#### SALLEGTAS 2018-2019

**CCNA 3: SCALING NETWORKS**

**CASE STUDY (PACKET TRACER)**

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Curso 2018/2019

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# Introducción

## Contenido

### Escenario

* A continuación de desarrollo un proyecto para poner en práctica todo lo aprendido durante el curso de CCNA 3 de cisco.
* el proyecto que nos fui asignado consiste en llevar a cabo la instalación de una infraestructura de red de una entidad.
* Desde el departamento de arquitectos hemos recibido algunos planos para comenzar las instalaciones.
* Nos han encargado comenzar la instalación y llevar a cabo todas las configuraciones necesarias.
* Hemos de documentar todos los apartados y seguir las necesidades que nos indica el cliente.

### Hardware

Los equipos de red son fabricados por CISCO.

### Cableado

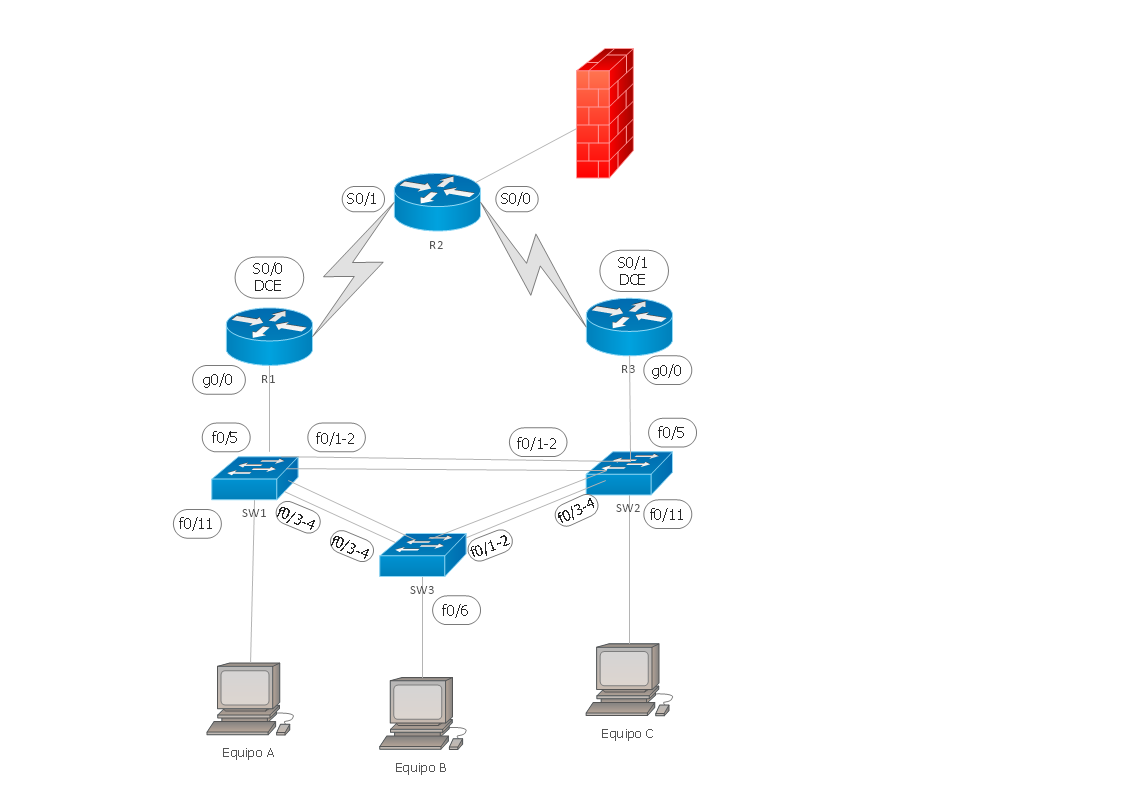
El cableado está a la elección de la empresa.

### Equipos

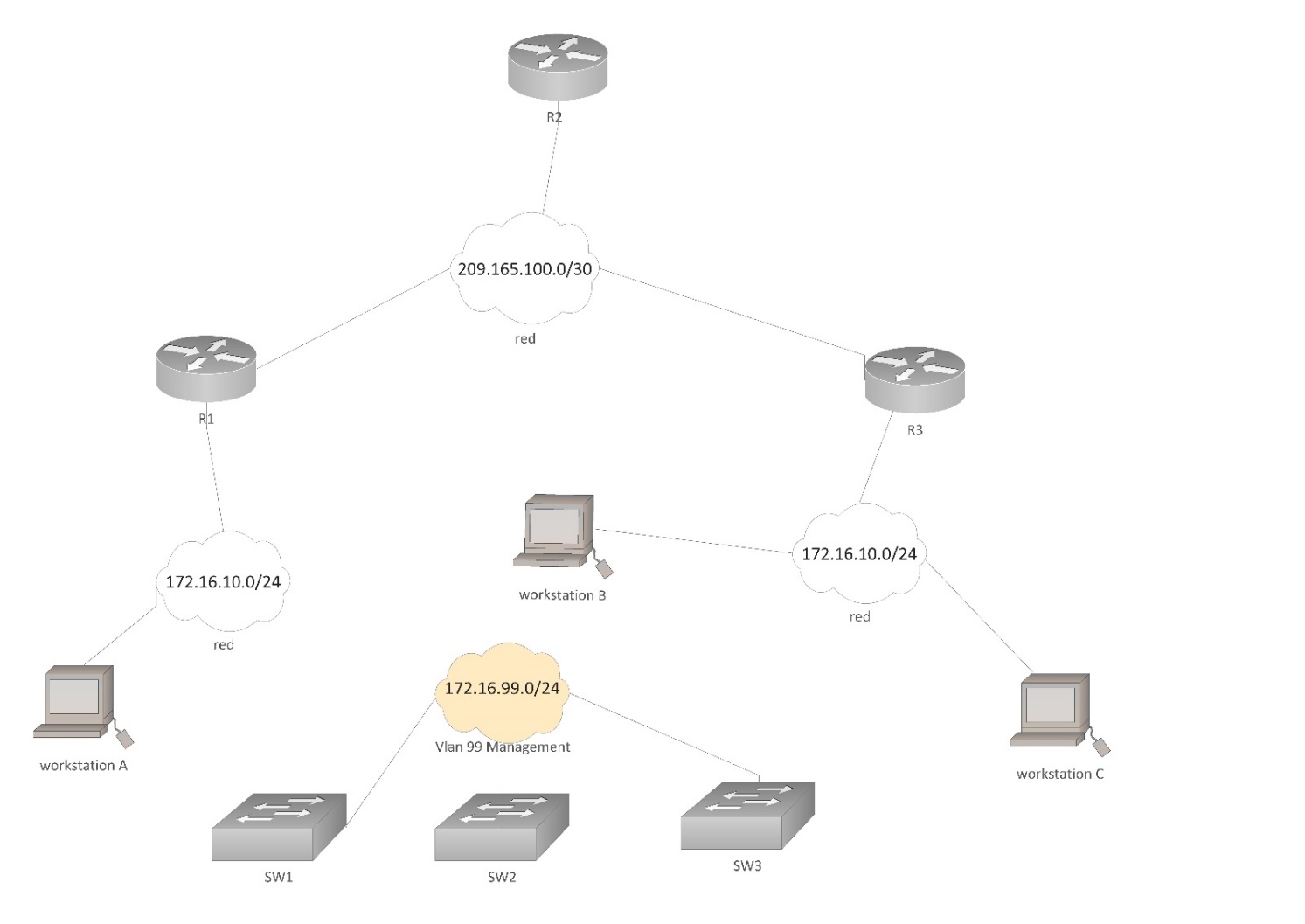
Los dispositivos finales a la elección de la empresa, la red ha de estar accesible por cable o sin cable.

# Planificación

## Esquema físico



## Esquema lógico



## Direccionamiento

Tabla correspondiente al direccionamiento

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Device** | **Interface** | **IP Address** | **Subnet Mask** | **Default Gateway** |
| **R1** | G0/0 | 172.16.10.1 | 255.255.255.0 | N/A |
| S0/0 | 209.165.100.1 | 255.255.255.252 | N/A |
| **R2** | S0/0 | 209.165.100.5 | 255.255.255.252 | N/A |
| S0/1 | 209.165.100.2 | 255.255.255.252 | N/A |
| Lo0 | 200.200.200.1 | 255.255.255.0 | N/A |
| **R3** | G0/0 | 172.16.10.3 | 255.255.255.0 | N/A |
| S0/1 | 209.165.100.6 | 255.255.255.252 | N/A |
| **SW1** | VLAN 99 | 172.16.99.11 | 255.255.255.0 | N/A |
| **SW2** | VLAN 99 | 172.16.99.12 | 255.255.255.0 | N/A |
| **SW3** | VLAN 99 | 172.16.99.13 | 255.255.255.0 | N/A |
| **PC1** | NIC | 172.16.10.11 | 255.255.255.0 | 172.16.10.2 |
| **PC2** | NIC | 172.16.10.12 | 255.255.255.0 | 172.16.10.4 |
| **PC3** | NIC | 172.16.10.13 | 255.255.255.0 | 172.16.10.4 |

Distribución de puertos físicos

|  |  |  |  |
| --- | --- | --- | --- |
| **Switch** | **Ports** | **Assignment** | **Network** |
| SW1 | Rango F0/1 - F0/4 | 802.1q Trunks (Native VLAN 99) | 172.16.99.0/24 |
| Rango F0/5 - F0/16 | VLAN 10 – Sales | 172.16.10.0/24 |
| SW2 | Rango F0/1 - F0/4 | 802.1q Trunks (Native VLAN 99) | 172.16.99.0/24 |
| Rango F0/5 - F0/16 | VLAN 10 – Sales | 172.16.10.0/24 |
| SW3 | Rango F0/1- F0/4 | 802.1q Trunks (Native VLAN 99) | 172.16.99.0/24 |
| Rango F0/5 - F0/16 | VLAN 10 – Sales | 172.16.10.0/24 |

Información relativa de Vlan’s

|  |  |
| --- | --- |
| **VLAN** | **VLAN Name** |
| VLAN 99 (Native) | Management |
| VLAN 10 | Sales |

# Configuraciones

## Acceso a los dispositivos

Por razones de seguridad se han habilitado todos los controles de acceso a los dispositivos de red, a continuación, se muestran las credenciales de acceso:

|  |  |  |  |
| --- | --- | --- | --- |
| Dispositivo | Nivel de acceso | Usuario | Password |
| Routers | Console | **admin01** | **admin01pass** |
| Switch’s | Console | **admin01** | **admin01pass** |
|  |  |  |  |
| Routers | Privilegiado | **-** | **ciscoenpa55** |
| Switch’s | Console | **-** | **ciscoenpa55** |
|  |  |  |  |
| Routers | Acceso remoto | **adminSSH** | **adminSSHpass** |
| Switch’s | Acceso remoto | **adminSSH** | **adminSSHpass** |

## Configuraciones de Routers

A continuación se procede a realizar todas las configuraciones necesarias en los routers, desde las asignaciones de IP’s, destinitos protocolos, hasta la verificación de la conectividad.

Después de haber acabado las configuraciones verificamos los resultados de cada apartado con las herramientas adecuadas.

### Router 1

#### Especificaciones

**R1# show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge

S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID Local Intrfce Holdtme Capability Platform Port ID

SW1 Gig 0/0 126 S 2960 Fas 0/5

R2 Ser 0/3/0 126 R C2900 Ser 0/3/1

**R1#show ip interface brief**

Interface IP-Address OK? Method Status Protocol

GigabitEthernet0/0 172.16.10.1 YES manual up up

GigabitEthernet0/1 unassigned YES unset administratively down down

GigabitEthernet0/2 unassigned YES unset administratively down down

Serial0/3/0 209.165.100.1 YES manual up up

Serial0/3/1 unassigned YES unset administratively down down

Vlan1 unassigned YES unset administratively down down

**R1#show version**

Cisco IOS Software, C2900 Software (C2900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc2)

Technical Support: http://www.cisco.com/techsupport

Copyright (c) 1986-2012 by Cisco Systems, Inc.

Compiled Thurs 5-Jan-12 15:41 by pt\_team

…

License UDI:

Device# PID SN

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

\*0 CISCO2911/K9 FTX1524IV7N-

Technology Package License Information for Module:'c2900'

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

Technology Technology-package Technology-package

Current Type Next reboot

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

ipbase ipbasek9 Permanent ipbasek9

security disable None None

uc disable None None

data disable None None

Configuration register is 0x2102

**R1#show startup-config**

Using 1406 bytes

!

version 15.1

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

security passwords min-length 10

!

hostname R1

enable secret 5 $1$mERr$TfFTxE.mmb5O5BVC56ndL0

no ip cef

no ipv6 cef

username admin01 password 7 0820484300175546020A1F17

username adminSSH password 7 08204843001736243A1B0D1739

!

license udi pid CISCO2911/K9 sn FTX1524IV7N-

no ip domain-lookup

ip domain-name CCNA\_CS3.com

spanning-tree mode pvst

interface GigabitEthernet0/0

description LAN 1

ip address 172.16.10.1 255.255.255.0

duplex auto

speed auto

standby version 2

standby 1 ip 172.16.10.2

standby preempt

standby 2 ip 172.16.10.4

!

interface GigabitEthernet0/1

no ip address

duplex auto

speed auto

shutdown

!

interface GigabitEthernet0/2

no ip address

duplex auto

speed auto

shutdown

!

interface Serial0/3/0

description link R1 --> R2

ip address 209.165.100.1 255.255.255.252

!

interface Serial0/3/1

no ip address

clock rate 2000000

shutdown

!

interface Vlan1

no ip address

shutdown

ip classless

ip flow-export version 9

banner motd ^C

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

This is the R1 CLI.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*^C

line con 0

login local

!

line aux 0

!

line vty 0 4

login local

transport input ssh

line vty 5 15

login local

transport input ssh

End

**R1#show standby**

GigabitEthernet0/0 - Group 1 (version 2)

State is Standby

8 state changes, last state change 00:00:37

Virtual IP address is 172.16.10.2

Active virtual MAC address is 0000.0C9F.F001

Local virtual MAC address is 0000.0C9F.F001 (v2 default)

Hello time 3 sec, hold time 10 sec

Next hello sent in 1.833 secs

Preemption disabled

Active router is 172.16.10.3

Standby router is local

Priority 100 (default 100)

Group name is hsrp-Gig0/0-1 (default)

GigabitEthernet0/0 - Group 2 (version 2)

State is Standby

10 state changes, last state change 00:00:42

Virtual IP address is 172.16.10.4

Active virtual MAC address is 0000.0C9F.F002

Local virtual MAC address is 0000.0C9F.F002 (v2 default)

Hello time 3 sec, hold time 10 sec

Next hello sent in 1.345 secs

Preemption disabled

Active router is 172.16.10.3

Standby router is local

Priority 100 (default 100)

Group name is hsrp-Gig0/0-2 (default)

* show standby brief

**R1#show standby brief**

P indicates configured to preempt.

|

Interface Grp Pri P State Active Standby Virtual IP

Gig0/0 1 100 Standby 172.16.10.3 local 172.16.10.2

Gig0/0 2 100 Standby 172.16.10.3 local 172.16.10.4

#### Protocolo OSPF

**R1#show ip route**

172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks

C 172.16.10.0/24 is directly connected, GigabitEthernet0/0

L 172.16.10.1/32 is directly connected, GigabitEthernet0/0

200.200.200.0/32 is subnetted, 1 subnets

O 200.200.200.1/32 [110/65] via 209.165.100.2, 00:00:15, Serial0/3/0

209.165.100.0/24 is variably subnetted, 3 subnets, 2 masks

C 209.165.100.0/30 is directly connected, Serial0/3/0

L 209.165.100.1/32 is directly connected, Serial0/3/0

O 209.165.100.4/30 [110/128] via 209.165.100.2, 00:00:15, Serial0/3/0

**R1#show ip protocols**

Routing Protocol is "ospf 10"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Router ID 1.1.1.1

Number of areas in this router is 2. 2 normal 0 stub 0 nssa

Maximum path: 4

Routing for Networks:

172.16.10.0 0.0.0.255 area 1

209.165.100.0 0.0.0.3 area 1

Routing Information Sources:

Gateway Distance Last Update

1.1.1.1 110 00:09:49

2.2.2.2 110 00:09:49

3.3.3.3 110 00:09:49

Distance: (default is 110)

**R1#show ip ospf**

Routing Process "ospf 10" with ID 1.1.1.1

Supports only single TOS(TOS0) routes

Supports opaque LSA

It is an area border router

SPF schedule delay 5 secs, Hold time between two SPFs 10 secs

Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs

Number of external LSA 0. Checksum Sum 0x000000

Number of opaque AS LSA 0. Checksum Sum 0x000000

Number of DCbitless external and opaque AS LSA 0

Number of DoNotAge external and opaque AS LSA 0

Number of areas in this router is 2. 2 normal 0 stub 0 nssa

External flood list length 0

Area 1

Number of interfaces in this area is 2

Area has no authentication

SPF algorithm executed 5 times

Area ranges are

Number of LSA 7. Checksum Sum 0x031364

Number of opaque link LSA 0. Checksum Sum 0x000000

Number of DCbitless LSA 0

Number of indication LSA 0

Number of DoNotAge LSA 0

Flood list length 0

**R1#show ip ospf neighbor**

Neighbor ID Pri State Dead Time Address Interface

3.3.3.3 1 FULL/DR 00:00:38 172.16.10.3 GigabitEthernet0/0

2.2.2.2 0 FULL/ - 00:00:19 209.165.100.2 Serial0/3/0

show ip ospf database

**R1#show ip ospf database**

OSPF Router with ID (1.1.1.1) (Process ID 10)

Router Link States (Area 0)

Link ID ADV Router Age Seq# Checksum Link count

1.1.1.1 1.1.1.1 703 0x80000003 0x009e5f 2

3.3.3.3 3.3.3.3 703 0x80000003 0x00a341 2

2.2.2.2 2.2.2.2 703 0x80000007 0x00031c 5

Summary Net Link States (Area 0)

Link ID ADV Router Age Seq# Checksum

172.16.10.0 1.1.1.1 709 0x80000001 0x00abfc

172.16.10.0 3.3.3.3 693 0x80000001 0x006f31

Summary ASB Link States (Area 0)

Link ID ADV Router Age Seq# Checksum

2.2.2.2 1.1.1.1 669 0x80000002 0x00818f

Router Link States (Area 1)

Link ID ADV Router Age Seq# Checksum Link count

1.1.1.1 1.1.1.1 670 0x80000004 0x00f4ae 2

3.3.3.3 3.3.3.3 670 0x80000003 0x0012a9 1

Net Link States (Area 1)

Link ID ADV Router Age Seq# Checksum

172.16.10.3 3.3.3.3 670 0x80000001 0x0038f7

Summary Net Link States (Area 1)

Link ID ADV Router Age Seq# Checksum

209.165.100.4 3.3.3.3 694 0x80000002 0x00b97b

200.200.200.1 3.3.3.3 694 0x80000003 0x007143

209.165.100.0 3.3.3.3 694 0x80000004 0x006096

Summary ASB Link States (Area 1)

Link ID ADV Router Age Seq# Checksum

2.2.2.2 3.3.3.3 694 0x80000001 0x0047c2

show ip ospf interface <interface>

**R1#show ip ospf interface s0/3/0**

Serial0/3/0 is up, line protocol is up

Internet address is 209.165.100.1/30, Area 0

Process ID 10, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0

No designated router on this network

No backup designated router on this network

Timer intervals configured, Hello 5, Dead 20, Wait 20, Retransmit 5

Hello due in 00:00:02

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1 , Adjacent neighbor count is 1

Adjacent with neighbor 2.2.2.2

Suppress hello for 0 neighbor(s)

Message digest authentication enabled

Youngest key id is 1

Serial0/3/0 is up, line protocol is up

Internet address is 209.165.100.1/30, Area 1

Process ID 10, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0

No designated router on this network

No backup designated router on this network

Timer intervals configured, Hello 5, Dead 20, Wait 20, Retransmit 5

Hello due in 00:00:02

Index 3/3, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Suppress hello for 0 neighbor(s)

Message digest authentication enabled

Youngest key id is 1

**show ip ospf interface brief** (no lo suporta packet tracer)

#### Protocolo EIGRP

**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

172.16.0.0/16 is variably subnetted, 3 subnets, 3 masks

D 172.16.0.0/16 is a summary, 00:00:21, Null0

C 172.16.10.0/24 is directly connected, GigabitEthernet0/0

L 172.16.10.1/32 is directly connected, GigabitEthernet0/0

209.165.100.0/24 is variably subnetted, 3 subnets, 3 masks

D 209.165.100.0/24 is a summary, 00:00:21, Null0

C 209.165.100.0/30 is directly connected, Serial0/3/0

* L 209.165.100.1/32 is directly connected, Serial0/3/0

**R1#show ip protocols**

Routing Protocol is "eigrp 20 "

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Default networks flagged in outgoing updates

Default networks accepted from incoming updates

Redistributing: eigrp 20

EIGRP-IPv4 Protocol for AS(20)

Metric weight K1=1, K2=0, K3=1, K4=0, K5=0

NSF-aware route hold timer is 240

Router-ID: 1.1.1.1

Topology : 0 (base)

Active Timer: 3 min

Distance: internal 90 external 170

Maximum path: 4

Maximum hopcount 100

Maximum metric variance 1

Automatic Summarization: enabled

Automatic address summarization:

172.16.0.0/16 for Serial0/3/0

Summarizing with metric 5120

209.165.100.0/24 for GigabitEthernet0/0

Summarizing with metric 2169856

Maximum path: 4

Routing for Networks:

172.16.10.0/24

209.165.100.0/30

Routing Information Sources:

Gateway Distance Last Update

209.165.100.2 90 8369

172.16.10.3 90 33055

Distance: internal 90 external 170

show ip eigrp neighbors

**R1#show ip eigrp neighbors**

IP-EIGRP neighbors for process 20

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 209.165.100.2 Se0/3/0 11 00:02:57 40 1000 0 3

1 172.16.10.3 Gig0/0 11 00:02:32 40 1000 0 3

show ip eigrp topology

**R1#show ip eigrp topology**

IP-EIGRP Topology Table for AS 20/ID(1.1.1.1)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,

r - Reply status

P 172.16.0.0/16, 1 successors, FD is 5120

via Summary (5120/0), Null0

P 172.16.10.0/24, 1 successors, FD is 5120

via Connected, GigabitEthernet0/0

P 209.165.100.0/24, 1 successors, FD is 2169856

via Summary (2169856/0), Null0

P 209.165.100.0/30, 1 successors, FD is 2169856

via Connected, Serial0/3/0

### Router 2

#### Especificaciones

**R2#show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge

S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID Local Intrfce Holdtme Capability Platform Port ID

R3 Ser 0/3/0 158 R C2900 Ser 0/3/1

R1 Ser 0/3/1 159 R C2900 Ser 0/3/0

**R2#show ip interface brief**

Interface IP-Address OK? Method Status Protocol

GigabitEthernet0/0 unassigned YES unset administratively down down

GigabitEthernet0/1 unassigned YES unset administratively down down

GigabitEthernet0/2 unassigned YES unset administratively down down

Serial0/3/0 209.165.100.5 YES manual up up

Serial0/3/1 209.165.100.2 YES manual up up

Loopback0 200.200.200.1 YES manual up up

Vlan1 unassigned YES unset administratively down down

**R2#show version**

Cisco IOS Software, C2900 Software (C2900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc2)

Technical Support: http://www.cisco.com/techsupport

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Compiled Thurs 5-Jan-12 15:41 by pt\_team

ROM: System Bootstrap, Version 15.1(4)M4, RELEASE SOFTWARE (fc1)

cisco2911 uptime is 3 minutes, 23 seconds

System returned to ROM by power-on

System image file is "flash0:c2900-universalk9-mz.SPA.151-1.M4.bin"

Last reload type: Normal Reload

…

**R2#show startup-config**

Using 1410 bytes

!

version 15.1

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

security passwords min-length 10

!

hostname R2

!

enable secret 5 $1$mERr$TfFTxE.mmb5O5BVC56ndL0

!

no ip cef

no ipv6 cef

!

username admin01 password 7 0820484300175546020A1F17

username adminSSH password 7 08204843001736243A1B0D1739

!

!

license udi pid CISCO2911/K9 sn FTX15246785-

!

no ip domain-lookup

ip domain-name CCNA\_CS3.com

!

!

spanning-tree mode pvst

!

interface Loopback0

ip address 200.200.200.1 255.255.255.0

!

interface GigabitEthernet0/0

no ip address

duplex auto

speed auto

shutdown

!

interface GigabitEthernet0/1

no ip address

duplex auto

speed auto

shutdown

!

interface GigabitEthernet0/2

no ip address

duplex auto

speed auto

shutdown

!

interface Serial0/3/0

description Link R2 --> R3

ip address 209.165.100.5 255.255.255.252

clock rate 2000000

!

interface Serial0/3/1

description Link R2 --> R1

ip address 209.165.100.2 255.255.255.252

clock rate 2000000

!

interface Vlan1

no ip address

shutdown

!

ip classless

!

ip flow-export version 9

!

banner motd ^C

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

This is the R2 CLI

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*^C

!

line con 0

login local

!

line aux 0

!

line vty 0 4

login local

transport input ssh

line vty 5 15

login local

transport input ssh

!

!

!

end

**show standby** (No tiene ninguna configuración standby)

**show standby brief** (No tiene ninguna configuración standby)

#### Protocolo OSPF

**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

172.16.0.0/24 is subnetted, 1 subnets

O IA 172.16.10.0/24 [110/1064] via 209.165.100.6, 00:04:26, Serial0/3/0

[110/1064] via 209.165.100.1, 00:04:26, Serial0/3/1

200.200.200.0/24 is variably subnetted, 2 subnets, 2 masks

C 200.200.200.0/24 is directly connected, Loopback0

L 200.200.200.1/32 is directly connected, Loopback0

209.165.100.0/24 is variably subnetted, 4 subnets, 2 masks

C 209.165.100.0/30 is directly connected, Serial0/3/1

L 209.165.100.2/32 is directly connected, Serial0/3/1

C 209.165.100.4/30 is directly connected, Serial0/3/0

L 209.165.100.5/32 is directly connected, Serial0/3/0

**R2#show ip protocols**

Routing Protocol is "ospf 10"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Router ID 2.2.2.2

Number of areas in this router is 1. 1 normal 0 stub 0 nssa

Maximum path: 4

Routing for Networks:

200.200.200.0 0.0.0.255 area 0

209.165.100.0 0.0.0.3 area 0

209.165.100.4 0.0.0.3 area 0

Routing Information Sources:

Gateway Distance Last Update

1.1.1.1 110 00:05:00

2.2.2.2 110 00:04:59

3.3.3.3 110 00:04:59

Distance: (default is 110)

**R2#show ip ospf**

Routing Process "ospf 10" with ID 2.2.2.2

Supports only single TOS(TOS0) routes

Supports opaque LSA

SPF schedule delay 5 secs, Hold time between two SPFs 10 secs

Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs

Number of external LSA 0. Checksum Sum 0x000000

Number of opaque AS LSA 0. Checksum Sum 0x000000

Number of DCbitless external and opaque AS LSA 0

Number of DoNotAge external and opaque AS LSA 0

Number of areas in this router is 1. 1 normal 0 stub 0 nssa

External flood list length 0

Area BACKBONE(0)

Number of interfaces in this area is 3

Area has message digest authentication

SPF algorithm executed 3 times

Area ranges are

Number of LSA 6. Checksum Sum 0x02e178

Number of opaque link LSA 0. Checksum Sum 0x000000

Number of DCbitless LSA 0

Number of indication LSA 0

Number of DoNotAge LSA 0

Flood list length 0

**R2#show ip ospf neighbor**

Neighbor ID Pri State Dead Time Address Interface

1.1.1.1 0 FULL/ - 00:00:18 209.165.100.1 Serial0/3/1

3.3.3.3 0 FULL/ - 00:00:17 209.165.100.6 Serial0/3/0

**R2#show ip ospf database**

OSPF Router with ID (2.2.2.2) (Process ID 10)

Router Link States (Area 0)

Link ID ADV Router Age Seq# Checksum Link count

1.1.1.1 1.1.1.1 379 0x80000003 0x009e5f 2

2.2.2.2 2.2.2.2 378 0x80000007 0x00031c 5

3.3.3.3 3.3.3.3 378 0x80000003 0x00a341 2

Summary Net Link States (Area 0)

Link ID ADV Router Age Seq# Checksum

172.16.10.0 3.3.3.3 379 0x80000001 0x006f31

172.16.10.0 1.1.1.1 377 0x80000001 0x00abfc

Summary ASB Link States (Area 0)

Link ID ADV Router Age Seq# Checksum

2.2.2.2 1.1.1.1 344 0x80000002 0x00818f

**R2#show ip ospf interface s0/3/1**

Serial0/3/1 is up, line protocol is up

Internet address is 209.165.100.2/30, Area 0

Process ID 10, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0

No designated router on this network

No backup designated router on this network

Timer intervals configured, Hello 5, Dead 20, Wait 20, Retransmit 5

Hello due in 00:00:01

Index 3/3, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1 , Adjacent neighbor count is 1

Adjacent with neighbor 1.1.1.1

Suppress hello for 0 neighbor(s)

Message digest authentication enabled

Youngest key id is 1

**R2#show ip ospf interface s0/3/0**

Serial0/3/0 is up, line protocol is up

Internet address is 209.165.100.5/30, Area 0

Process ID 10, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0

No designated router on this network

No backup designated router on this network

Timer intervals configured, Hello 5, Dead 20, Wait 20, Retransmit 5

Hello due in 00:00:01

Index 2/2, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1 , Adjacent neighbor count is 1

Adjacent with neighbor 3.3.3.3

Suppress hello for 0 neighbor(s)

Message digest authentication enabled

Youngest key id is 1

**show ip ospf interface brief** (No suportado en Packet Tracer)

#### Protocolo EIGRP

**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

D 172.16.0.0/16 [90/2172416] via 209.165.100.1, 00:07:45, Serial0/3/1

200.200.200.0/24 is variably subnetted, 2 subnets, 2 masks

C 200.200.200.0/24 is directly connected, Loopback0

L 200.200.200.1/32 is directly connected, Loopback0

209.165.100.0/24 is variably subnetted, 4 subnets, 2 masks

C 209.165.100.0/30 is directly connected, Serial0/3/1

L 209.165.100.2/32 is directly connected, Serial0/3/1

C 209.165.100.4/30 is directly connected, Serial0/3/0

L 209.165.100.5/32 is directly connected, Serial0/3/0

**R2#show ip protocols**

Routing Protocol is "eigrp 20 "

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Default networks flagged in outgoing updates

Default networks accepted from incoming updates

Redistributing: eigrp 20

EIGRP-IPv4 Protocol for AS(20)

Metric weight K1=1, K2=0, K3=1, K4=0, K5=0

NSF-aware route hold timer is 240

Router-ID: 2.2.2.2

Topology : 0 (base)

Active Timer: 3 min

Distance: internal 90 external 170

Maximum path: 4

Maximum hopcount 100

Maximum metric variance 1

Automatic Summarization: enabled

Automatic address summarization:

Maximum path: 4

Routing for Networks:

209.165.100.0/30

Routing Information Sources:

Gateway Distance Last Update

209.165.100.1 90 8369

Distance: internal 90 external 170

**R2#show ip eigrp neighbors**

IP-EIGRP neighbors for process 20

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 209.165.100.1 Se0/3/1 13 00:17:46 40 1000 0 1

**R2#show ip eigrp topology**

IP-EIGRP Topology Table for AS 20/ID(2.2.2.2)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,

r - Reply status

P 172.16.0.0/16, 1 successors, FD is 2172416

via 209.165.100.1 (2172416/5120), Serial0/3/1

P 209.165.100.0/30, 1 successors, FD is 2169856

via Connected, Serial0/3/1

### Router 3

#### Especificaciones

**R3#show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge

S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID Local Intrfce Holdtme Capability Platform Port ID

SW2 Gig 0/0 143 S 2960 Fas 0/5

R2 Ser 0/3/1 142 R C2900 Ser 0/3/0show ip interface brief

**R3#show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge

S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID Local Intrfce Holdtme Capability Platform Port ID

SW2 Gig 0/0 143 S 2960 Fas 0/5

R2 Ser 0/3/1 142 R C2900 Ser 0/3/0

**R3#show version**

Cisco IOS Software, C2900 Software (C2900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc2)

Technical Support: http://www.cisco.com/techsupport

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Compiled Thurs 5-Jan-12 15:41 by pt\_team

…

**R3#show startup-config**

Using 1364 bytes

!

version 15.1

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

security passwords min-length 10

!

hostname R3

!

enable secret 5 $1$mERr$TfFTxE.mmb5O5BVC56ndL0

!

no ip cef

no ipv6 cef

!

username admin01 password 7 0820484300175546020A1F17

username adminSSH password 7 08204843001736243A1B0D1739

!

license udi pid CISCO2911/K9 sn FTX1524FTY1-

!

ip domain-name CCNA\_CS3.com

!

!

spanning-tree mode pvst

!

interface GigabitEthernet0/0

description LAN 3

ip address 172.16.10.3 255.255.255.0

duplex auto

speed auto

standby version 2

standby 2 ip 172.16.10.4

standby 2 priority 101

standby preempt

standby 1 ip 172.16.10.2

!

interface GigabitEthernet0/1

no ip address

duplex auto

speed auto

shutdown

!

interface GigabitEthernet0/2

no ip address

duplex auto

speed auto

shutdown

!

interface Serial0/3/0

no ip address

clock rate 2000000

shutdown

!

interface Serial0/3/1

description Link R3 --> R2

ip address 209.165.100.6 255.255.255.252

!

interface Vlan1

no ip address

shutdown

!

ip classless

!

ip flow-export version 9

!

banner motd ^C

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

This is the R3 CLI.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*^C

!

!

line con 0

login local

!

line aux 0

!

line vty 0 4

login local

line vty 5 15

login local

!

end

**R3#show standby**

GigabitEthernet0/0 - Group 2 (version 2)

State is Active

7 state changes, last state change 00:00:19

Virtual IP address is 172.16.10.4

Active virtual MAC address is 0000.0C9F.F002

Local virtual MAC address is 0000.0C9F.F002 (v2 default)

Hello time 3 sec, hold time 10 sec

Next hello sent in 0.447 secs

Preemption disabled

Active router is local

Standby router is 172.16.10.1

Priority 101 (configured 101)

Group name is hsrp-Gig0/0-2 (default)

GigabitEthernet0/0 - Group 1 (version 2)

State is Active

7 state changes, last state change 00:00:19

Virtual IP address is 172.16.10.2

Active virtual MAC address is 0000.0C9F.F001

Local virtual MAC address is 0000.0C9F.F001 (v2 default)

Hello time 3 sec, hold time 10 sec

Next hello sent in 0.634 secs

Preemption disabled

Active router is local

Standby router is 172.16.10.1

Priority 100 (default 100)

Group name is hsrp-Gig0/0-1 (default)

**R3#show standby brief**

P indicates configured to preempt.

|

Interface Grp Pri P State Active Standby Virtual IP

Gig0/0 2 101 Active local 172.16.10.1 172.16.10.4

Gig0/0 1 100 Active local 172.16.10.1 172.16.10.2

#### Protocolo OSPF

**R3#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

172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks

C 172.16.10.0/24 is directly connected, GigabitEthernet0/0

L 172.16.10.3/32 is directly connected, GigabitEthernet0/0

200.200.200.0/32 is subnetted, 1 subnets

O 200.200.200.1/32 [110/65] via 209.165.100.5, 00:11:08, Serial0/3/1

209.165.100.0/24 is variably subnetted, 3 subnets, 2 masks

O 209.165.100.0/30 [110/128] via 209.165.100.5, 00:11:08, Serial0/3/1

C 209.165.100.4/30 is directly connected, Serial0/3/1

L 209.165.100.6/32 is directly connected, Serial0/3/1

**R3#show ip protocols**

Routing Protocol is "ospf 10"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Router ID 3.3.3.3

Number of areas in this router is 2. 2 normal 0 stub 0 nssa

Maximum path: 4

Routing for Networks:

172.16.10.0 0.0.0.255 area 1

209.165.100.0 0.0.0.3 area 0

209.165.100.4 0.0.0.3 area 0

Routing Information Sources:

Gateway Distance Last Update

1.1.1.1 110 00:11:46

2.2.2.2 110 00:11:47

3.3.3.3 110 00:11:47

Distance: (default is 110)

**R3#show ip ospf**

Routing Process "ospf 10" with ID 3.3.3.3

Supports only single TOS(TOS0) routes

Supports opaque LSA

It is an area border router

SPF schedule delay 5 secs, Hold time between two SPFs 10 secs

Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs

Number of external LSA 0. Checksum Sum 0x000000

Number of opaque AS LSA 0. Checksum Sum 0x000000

Number of DCbitless external and opaque AS LSA 0

Number of DoNotAge external and opaque AS LSA 0

Number of areas in this router is 2. 2 normal 0 stub 0 nssa

External flood list length 0

Area 1

Number of interfaces in this area is 1

Area has no authentication

SPF algorithm executed 3 times

Area ranges are

Number of LSA 7. Checksum Sum 0x03b8e7

Number of opaque link LSA 0. Checksum Sum 0x000000

Number of DCbitless LSA 0

Number of indication LSA 0

Number of DoNotAge LSA 0

Flood list length 0

Area BACKBONE(0)

Number of interfaces in this area is 1

Area has message digest authentication

SPF algorithm executed 4 times

Area ranges are

Number of LSA 6. Checksum Sum 0x02e178

Number of opaque link LSA 0. Checksum Sum 0x000000

Number of DCbitless LSA 0

Number of indication LSA 0

Number of DoNotAge LSA 0

Flood list length 0

**R3#show ip ospf neighbor**

Neighbor ID Pri State Dead Time Address Interface

1.1.1.1 1 FULL/BDR 00:00:32 172.16.10.1 GigabitEthernet0/0

2.2.2.2 0 FULL/ - 00:00:18 209.165.100.5 Serial0/3/1

**R3#show ip ospf neighbor**

Neighbor ID Pri State Dead Time Address Interface

1.1.1.1 1 FULL/BDR 00:00:32 172.16.10.1 GigabitEthernet0/0

2.2.2.2 0 FULL/ - 00:00:18 209.165.100.5 Serial0/3/1

**R3#show ip ospf database**

OSPF Router with ID (3.3.3.3) (Process ID 10)

Router Link States (Area 0)

Link ID ADV Router Age Seq# Checksum Link count

3.3.3.3 3.3.3.3 802 0x80000003 0x00a341 2

2.2.2.2 2.2.2.2 802 0x80000007 0x00031c 5

1.1.1.1 1.1.1.1 801 0x80000003 0x009e5f 2

Summary Net Link States (Area 0)

Link ID ADV Router Age Seq# Checksum

172.16.10.0 3.3.3.3 803 0x80000001 0x006f31

172.16.10.0 1.1.1.1 801 0x80000001 0x00abfc

Summary ASB Link States (Area 0)

Link ID ADV Router Age Seq# Checksum

2.2.2.2 1.1.1.1 768 0x80000002 0x00818f

Router Link States (Area 1)

Link ID ADV Router Age Seq# Checksum Link count

3.3.3.3 3.3.3.3 768 0x80000003 0x0012a9 1

1.1.1.1 1.1.1.1 763 0x80000005 0x00f2af 2

Net Link States (Area 1)

Link ID ADV Router Age Seq# Checksum

172.16.10.3 3.3.3.3 768 0x80000001 0x00e079

Summary Net Link States (Area 1)

Link ID ADV Router Age Seq# Checksum

209.165.100.4 3.3.3.3 791 0x80000002 0x00b97b

200.200.200.1 3.3.3.3 791 0x80000003 0x007143

209.165.100.0 3.3.3.3 791 0x80000004 0x006096

Summary ASB Link States (Area 1)

Link ID ADV Router Age Seq# Checksum

2.2.2.2 3.3.3.3 791 0x80000001 0x0047c2

**R3#show ip ospf interface s0/3/1**

Serial0/3/1 is up, line protocol is up

Internet address is 209.165.100.6/30, Area 0

Process ID 10, Router ID 3.3.3.3, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0

No designated router on this network

No backup designated router on this network

Timer intervals configured, Hello 5, Dead 20, Wait 20, Retransmit 5

Hello due in 00:00:00

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1 , Adjacent neighbor count is 1

Adjacent with neighbor 2.2.2.2

Suppress hello for 0 neighbor(s)

Message digest authentication enabled

Youngest key id is 1

**R3#show ip ospf interface g0/0**

GigabitEthernet0/0 is up, line protocol is up

Internet address is 172.16.10.3/24, Area 1

Process ID 10, Router ID 3.3.3.3, Network Type BROADCAST, Cost: 1000

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 3.3.3.3, Interface address 172.16.10.3

Backup Designated Router (ID) 1.1.1.1, Interface address 172.16.10.1

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:07

Index 2/2, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1, Adjacent neighbor count is 1

Adjacent with neighbor 1.1.1.1 (Backup Designated Router)

Suppress hello for 0 neighbor(s)

**show ip ospf interface brief** (No suportado por Packet Tracer)

#### Protocolo EIGRP

**R3#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

172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks

C 172.16.10.0/24 is directly connected, GigabitEthernet0/0

L 172.16.10.3/32 is directly connected, GigabitEthernet0/0

209.165.100.0/24 is variably subnetted, 3 subnets, 3 masks

D 209.165.100.0/24 [90/2172416] via 172.16.10.1, 00:21:48, GigabitEthernet0/0

C 209.165.100.4/30 is directly connected, Serial0/3/1

L 209.165.100.6/32 is directly connected, Serial0/3/1

**R3#show ip protocols**

Routing Protocol is "eigrp 20 "

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Default networks flagged in outgoing updates

Default networks accepted from incoming updates

Redistributing: eigrp 20

EIGRP-IPv4 Protocol for AS(20)

Metric weight K1=1, K2=0, K3=1, K4=0, K5=0

NSF-aware route hold timer is 240

Router-ID: 172.16.10.3

Topology : 0 (base)

Active Timer: 3 min

Distance: internal 90 external 170

Maximum path: 4

Maximum hopcount 100

Maximum metric variance

Automatic Summarization: enabled

Automatic address summarization:

Maximum path: 4

Routing for Networks:

172.16.10.0/24

209.165.100.0/30

Routing Information Sources:

Gateway Distance Last Update

172.16.10.1 90 33055

Distance: internal 90 external 170

**R3#show ip eigrp neighbors**

IP-EIGRP neighbors for process 20

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 172.16.10.1 Gig0/0 13 00:23:08 40 1000 0

**R3#show ip eigrp topology**

IP-EIGRP Topology Table for AS 20/ID(209.165.100.6)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,

r - Reply status

P 172.16.10.0/24, 1 successors, FD is 5120

via Connected, GigabitEthernet0/0

P 209.165.100.0/24, 1 successors, FD is 2172416

via 172.16.10.1 (2172416/2169856), GigabitEthernet0/0

## Configuraciones de Switch’s

### Switch 1

**SW1#show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge

S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID Local Intrfce Holdtme Capability Platform Port ID

R1 Fas 0/5 154 R C2900 Gig 0/0

SW3 Por 1 148 S 2960 Fas 0/4

SW3 Por 1 148 S 2960 Por 1

SW3 Por 1 148 S 2960 Fas 0/3

SW2 Por 3 148 S 2960 Fas 0/1

SW2 Por 3 148 S 2960 Fas 0/2

SW2 Por 3 148 S 2960 Por 3

**SW1#show ip interface brief**

Interface IP-Address OK? Method Status Protocol

Port-channel1 unassigned YES manual up up

Port-channel3 unassigned YES manual up up

FastEthernet0/1 unassigned YES manual up up

FastEthernet0/2 unassigned YES manual up up

FastEthernet0/3 unassigned YES manual up up

FastEthernet0/4 unassigned YES manual up up

FastEthernet0/5 unassigned YES manual up up

…

FastEthernet0/11 unassigned YES manual up up

Vlan99 172.16.99.11 YES manual up up

**SW1#show interfaces trunk**

Port Mode Encapsulation Status Native vlan

Po1 on 802.1q trunking 99

Po3 on 802.1q trunking 99

Port Vlans allowed on trunk

Po1 10,99

Po3 10,99

Port Vlans allowed and active in management domain

Po1 10,99

Po3 10,99

Port Vlans in spanning tree forwarding state and not pruned

Po1 10,99

Po3 10,99

**SW1#show interface vlan 99**

Vlan99 is up, line protocol is up

Hardware is CPU Interface, address is 0090.2b4c.6b01 (bia 0090.2b4c.6b01)

Internet address is 172.16.99.11/24

MTU 1500 bytes, BW 100000 Kbit, DLY 1000000 usec,

reliability 255/255, txload 1/255, rxload 1/255

Encapsulation ARPA, loopback not set

ARP type: ARPA, ARP Timeout 04:00:00

Last input 21:40:21, output never, output hang never

Last clearing of "show interface" counters never

Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0

Queueing strategy: fifo

Output queue: 0/40 (size/max)

5 minute input rate 0 bits/sec, 0 packets/sec

5 minute output rate 0 bits/sec, 0 packets/sec

1682 packets input, 530955 bytes, 0 no buffer

Received 0 broadcasts (0 IP multicast)

0 runts, 0 giants, 0 throttles

0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored

563859 packets output, 0 bytes, 0 underruns

0 output errors, 23 interface resets

0 output buffer failures, 0 output buffers swapped out

**SW1#show vlan**

VLAN Name Status Ports

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

1 default active Fa0/17, Fa0/18, Fa0/19, Fa0/20

Fa0/21, Fa0/22, Fa0/23, Fa0/24

Gig0/1, Gig0/2

10 Sales active Fa0/5, Fa0/6, Fa0/7, Fa0/8

Fa0/9, Fa0/10, Fa0/11, Fa0/12

Fa0/13, Fa0/14, Fa0/15, Fa0/16

99 Management active

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

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

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**SW1#show spanning-tree**

VLAN0010

Spanning tree enabled protocol ieee

Root ID Priority 24586

Address 0001.43CA.9115

Cost 9

Port 28(Port-channel3)

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 28682 (priority 28672 sys-id-ext 10)

Address 0090.2B4C.6B72

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 20

Interface Role Sts Cost Prio.Nbr Type

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

Fa0/5 Desg FWD 19 128.5 P2p

Fa0/11 Desg FWD 19 128.11 P2p

Po1 Desg FWD 9 128.27 Shr

Po3 Root FWD 9 128.28 Shr

VLAN0099

Spanning tree enabled protocol ieee

Root ID Priority 24675

Address 0090.2B4C.6B72

This bridge is the root

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 24675 (priority 24576 sys-id-ext 99)

Address 0090.2B4C.6B72

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 20

Interface Role Sts Cost Prio.Nbr Type

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

Po1 Desg FWD 9 128.27 Shr

Po3 Desg FWD 9 128.28 Shr

**show port-security** (No configurado)

**show port-security interface <secured port**> (No configurado)

### Switch 2

**SW2#show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge

S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID Local Intrfce Holdtme Capability Platform Port ID

SW3 Por 2 142 S 2960 Fas 0/1

SW3 Por 2 142 S 2960 Por 2

R3 Fas 0/5 151 R C2900 Gig 0/0

SW1 Por 3 142 S 2960 Fas 0/2

SW1 Por 3 142 S 2960 Fas 0/1

SW1 Por 3 142 S 2960 Por 3

SW3 Por 2 142 S 2960 Fas 0/2

**SW2#show ip interface brief**

Interface IP-Address OK? Method Status Protocol

Port-channel1 unassigned YES manual down down

Port-channel2 unassigned YES manual up up

Port-channel3 unassigned YES manual up up

FastEthernet0/1 unassigned YES manual up up

FastEthernet0/2 unassigned YES manual up up

FastEthernet0/3 unassigned YES manual up up

FastEthernet0/4 unassigned YES manual up up

FastEthernet0/5 unassigned YES manual up up

…

FastEthernet0/11 unassigned YES manual up up

Vlan99 172.16.99.12 YES manual up up

**SW2#show interfaces trunk**

Port Mode Encapsulation Status Native vlan

Po2 on 802.1q trunking 99

Po3 on 802.1q trunking 99

Port Vlans allowed on trunk

Po2 10,99

Po3 10,99

Port Vlans allowed and active in management domain

Po2 10,99

Po3 10,99

Port Vlans in spanning tree forwarding state and not pruned

Po2 10,99

Po3 10,99

**SW2#show interfaces vlan 99**

Vlan99 is up, line protocol is up

Hardware is CPU Interface, address is 0001.43ca.9101 (bia 0001.43ca.9101)

Internet address is 172.16.99.12/24

MTU 1500 bytes, BW 100000 Kbit, DLY 1000000 usec,

reliability 255/255, txload 1/255, rxload 1/255

Encapsulation ARPA, loopback not set

ARP type: ARPA, ARP Timeout 04:00:00

Last input 21:40:21, output never, output hang never

Last clearing of "show interface" counters never

Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0

Queueing strategy: fifo

Output queue: 0/40 (size/max)

5 minute input rate 0 bits/sec, 0 packets/sec

5 minute output rate 0 bits/sec, 0 packets/sec

1682 packets input, 530955 bytes, 0 no buffer

Received 0 broadcasts (0 IP multicast)

0 runts, 0 giants, 0 throttles

0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored

563859 packets output, 0 bytes, 0 underruns

0 output errors, 23 interface resets

0 output buffer failures, 0 output buffers swapped out

**SW2#show vlan**

VLAN Name Status Ports

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

1 default active Po1, Fa0/17, Fa0/18, Fa0/19

Fa0/20, Fa0/21, Fa0/22, Fa0/23

Fa0/24, Gig0/1, Gig0/2

10 Sales active Fa0/5, Fa0/6, Fa0/7, Fa0/8

Fa0/9, Fa0/10, Fa0/11, Fa0/12

Fa0/13, Fa0/14, Fa0/15, Fa0/16

99 Management active

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

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

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Remote SPAN VLANs

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Primary Secondary Type Ports

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

**SW2#show spanning-tree**

VLAN0010

Spanning tree enabled protocol ieee

Root ID Priority 24586

Address 0001.43CA.9115

This bridge is the root

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 24586 (priority 24576 sys-id-ext 10)

Address 0001.43CA.9115

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 20

Interface Role Sts Cost Prio.Nbr Type

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

Fa0/11 Desg FWD 19 128.11 P2p

Fa0/5 Desg FWD 19 128.5 P2p

Po2 Desg FWD 9 128.28 Shr

Po3 Desg FWD 9 128.29 Shr

VLAN0099

Spanning tree enabled protocol ieee

Root ID Priority 24675

Address 0090.2B4C.6B72

Cost 9

Port 29(Port-channel3)

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 28771 (priority 28672 sys-id-ext 99)

Address 0001.43CA.9115

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 20

Interface Role Sts Cost Prio.Nbr Type

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

Po2 Desg FWD 9 128.28 Shr

Po3 Root FWD 9 128.29 Shr

**show port-security** (No configurado)

**show port-security** interface <secured port> (No configurado)

### Switch 3

**SW3#show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge

S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID Local Intrfce Holdtme Capability Platform Port ID

SW1 Por 1 134 S 2960 Fas 0/4

SW1 Por 1 134 S 2960 Fas 0/3

SW1 Por 1 134 S 2960 Por 1

SW2 Por 2 134 S 2960 Fas 0/4

SW2 Por 2 134 S 2960 Fas 0/3

SW2 Por 2 134 S 2960 Por 2

**SW3#show ip interface brief**

Interface IP-Address OK? Method Status Protocol

Port-channel1 unassigned YES manual up up

Port-channel2 unassigned YES manual up up

FastEthernet0/1 unassigned YES manual up up

FastEthernet0/2 unassigned YES manual up up

FastEthernet0/3 unassigned YES manual up up

FastEthernet0/4 unassigned YES manual up up

FastEthernet0/5 unassigned YES manual down down

FastEthernet0/6 unassigned YES manual up up

…

Vlan99 172.16.99.13 YES manual up up

**SW3#show interfaces trunk**

Port Mode Encapsulation Status Native vlan

Po1 on 802.1q trunking 99

Po2 on 802.1q trunking 99

Port Vlans allowed on trunk

Po1 10,99

Po2 10,99

Port Vlans allowed and active in management domain

Po1 10,99

Po2 10,99

Port Vlans in spanning tree forwarding state and not pruned

Po1 99

Po2 10

**SW3#show interfaces vlan 99**

Vlan99 is up, line protocol is up

Hardware is CPU Interface, address is 00e0.8f48.4301 (bia 00e0.8f48.4301)

Internet address is 172.16.99.13/24

MTU 1500 bytes, BW 100000 Kbit, DLY 1000000 usec,

reliability 255/255, txload 1/255, rxload 1/255

Encapsulation ARPA, loopback not set

ARP type: ARPA, ARP Timeout 04:00:00

Last input 21:40:21, output never, output hang never

Last clearing of "show interface" counters never

Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0

Queueing strategy: fifo

Output queue: 0/40 (size/max)

5 minute input rate 0 bits/sec, 0 packets/sec

5 minute output rate 0 bits/sec, 0 packets/sec

1682 packets input, 530955 bytes, 0 no buffer

Received 0 broadcasts (0 IP multicast)

0 runts, 0 giants, 0 throttles

0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored

563859 packets output, 0 bytes, 0 underruns

0 output errors, 23 interface resets

0 output buffer failures, 0 output buffers swapped out

**SW3#show vlan**

VLAN Name Status Ports

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

1 default active Fa0/17, Fa0/18, Fa0/19, Fa0/20

Fa0/21, Fa0/22, Fa0/23, Fa0/24

Gig0/1, Gig0/2

10 Sales active Fa0/5, Fa0/6, Fa0/7, Fa0/8

Fa0/9, Fa0/10, Fa0/11, Fa0/12

Fa0/13, Fa0/14, Fa0/15, Fa0/16

99 Management active

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

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

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

**SW3#show spanning-tree**

VLAN0010

Spanning tree enabled protocol ieee

Root ID Priority 24586

Address 0001.43CA.9115

Cost 9

Port 28(Port-channel2)

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)

Address 00E0.8F48.4369

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 20

Interface Role Sts Cost Prio.Nbr Type

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

Fa0/6 Desg FWD 19 128.6 P2p

Po1 Altn BLK 9 128.27 Shr

Po2 Root FWD 9 128.28 Shr

VLAN0099

Spanning tree enabled protocol ieee

Root ID Priority 24675

Address 0090.2B4C.6B72

Cost 9

Port 27(Port-channel1)

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32867 (priority 32768 sys-id-ext 99)

Address 00E0.8F48.4369

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 20

Interface Role Sts Cost Prio.Nbr Type

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

Po1 Root FWD 9 128.27 Shr

Po2 Altn BLK 9 128.28 Shr

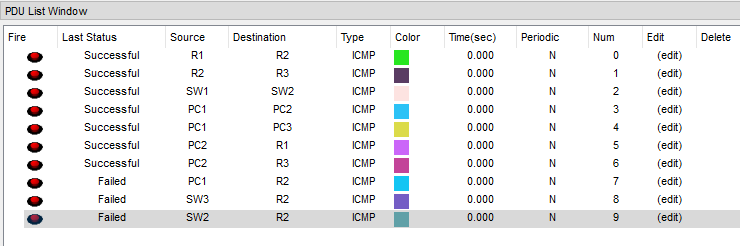
**show port-security** (No configurado)

**show port-security** interface <secured port> (No configurado)

# Conectividad

## Verificación de conectividad en la red

Antes de configurar los protocolos de direccionamiento, el HSRP esta configurado y el router enruta únicamente entre las redes que conoce.



Después de implementar protocolos EIGRP o OSPF:

