**1. Introduction**

This document provides a comprehensive overview of the enterprise network designed using Cisco Packet Tracer. The network integrates various technologies and protocols to ensure robust connectivity, security, and performance.

**2. Network Topology**

**Overview**

* **Type:** Enterprise Network
* **Topology:** Hierarchical

**3. Network Protocols**

**OSPF Configuration**

* **Area 0:**
  + Routers: R1, R2, R3, R4
  + Configuration on R1:

router ospf 10

router-id 1.1.1.1

network 10.10.10.0 0.0.0.255 area 0

network 11.11.11.0 0.0.0.3 area 0

network 12.12.12.0 0.0.0.3 area 0

* + Configuration on R2:

router ospf 10

router-id 2.2.2.2

network 10.10.10.0 0.0.0.255 area 0

network 13.13.13.0 0.0.0.3 area 0

network 12.12.12.0 0.0.0.3 area 0

* + Configuration on R3:

router ospf 10

router-id 3.3.3.3

network 10.10.10.0 0.0.0.255 area 0

network 11.11.11.0 0.0.0.3 area 0

network 14.14.14.0 0.0.0.3 area 0

* + Configuration on R4:

router ospf 10

router-id 4.4.4.4

network 10.10.10.0 0.0.0.255 area 0

network 13.13.13.0 0.0.0.3 area 0

network 14.14.14.0 0.0.0.3 area 0

network 15.15.15.0 0.0.0.3 area 0

network 16.16.16.0 0.0.0.3 area 0

network 17.17.17.0 0.0.0.3 area 0

network 18.18.18.0 0.0.0.3 area 0

* **Area 1:**
  + Routers: R9, R10, R20, R19
  + Configuration on R9:

router ospf 10

router-id 5.5.5.5

network 15.15.15.0 0.0.0.3 area 1

network 28.28.28.0 0.0.0.3 area 1

network 29.29.29.0 0.0.0.3 area 1

* + Configuration on R10:

router ospf 10

router-id 6.6.6.6

network 16.16.16.0 0.0.0.3 area 1

network 27.27.27.0 0.0.0.3 area 1

network 31.31.31.0 0.0.0.3 area 1

* + Configuration on R19:

router ospf 10

router-id 11.11.11.11

network 29.29.29.0 0.0.0.3 area 1

network 31.31.31.0 0.0.0.3 area 1

* + Configuration on R20:

router ospf 10

router-id 12.12.12.12

network 28.28.28.28 0.0.0.3 area 1

network 27.27.27.27 0.0.0.3 area 1

* **Area 2:**
  + Routers: R11, R12, R17, R18
  + Configuration on R11:

router ospf 10

router-id 7.7.7.7

network 17.17.17.0 0.0.0.3 area 2

network 20.20.20.0 0.0.0.3 area 2

network 23.23.23.0 0.0.0.3 area 2

* + Configuration on R12:

router ospf 10

router-id 8.8.8.8

network 18.18.18.0 0.0.0.3 area 2

network 21.21.21.0 0.0.0.3 area 2

network 22.22.22.0 0.0.0.3 area 2

* + Configuration on R17:

router ospf 10

router-id 9.9.9.9

network 20.20.20.0 0.0.0.3 area 2

network 21.21.21.0 0.0.0.3 area 2

network 25.25.25.0 0.0.0.3 area 2

* + Configuration on R18:

router ospf 10

router-id 10.10.10.10

network 22.22.22.0 0.0.0.3 area 2

network 23.23.23.0 0.0.0.3 area 2

network 25.25.25.0 0.0.0.3 area 2

**EIGRP Configuration**

* **AS Number:** 100
* **Routers:** R13, R14, R15, R16
  + Configuration on R13:

router eigrp 20

network 19.19.19.0 0.0.0.3

network 20.20.20.0 0.0.0.255

network 21.21.21.0 0.0.0.3

network 22.22.22.0 0.0.0.3

* + Configuration on R14:

router eigrp 20

network 20.20.20.0 0.0.0.255

network 21.21.21.0 0.0.0.3

network 23.23.23.0 0.0.0.3

* + Configuration on R15:

router eigrp 20

network 20.20.20.0 0.0.0.255

network 22.22.22.0 0.0.0.3

network 24.24.24.0 0.0.0.3

* + Configuration on R16:

router eigrp 20

network 20.20.20.0 0.0.0.255

network 23.23.23.0 0.0.0.3

network 24.24.24.0 0.0.0.3

network 65.65.65.0 0.0.0.255

network 70.70.70.0 0.0.0.255

**RIP Configuration**

* **Version:** 2
* **Routers:** R17, R18, R19, R20
  + Configuration on R17:

router rip

version 2

network 20.20.20.0

network 21.21.21.0

network 25.25.25.0

* + Configuration on R18:

router rip

version 2

network 22.22.22.0

network 23.23.23.0

network 25.25.25.0

* + Configuration on R19:

router rip

version 2

network 29.29.29.0

network 31.31.31.0

* + Configuration on R20:

router rip

version 2

network 28.28.28.28

network 27.27.27.27

**Static Routing**

* **Routers:** R16
  + Configuration on R16:

ip route 0.0.0.0 0.0.0.0 20.20.20.1

**4. Network Services**

**DHCP**

* **Server:** DHCP Server1
  + Configuration:

ip dhcp pool VLAN10

network 192.168.99.0 255.255.255.0

default-router 192.168.99.1

dns-server 192.168.10.10

ip dhcp pool VLAN30

network 192.168.70.0 255.255.255.0

default-router 192.168.70.1

dns-server 192.168.10.10

* **Server:** DHCP Server2
  + Configuration:

ip dhcp pool VLAN20

network 192.168.98.0 255.255.255.0

default-router 192.168.98.100

dns-server 192.168.200.10

ip dhcp pool TOWER

network 192.168.200.0 255.255.255.0

default-router 192.168.200.100

dns-server 192.168.200.10

* **Server:** DHCP Server3
  + Configuration:

ip dhcp pool VLAN10

network 192.168.50.0 255.255.255.0

default-router 192.168.50.100

dns-server 192.168.50.10

ip dhcp pool VLAN20

network 192.168.3.0 255.255.255.0

default-router 192.168.3.100

dns-server 192.168.50.10

* **Server:** DHCP Server4
  + Configuration:

ip dhcp pool VLAN20

network 192.168.6.0 255.255.255.0

default-router 192.168.6.100

dns-server 192.168.30.10

**FTP**

* **Server:** FTP Server
  + IP Address: 192.168.10.10, 192.168.200.10, 192.168.50.10, 192.168.30.10
  + Configuration:  
    ip ftp server enable

**NTP**

* **Server:** NTP Server
  + Configuration:  
    ntp server 192.168.10.10

**Email**

* **Server:** Email Server
  + Configuration:  
    email server enable

**5.VLAN Configuration**

* **VLAN 10:** Management (192.168.99.0/24)
* **VLAN 20:** Sales (192.168.98.0/24)
* **VLAN 65:** Call Center (65.65.65.0/24)
* **VLAN 70:** IT (70.70.70.0/24)

**6. Security**

**Port Security**

* **Switch:** SW6, SW7, SW8, SW9, SW10, SW11, SW12, SW13, SW14
  + Configuration:

interface range FastEthernet0/5-6

switchport mode access

switchport port-security

switchport port-security maximum 2

switchport port-security violation restrict

switchport port-security mac-address sticky

**7. EtherChannel**

* **Switches:** SW1, SW2, SW6, SW7, SW8, SW9, SW10, SW11, SW12, SW13, SW14, SW15, SW16, SW17, SW18
  + Configuration on SW2:

interface Port-channel1

switchport mode trunk

!

interface FastEthernet0/1

channel-group 1 mode active

!

interface FastEthernet0/2

channel-group 1 mode active

**8. IP Phone Configuration**

* **Switch:** SW19
  + Configuration:

interface FastEthernet0/3

switchport mode access

switchport voice vlan 65

**9. IoT Configuration**

* **Devices:** Cameras
  + Configuration:  
    ip address dhcp

**10. 3G/4G Cellular Data Service**

* **Device:** Cellular Router
  + Configuration:

interface Cellular0/0/0

ip address negotiated

**12. Appendices**

**Device Inventory**

* **Routers:** cisco 2911
* **Switches:** cisco 2960 and cisco catalyst 3650
* **Servers:** DHCP, NTP, IOT, FTP, DNS, Email Server