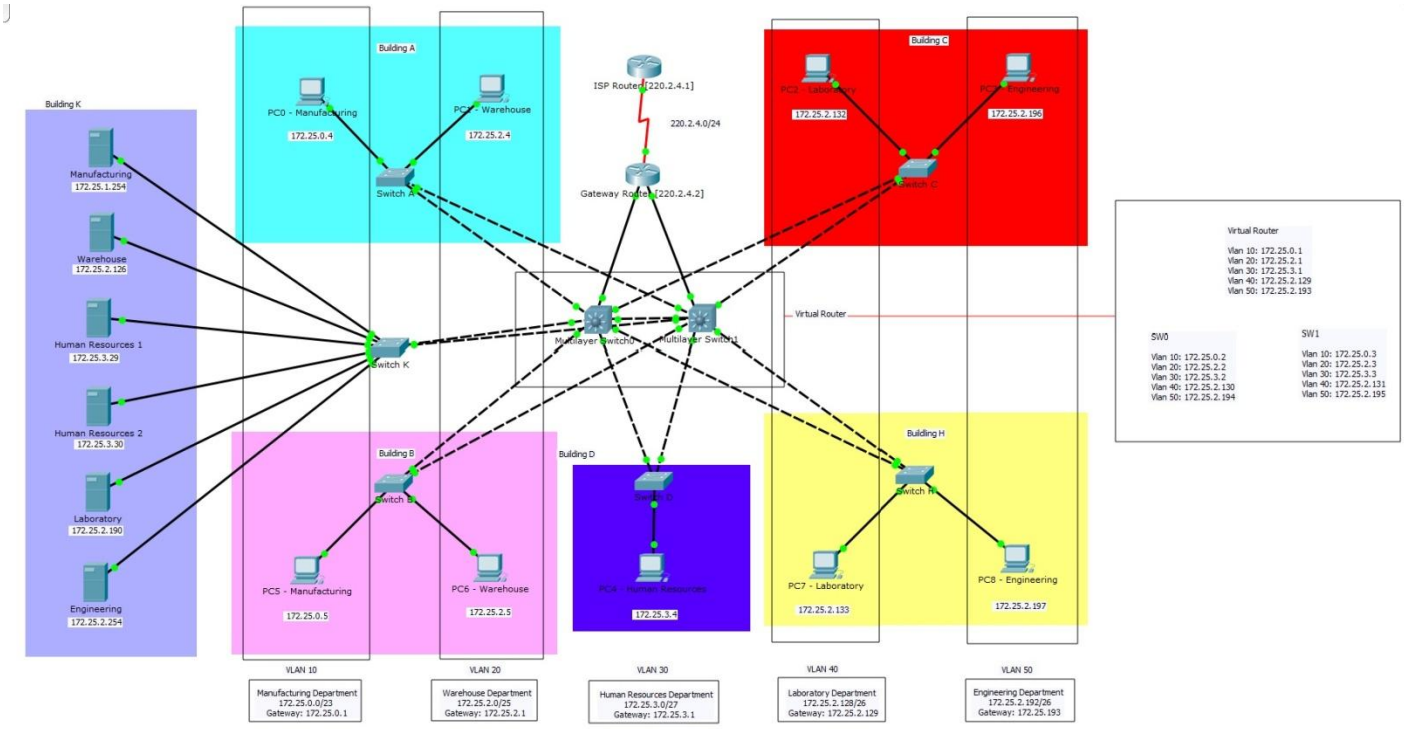

Figure 2: Network Topology Design

Question 2: Subnets required for proposed topology

MANUFACTURING DEPARTMENT	
Allocated Subnet Address and Subnet Mask	**172.25.0.0/23**
Network Address	**172.25.0.0**
Default Gateway Address	**172.25.0.1**
Valid Host Address Range	**172.25.0.1 – 172.25.1.254**
Broadcast Address	**172.25.1.255**

WAREHOUSE DEPARTMENT	
Allocated Subnet Address and Subnet Mask	**172.25.2.0/25**
Network Address	**172.25.2.0**
Default Gateway Address	**172.25.2.1**
Valid Host Address Range	**172.25.2.1 – 172.25.2.126**
Broadcast Address	**172.25.2.127**

LABORTORY DEPARTMENT	
Allocated Subnet Address and Subnet Mask	172.25.2.128/26
Network Address	172.25.2.128
Default Gateway Address	172.25.2.129
Valid Host Address Range	172.25.2.129 – 172.25.2.190
Broadcast Address	172.25.2.191

ENGINEERING DEPARTMENT	
Allocated Subnet Address and Subnet Mask	172.25.2.192/26
Network Address	172.25.2.192
Default Gateway Address	172.25.2.193
Valid Host Address Range	172.25.2.193 – 172.25.2.254
Broadcast Address	172.25.2.255

HUMAN RESOURCES DEPARTMENT	
Allocated Subnet Address and Subnet Mask	172.25.3.0/27
Network Address	172.25.3.0
Default Gateway Address	172.25.3.1
Valid Host Address Range	172.25.3.1 – 172.25.3.30
Broadcast Address	172.25.3.31

Router IP Addressing Plan

Gateway Router	
Fa0/0 (to SW0)	172.25.3.33/30
Fa0/1 (to SW1)	172.25.3.37/30
S0/0/0 (to ISP Router)	220.2.4.2/24

ISP Router	
S0/0/0 (to ISP Router)	220.2.4.2/24

Question 4: Configuration scripts for the routers and switches of the proposed topology

Switch A and B:

Switch A [Building A]

```
en
conf t
hostname SwitchA
int f0/1
switchport mode trunk
switchport trunk native vlan 80
switchport trunk allowed vlan 10,20,80
exit
int f0/2
switchport mode trunk
switchport trunk native vlan 80
switchport trunk allowed vlan 10,20,80
exit
vlan 10
name Manufacturing
vlan 20
name Warehouse
int f0/3
switchport access vlan 10
exit
int f0/4
switchport access vlan 20
exit
exit
show vlan
```

Switch B [Building B]

```
en
conf t
hostname SwitchB
int f0/1
switchport mode trunk
switchport trunk native vlan 80
switchport trunk allowed vlan 10,20,80
exit
int f0/2
switchport mode trunk
switchport trunk native vlan 80
switchport trunk allowed vlan 10,20,80
exit
vlan 10
name Manufacturing
vlan 20
name Warehouse
int f0/3
switchport access vlan 10
exit
int f0/4
switchport access vlan 20
exit
exit
show vlan
```

Switch C and D:

Switch C [Building C]

```
en
conf t
hostname SwitchC
int f0/1
switchport mode trunk
switchport trunk native vlan 80
switchport trunk allowed vlan 40,50,80
exit
int f0/2
switchport mode trunk
switchport trunk native vlan 80
switchport trunk allowed vlan 40,50,80
exit
vlan 40
name Laboratory
vlan 50
name Engineering
int f0/3
switchport access vlan 40
exit
int f0/4
switchport access vlan 50
exit
exit
show vlan
```

Switch D [Building D]

```
en
conf t
int f0/1
switchport mode trunk
switchport trunk native vlan 80
switchport trunk allowed vlan 30,80
exit
int f0/2
switchport mode trunk
switchport trunk native vlan 80
switchport trunk allowed vlan 30,80
exit
vlan 30
name HumanResources
int f0/3
switchport access vlan 30
exit
exit
show vlan
```

Switch H and K:

Switch H [Building H]

```
en
conf t
hostname SwitchH
int f0/1
switchport mode trunk
switchport trunk native vlan 80
switchport trunk allowed vlan 40,50,80
exit
int f0/2
switchport mode trunk
switchport trunk native vlan 80
switchport trunk allowed vlan 40,50,80
exit
vlan 40
name Laboratory
vlan 50
name Engineering
int f0/3
switchport access vlan 40
exit
int f0/4
switchport access vlan 50
exit
exit
show vlan
```

Switch K [Building K]

```
en
conf t
hostname SwitchK
int f0/1
switchport mode trunk
switchport trunk native vlan 80
switchport trunk allowed vlan 10,20,30,40,50,80
exit
int f0/2
switchport mode trunk
switchport trunk native vlan 80
switchport trunk allowed vlan 10,20,30,40,50,80
exit
vlan 10
name Manufacturing
vlan 20
name Warehouse
vlan 30
name HumanResources
vlan 40
name Laboratory
vlan 50
name Engineering
int f0/11
switchport access vlan 10
exit
int f0/12
switchport access vlan 20
exit
int f0/13
switchport access vlan 30
exit
int f0/14
switchport access vlan 30
exit
int f0/15
switchport access vlan 40
exit
int f0/16
switchport access vlan 50
exit
exit
show vlan
```

Layer 3 Switch 0:

Layer 3 SW0

```
en
conf t
hostname SW0
int f0/1
switchport trunk allowed vlan 1-99
exit
int f0/5
switchport trunk allowed vlan 10,20
switchport trunk native vlan 80
exit
int f0/10
switchport trunk allowed vlan 10,20
switchport trunk native vlan 80
exit
int f0/15
switchport trunk allowed vlan 40,50
switchport trunk native vlan 80
exit
int f0/20
switchport trunk allowed vlan 40,50
switchport trunk native vlan 80
exit
int f0/22
switchport trunk allowed vlan 30
switchport trunk native vlan 80
exit
int f0/23
switchport trunk native vlan 10,20,30,40,50,80
exit
vlan 10
name Manufacturing
int vlan 10
ip add 172.25.0.2 255.255.254.0
standby 10 ip 172.25.0.1
standby 10 priority 110
standby 10 preempt
exit
ip routing
vlan 20
name Warehouse
int vlan 20
ip add 172.25.2.2 255.255.255.128
standby 20 ip 172.25.2.1
standby 20 priority 110
standby 20 preempt
exit
```

```
ip routing
vlan 30
name HumanResoures
int vlan 30
ip add 172.25.3.2 255.255.255.224
standby 30 ip 172.25.3.1
standby 30 priority 110
standby 30 preempt
exit
ip routing
vlan 40
name Laboratory
int vlan 40
ip add 172.25.2.130 255.255.255.192
standby 40 ip 172.25.2.129
standby 40 priority 90
standby 40 preempt
exit
ip routing
vlan 50
name Engineering
int vlan 50
ip add 172.25.2.194 255.255.255.192
standby 50 ip 172.25.2.193
standby 50 priority 90
standby 50 preempt
exit
ip routing


int f0/24
no switchport
ip add 172.25.3.38 255.255.255.252
no shut
ip route 0.0.0.0 0.0.0.0 172.25.3.33
exit
exit
```

Layer 3 Switch 1:

Layer 3 SW1

```
en
conf t
hostname SW1
int f0/1
switchport trunk allowed vlan 1-1005
exit
int f0/5
switchport trunk allowed vlan 10,20,80
switchport trunk native vlan 80
exit
int f0/10
switchport trunk allowed vlan 10,20,80
switchport trunk native vlan 80
exit
int f0/15
switchport trunk allowed vlan 40,50,80
switchport trunk native vlan 80
exit
int f0/20
switchport trunk allowed vlan 40,50,80
switchport trunk native vlan 80
exit
int f0/22
switchport trunk allowed vlan 30,80
switchport trunk native vlan 80
exit
int f0/23
switchport trunk allowed vlan 10,20,30,40,50,80
switchport trunk native vlan 80
exit
vlan 10
name Manufacturing
int vlan 10
ip add 172.25.0.3 255.255.254.0
standby 10 ip 172.25.0.1
standby 10 priority 90
standby 10 preempt
exit
ip routing
vlan 20
name Warehouse
int vlan 20
ip add 172.25.2.3 255.255.255.128
standby 20 ip 172.25.2.1
standby 20 priority 90
standby 20 preempt
exit
ip routing
vlan 30
name HumanResoures
int vlan 30
ip add 172.25.3.3 255.255.255.224
standby 30 ip 172.25.3.1
standby 30 priority 90
standby 30 preempt
exit
ip routing
vlan 40
name Laboratory
int vlan 40
ip add 172.25.2.131 255.255.255.192
standby 40 ip 172.25.2.129
standby 40 priority 100
standby 40 preempt
exit
ip routing
vlan 50
name Engineering
int vlan 50
ip add 172.25.2.195 255.255.255.192
standby 50 ip 172.25.2.193
standby 50 priority 100
standby 50 preempt
exit
ip routing



int f0/24
no switchport
ip add 172.25.3.34 255.255.255.252
no shut
ip route 0.0.0.0 0.0.0.0 172.25.3.37
exit
exit
```

Routers:

Company Gateway Router

```
en
conf t
hostname Gateway
int s0/0/0
ip add 220.2.4.2 255.255.255.0
no shut
int f0/0
ip add 172.25.3.33 255.255.255.252
no shut
int f0/1
ip add 172.25.3.37 255.255.255.252
no shut
ip route 0.0.0.0 0.0.0.0 172.25.3.34
ip route 0.0.0.0 172.25.3.37
exit


ip nat pool R2NatPool 220.2.4.3 220.2.4.254 netmask 255.255.255.0
access-list 10 permit 172.25.0.0 0.0.255.255
ip nat inside source list 10 pool R2NatPool
exit

int s0/0/0
ip nat outside
exit
int f0/0
ip nat inside
exit
int f0/1
ip nat inside
exit
```

ISP Router

```
en
conf t
hostname ISP
int s0/0/0
ip add 220.2.4.1 255.255.255.0
no shut
exit
exit
```

Question 5: Screenshots of ping and show commands

Pinging between computers

- Ping from Building A(Manufacturing) to Building D(Human Resources)

```
Pinging 172.25.3.4 with 32 bytes of data:

Reply from 172.25.3.4: bytes=32 time=0ms TTL=127
Reply from 172.25.3.4: bytes=32 time=0ms TTL=127
Reply from 172.25.3.4: bytes=32 time=1ms TTL=127
Reply from 172.25.3.4: bytes=32 time=0ms TTL=127

Ping statistics for 172.25.3.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- Ping from Building C(Laboratory) to Building B(Warehouse)

```
Pinging 172.25.2.5 with 32 bytes of data:

Reply from 172.25.2.5: bytes=32 time=0ms TTL=127
Reply from 172.25.2.5: bytes=32 time=0ms TTL=127
Reply from 172.25.2.5: bytes=32 time=0ms TTL=127
Reply from 172.25.2.5: bytes=32 time=0ms TTL=127

Ping statistics for 172.25.2.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- Ping from Building H(Engineering) to Building D(Human Resources)

```
Pinging 172.25.3.4 with 32 bytes of data:

Reply from 172.25.3.4: bytes=32 time=1ms TTL=127
Reply from 172.25.3.4: bytes=32 time=0ms TTL=127
Reply from 172.25.3.4: bytes=32 time=0ms TTL=127
Reply from 172.25.3.4: bytes=32 time=1ms TTL=127

Ping statistics for 172.25.3.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- Ping from Building B(Manufacturing) to Building A(Manufacturing)

```
Pinging 172.25.0.4 with 32 bytes of data:

Reply from 172.25.0.4: bytes=32 time=0ms TTL=128
Reply from 172.25.0.4: bytes=32 time=1ms TTL=128
Reply from 172.25.0.4: bytes=32 time=0ms TTL=128
Reply from 172.25.0.4: bytes=32 time=0ms TTL=128

Ping statistics for 172.25.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- Ping from Building D(Human Resources) to Building C(Laboratory)

```
Pinging 172.25.2.132 with 32 bytes of data:

Reply from 172.25.2.132: bytes=32 time=0ms TTL=127
Reply from 172.25.2.132: bytes=32 time=0ms TTL=127
Reply from 172.25.2.132: bytes=32 time=0ms TTL=127
Reply from 172.25.2.132: bytes=32 time=0ms TTL=127

Ping statistics for 172.25.2.132:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

Pinging to and from servers

- Ping from Building H(Engineering) to Building K(Human Resources Server 1)

```
Pinging 172.25.3.29 with 32 bytes of data:

Reply from 172.25.3.29: bytes=32 time=1ms TTL=127
Reply from 172.25.3.29: bytes=32 time=0ms TTL=127
Reply from 172.25.3.29: bytes=32 time=0ms TTL=127
Reply from 172.25.3.29: bytes=32 time=0ms TTL=127

Ping statistics for 172.25.3.29:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- Ping from Building K(Laboratory Server) to Building B(Manufacturing)

```
Pinging 172.25.0.5 with 32 bytes of data:

Reply from 172.25.0.5: bytes=32 time=0ms TTL=127
Reply from 172.25.0.5: bytes=32 time=0ms TTL=127
Reply from 172.25.0.5: bytes=32 time=0ms TTL=127
Reply from 172.25.0.5: bytes=32 time=1ms TTL=127

Ping statistics for 172.25.0.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- Ping from Building K(Engineering Server) to Building A(Warehouse)

```
Pinging 172.25.0.4 with 32 bytes of data:

Reply from 172.25.0.4: bytes=32 time=0ms TTL=127
Reply from 172.25.0.4: bytes=32 time=0ms TTL=127
Reply from 172.25.0.4: bytes=32 time=0ms TTL=127
Reply from 172.25.0.4: bytes=32 time=0ms TTL=127

Ping statistics for 172.25.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- Ping from Building K(Warehouse Server) to Building C(Laboratory)

```
Pinging 172.25.2.132 with 32 bytes of data:

Reply from 172.25.2.132: bytes=32 time=1ms TTL=127
Reply from 172.25.2.132: bytes=32 time=0ms TTL=127
Reply from 172.25.2.132: bytes=32 time=0ms TTL=127
Reply from 172.25.2.132: bytes=32 time=0ms TTL=127

Ping statistics for 172.25.2.132:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- Ping from Building K(Human Resources Server 2) to Building D(Human Resources)

```
Pinging 172.25.3.4 with 32 bytes of data:

Reply from 172.25.3.4: bytes=32 time=0ms TTL=128
Reply from 172.25.3.4: bytes=32 time=0ms TTL=128
Reply from 172.25.3.4: bytes=32 time=6ms TTL=128
Reply from 172.25.3.4: bytes=32 time=0ms TTL=128

Ping statistics for 172.25.3.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

Pinging to the ISP router

- Ping from Building C(Engineering) to ISP Router

```
Pinging 220.2.4.1 with 32 bytes of data:

Reply from 220.2.4.1: bytes=32 time=1ms TTL=253
Reply from 220.2.4.1: bytes=32 time=1ms TTL=253
Reply from 220.2.4.1: bytes=32 time=1ms TTL=253
Reply from 220.2.4.1: bytes=32 time=1ms TTL=253

Ping statistics for 220.2.4.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- Ping from Building A(Warehouse) to ISP Router

```
Pinging 220.2.4.1 with 32 bytes of data:

Reply from 220.2.4.1: bytes=32 time=1ms TTL=253
Reply from 220.2.4.1: bytes=32 time=1ms TTL=253
Reply from 220.2.4.1: bytes=32 time=1ms TTL=253
Reply from 220.2.4.1: bytes=32 time=1ms TTL=253

Ping statistics for 220.2.4.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- Ping from Building K(Human Resources Server 2) to ISP Router

```
Pinging 220.2.4.1 with 32 bytes of data:

Reply from 220.2.4.1: bytes=32 time=1ms TTL=253
Reply from 220.2.4.1: bytes=32 time=1ms TTL=253
Reply from 220.2.4.1: bytes=32 time=1ms TTL=253
Reply from 220.2.4.1: bytes=32 time=1ms TTL=253

Ping statistics for 220.2.4.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- Ping from Building B(Manufacturing) to ISP Router

```
Pinging 220.2.4.1 with 32 bytes of data:

Reply from 220.2.4.1: bytes=32 time=1ms TTL=253
Reply from 220.2.4.1: bytes=32 time=1ms TTL=253
Reply from 220.2.4.1: bytes=32 time=2ms TTL=253
Reply from 220.2.4.1: bytes=32 time=2ms TTL=253

Ping statistics for 220.2.4.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- Ping from Building D(Human Resources) to ISP Router

```
Pinging 220.2.4.1 with 32 bytes of data:

Reply from 220.2.4.1: bytes=32 time=2ms TTL=253
Reply from 220.2.4.1: bytes=32 time=2ms TTL=253
Reply from 220.2.4.1: bytes=32 time=1ms TTL=253
Reply from 220.2.4.1: bytes=32 time=1ms TTL=253

Ping statistics for 220.2.4.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```