

## NETWORKING INFRASTRUCTURE

### PROJECT REPORT

#### GROUP 4

1. JUMALE ABDI 20241227
2. SULEIMAN USAMA 2024119
3. INNOCENT KISOKA 2024128

#### INTRODUCTION

Our project is to design a reliable network system for company Phantom Dynasty which has four branches located in different cities. LA, Boston, New York, and Texas. Each branches have four departments.

#### **The departments**

- a) Marketing
- b) Sales
- c) IT
- d) Accounting

#### **Project Scope**

Is to design a network that connects the four branches in each city.

Configuring used network devices using assigned IP address 192.168.4.0 so that all four branches can communicate with each other and share resources efficiently.

#### **Network requirement**

1. 20 switches
2. 4 routers
3. 140 PCS
4. Serial DTE
5. Cross-over cables
6. Straight -through cables

## **Physical Design**

Our project is physically designed to represent Phantom Dynasty's network structure in four cities.

Each department connects all the PCs to a switch using a copper straight through cable in star topology. The departments are then connected to each other for communication to another switch via copper cross over then is connected to a router using copper straight through.

This is done to the four branches and therefore a connection is brought to reality by connecting all the four routers to each other by introducing a WIC-2T to enable connection of more than one serial connection

## **Local Design**

### **IP ADDRESSING**

We set up an IP address 192.168.4.0 as the network address for the company.

The IP was subnetted to a total of three subnets address to ease up the network, 255.255.255.192, 255.255.255.224, 255.255.255.252.

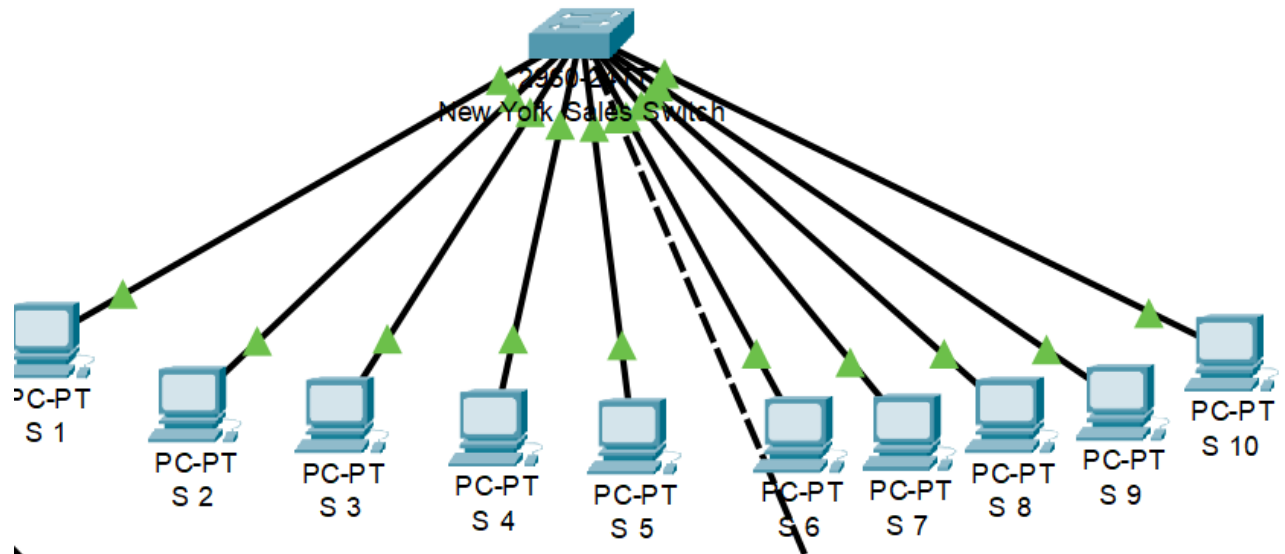
After looking at the total number of hosts, we decided to adopt this approach as:

- i. For the three cities(New York, Boston and Texas) we had a total of 3 subnets which hosted 40 hosts per subnet
- ii. For the Los Angeles, we had a total of 1 subnets which hosted 6 hosts per subnet
- iii. For the last IP address, we decided to leave it for the routing thus had a total of 4 subnets which hosted 2 hosts per subnet

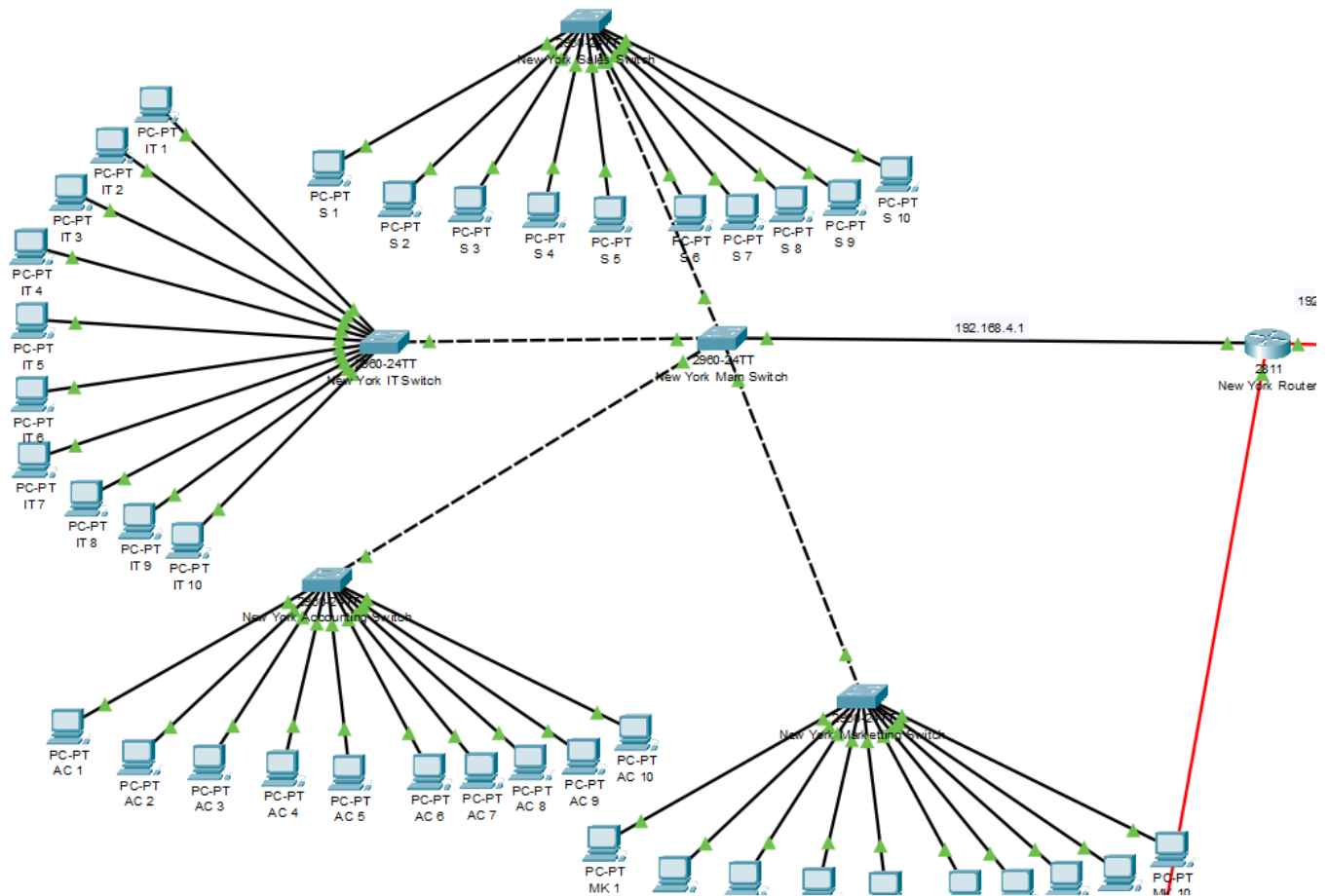
This left a total 3 subnets thus allowing leeway for the expansion of the company's network

SUBNET	NETWORK ADDRESS	FIRST IP ADDRESS	LAST IP ADDRESS	BROADCAST ADDRESS	SUBNET MASK	NUMBER OF HOST
New York	192.168.4.0	192.168.4.2	192.168.4.62	192.168.4.63	/26	40
Boston	192.168.4.64	192.168.4.66	192.168.4.126	192.168.4.127	/26	40
Texas	192.168.4.128	192.168.4.130	192.168.4.190	192.168.4.191	/26	40
L.A	192.168.192	192.168.4.194	192.168.4.222	192.168.4.223	/27	20
Router 1&2	192.168.4.224	192.168.4.226	192.168.4.226	192.168.4.227	/30	2
Router 2&3	192.168.4.228	192.168.4.230	192.168.4.230	192.168.4.231	/30	2
Router 3&4	192.168.4.232	192.168.4.234	192.168.4.234	192.168.4.235	/30	2
Router 4&1	192.168.4.236	192.168.4.237	192.168.4.238	192.168.4.239	/30	2

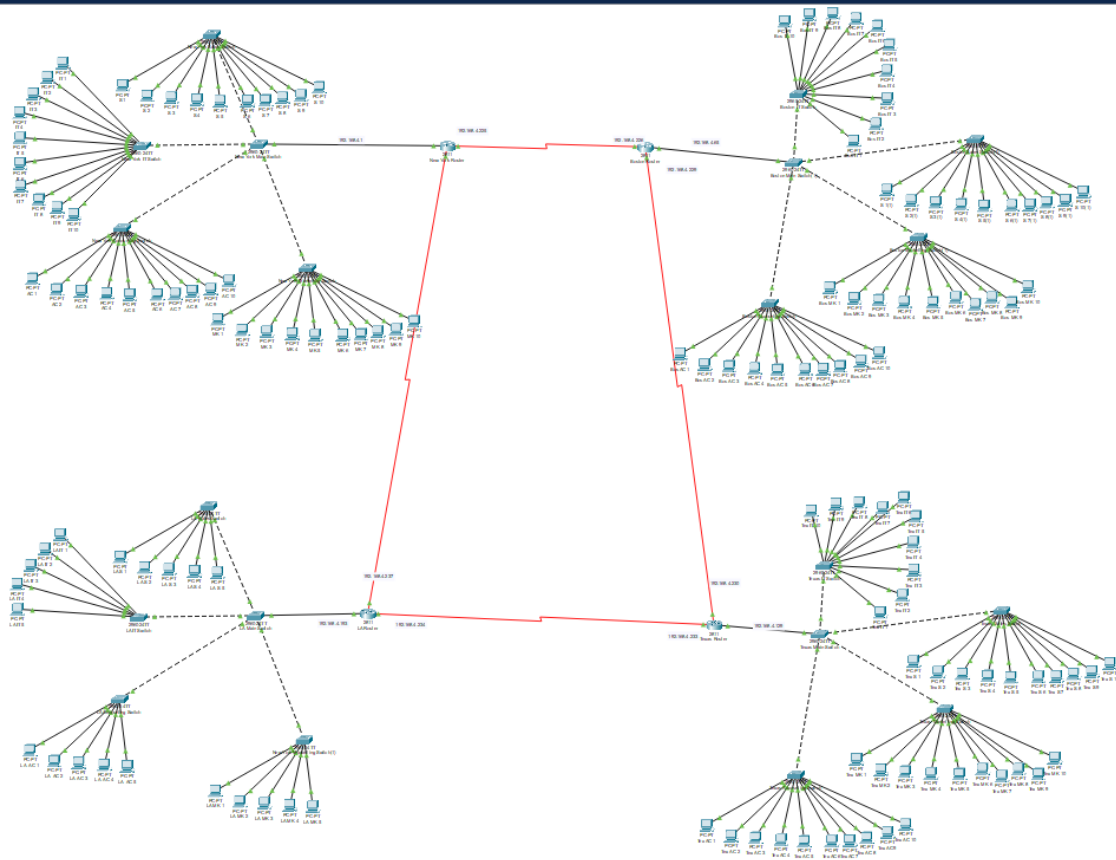
## Departmental Topology



## Branch Topology



# Wide Area Network



## Network Testing and Verification

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.4.2

Pinging 192.168.4.2 with 32 bytes of data:

Reply from 192.168.4.2: bytes=32 time=23ms TTL=128
Reply from 192.168.4.2: bytes=32 time=16ms TTL=128
Reply from 192.168.4.2: bytes=32 time<1ms TTL=128
Reply from 192.168.4.2: bytes=32 time=7ms TTL=128

Ping statistics for 192.168.4.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 23ms, Average = 11ms
```