Universidad Tecnológica de Durango

Tecnologías de la Información

Interconexión de redes

Actividades

*“Proyecto de Evaluación Final”*

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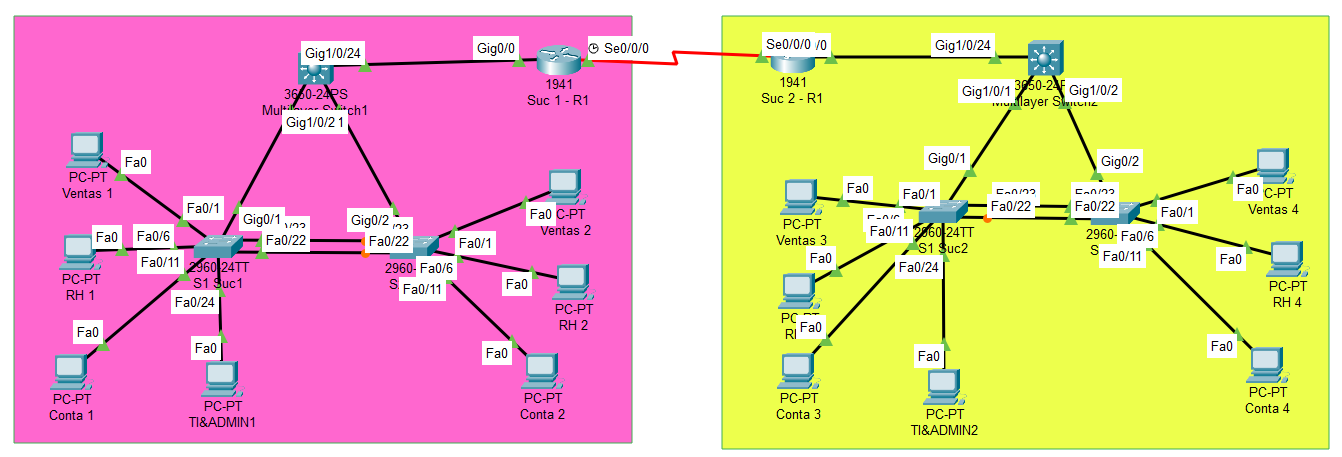
**Introduccion**

Este proyecto configura una red distribuida entre dos sucursales, cada una con un router, un switch multicapa (MLS), y dos switches de acceso. Los routers R1 y R2 conectan las sucursales mediante un enlace serial, y se enlazan con los switches multicapa utilizando subredes /30. Los switches multicapa gestionan el enrutamiento interno y distribuyen el tráfico a los switches de acceso, donde se utilizan VLANs para segmentar la red en diferentes dominios.

Se implementa el protocolo de enrutamiento RIP versión 2 para facilitar el intercambio de rutas, y se usa Spanning Tree Protocol (STP) para evitar bucles en la red. Las ACLs en los routers restringen el acceso no autorizado a las redes de administración, limitando el acceso SSH solo a administradores autorizados. Además, los switches multicapa gestionan el servicio DHCP para asignar direcciones IP a las PCs en cada VLAN, con gateways configurados para permitir la comunicación fuera de la red local. El proyecto asegura una red eficiente, segura y bien segmentada entre las dos sucursales.

**Desarrollo**

**Topologia**

****

**Tabla de Direccionamiento**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dispositivo** | **Interfaces** | **Dirección IPv4** | **Máscara de subred** | **Gateway predeterminado** | **VLAN ID** |
| R1\_SucursalA | S0/0/0 | 10.1.0.1 | 255.255.255.252 | N/D | N/D |
| G0/0 | 10.1.0.9 | 255.255.255.252 | N/D |  |
| G0/1 |  |  | N/D |  |
| S1Multi\_SucA | VLAN 10 | 10.1.1.1 | 255.255.255.0 | N/D | 10 |
| VLAN 20 | 10.1.2.1 | 255.255.255.0 | N/D | 20 |
| VLAN 30 | 10.1.3.1 | 255.255.255.0 | N/D | 30 |
| VLAN 99 | 10.1.4.1 | 255.255.255.0 | N/D | 99 |
| VLAN X | N/D | N/D | N/D | N/D |
| S1\_SucA | VLAN X | Asignada DHCP | 255.255.255.0 |  | 10, 20, 30, 99 |
| S2\_SucA | VLAN X | Asignada DHCP | 255.255.255.0 |  | 10, 20, 30, 99 |
| PC-Ventas 1 | NIC | DHCP 10.1.1.3 | 255.255.255.0 | 10.1.1.1 | 10 |
| PC-Ventas 2 | NIC | DHCP 10.1.1.2 | 255.255.255.0 | 10.1.1.1 | 10 |
| PC-RH 1 | NIC | DHCP 10.1.2.1 | 255.255.255.0 | 10.1.2.1 | 20 |
| PC-RH 2 | NIC | DHCP 10.1.2.2 | 255.255.255.0 | 10.1.2.1 | 20 |
| PC-Conta 1 | NIC | DHCP 10.1.3.2 | 255.255.255.0 | 10.1.3.1 | 30 |
| PC-Conta 2 | NIC | DHCP 10.1.3.3 | 255.255.255.0 | 10.1.3.1 | 30 |
| PC-Admin 1 | NIC | DHCP 10.1.4.2 | 255.255.255.0 | 10.1.4.1 | 99 |
| R2\_SucursalB | S0/0/0 | 10.1.0.10 | 255.255.255.252 | N/D | N/D |
| G0/0 | 10.2.0.1 | 255.255.255.252 | N/D |  |
| G0/1 |  |  | N/D |  |
| S1Multi\_SucB | VLAN 10 | 10.2.1.1 | 255.255.255.0 | N/D | 10 |
| VLAN 20 | 10.2.2.1 | 255.255.255.0 | N/D | 20 |
| VLAN 30 | 10.2.3.1 | 255.255.255.0 | N/D | 30 |
| VLAN 99 | 10.2.4.1 | 255.255.255.0 | N/D | 99 |
| VLAN X | N/D | N/D | N/D | N/D |
| S1\_ SucB | VLAN X | Asignada DHCP | 255.255.255.0 |  | 10, 20, 30, 99 |
| S2\_SucB | VLAN X | Asignada DHCP | 255.255.255.0 |  | 10, 20, 30, 99 |
| PC-Ventas 3 | NIC | DHCP 10.2.1.2 | 255.255.255.0 | 10.2.1.1 | 10 |
| PC-Ventas 4 | NIC | DHCP 10.2.1.5 | 255.255.255.0 | 10.2.1.1 | 10 |
| PC-RH 3 | NIC | DHCP 10.2.2.2 | 255.255.255.0 | 10.2.2.1 | 20 |
| PC-RH 4 | NIC | DHCP 10.2.2.3 | 255.255.255.0 | 10.2.2.1 | 20 |
| PC-Conta 3 | NIC | DHCP 10.2.3.2 | 255.255.255.0 | 10.2.3.1 | 30 |
| PC-Conta 4 | NIC | DHCP 10.2.3.3 | 255.255.255.0 | 10.2.3.1 | 30 |

**Tabla de VLAN, puertos y DHCP. Sucursal A**

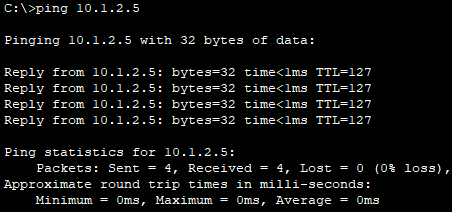
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Interfaces** | **VLAN ID** | **Nombre VLAN** | **Nombre del pool de DHCP** | **Red** |
| Fa0/1 - 5 | 10 | Red | Red | 10.1.1.1 |
| Fa0/6 - 10 | 20 | Purple | Purple | 10.1.2.1 |
| Fa0/11 - 15 | 30 | Green | Green | 10.1.3.1 |
| Fa0/24 | 99 | Managment | Managment | 10.1.4.1 |
| Fa0/22 - 23 |  | Nativa\_A | - | - |

**Tabla de VLAN, puertos y DHCP. Sucursal B**

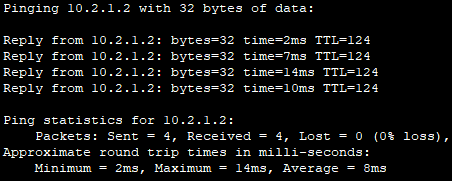
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Interfaces** | **VLAN ID** | **Nombre VLAN** | **Nombre del pool de DHCP** | **Red** |
| Fa0/1 - 5 | 10 | Red | Red | 10.2.1.1 |
| Fa0/6 - 10 | 20 | Purple | Purple | 10.2.2.1 |
| Fa0/11 - 15 | 30 | Green | Green | 10.2.3.1 |
| Fa0/24 | 99 | Managment | Managment | 10.2.4.1 |
| Fa0/22 - 23 |  | Nativa\_A | - | - |

**Pruebas de conectividad**

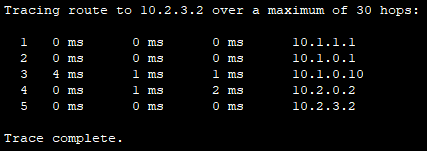
**Pruebas de ping entre PC’s en diferentes VLAN:** en este caso se esta probando la conectividad de Ventas 1 con RH 1 (Lado rosa)



**Pruebas de ping entre PC’s en diferentes Redes WAN:** en este caso se está probando la conectividad de Ventas 2 (Lado rosa) con Ventas 3 (Lado amarillo)



**Prueba de tracert entre PC’s en diferentes Redes WAN:** en este caso se está probando la conectividad de Ventas 1 (Lado rosa) con Conta 3 (Lado amarillo)



**Anexos(Configuraciones).**

* Se incluyen las configuraciones completas (show running-config) y las tablas de enrutamiento (show ip route) de los routers R1 y R2.
* Se incluyen las configuraciones completas (show running-config) y la información de VLANs (show vlan) de los switches MLS1, MLS2, S1, S2, S3 y S4.

**R1**

**R1#show running-config**

version 15.1

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname R1

!

!

!

enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1

!

!

!

!

!

!

no ip cef

no ipv6 cef

!

!

!

username admin password 7 0834584A5B495743

!

!

license udi pid CISCO1941/K9 sn FTX1524T448-

!

!

!

!

!

!

!

!

!

no ip domain-lookup

!

!

spanning-tree mode pvst

!

!

!

!

!

!

interface GigabitEthernet0/0

description Conexin a MLS1

ip address 10.1.0.1 255.255.255.252

duplex auto

speed auto

!

interface GigabitEthernet0/1

no ip address

duplex auto

speed auto

shutdown

!

interface Serial0/0/0

description Conexin a R2

ip address 10.1.0.9 255.255.255.252

clock rate 2000000

!

interface Serial0/0/1

no ip address

clock rate 2000000

shutdown

!

interface Vlan1

no ip address

shutdown

!

router rip

version 2

network 10.0.0.0

!

ip classless

!

ip flow-export version 9

!

!

!

banner motd ^CAcceso Autorizado Solo a Personal. Uso no autorizado esta prohibido!^C

!

!

!

!

line con 0

password 7 0822455D0A16

login

!

line aux 0

!

line vty 0 4

access-class SOLO\_ADMIN\_VTY in

login local

transport input ssh

!

!

!

End

**R1#show ip route**

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

\* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 13 subnets, 3 masks

C 10.1.0.0/30 is directly connected, GigabitEthernet0/0

L 10.1.0.1/32 is directly connected, GigabitEthernet0/0

C 10.1.0.8/30 is directly connected, Serial0/0/0

L 10.1.0.9/32 is directly connected, Serial0/0/0

R 10.1.1.0/24 [120/1] via 10.1.0.2, 00:00:11, GigabitEthernet0/0

R 10.1.2.0/24 [120/1] via 10.1.0.2, 00:00:11, GigabitEthernet0/0

R 10.1.3.0/24 [120/1] via 10.1.0.2, 00:00:11, GigabitEthernet0/0

R 10.1.4.0/24 [120/1] via 10.1.0.2, 00:00:11, GigabitEthernet0/0

R 10.2.0.0/30 [120/1] via 10.1.0.10, 00:00:19, Serial0/0/0

R 10.2.1.0/24 [120/2] via 10.1.0.10, 00:00:19, Serial0/0/0

R 10.2.2.0/24 [120/2] via 10.1.0.10, 00:00:19, Serial0/0/0

R 10.2.3.0/24 [120/2] via 10.1.0.10, 00:00:19, Serial0/0/0

R 10.2.4.0/24 [120/2] via 10.1.0.10, 00:00:19, Serial0/0/0

**R2**

**R2#show running-config**

version 15.1

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname R2

!

!

!

enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1

!

!

!

!

!

!

no ip cef

no ipv6 cef

!

!

!

username admin password 7 0834584A5B495743

!

!

license udi pid CISCO1941/K9 sn FTX1524U8WL-

!

!

!

!

!

!

!

!

!

no ip domain-lookup

!

!

spanning-tree mode pvst

!

!

!

!

!

!

interface GigabitEthernet0/0

description Conexin a MLS2

ip address 10.2.0.1 255.255.255.252

duplex auto

speed auto

!

interface GigabitEthernet0/1

no ip address

duplex auto

speed auto

shutdown

!

interface Serial0/0/0

description Conexin a R2

ip address 10.1.0.10 255.255.255.252

!

interface Serial0/0/1

no ip address

clock rate 2000000

shutdown

!

interface Vlan1

no ip address

shutdown

!

router rip

version 2

network 10.0.0.0

no auto-summary

!

ip classless

!

ip flow-export version 9

!

!

!

banner motd ^CAcceso Autorizado Solo a Personal. Uso no autorizado esta prohibido!^C

!

!

!

!

line con 0

password 7 0822455D0A16

login

!

line aux 0

!

line vty 0 4

access-class SOLO\_ADMIN\_VTY in

login local

transport input ssh

!

!

!

End

**R2#show ip route**

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

\* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 13 subnets, 3 masks

R 10.1.0.0/30 [120/1] via 10.1.0.9, 00:00:07, Serial0/0/0

C 10.1.0.8/30 is directly connected, Serial0/0/0

L 10.1.0.10/32 is directly connected, Serial0/0/0

R 10.1.1.0/24 [120/2] via 10.1.0.9, 00:00:07, Serial0/0/0

R 10.1.2.0/24 [120/2] via 10.1.0.9, 00:00:07, Serial0/0/0

R 10.1.3.0/24 [120/2] via 10.1.0.9, 00:00:07, Serial0/0/0

R 10.1.4.0/24 [120/2] via 10.1.0.9, 00:00:07, Serial0/0/0

C 10.2.0.0/30 is directly connected, GigabitEthernet0/0

L 10.2.0.1/32 is directly connected, GigabitEthernet0/0

R 10.2.1.0/24 [120/1] via 10.2.0.2, 00:00:23, GigabitEthernet0/0

R 10.2.2.0/24 [120/1] via 10.2.0.2, 00:00:23, GigabitEthernet0/0

R 10.2.3.0/24 [120/1] via 10.2.0.2, 00:00:23, GigabitEthernet0/0

R 10.2.4.0/24 [120/1] via 10.2.0.2, 00:00:23, GigabitEthernet0/0

**Mls1**

**Mls1# show running-config**

version 16.3.2

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname MLS1

!

!

enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1

!

!

ip dhcp excluded-address 10.1.1.1

ip dhcp excluded-address 10.1.2.1

ip dhcp excluded-address 10.1.3.1

ip dhcp excluded-address 10.1.4.1

!

ip dhcp pool Red

network 10.1.1.0 255.255.255.0

default-router 10.1.1.1

ip dhcp pool Purple

network 10.1.2.0 255.255.255.0

default-router 10.1.2.1

ip dhcp pool Green

network 10.1.3.0 255.255.255.0

default-router 10.1.3.1

ip dhcp pool Management

network 10.1.4.0 255.255.255.0

default-router 10.1.4.1

!

!

!

no ip cef

ip routing

!

no ipv6 cef

!

!

!

username admin password 7 0834584A5B495743

!

!

!

!

!

!

!

!

!

!

no ip domain-lookup

!

!

spanning-tree mode rapid-pvst

spanning-tree vlan 10,20,30,99 priority 24576

!

!

!

!

!

!

interface GigabitEthernet1/0/1

switchport trunk allowed vlan 10,20,30,99

switchport mode trunk

!

interface GigabitEthernet1/0/2

switchport trunk allowed vlan 10,20,30,99

switchport mode trunk

!

interface GigabitEthernet1/0/3

!

interface GigabitEthernet1/0/4

!

interface GigabitEthernet1/0/5

!

interface GigabitEthernet1/0/6

!

interface GigabitEthernet1/0/7

!

interface GigabitEthernet1/0/8

!

interface GigabitEthernet1/0/9

!

interface GigabitEthernet1/0/10

!

interface GigabitEthernet1/0/11

!

interface GigabitEthernet1/0/12

!

interface GigabitEthernet1/0/13

!

interface GigabitEthernet1/0/14

!

interface GigabitEthernet1/0/15

!

interface GigabitEthernet1/0/16

!

interface GigabitEthernet1/0/17

!

interface GigabitEthernet1/0/18

!

interface GigabitEthernet1/0/19

!

interface GigabitEthernet1/0/20

!

interface GigabitEthernet1/0/21

!

interface GigabitEthernet1/0/22

!

interface GigabitEthernet1/0/23

!

interface GigabitEthernet1/0/24

no switchport

ip address 10.1.0.2 255.255.255.252

duplex auto

speed auto

!

interface GigabitEthernet1/1/1

!

interface GigabitEthernet1/1/2

!

interface GigabitEthernet1/1/3

!

interface GigabitEthernet1/1/4

!

interface Vlan1

no ip address

shutdown

!

interface Vlan10

mac-address 0002.4a94.4401

ip address 10.1.1.1 255.255.255.0

!

interface Vlan20

mac-address 0002.4a94.4402

ip address 10.1.2.1 255.255.255.0

!

interface Vlan30

mac-address 0002.4a94.4403

ip address 10.1.3.1 255.255.255.0

!

interface Vlan99

mac-address 0002.4a94.4404

ip address 10.1.4.1 255.255.255.0

!

router rip

version 2

network 10.0.0.0

no auto-summary

!

ip classless

!

ip flow-export version 9

!

!

!

banner motd ^CAcceso Autorizado Solo a Personal. Uso no autorizado esta prohibido!^C

!

!

!

!

line con 0

password 7 0822455D0A16

login

!

line aux 0

!

line vty 0 4

login local

transport input ssh

!

!

!

!

End

**Mls1#show ip route**

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

\* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 11 subnets, 2 masks

C 10.1.0.0/30 is directly connected, GigabitEthernet1/0/24

R 10.1.0.8/30 [120/1] via 10.1.0.1, 00:00:19, GigabitEthernet1/0/24

C 10.1.1.0/24 is directly connected, Vlan10

C 10.1.2.0/24 is directly connected, Vlan20

C 10.1.3.0/24 is directly connected, Vlan30

C 10.1.4.0/24 is directly connected, Vlan99

R 10.2.0.0/30 [120/2] via 10.1.0.1, 00:00:19, GigabitEthernet1/0/24

R 10.2.1.0/24 [120/3] via 10.1.0.1, 00:00:19, GigabitEthernet1/0/24

R 10.2.2.0/24 [120/3] via 10.1.0.1, 00:00:19, GigabitEthernet1/0/24

R 10.2.3.0/24 [120/3] via 10.1.0.1, 00:00:19, GigabitEthernet1/0/24

R 10.2.4.0/24 [120/3] via 10.1.0.1, 00:00:19, GigabitEthernet1/0/24

**Mls2**

**Mls2# show running-config**

version 16.3.2

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname MLS2

!

!

enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1

!

!

ip dhcp excluded-address 10.2.1.1

ip dhcp excluded-address 10.2.2.1

ip dhcp excluded-address 10.2.3.1

ip dhcp excluded-address 10.2.4.1

!

ip dhcp pool Red

network 10.2.1.0 255.255.255.0

default-router 10.2.1.1

ip dhcp pool Purple

network 10.2.2.0 255.255.255.0

default-router 10.2.2.1

ip dhcp pool Green

network 10.2.3.0 255.255.255.0

default-router 10.2.3.1

ip dhcp pool Management

network 10.2.4.0 255.255.255.0

default-router 10.2.4.1

!

!

!

ip cef

ip routing

!

no ipv6 cef

!

!

!

username admin password 7 0834584A5B495743

!

!

!

!

!

!

!

!

!

!

no ip domain-lookup

!

!

spanning-tree mode rapid-pvst

!

!

!

!

!

!

interface GigabitEthernet1/0/1

switchport trunk allowed vlan 10,20,30,99

switchport mode trunk

!

interface GigabitEthernet1/0/2

switchport trunk allowed vlan 10,20,30,99

switchport mode trunk

!

interface GigabitEthernet1/0/3

!

interface GigabitEthernet1/0/4

!

interface GigabitEthernet1/0/5

!

interface GigabitEthernet1/0/6

!

interface GigabitEthernet1/0/7

!

interface GigabitEthernet1/0/8

!

interface GigabitEthernet1/0/9

!

interface GigabitEthernet1/0/10

!

interface GigabitEthernet1/0/11

!

interface GigabitEthernet1/0/12

!

interface GigabitEthernet1/0/13

!

interface GigabitEthernet1/0/14

!

interface GigabitEthernet1/0/15

!

interface GigabitEthernet1/0/16

!

interface GigabitEthernet1/0/17

!

interface GigabitEthernet1/0/18

!

interface GigabitEthernet1/0/19

!

interface GigabitEthernet1/0/20

!

interface GigabitEthernet1/0/21

!

interface GigabitEthernet1/0/22

!

interface GigabitEthernet1/0/23

!

interface GigabitEthernet1/0/24

no switchport

ip address 10.2.0.2 255.255.255.252

duplex auto

speed auto

!

interface GigabitEthernet1/1/1

!

interface GigabitEthernet1/1/2

!

interface GigabitEthernet1/1/3

!

interface GigabitEthernet1/1/4

!

interface Vlan1

no ip address

shutdown

!

interface Vlan10

mac-address 000a.f3b2.4c01

ip address 10.2.1.1 255.255.255.0

!

interface Vlan20

mac-address 000a.f3b2.4c02

ip address 10.2.2.1 255.255.255.0

!

interface Vlan30

mac-address 000a.f3b2.4c03

ip address 10.2.3.1 255.255.255.0

!

interface Vlan99

mac-address 000a.f3b2.4c04

ip address 10.2.4.1 255.255.255.0

!

router rip

version 2

network 10.0.0.0

no auto-summary

!

ip classless

!

ip flow-export version 9

!

!

!

banner motd ^CAcceso Autorizado Solo a Personal. Uso no autorizado esta prohibido!^C

!

!

!

!

line con 0

password 7 0822455D0A16

login

!

line aux 0

!

line vty 0 4

login local

transport input ssh

!

!

!

!

End

**Mls2# show ip route**

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

\* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 11 subnets, 2 masks

R 10.1.0.0/30 [120/2] via 10.2.0.1, 00:00:19, GigabitEthernet1/0/24

R 10.1.0.8/30 [120/1] via 10.2.0.1, 00:00:19, GigabitEthernet1/0/24

R 10.1.1.0/24 [120/3] via 10.2.0.1, 00:00:19, GigabitEthernet1/0/24

R 10.1.2.0/24 [120/3] via 10.2.0.1, 00:00:19, GigabitEthernet1/0/24

R 10.1.3.0/24 [120/3] via 10.2.0.1, 00:00:19, GigabitEthernet1/0/24

R 10.1.4.0/24 [120/3] via 10.2.0.1, 00:00:19, GigabitEthernet1/0/24

C 10.2.0.0/30 is directly connected, GigabitEthernet1/0/24

C 10.2.1.0/24 is directly connected, Vlan10

C 10.2.2.0/24 is directly connected, Vlan20

C 10.2.3.0/24 is directly connected, Vlan30

C 10.2.4.0/24 is directly connected, Vlan99

**S1 Suc1**

**S1#show running-config**

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname S1

!

enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1

!

!

!

no ip domain-lookup

!

username admin privilege 1 password 7 0834584A5B495743

!

!

!

spanning-tree mode rapid-pvst

spanning-tree extend system-id

spanning-tree vlan 10,20,30,99 priority 24576

!

interface Port-channel1

switchport trunk allowed vlan 10,20,30,99

switchport mode trunk

!

interface FastEthernet0/1

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/2

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/3

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/4

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/5

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/6

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/7

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/8

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/9

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/10

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/11

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/12

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/13

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/14

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/15

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/16

shutdown

!

interface FastEthernet0/17

shutdown

!

interface FastEthernet0/18

shutdown

!

interface FastEthernet0/19

shutdown

!

interface FastEthernet0/20

shutdown

!

interface FastEthernet0/21

shutdown

!

interface FastEthernet0/22

channel-group 1 mode active

!

interface FastEthernet0/23

channel-group 1 mode active

!

interface FastEthernet0/24

switchport access vlan 99

switchport mode access

!

interface GigabitEthernet0/1

channel-group 1 mode active

!

interface GigabitEthernet0/2

!

interface Vlan1

no ip address

shutdown

!

banner motd ^CAcceso Autorizado Solo a Personal. Uso no autorizado esta prohibido!^C

!

!

!

line con 0

password 7 0822455D0A16

login

!

line vty 0 4

login local

transport input ssh

line vty 5 15

login

!

!

!

!

End

**S1#show vlan**

VLAN Name Status Ports

---- -------------------------------- --------- -------------------------------

1 default active Po1, Fa0/16, Fa0/17, Fa0/18

Fa0/19, Fa0/20, Fa0/21, Fa0/22

Fa0/23, Gig0/2

10 Red active Fa0/1, Fa0/2, Fa0/3, Fa0/4

Fa0/5

20 Purple active Fa0/6, Fa0/7, Fa0/8, Fa0/9

Fa0/10

30 Green active Fa0/11, Fa0/12, Fa0/13, Fa0/14

Fa0/15

99 Management active Fa0/24

1002 fddi-default active

1003 token-ring-default active

1004 fddinet-default active

1005 trnet-default active

VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2

---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

1 enet 100001 1500 - - - - - 0 0

10 enet 100010 1500 - - - - - 0 0

20 enet 100020 1500 - - - - - 0 0

30 enet 100030 1500 - - - - - 0 0

99 enet 100099 1500 - - - - - 0 0

1002 fddi 101002 1500 - - - - - 0 0

1003 tr 101003 1500 - - - - - 0 0

1004 fdnet 101004 1500 - - - ieee - 0 0

1005 trnet 101005 1500 - - - ibm - 0 0

VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2

---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs

------------------------------------------------------------------------------

Primary Secondary Type Ports

------- --------- ----------------- ------------------------------------------

**S2 Suc1**

**S2#show running-config**

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname S2

!

enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1

!

!

!

no ip domain-lookup

!

username admin privilege 1 password 7 0834584A5B495743

!

!

!

spanning-tree mode rapid-pvst

spanning-tree extend system-id

!

interface Port-channel1

switchport trunk allowed vlan 10,20,30,99

switchport mode trunk

!

interface FastEthernet0/1

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/2

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/3

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/4

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/5

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/6

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/7

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/8

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/9

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/10

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/11

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/12

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/13

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/14

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/15

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/16

shutdown

!

interface FastEthernet0/17

shutdown

!

interface FastEthernet0/18

shutdown

!

interface FastEthernet0/19

shutdown

!

interface FastEthernet0/20

shutdown

!

interface FastEthernet0/21

shutdown

!

interface FastEthernet0/22

channel-group 1 mode active

!

interface FastEthernet0/23

channel-group 1 mode active

!

interface FastEthernet0/24

switchport access vlan 99

switchport mode access

!

interface GigabitEthernet0/1

!

interface GigabitEthernet0/2

channel-group 1 mode active

!

interface Vlan1

no ip address

shutdown

!

banner motd ^CAcceso Autorizado Solo a Personal. Uso no autorizado esta prohibido!^C

!

!

!

line con 0

password 7 0822455D0A16

login

!

line vty 0 4

login local

transport input ssh

line vty 5 15

login

!

!

!

!

end

**S2#show vlan**

VLAN Name Status Ports

---- -------------------------------- --------- -------------------------------

1 default active Po1, Fa0/16, Fa0/17, Fa0/18

Fa0/19, Fa0/20, Fa0/21, Fa0/22

Fa0/23, Gig0/1

10 Red active Fa0/1, Fa0/2, Fa0/3, Fa0/4

Fa0/5

20 Purple active Fa0/6, Fa0/7, Fa0/8, Fa0/9

Fa0/10

30 Green active Fa0/11, Fa0/12, Fa0/13, Fa0/14

Fa0/15

99 Management active Fa0/24

1002 fddi-default active

1003 token-ring-default active

1004 fddinet-default active

1005 trnet-default active

VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2

---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

1 enet 100001 1500 - - - - - 0 0

10 enet 100010 1500 - - - - - 0 0

20 enet 100020 1500 - - - - - 0 0

30 enet 100030 1500 - - - - - 0 0

99 enet 100099 1500 - - - - - 0 0

1002 fddi 101002 1500 - - - - - 0 0

1003 tr 101003 1500 - - - - - 0 0

1004 fdnet 101004 1500 - - - ieee - 0 0

1005 trnet 101005 1500 - - - ibm - 0 0

VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2

---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs

------------------------------------------------------------------------------

Primary Secondary Type Ports

------- --------- ----------------- ------------------------------------------

**S3 Suc2**

**S3#show running-config**

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname S3

!

enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1

!

!

!

no ip domain-lookup

!

username admin privilege 1 password 7 0834584A5B495743

!

!

!

spanning-tree mode rapid-pvst

spanning-tree extend system-id

spanning-tree vlan 10,20,30,99 priority 24576

!

interface Port-channel1

switchport trunk allowed vlan 10,20,30,99

switchport mode trunk

!

interface FastEthernet0/1

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/2

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/3

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/4

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/5

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/6

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/7

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/8

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/9

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/10

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/11

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/12

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/13

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/14

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/15

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/16

shutdown

!

interface FastEthernet0/17

shutdown

!

interface FastEthernet0/18

shutdown

!

interface FastEthernet0/19

shutdown

!

interface FastEthernet0/20

shutdown

!

interface FastEthernet0/21

shutdown

!

interface FastEthernet0/22

channel-group 1 mode active

!

interface FastEthernet0/23

channel-group 1 mode active

!

interface FastEthernet0/24

switchport access vlan 99

switchport mode access

!

interface GigabitEthernet0/1

channel-group 1 mode active

!

interface GigabitEthernet0/2

!

interface Vlan1

no ip address

shutdown

!

banner motd ^CAcceso Autorizado Solo a Personal. Uso no autorizado esta prohibido!^C

!

!

!

line con 0

password 7 0822455D0A16

login

!

line vty 0 4

login local

transport input ssh

line vty 5 15

login

!

!

!

!

End

**S3#show vlan**

VLAN Name Status Ports

---- -------------------------------- --------- -------------------------------

1 default active Po1, Fa0/16, Fa0/17, Fa0/18

Fa0/19, Fa0/20, Fa0/21, Fa0/22

Fa0/23, Gig0/2

10 Red active Fa0/1, Fa0/2, Fa0/3, Fa0/4

Fa0/5

20 Purple active Fa0/6, Fa0/7, Fa0/8, Fa0/9

Fa0/10

30 Green active Fa0/11, Fa0/12, Fa0/13, Fa0/14

Fa0/15

99 Management active Fa0/24

1002 fddi-default active

1003 token-ring-default active

1004 fddinet-default active

1005 trnet-default active

VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2

---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

1 enet 100001 1500 - - - - - 0 0

10 enet 100010 1500 - - - - - 0 0

20 enet 100020 1500 - - - - - 0 0

30 enet 100030 1500 - - - - - 0 0

99 enet 100099 1500 - - - - - 0 0

1002 fddi 101002 1500 - - - - - 0 0

1003 tr 101003 1500 - - - - - 0 0

1004 fdnet 101004 1500 - - - ieee - 0 0

1005 trnet 101005 1500 - - - ibm - 0 0

VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2

---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs

------------------------------------------------------------------------------

Primary Secondary Type Ports

------- --------- ----------------- ------------------------------------------

**S4 Suc2**

**S4#show running-config**

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname S4

!

enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1

!

!

!

no ip domain-lookup

!

username admin privilege 1 password 7 0834584A5B495743

!

!

!

spanning-tree mode rapid-pvst

spanning-tree extend system-id

!

interface Port-channel1

switchport trunk allowed vlan 10,20,30,99

switchport mode trunk

!

interface FastEthernet0/1

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/2

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/3

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/4

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/5

switchport access vlan 10

switchport mode access

!

interface FastEthernet0/6

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/7

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/8

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/9

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/10

switchport access vlan 20

switchport mode access

!

interface FastEthernet0/11

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/12

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/13

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/14

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/15

switchport access vlan 30

switchport mode access

!

interface FastEthernet0/16

shutdown

!

interface FastEthernet0/17

shutdown

!

interface FastEthernet0/18

shutdown

!

interface FastEthernet0/19

shutdown

!

interface FastEthernet0/20

shutdown

!

interface FastEthernet0/21

shutdown

!

interface FastEthernet0/22

channel-group 1 mode active

!

interface FastEthernet0/23

channel-group 1 mode active

!

interface FastEthernet0/24

switchport access vlan 99

switchport mode access

!

interface GigabitEthernet0/1

!

interface GigabitEthernet0/2

channel-group 1 mode active

!

interface Vlan1

no ip address

shutdown

!

banner motd ^CAcceso Autorizado Solo a Personal. Uso no autorizado esta prohibido!^C

!

!

!

line con 0

password 7 0822455D0A16

login

!

line vty 0 4

login local

transport input ssh

line vty 5 15

login

!

!

!

!

End

**S4#show vlan**

VLAN Name Status Ports

---- -------------------------------- --------- -------------------------------

1 default active Po1, Fa0/16, Fa0/17, Fa0/18

Fa0/19, Fa0/20, Fa0/21, Fa0/22

Fa0/23, Gig0/1

10 Red active Fa0/1, Fa0/2, Fa0/3, Fa0/4

Fa0/5

20 Purple active Fa0/6, Fa0/7, Fa0/8, Fa0/9

Fa0/10

30 Green active Fa0/11, Fa0/12, Fa0/13, Fa0/14

Fa0/15

99 Management active Fa0/24

1002 fddi-default active

1003 token-ring-default active

1004 fddinet-default active

1005 trnet-default active

VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2

---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

1 enet 100001 1500 - - - - - 0 0

10 enet 100010 1500 - - - - - 0 0

20 enet 100020 1500 - - - - - 0 0

30 enet 100030 1500 - - - - - 0 0

99 enet 100099 1500 - - - - - 0 0

1002 fddi 101002 1500 - - - - - 0 0

1003 tr 101003 1500 - - - - - 0 0

1004 fdnet 101004 1500 - - - ieee - 0 0

1005 trnet 101005 1500 - - - ibm - 0 0

VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2

---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs

------------------------------------------------------------------------------

Primary Secondary Type Ports

------- --------- ----------------- ------------------------------------------

**Funcionamiento y operación de la red simulada (Packet Tracer)**

La red en Packet Tracer funcionó como esperábamos. Todas las PCs dentro de la misma sucursal y entre sucursales se conectaron sin problemas. El EtherChannel ayudó a mantener la red activa, incluso si uno de los enlaces fallaba. Además, las ACLs hicieron un buen trabajo protegiendo la VLAN de administración al bloquear el acceso no autorizado.

**Conectividad física y lógica de los dispositivos**

**• Conectividad física:** Los dispositivos están conectados físicamente mediante cables Ethernet y seriales, según se muestra en la topología de la red.

**• Conectividad lógica**: La conectividad lógica se logra mediante la configuración de direcciones IP, VLANs, enrutamiento (RIP) y STP.

**Uso de comandos show**

Para comprobar y verificar el estado de la configuración y el funcionamiento de una red en Cisco Packet Tracer, se pueden utilizar varios comandos show. A continuación, mostraremos algunos de ellos:

* show running-config
* show ip route
* show vlan
* show etherchannel summary
* show spanning-tree
* show ip access-lists

**Herramientas de cmd (ping, ipconfig)**

Se utilizaron las herramientas de línea de comandos ping e ipconfig para probar la conectividad entre dispositivos y obtener información sobre la configuración de red de las PCs.ping es una herramienta que envía paquetes de solicitud ICMP (Internet Control Message Protocol) a una dirección IP o dominio para comprobar si es alcanzable y medir el tiempo de respuesta.

ipconfig muestra la configuración IP actual de las interfaces de red en tu equipo, incluyendo la dirección IP, máscara de subred, puerta de enlace predeterminada, y más.

**Conclusiones**

Configuramos una red en Cisco Packet Tracer con múltiples routers, switches y VLANs para conectar PCs en diferentes segmentos. Establecimos direcciones IP para cada red y configuramos enrutamiento usando RIP para asegurar que todos los dispositivos puedan comunicarse entre sí. También aplicamos listas de acceso para controlar el tráfico y asegurar que solo las PCs autorizadas puedan acceder a ciertos recursos.

Luego, probamos la conectividad con herramientas de diagnóstico. En Packet Tracer, utilizamos tracert para seguir la ruta que toman los paquetes a través de la red, lo que nos ayudó a identificar posibles problemas de enrutamiento. En CMD, usamos comandos como ping para verificar si los dispositivos se comunican correctamente, ipconfig para revisar la configuración de red en cada dispositivo, y nslookup para resolver nombres de dominio a direcciones IP.

Estos pasos nos aseguraron que la configuración de red estaba correcta y que todos los dispositivos podían comunicarse como se esperaba. En esencia, configuramos la red, la probamos, y nos aseguramos de que todo estuviera funcionando bien.