Super Lab 1: HermesCerf Network Design

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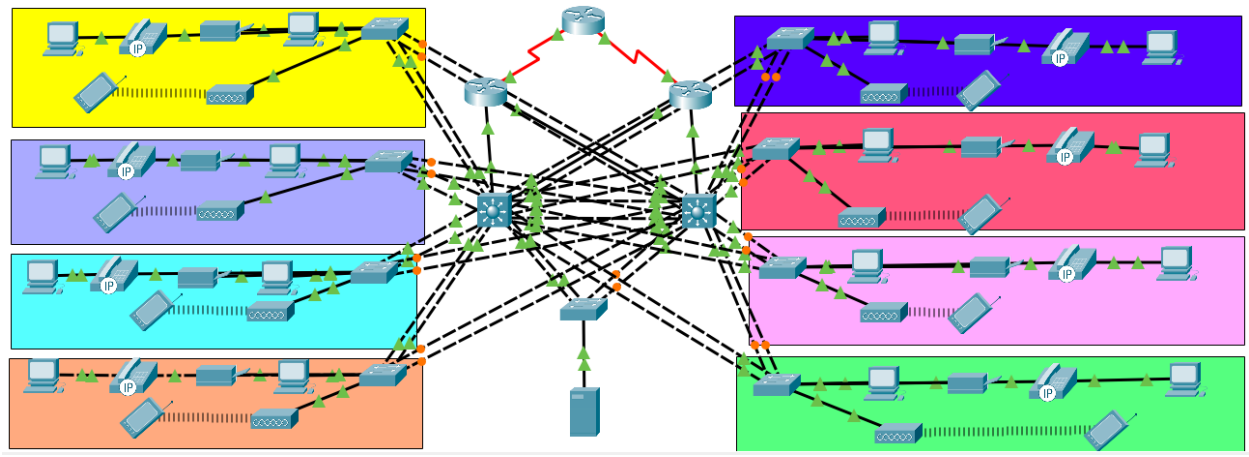
Company Profile



The HermesCerf IT Service & Consulting is a medium-sized IT services and consulting firm. It operates a network supports departmental VLANs, dynamic routing with OSPF, and VLSM-based efficient IP addressing. The topology showcases redundant edge routers and the utilization of a collapsed core model, with the edge routers feeding into two core multilayer switches, and distributed via location-based division access switches per floor.

IPv4 & IPv6 Addressing Scheme

Software Engineering Department | VLAN 10

Address Block: 10.10.10.0/24
Network Address: 10.10.10.0
Subnet Mask: 255.255.255.0
Usable Host Range: 10.10.10.1 – 10.10.10.254
Broadcast Address: 10.10.10.255

Addressing Roles:

- **HSRP VLAN 10**: 10.10.10.254
- **CoreSwitch1 VLAN 10 SVI**: 10.10.10.1
- **CoreSwitch2 VLAN 10 SVI:** 10.10.10.2

Infrastructure Department | VLAN 20

Address Block: 10.10.20.0/24
Network Address: 10.10.20.0
Subnet Mask: 255.255.255.0
Usable Host Range: 10.10.20.1 – 10.10.20.254
Broadcast Address: 10.10.20.255

Addressing Roles:

- **HSRP VLAN 20**: 10.10.20.254
- **CoreSwitch1 VLAN 20 SVI**: 10.10.20.1
- **CoreSwitch2 VLAN 20 SVI:** 10.10.20.2

Technical Operations Department | VLAN 30

Address Block: 10.10.30.0/27
Network Address: 10.10.30.0
Subnet Mask: 255.255.255.224
Usable Host Range: 10.10.30.1 – 10.10.30.30
Broadcast Address: 10.10.30.31

Addressing Roles:

- **HSRP VLAN 30**: 10.10.30.30
- **CoreSwitch1 VLAN 30 SVI**: 10.10.30.1
- **CoreSwitch2 VLAN 30 SVI:** 10.10.30.2

Sales & Marketing Department | VLAN 40

Address Block: 10.10.40.0/26
Network Address: 10.10.40.0
Subnet Mask: 255.255.255.192
Usable Host Range: 10.10.40.1 – 10.10.40.62
Broadcast Address: 10.10.40.63

Addressing Roles:

- **HSRP VLAN 10**: 10.10.40.62
- **CoreSwitch1 VLAN 10 SVI**: 10.10.40.1
- **CoreSwitch2 VLAN 10 SVI:** 10.10.40.2

Customer Agents Department | VLAN 50

Address Block: 10.10.50.0/24
Network Address: 10.10.50.0
Subnet Mask: 255.255.255.0
Usable Host Range: 10.10.50.1 – 10.10.50.254
Broadcast Address: 10.10.50.255

Addressing Roles:

- **HSRP VLAN 10**: 10.10.50.254
- **CoreSwitch1 VLAN 50 SVI**: 10.10.50.1
- **CoreSwitch2 VLAN 50 SVI:** 10.10.50.2

Accounting & Payroll Department | VLAN 60

Address Block: 10.10.60.0/27
Network Address: 10.10.60.0
Subnet Mask: 255.255.255.224
Usable Host Range: 10.10.60.1 – 10.10.60.30
Broadcast Address: 10.10.60.31

Addressing Roles:

- **HSRP VLAN 60**: 10.10.60.30
- **CoreSwitch1 VLAN 60 SVI**: 10.10.60.1
- **CoreSwitch2 VLAN 60 SVI:** 10.10.60.2

Human Resources Department | VLAN 70

Address Block: 10.10.70.0/26
Network Address: 10.10.70.0
Subnet Mask: 255.255.255.192
Usable Host Range: 10.10.70.1 – 10.10.70.62
Broadcast Address: 10.10.70.63

Addressing Roles:

- **HSRP VLAN 70**: 10.10.70.62
- **CoreSwitch1 VLAN 70 SVI**: 10.10.70.1
- **CoreSwitch2 VLAN 70 SVI:** 10.10.70.2

Procurement Department | VLAN 80

Address Block: 10.10.80.0/27
Network Address: 10.10.80.0
Subnet Mask: 255.255.255.224
Usable Host Range: 10.10.80.1 – 10.10.80.30
Broadcast Address: 10.10.80.31

Addressing Roles:

- **HSRP VLAN 80**: 10.10.80.30
- **CoreSwitch1 VLAN 80 SVI**: 10.10.80.1
- **CoreSwitch2 VLAN 80 SVI:** 10.10.80.2

Network Management| VLAN 90

Address Block: 10.10.90.0/24
Network Address: 10.10.90.0
Subnet Mask: 255.255.255.0
Usable Host Range: 10.10.90.1 - 10.10.90.254
Broadcast Address: 10.10.90.255

Addressing Roles:

- **HSRP VLAN 90**: 10.10.90.254
- **CoreSwitch1 VLAN 90 SVI**: 10.10.90.1
- **CoreSwitch2 VLAN 90 SVI:** 10.10.90.2

Servers | VLAN 100

Address Block: 10.10.100.0/24
Network Address: 10.10.100.0
Subnet Mask: 255.255.255.0
Usable Host Range: 10.10.100.1 - 10.10.100.254
Broadcast Address: 10.10.100.255

Addressing Roles:

- **HSRP VLAN 10**: 10.10.100.254
- **CoreSwitch1 VLAN 10 SVI**: 10.10.100.1
- **CoreSwitch2 VLAN 10 SVI:** 10.10.100.2

Printers | VLAN 110

Address Block: 10.10.110.0/24
Network Address: 10.10.110.0
Subnet Mask: 255.255.255.0
Usable Host Range: 10.10.110.1 - 10.10.110.254
Broadcast Address: 10.10.110.255

Addressing Roles:

- **HSRP VLAN 110**: 10.10.110.254
- **CoreSwitch1 VLAN 110 SVI**: 10.10.110.1
- **CoreSwitch2 VLAN 110 SVI:** 10.10.110.2

Wireless | VLAN 120

Address Block: 10.10.120.0/24
Network Address: 10.10.120.0
Subnet Mask: 255.255.255.0
Usable Host Range: 10.10.120.1 - 10.10.120.254
Broadcast address: 10.10.120.255

Addressing Roles:

- **HSRP VLAN 10**: 10.10.120.254
- **CoreSwitch1 VLAN 120 SVI**: 10.10.120.1
- **CoreSwitch2 VLAN 120 SVI:** 10.10.120.2

Voice | VLAN 130

Address Block: 10.10.130.0/24
Network Address: 10.10.130.0
Subnet Mask: 255.255.255.0
Usable Host Range: 10.10.130.1 – 10.10.130.254
Broadcast Address: 10.10.130.255

Addressing Roles:

- **HSRP VLAN 130**: 10.10.130.254
- **CoreSwitch1 VLAN 130 SVI**: 10.10.130.1
- **CoreSwitch2 VLAN 130 SVI:** 10.10.130.2

Device Connections in the Network Design

Due to clutter try to practice the command "**show cdp neighbors**"to reveal the interfaces utilize in connecting the devices.

ISP Connections

ISP Interfaces	Connected Device & Its Interfaces	Network Address Block
Se0/1/0 (201.0.113.1)	EdgeRouter1 Se0/1/0 (201.0.113.2)	201.0.113.0/30
Se0/1/1 (201.0.113.5)	EdgeRouter2 Se0/1/0 (201.0.113.6)	201.0.113.4/30

EdgeRouter1 Connections

EdgeRouter1 Interfaces	Connected Device & Its Interfaces	Network Address Block
Se0/1/0 (201.0.113.2)	ISP Se0/1/0 (201.0.113.1)	201.0.113.0/30
G0/0/0 (192.168.100.2)	CoreSwitch1 G1/0/1 (192.168.100.1)	192.168.100.0/30
G0/0/1 (192.168.200.2)	CoreSwitch2 G1/0/2 (192.168.200.1)	192.168.200.0/30

EdgeRouter2 Connections

EdgeRouter2 Interfaces	Connected Devices & Their Interfaces	Network Address Block
Se0/1/0 (201.0.113.6)	ISP Se0/1/1 (201.0.113.6)	201.0.113.4/30
G0/0/0 (192.168.100.6)	CoreSwitch2 G1/0/1 (192.168.100.5)	192.168.100.4/30
G0/0/1 (192.168.200.6)	CoreSwitch1 G1/0/2 (192.168.200.5)	192.168.200.4/30

CoreSwitch1 Connections

CoreSwitch1 Interfaces	Connected Devices & Their Interfaces	Network Address Block
G1/0/1 (192.168.100.1)	EdgeRouter1 G0/0/0 (192.168.100.2)	192.168.100.0/30
G1/0/2 (192.168.200.5)	EdgeRouter2 G0/0/1 (192.168.200.6)	192.168.200.4/30
G1/0/3-4 / Po1 (Trunk Port)	CoreSwitch2 G1/0/3-4 / Po1 (Trunk Port)	N/A
G1/0/5-6 / Po2 (Trunk Port)	AccessSwitch1 Fa0/1-2 / Po1 (Trunk Port)	N/A
G1/0/7-8 / Po3 (Trunk Port)	AccessSwitch2 Fa0/1-2 / Po1 (Trunk Port)	N/A
G1/0/9-10 / Po4 (Trunk Port)	AccessSwitch3 Fa0/1-2 / Po1 (Trunk Port)	N/A

G1/0/11-12 / Po5 (Trunk Port)	AccessSwitch4 Fa0/1-2 / Po1 (Trunk Port)	N/A
G1/0/13-14 / Po6 (Trunk Port)	AccessSwitch5 Fa0/1-2 / Po1 (Trunk Port)	N/A
G1/0/15-16 / Po7 (Trunk Port)	AccessSwitch6 Fa0/1-2 / Po1 (Trunk Port)	N/A
G1/0/17-18 / Po8 (Trunk Port)	AccessSwitch7 Fa0/1-2 / Po1 (Trunk Port)	N/A
G1/0/19-20 / Po9 (Trunk Port)	AccessSwitch8 Fa0/1-2 / Po1 (Trunk Port)	N/A
G1/0/21-22 / Po10 (Trunk Port)	AccessSwitch9 Fa0/1-2 / Po1 (Trunk Port)	N/A

CoreSwitch2 Connections

CoreSwitch2 Interfaces	**Connected Devices & Their Interfaces**	**Network Address Block**
G1/0/1 (192.168.100.5)	EdgeRouter2 G0/0/0 (192.168.100.6)	192.168.100.4/30
G1/0/2 (192.168.200.1)	EdgeRouter1 G0/0/1 (192.168.200.2)	192.168.200.0/30
G1/0/3-4 / Po1 (Trunk Port)	CoreSwitch1 G1/0/3-4 / Po1 (Trunk Port)	N/A
G1/0/5-6 / Po2 (Trunk Port)	AccessSwitch1 Fa0/3-4 / Po2 (Trunk Port)	N/A
G1/0/7-8 / Po3 (Trunk Port)	AccessSwitch2 Fa0/3-4 / Po2 (Trunk Port)	N/A
G1/0/9-10 / Po4 (Trunk Port)	AccessSwitch3 Fa0/3-4 / Po2 (Trunk Port)	N/A
G1/0/11-12 / Po5 (Trunk Port)	AccessSwitch4 Fa0/3-4 / Po2 (Trunk Port)	N/A
G1/0/13-14 / Po6 (Trunk Port)	AccessSwitch5 Fa0/3-4 / Po2 (Trunk Port)	N/A
G1/0/15-16 / Po7 (Trunk Port)	AccessSwitch6 Fa0/3-4 / Po2 (Trunk Port)	N/A
G1/0/17-18 / Po8 (Trunk Port)	AccessSwitch7 Fa0/3-4 / Po2 (Trunk Port)	N/A
G1/0/19-20 / Po9 (Trunk Port)	AccessSwitch8 Fa0/3-4 / Po2 (Trunk Port)	N/A
G1/0/21-22 / Po10 (Trunk Port)	AccessSwitch9 Fa0/3-4 / Po2 (Trunk Port)	N/A

AccessSwitch1 Connections

AccessSwitch1 Interfaces	Connected Device & Their Interfaces	Network Address Block
Fa0/1-2 / Po1 (Trunk Port)	CoreSwitch1 G1/0/5-6 / Po2 (Trunk Port)	N/A
Fa0/3-4 / Po2 (Trunk Port)	CoreSwitch2 G1/0/5-6 / Po2 (Trunk Port)	N/A
Fa0/5 (Access Port for VLAN 100)	DHCP Server Fa0	N/A
Fa0/6 (Access Port for VLAN 100)	Unused	N/A

AccessSwitch2 Connections

AccessSwitch2 Interfaces	Connected Device & Their Interfaces	Network Address Block
Fa0/1-2 / Po1 (Trunk Port)	CoreSwitch1 G1/0/7-8 / Po3 (Trunk Port)	N/A
Fa0/3-4 / Po2 (Trunk Port)	CoreSwitch2 G1/0/7-8 / Po3 (Trunk Port)	N/A
Fa0/5-21 (Access Port for VLAN 10)	PCs	10.10.10.0/24
Fa0/22 (Access Port for VLAN 110 Printer)	Printer	10.10.110.0/24
Fa0/23 (Access Port for VLAN 130)	IP Phone	10.10.130/24
Fa0/24 (Access Port for VLAN 120)	Access Point	10.10.120/24

AccessSwitch3 Connections

AccessSwitch3 Interfaces	Connected Device & Their Interfaces	Network Address Block
Fa0/1-2 / Po1 (Trunk Port)	CoreSwitch1 G1/0/9-10 / Po4 (Trunk Port)	N/A
Fa0/3-4 / Po2 (Trunk Port)	CoreSwitch2 G1/0/9-10 / Po4 (Trunk Port)	N/A
Fa0/5-21 (Access Port for VLAN 20)	PCs	10.10.20.0/24
Fa0/22 (Access Port for VLAN 110 Printer)	Printer	10.10.110.0/24
Fa0/23 (Access Port for VLAN 130)	IP Phone	10.10.130/24
Fa0/24 (Access Port for VLAN 120)	Access Point	10.10.120/24

AccessSwitch4 Connections

AccessSwitch4 Interfaces	Connected Device & Their Interfaces	Network Address Block
Fa0/1-2 / Po1 (Trunk Port)	CoreSwitch1 G1/0/11-12 / Po5 (Trunk Port)	N/A
Fa0/3-4 / Po2 (Trunk Port)	CoreSwitch2 G1/0/11-12 / Po5 (Trunk Port)	N/A
Fa0/5-21 (Access Port for VLAN 30)	PCs	10.10.30.0/27
Fa0/22 (Access Port for VLAN 110 Printer)	Printer	10.10.110.0/24
Fa0/23 (Access Port for VLAN 130)	IP Phone	10.10.130/24
Fa0/24 (Access Port for VLAN 120)	Access Point	10.10.120/24

AccessSwitch5 Connections

AccessSwitch5 Interfaces	Connected Device & Their Interfaces	Network Address Block
Fa0/1-2 / Po1 (Trunk Port)	CoreSwitch1 G1/0/13-14 / Po6 (Trunk Port)	N/A
Fa0/3-4 / Po2 (Trunk Port)	CoreSwitch2 G1/0/13-14 / Po6 (Trunk Port)	N/A
Fa0/5-21 (Access Port for VLAN 40)	PCs	10.10.40.0/26
Fa0/22 (Access Port for VLAN 110 Printer)	Printer	10.10.110.0/24
Fa0/23 (Access Port for VLAN 130)	IP Phone	10.10.130/24
Fa0/24 (Access Port for VLAN 120)	Access Point	10.10.120/24

AccessSwitch6 Connections

AccessSwitch6 Interfaces	Connected Device & Their Interfaces	Network Address Block
Fa0/1-2 / Po1 (Trunk Port)	CoreSwitch1 G1/0/15-16 / Po7 (Trunk Port)	N/A
Fa0/3-4 / Po2 (Trunk Port)	CoreSwitch2 G1/0/15-16 / Po7 (Trunk Port)	N/A
Fa0/5-21 (Access Port for VLAN 50)	PCs	10.10.50.0/24
Fa0/22 (Access Port for VLAN 110 Printer)	Printer	10.10.110.0/24

Fa0/23 (Access Port for VLAN 130)	IP Phone	10.10.130/24
Fa0/24 (Access Port for VLAN 120)	Access Point	10.10.120/24

AccessSwitch7 Connections

AccessSwitch7 Interfaces	Connected Device & Their Interfaces	Network Address Block
Fa0/1-2 / Po1 (Trunk Port)	CoreSwitch1 G1/0/17-18 / Po8 (Trunk Port)	N/A
Fa0/3-4 / Po2 (Trunk Port)	CoreSwitch2 G1/0/17-18 / Po8 (Trunk Port)	N/A
Fa0/5-21 (Access Port for VLAN 60)	PCs	10.10.60.0/27
Fa0/22 (Access Port for VLAN 110 Printer)	Printer	10.10.110.0/24
Fa0/23 (Access Port for VLAN 130)	IP Phone	10.10.130/24
Fa0/24 (Access Port for VLAN 120)	Access Point	10.10.120/24

AccessSwitch8 Connections

AccessSwitch8 Interfaces	Connected Device & Their Interfaces	Network Address Block
Fa0/1-2 / Po1 (Trunk Port)	CoreSwitch1 G1/0/19-20 / Po9 (Trunk Port)	N/A
Fa0/3-4 / Po2 (Trunk Port)	CoreSwitch2 G1/0/19-20 / Po9 (Trunk Port)	N/A
Fa0/5-21 (Access Port for VLAN 70)	PCs	10.10.70.0/26
Fa0/22 (Access Port for VLAN 110 Printer)	Printer	10.10.110.0/24
Fa0/23 (Access Port for VLAN 130)	IP Phone	10.10.130/24
Fa0/24 (Access Port for VLAN 120)	Access Point	10.10.120/24

AccessSwitch9 Connections

AccessSwitch9 Interfaces	Connected Device & Their Interfaces	Network Address Block
Fa0/1-2 / Po1 (Trunk Port)	CoreSwitch1 G1/0/21-22 / Po10 (Trunk Port)	N/A

Fa0/3-4 / Po2 (Trunk Port)	CoreSwitch2 G1/0/21-22 / Po10 (Trunk Port)	N/A
Fa0/5-21 (Access Port for VLAN 80)	PCs	10.10.80.0/27
Fa0/22 (Access Port for VLAN 110 Printer)	Printer	10.10.110.0/24
Fa0/23 (Access Port for VLAN 130)	IP Phone	10.10.130/24
Fa0/24 (Access Port for VLAN 120)	Access Point	10.10.120/24

ISP Configuration

```
hostname ISP
no ip domain lookup
ip routing
ipv6 unicast routing


int se0/1/0
description "Link to EdgeRouter1"
ip add 201.0.113.1 255.255.255.252
clock rate 1000000
no shutdown
exit

int se0/1/1
description "Link to EdgeRouter2"
ip add 201.0.113.5 255.255.255.252
clock rate 1000000
no shutdown


! simulate upstream internet for ipv4
ip route 0.0.0.0 0.0.0.0 null0
```

Basic Configurations

EdgeRouter1-2

No ip domain lookup
Hostname EdgeRouter<#> !1 or 2
Service password-encryption
Security passwords min-length 10
Enable secret ramcie12345
Login block-for 60 attempts 10 within 15

Ip routing

Spanning-tree mode rapid-pvst

Ip domain name ram-net.com
Username ramchi privilege 15 secret ramcie12345
Crypto key generate rsa general-keys modulus 1024

Line con 0
Logging synchronous
Password ramcie12345
Exec-timeout 1 30

Line vty 0 4
Logging synchronous
Transport input ssh
Password ramcie12345
Exec-timeout
Login local

! .4 for EdgeRouter2
Int loopback 0
Ip add 10.10.90.3 255.255.255.0

Routed Ports to CoreSwitches & ISP in EdgeRouter1

int se0/1/0
description "Link to ISP for EdgeRouter1"
ip address 201.0.113.2 255.255.255.252
no shutdown

int g0/0/0

description "Link to CoreSwitch1"

Ip address 192.168.100.2 255.255.255.252

No shutdown

int g0/0/1

description "Link to CoreSwitch2"

Ip address 192.168.200.2 255.255.255.252

No shutdown

Routed Ports to CoreSwitches & ISP in EdgeRouter2

int se0/1/0
description "Link to ISP for EdgeRouter2"
ip address 201.0.113.6 255.255.255.252
no shutdown

int g0/0/0
description "Link to CoreSwitch2"
Ip address 192.168.100.6 255.255.255.252
No shutdown

int g0/0/1
description "Link to CoreSwitch1"
Ip address 192.168.200.6 255.255.255.252
No shutdown

CoreSwitch1-2

No ip domain lookup
Hostname CoreSwitch<#> !1 or 2
Service password-encryption
Enable secret ramcie12345
Login block-for 60 attempts 10 within 15

Ip routing

Spanning-tree mode rapid-pvst

Ip domain name ram-net.com
Username ramchi privilege 15 secret ramcie12345

Crypto key generate rsa general-keys modulus 1024

Line con 0
Logging synchronous
Password ramcie12345
Exec-timeout 1 30

Line vty 0 4
Logging synchronous
Transport input ssh
Password ramcie12345
Exec-timeout 1 30
Login local

! Use int vlan 90 for SSH

Routed Ports to EdgeRouters in CoreSwitch1

int g1/0/1
Description “Link to EdgeRouter1”
No switchport
Ip address 192.168.100.1 255.255.255.252
no sh

int range g1/0/2
description "Link to EdgeRouter2"
No switchport
ip add 192.168.200.5 255.255.255.252
no sh

Routed Ports to EdgeRouters in CoreSwitch2

int g1/0/1
Description “Link to EdgeRouter2”
no switchport
Ip address 192.168.100.5 255.255.255.252
no sh

int range g1/0/2
description "Link to EdgeRouter1"
no switchport
ip add 192.168.200.5 255.255.255.252
no sh

AccessSwitch1-9

No ip domain lookup
Hostname AccessSwitch<#> !1-9
Service password-encryption
Enable secret ramcie12345
Login block-for 60 attempts 10 within 15

Ip routing

Spanning-tree mode rapid-pvst

Ip domain name ram-net.com
Username ramchi privilege 15 secret ramcie12345
Crypto key generate rsa general-keys modulus 1024

Line con 0
Logging synchronous
Password ramcie12345
Exec-timeout 1 30

Line vty 0 4
Logging synchronous
Transport input ssh
Password ramcie12345
Exec-timeout 1 30
Login local

! For remote network management
!increment by 1 as you go
Int vlan 90
Ip add 10.10.90.13 255.255.255.0
Exit

Ip default-gateway 10.10.90.254

VLAN Configurations (SVI, Nomenclature, Trunk & Access Ports)

CoreSwitch1-2

! on CoreSwitch use .2

int vlan 10
description "Software Engineering VLAN"
ip address 10.10.10.1 255.255.255.0

int vlan 20
description "Infrastructure VLAN"
ip address 10.10.20.1 255.255.255.0

int vlan 30
description "Technical Operations VLAN"
ip address 10.10.30.1 255.255.255.224

int vlan 40
description "Sales & Marketing VLAN"
ip address 10.10.40.1 255.255.255.192

int vlan 50
description "Customer Agents VLAN"
ip address 10.10.50.1 255.255.255.0

int vlan 60
description "Accounting & Payroll VLAN"
ip address 10.10.60.1 255.255.255.224

int vlan 70
description "Human Resources VLAN"
ip address 10.10.70.1 255.255.255.192

int vlan 80
description "Procurement VLAN"
ip address 10.10.80.1 255.255.255.240

int vlan 90
description "Network Management VLAN"
ip addess 10.10.90.1 255.255.255.0

int vlan 100
description "Servers VLAN"

ip add 10.10.100.1 255.255.255.0

int vlan 110
description "Printers VLAN"
ip add 10.10.110.1 255.255.255.0

int vlan 120
description "Wireless VLAN"
ip add 10.10.120.1 255.255.255.0

int vlan 130
description "Voice VLAN"
ip add 10.10.130.1 255.255.255.0

vlan 10
name "Software Engineering"
vlan 20
name "Infrastructure"
vlan 30
name "Technical Operations"
vlan 40
name "Sales & Marketing"
vlan 50
name "Customer Agents"
vlan 60
name "Accounting & Payroll"
vlan 70
name "Human Resources"
vlan 80
name "Procurement"
vlan 90
name "Network Management"
vlan 100
name "Servers"
vlan 110
name "Printers"
vlan 120
name "Wireless"
vlan 30
name "Voice"

int range g1/0/3-22
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,90,100,110,120,130

AccessSwitch1-9

vlan 10
name "Software Engineering"
vlan 20
name "Infrastructure"
vlan 30
name "Technical Operations"
vlan 40
name "Sales & Marketing"
vlan 50
name "Customer Agents"
vlan 60
name "Accounting & Payroll"
vlan 70
name "Human Resources"
vlan 80
name "Procurement"
vlan 90
name "Network Management"
vlan 100
name "Servers"
vlan 110
name "Printers"
vlan 120
name "Wireless"
vlan 130
name "Voice"

int range fa0/1-4
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,90,100,110,120,130

int fa0/5-21
switchport mode access
switchport access vlan <10 – 80, 100>
spanning-tree portfast
spanning-tree bpduguard enable

int fa0/22
switchport mode access
switchport access vlan 110
spanning-tree portfast
spanning-tree bpduguard enable

int fa0/23
switchport mode access
switchport access vlan 110

switchport voice vlan 130
spanning-tree portfast
spanning-tree bpduguard enable

int fa0/24
switchport mode access
switchport access vlan 120
spanning-tree portfast
spanning-tree bpduguard enable

DHCP Configurations

Server

Statically configure
IP address: 10.10.100.3
Subnet mask: 255.255.255.0
Default-gateway: 10.10.100.254
DNS: 8.8.8.8

Pool name: SoftwareEngineering_Pool
Default gateway: 10.10.10.254
DNS: 8.8.8.8
Start IP address: 10.10.10.3
Subnet mask: 255.255.255.0
Maximum no. of users: 250

Pool name: Infrastructure_Pool
Default gateway: 10.10.20.254
DNS: 8.8.8.8
Start IP address: 10.10.20.3
Subnet mask: 255.255.255.0
Maximum no. of users: 250

Pool name: TechnicalOps_Pool
Default gateway: 10.10.30.30
DNS: 8.8.8.8
Start IP address: 10.10.10.3
Subnet mask: 255.255.255.224
Maximum no. of users: 27

Pool name: Sales&Marketing_Pool
Default gateway: 10.10.40.62
DNS: 8.8.8.8
Start IP address: 10.10.40.3
Subnet mask: 255.255.255.192
Maximum no. of users: 59

Pool name: CustomerAgents_Pool
Default gateway: 10.10.50.254
DNS: 8.8.8.8
Start IP address: 10.10.50.3
Subnet mask: 255.255.255.0
Maximum no. of users: 250

Pool name: Accounting&Payroll_Pool
Default gateway: 10.10.60.30
DNS: 8.8.8.8
Start IP address: 10.10.60.3
Subnet mask: 255.255.255.224
Maximum no. of users: 27

Pool name: HR_Pool
Default gateway: 10.10.70.62
DNS: 8.8.8.8
Start IP address: 10.10.70.3
Subnet mask: 255.255.255.192
Maximum no. of users: 59

Pool name: Procurement_Pool
Default gateway: 10.10.80.30
DNS: 8.8.8.8
Start IP address: 10.10.80.3
Subnet mask: 255.255.255.224
Maximum no. of users: 27

Pool name: Printer_Pool
Default gateway: 10.10.110.254
DNS: 8.8.8.8
Start IP address: 10.10.110.3
Subnet mask: 255.255.255.0
Maximum no. of users: 250

Pool name: Wireless_Pool
Default gateway: 10.10.120.254
DNS: 8.8.8.8
Start IP address: 10.10.120.3
Subnet mask: 255.255.255.0
Maximum no. of users: 250

Pool name: Voice_Pool
Default gateway: 10.10.130.254
DNS: 8.8.8.8
Start IP address: 10.10.130.3
Subnet mask: 255.255.255.0
Maximum no. of users: 250

CoreSwitch1-2

Int vlan 10
Ip dhcp helper-address 10.10.100.3

Int vlan 20
Ip dhcp helper-address 10.10.100.3

Int vlan 30
Ip dhcp helper-address 10.10.100.3

Int vlan 40
Ip dhcp helper-address 10.10.100.3

Int vlan 50
Ip dhcp helper-address 10.10.100.3

Int vlan 60
Ip dhcp helper-address 10.10.100.3

Int vlan 70
Ip dhcp helper-address 10.10.100.3

Int vlan 80
Ip dhcp helper-address 10.10.100.3

Int vlan 90
Ip dhcp helper-address 10.10.100.3

Int vlan 100
Ip dhcp helper-address 10.10.100.3

Int vlan 110
Ip dhcp helper-address 10.10.100.3

Int vlan 120
Ip dhcp helper-address 10.10.100.3

Int vlan 130
Ip dhcp helper-address 10.10.100.3

EtherChannel

CoreSwitch1-2

int range g1/0/3-4
channel-group 1 mode active

int po1
switchport trunk native vlan 90
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,100,110,120,130

int range g1/0/5-6
channel-group 2 mode active

int po2
description "Etherchannel link to CoreSwitch"
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,100,110,120,130

int range g1/0/7-8
channel-group 3 mode active

int po3
description "Etherchannel link to AccessSwitch2"
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,90,100,110,120,130

int range g1/0/9-10
channel-group 4 mode active

int po4
description "Etherchannel link to AccessSwitch3"
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,90,100,110,120,130

int range g1/0/11-12
channel-group 5 mode active

int po5
description "Etherchannel link to AccessSwitch4"
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,90,100,110,120,130

int range g1/0/13-14
channel-group 6 mode active

int po6
description "Etherchannel link to AccessSwitch5"
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,90,100,110,120,130

int range g1/0/15-16
channel-group 7 mode active

int po7
description "Etherchannel link to AccessSwitch6"
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,90,100,110,120,130

int range g1/0/17-18
channel-group 8 mode active

int po8
description "Etherchannel link to AccessSwitch7"
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,90,100,110,120,130

int range g1/0/19-20
channel-group 9 mode active

int po9
description "Etherchannel link to AccessSwitch8"
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,90,100,110,120,130

int range g1/0/21-22
channel-group 10 mode active

int po10
description "Etherchannel link to AccessSwitch9"
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,90,100,110,120,130

AccessSwitch1-9

int range fa0/1-2
channel-group 1 mode active

int po1
description "Etherchannel link2 to CoreSwitch1"
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,90,100,110,120,130

int range fa0/3-4
channel-group 2 mode active

int po2
description "Etherchannel link to CoreSwitch2"
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,60,70,80,90,100,110,120,130

HSRP Configurations

CoreSwitch1-2

```
! Use 100 on CoreSwitch2

interface vlan 10
 standby 1 ip 10.10.10.254
 standby 1 priority 110
 standby 1 preempt

interface vlan 20
 standby 1 ip 10.10.20.254
 standby 1 priority 110
 standby 1 preempt

interface vlan 30
 standby 1 ip 10.10.30.30
 standby 1 priority 110
 standby 1 preempt

interface vlan 40
 standby 1 ip 10.10.40.254
 standby 1 priority 110
 standby 1 preempt

interface vlan 50
 standby 1 ip 10.10.50.254
 standby 1 priority 110
 standby 1 preempt

interface vlan 60
 standby 1 ip 10.10.60.254
 standby 1 priority 110
 standby 1 preempt

interface vlan 70
 standby 1 ip 10.10.70.254
 standby 1 priority 110
 standby 1 preempt

interface vlan 80
 standby 1 ip 10.10.80.254
 standby 1 priority 110
 standby 1 preempt
```

```
interface vlan 90
 standby 1 ip 10.10.90.254
 standby 1 priority 110
 standby 1 preempt

interface vlan 100
 standby 1 ip 10.10.100.254
 standby 1 priority 110
 standby 1 preempt

interface vlan 110
 standby 1 ip 10.10.110.254
 standby 1 priority 110
 standby 1 preempt

interface vlan 120
 standby 1 ip 10.10.120.254
 standby 1 priority 110
 standby 1 preempt

interface vlan 130
 standby 1 ip 10.10.130.254
 standby 1 priority 110
 standby 1 preempt
```

STP Configurations

On CoreSwitch1

spanning-tree vlan 10 root primary
spanning-tree vlan 20 root primary
spanning-tree vlan 30 root primary
spanning-tree vlan 40 root primary
spanning-tree vlan 50 root primary
spanning-tree vlan 60 root primary
spanning-tree vlan 70 root primary
spanning-tree vlan 80 root primary
spanning-tree vlan 90 root primary
spanning-tree vlan 100 root primary
spanning-tree vlan 110 root primary
spanning-tree vlan 120 root primary
spanning-tree vlan 130 root primary

On CoreSwitch2

spanning-tree vlan 10 root secondary
spanning-tree vlan 20 root secondary
spanning-tree vlan 30 root secondary
spanning-tree vlan 40 root secondary
spanning-tree vlan 50 root secondary
spanning-tree vlan 60 root secondary
spanning-tree vlan 70 root secondary
spanning-tree vlan 80 root secondary
spanning-tree vlan 90 root secondary
spanning-tree vlan 100 root secondary
spanning-tree vlan 110 root secondary
spanning-tree vlan 120 root secondary
spanning-tree vlan 130 root secondary

Single-Area OSPF and Default Routes

On EdgeRouter1

route ospf 10
router-id 100.100.100.100
network 192.168.100.0 0.0.0.3 area 0
network 192.168.200.0 0.0.0.3 area 0
network 10.10.90.0 0.0.0.255 area 0

ip route 0.0.0.0 0.0.0.0 201.0.113.1

On EdgeRouter2

router ospf 10
router-id 200.200.200.200
network 192.168.100.4 0.0.0.3 area 0
network 192.168.200.4 0.0.0.3 area 0
network 10.10.90.0 0.0.0.255 area0

ip route 0.0.0.0 0.0.0.0 201.0.113.4

On CoreSwitch1

router ospf 10
router-id 111.111.111.111
network 192.168.100.0 0.0.0.3 area 0
network 192.168.200.4 0.0.0.3 area 0
network 10.10.10.0 0.0.0.255 area 0
network 10.10.20.0 0.0.0.255 area 0
network 10.10.30.0 0.0.0.31 area 0
network 10.10.40.0 0.0.0.63 area 0
network 10.10.50.0 0.0.0.255 area 0
network 10.10.60.0 0.0.0.31 area 0
network 10.10.70.0 0.0.0.63 area 0
network 10.10.80.0 0.0.0.15 area 0
network 10.10.90.0 0.0.0.255 area 0
network 10.10.100.0 0.0.0.255 area 0
network 10.10.110.0 0.0.0.255 area 0
network 10.10.120.0 0.0.0.255 area 0
network 10.10.130.0 0.0.0.255 area 0

On CoreSwitch2

router ospf 10

router-id 222.222.222.222
network 192.168.100.4 0.0.0.3 area 0
network 192.168.200.0 0.0.0.3 area 0
network 10.10.10.0 0.0.0.255 area 0
network 10.10.20.0 0.0.0.255 area 0
network 10.10.30.0 0.0.0.31 area 0
network 10.10.40.0 0.0.0.63 area 0
network 10.10.50.0 0.0.0.255 area 0
network 10.10.60.0 0.0.0.31 area 0
network 10.10.70.0 0.0.0.63 area 0
network 10.10.80.0 0.0.0.15 area 0
network 10.10.90.0 0.0.0.255 area 0
network 10.10.100.0 0.0.0.255 area 0
network 10.10.110.0 0.0.0.255 area 0
network 10.10.120.0 0.0.0.255 area 0
network 10.10.130.0 0.0.0.255 area 0

ACLs, NAT and PAT

On EdgeRouter1-2

```
access-list 10 permit 10.10.0.0 0.0.255.255

ip access-list extended EDGE_INBOUND
 remark Permit established replies and SSH from admin net
 permit tcp any any established
 permit icmp any any
 deny ip any 10.10.0.0 0.0.255.255
 permit ip any any

ip nat inside source list 10 interface se0/1/0 overload

int se0/1/0
ip nat outside
ip access-group EDGE_INBOUND in

int g0/0/0
ip nat inside

int g0/0/1
ip nat inside
```

Port Security Configurations

AccessSwitch1

Int range fa0/5
Switchport port-security
Switchport port-security maximum 1
Switchport port-security mac-address sticky
Switchport port-security violation shutdown
End
Copy run start

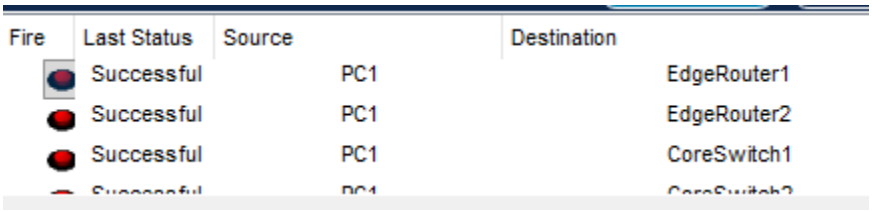
AccessSwitch2-9

Int range fa0/5-22
Switchport port-security
Switchport port-security maximum 1
Switchport port-security mac-address sticky
Switchport port-security violation shutdown

!If there is voice
Int fa0/23
Switchport port-security
Switchport port-security maximum 2
Switchport port-security mac-address sticky
Switchport port-security violation protect

! IF there is for wireless
Int fa0/24
Switchport port-security
Switchport port-security maximum 30
Switchport port-security mac-address sticky
Switchport port-security violation shutdown
Switchport port-security aging time 60
Switchport port-security aging type inactivity (if available)

Check-ups



Fire	Last Status	Source	Destination
	Successful	PC1	EdgeRouter1
	Successful	PC1	EdgeRouter2
	Successful	PC1	CoreSwitch1

```
ply from 10.10.20.3: bytes=32 time=1ms TTL=127
ply from 10.10.20.3: bytes=32 time<1ms TTL=127
ply from 10.10.20.3: bytes=32 time<1ms TTL=127
ply from 10.10.20.3: bytes=32 time<1ms TTL=127

ng statistics for 10.10.20.3:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
proximate round trip times in milli-seconds:
  Minimum = 0ms, Maximum = 1ms, Average = 0ms

\>ping 10.10.30.4

nging 10.10.30.4 with 32 bytes of data:

quest timed out.
ply from 10.10.30.4: bytes=32 time<1ms TTL=127
ply from 10.10.30.4: bytes=32 time=11ms TTL=127
ply from 10.10.30.4: bytes=32 time<1ms TTL=127

ng statistics for 10.10.30.4:
  Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
proximate round trip times in milli-seconds:
  Minimum = 0ms, Maximum = 11ms, Average = 3ms

\>ping 10.10.40.5

nging 10.10.40.5 with 32 bytes of data:

ply from 10.10.40.5: bytes=32 time=46ms TTL=127
ply from 10.10.40.5: bytes=32 time<1ms TTL=127
ply from 10.10.40.5: bytes=32 time=1ms TTL=127
ply from 10.10.40.5: bytes=32 time<1ms TTL=127

ng statistics for 10.10.40.5:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
proximate round trip times in milli-seconds:
  Minimum = 0ms, Maximum = 46ms, Average = 11ms
```

\

```
C:\>ping 10.10.50.3

Pinging 10.10.50.3 with 32 bytes of data:

Request timed out.
Reply from 10.10.50.3: bytes=32 time=5ms TTL=127
Reply from 10.10.50.3: bytes=32 time<1ms TTL=127
Reply from 10.10.50.3: bytes=32 time<1ms TTL=127

Ping statistics for 10.10.50.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 5ms, Average = 1ms

C:\>ping 10.10.60.4

Pinging 10.10.60.4 with 32 bytes of data:

Request timed out.
Reply from 10.10.60.4: bytes=32 time=1ms TTL=127
Reply from 10.10.60.4: bytes=32 time<1ms TTL=127
Reply from 10.10.60.4: bytes=32 time<1ms TTL=127

Ping statistics for 10.10.60.4:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 10.10.70.3

Pinging 10.10.70.3 with 32 bytes of data:

Request timed out.
Reply from 10.10.70.3: bytes=32 time<1ms TTL=127
Reply from 10.10.70.3: bytes=32 time=1ms TTL=127
Reply from 10.10.70.3: bytes=32 time<1ms TTL=127

Ping statistics for 10.10.70.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
```

```
Pinging 10.10.80.3 with 32 bytes of data:

Request timed out.
Reply from 10.10.80.3: bytes=32 time<1ms TTL=127
Reply from 10.10.80.3: bytes=32 time=11ms TTL=127
Reply from 10.10.80.3: bytes=32 time<1ms TTL=127

Ping statistics for 10.10.80.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 11ms, Average = 3ms

C:\>ping 10.10.90.3

Pinging 10.10.90.3 with 32 bytes of data:

Reply from 10.10.90.3: bytes=32 time<1ms TTL=254
Reply from 10.10.90.3: bytes=32 time=2ms TTL=254
Reply from 10.10.90.3: bytes=32 time=1ms TTL=254
Reply from 10.10.90.3: bytes=32 time<1ms TTL=254

Ping statistics for 10.10.90.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>ping 10.10.100.3

Pinging 10.10.100.3 with 32 bytes of data:

Reply from 10.10.100.3: bytes=32 time<1ms TTL=127
Reply from 10.10.100.3: bytes=32 time<1ms TTL=127
Reply from 10.10.100.3: bytes=32 time=2ms TTL=127
Reply from 10.10.100.3: bytes=32 time<1ms TTL=127

Ping statistics for 10.10.100.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
```