

**Routing, switching, network operation and CISCO performance**

**Adriana Carolina Torres Escobar  
1026257897**

**Universidad Nacional Abierta Y A Distancia (UNAD)  
CEAD José Acevedo Y Gómez  
Bogotá  
Mayo 27, 2018**

**Routing, switching, network operation and CISCO performance**

**Adriana Carolina Torres Escobar  
1026257897**

**Trabajo de grado para optar por el título de Ingeniera de Sistemas**

**Tutor  
Efraín Alejandro Pérez Gaitán**

**Director  
Juan Carlos Vega**

**Universidad Nacional Abierta Y A Distancia (UNAD)  
CEAD José Acevedo Y Gómez  
Bogotá  
Mayo 27, 2018**

**Nota de Aceptación**

**Presidente del Jurado**

---

**Jurado**

---

**Jurado**

**Bogotá, 27 de mayo, 2018**

**A Dios y a mis padres**

## **AGRADECIMIENTOS**

Me gustaría agradecer a mis supervisores Efraín Alejandro Pérez y Juan Carlos Vega por proporcionar comentarios y recomendaciones invaluableles.

Un reconocimiento especial a Dios y a mis padres por tiempos excelentes y memorables durante el desarrollo del trabajo de grado. Agradezco por su amor y apoyo incondicional. Muchas gracias por su orientación y entusiasmo.

## RESUMEN

Se desarrolló una topología que envuelve tres PCs, dos switches 2960, tres routers 2811, módulos HWIC-2T y los cables DCE adecuados para las conexiones. Se realizó tabla de direccionamiento-subnetting haciendo uso de tablas de direcciones, red, rango, broadcast y gateway. Adicionalmente, se configuraron los routers y switches con sus respectivos nombres y contraseñas. Se configuraron las VLANs en los switches asignando sus direcciones IP. Se realizó el enrutamiento OSPFv2, se configuró el NAT y los ACLs. Finalmente, se realizó la prueba de conectividad exitosa haciendo uso de PING y TRACER.

## **ABSTRACT**

The topology involves three PCs, two switches 2960, three routers 2811, HWIC-2T modules and DCE cables for making the connections. The addressing-subnetting table was made using address, network, range, broadcast and gateway tables. Additionally, there was the configuration of routers and switches with their respective names and passwords. The VLANs had their own IP address and they were configured on the switches. OSPFv2 routing was performed, NAT and ACLs were configured. Finally, the connectivity test was carried out using PING and TRACER.

## TABLA DE CONTENIDO

AGRADECIMIENTOS .....	5
RESUMEN .....	6
ABSTRACT .....	7
TABLA DE CONTENIDO .....	8
LISTA DE IMÁGENES .....	9
1. INTRODUCCIÓN .....	12
2. OBJETIVOS .....	13
1.1.1 OBJETIVO GENERAL.....	13
1.1.2 OBJETIVOS ESPECÍFICOS.....	13
3. PLANTEAMIENTO DEL PROBLEMA.....	14
4. MARCO TEÓRICO .....	15
5. MATERIALES.....	18
6. DESARROLLO DE LA TOPOLOGÍA .....	19
7. COMANDOS APLICADOS .....	47
8. CONCLUSIONES .....	52
REFERENCIAS BIBLIOGRÁFICAS .....	54



## LISTA DE IMÁGENES

Imagen 1 Topología.....	19
Imagen 2 Configuración int S0/0/0.....	20
Imagen 3 OSPF, passive interface y bandwidth .....	20
Imagen 4 IP dhcp pool, network, default-router, dns-server.....	20
Imagen 5 Ospf, passive interface, bandwidth .....	21
Imagen 6 IP route static .....	21
Imagen 7 interface lo5, IP address .....	21
Imagen 8 router id, router ospf, passive interface, bandwidth.....	22
Imagen 9 Inicialización.....	22
Imagen 10 show flash .....	23
Imagen 11 Bandwidth.....	23
Imagen 12 IPv6 route, clockrate y bandwidth .....	23
Imagen 13 IP configuration, IP address, subnet mask, default gateway, IPv6 address, link local address, IPV6 gateway .....	24
Imagen 14 no IP domain-lookup, hostname, password, line vty, IP address, IPv6 address, IP route, clockrate, interface serial .....	24
Imagen 15 Interface serial, IP address, IPv6 address, clock rate, int loopback.....	25
Imagen 16 no IP domain-lookup, hostname, password, line vty, IP address, IPv6 address, IP route, clockrate, interface serial, int loopback 4, 5, 6, 7 .....	25
Imagen 17 IPv6 address, IPv6 route.....	26
Imagen 18 no IP domain-lookup, hostname, password, line vty.....	26
Imagen 19 no IP domain-lookup, hostname, password, line vty.....	27
Imagen 20 verificación ping 172.16.12.2.....	27
Imagen 21 verificación ping 172.16.23.1.....	27
Imagen 22 verificación ping 209.165.200.225 .....	28
Imagen 23 IPv5 address, IPv6 address, interface serial, IP route, IPv6 route, clock rate. ....	28
Imagen 25 description connection to R3, IPv6 address, clock rate, int g0/0, IP address, description connection to simulated web server. ....	29
Imagen 26 Description connection to R2, interface loopback 4, 5, 6, 7.....	30
Imagen 27 IPv6 address, IP route, IPv6 route .....	30
Imagen 28 no IP domain-lookup, hostname.....	31

Imagen 29 verificación ping 172.16.12.2.....	31
Imagen 30 verificación 172.16.23.1 .....	31
Imagen 31 verificación ping 209.165.200.225 .....	32
Imagen 33 configuración VLAN 200 .....	33
Imagen 34 trunk native VLAN 1, delimitación int range, .....	33
Imagen 35 interfaces FastEthernet.....	34
Imagen 36 int f0/3, switchport mode trunk, int range.....	34
Imagen 37 int range parte 1.....	35
Imagen 38 int range parte 2.....	35
Imagen 39 Encapsulation dot1q 30, 40 y 120 .....	36
Imagen 40 prueba ping 192.168.30.1 y 192.168.99.2.....	36
Imagen 41 prueba ping 192.168.99.1 y ping 192.168.99.3 .....	36
Imagen 42 router rip .....	37
Imagen 43 passive interface, show IP protocols.....	37
Imagen 44 default-router, IP domain name, IP dhcp excluded-address, dns-server, default-router.....	38
Imagen 45 router rip, do show IP router connected, networks, passive-interface .....	38
Imagen 46 access-list 1 permit, IP nat pool .....	38
Imagen 47 router rip, do show IP route connected, passive interfaces .....	38
Imagen 48 Verificación DHCP .....	39
Imagen 49 PC-A verificación IP config /all .....	39
Imagen 50 PC-B verificación DHCP .....	39
Imagen 51 PC-C verificación IP config /all .....	40
Imagen 52 ntp server 172.16.12.2, ntp update-calendar .....	40
Imagen 53 telnet 172.16.12.2.....	40
Imagen 54 configuración NAT, clock set .....	41
Imagen 55 transport input telnet, line vty.....	41
Imagen 58 IP interface parte 2 .....	43
Imagen 59 IP interface parte 3 .....	43
Imagen 60 telnet 172.16.12.2.....	44
Imagen 61 access-class admin-mot in, show access-list.....	44
Imagen 62 show IP nat translations .....	44
Imagen 63 show IP nat translations parte 2.....	44

Imagen 64 Verificación 209.166.200.226 .....	45
Imagen 65 Ping 209.165.200.230 .....	45
Imagen 66 Ping 192.168.33.21 .....	45
Imagen 67 IP nat inside, show IP nat translations .....	46
Imagen 68 clear IP nat translation, show IP nat translation .....	46

## 1. INTRODUCCIÓN

En la presente evaluación, se trabajó con VLAN, configuramos IPV6 e IPV4 y trabajamos con cableado de red. Durante la resolución de la evaluación se puede evidenciar que cuando se conecta un grupo de PC a un computador y les da todas las direcciones IP en la misma red, se crea una LAN. Se evidencia en los laboratorios realizados que una VLAN es una LAN virtual. La diferencia es que las VLAN conecta todas las PC a un único computador, pero hace que el computador se comporte como si se tratara de computadores múltiples e independientes. Cada VLAN es su propio dominio de difusión y subred IP.

En los presentes laboratorios, se podrán encontrar ejercicios en los cuales resolvimos problemas relacionados con la configuración de switches, calculación de rutas con IPv4 e IPv6, diseño e implementación de direcciones IPv4 con VLSM, configuración de Trunk 802.1 y configuración de Trunks y de VLANs.

Durante el trabajo colaborativo se trabajó con Packet Tracer en la versión 6.0 para demostrar los conocimientos prácticos aprendidos durante el curso.

## **2. OBJETIVOS**

### **1.1.1 OBJETIVO GENERAL**

Evidenciar el registro de la configuración de cada uno de los dispositivos, hacer las conexiones entre ellos y seguir las especificaciones demandadas por la topología.

### **1.1.2 OBJETIVOS ESPECÍFICOS**

- Asignar direcciones IP a los Switches acorde a los lineamientos.
- Configurar al menos dos listas de acceso de tipo extendido o nombradas a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.
- Configurar NAT en R2 para permitir que los hosts puedan salir a Internet.
- deshabilitar DNS lookup.
- Verificar procesos de comunicación y redireccionamiento de tráfico en los routers mediante el uso de Ping y Traceroute.
- Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, passive interfaces configuradas en cada router.
- Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface.
- Visualizar tablas de enrutamiento y routers conectados por OSPFv2.

### **3. PLANTEAMIENTO DEL PROBLEMA**

Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Bogotá, Medellín y Bucaramanga, en donde el ingeniero será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.

## **4. MARCO TEÓRICO**

### **ENRUTADOR**

Un enrutador conecta redes. En función de su conocimiento actual del estado de la red a la que está conectado, un enrutador actúa como despachador, ya que determina a qué enviar cada paquete de información. Un enrutador está ubicado en cualquier puerta de enlace donde se encuentra una red. A menudo se incluye un enrutador como parte de un conmutador de red.

### **SWITCH**

Un switch es un dispositivo que canaliza los datos entrantes desde cualquiera de los múltiples puertos de entrada al puerto de salida específico que llevará los datos hacia su destino previsto. En la red telefónica tradicional con conmutación de circuitos, uno o más conmutadores se utilizan para configurar un dispositivo dedicado. En una red de área local Ethernet (LAN), un switch determina desde el dispositivo físico en cada cuadro de mensaje entrante el puerto de salida para reenviarlo. En una red de conmutación de paquetes de área amplia tal como Internet, un switch determina desde la dirección IP en cada paquete qué puerto de salida usar para la siguiente parte de su viaje al destino deseado.

### **OSPF**

OSPF realiza la autenticación a nivel de área, todos los dispositivos de enrutamiento dentro del área deben tener la misma autenticación y contraseña configurada. Para que

la autenticación funcione, los dispositivos de enrutamiento tanto de recepción como de transmisión deben tener la misma clave.

## **NAT**

Un NAT es la virtualización de las direcciones de Protocolo de Internet (IP). NAT mejora la seguridad y reduce el número de direcciones IP que una organización necesita.

Las NAT se ubican entre dos redes, la red interna y la red externa. Los sistemas en la red interna generalmente tienen asignadas direcciones IP que no pueden enrutarse a redes externas. Esta puerta de enlace hace que el tráfico asignado desde un dispositivo externo se envíe a un sistema interno correcto. Crea una dirección externa válida y la envía al sistema interno correcto. Garantiza la seguridad, ya que cada solicitud saliente o entrante debe pasar por un proceso de traducción que también ofrezca la oportunidad de calificar o transmitir flujos entrantes auténticos y hacer que coincidan con las solicitudes salientes.

## **VLAN**

Una red de área local virtual (VLAN) es un grupo lógico de estaciones de trabajo, servidores y dispositivos de red que parecen estar en la misma LAN teniendo en cuenta su distribución geográfica. Una VLAN permite que una red de computadoras y usuarios se comuniquen en un entorno simulado como si las VLAN se implementaran para lograr escalabilidad, seguridad y facilidad de administración de la red y pueden adaptarse a los cambios en los requisitos de red y a la reubicación de estaciones de trabajo y nodos de servidor.

El objetivo de implementar una VLAN es mejorar el rendimiento de una red o aplicar funciones de seguridad apropiadas.



## **LISTA DE ACCESO DE CONTROL ACL**

Una ACL es una lista de permisos de usuario para un archivo, carpeta u otro objeto. Define qué usuarios y grupos pueden acceder al objeto y qué operaciones pueden realizar. Estas operaciones generalmente incluyen lectura, escritura y ejecución. Por ejemplo, si una ACL especifica acceso de solo lectura para un usuario específico de un archivo, ese usuario podrá abrir el archivo, pero no podrá escribir ni ejecutar el archivo. Las listas de control de acceso proporcionan un método sencillo para administrar los permisos de archivos y carpetas.

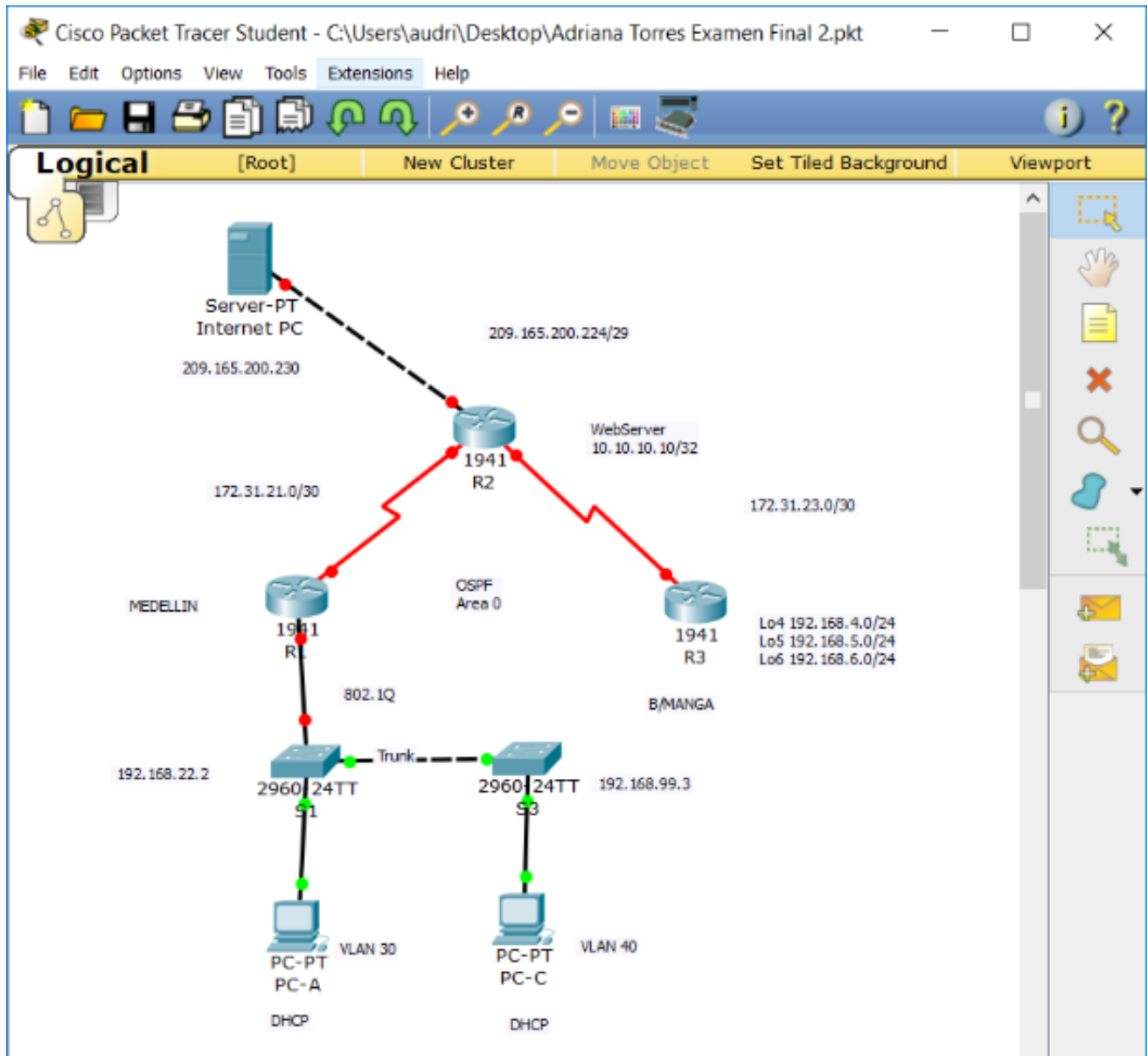
## 5. MATERIALES

- 3 Enrutadores (Cisco 1941 con Cisco IOS Release 15.2 (4) M3 imagen universal o similar)
- 2 Switches (Cisco 2960 con Cisco IOS Release 15.0 (2) lanbasek9 image o similar)
- 3 PC (Windows 7, Vista, O XP con programa de emulación de terminal, como Tera Term)
- Cable de consola para configurar los dispositivos Cisco IOS a través de los puertos de la consola
- Cables Ethernet y serie como se muestra en la topología

## 6. DESARROLLO DE LA TOPOLOGÍA

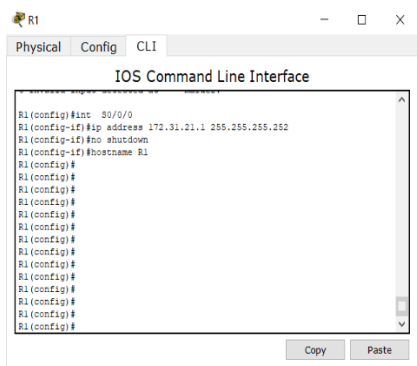
### REALIZAR LA TOPOLOGÍA

Imagen 1 Topología

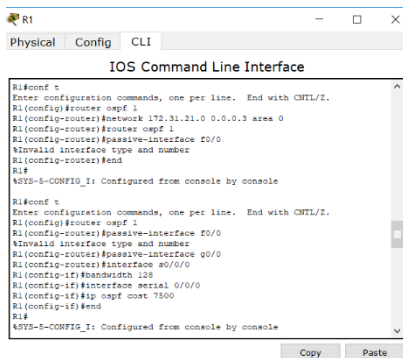


**INICIALIZAR LOS EQUIPOS Y CONFIGURAR, REALIZAR ENRUTAMIENTO OSPFV2, VLAN, DESHABILITAR DNS LOOKUP, NAT, RELOJ Y BANDA ANCHA, INICIALIZAR LOS ROUTERS, BORRAR EL STARTUP-CONFIG FILE EN TODOS LOS ROUTERS, REINICIAR TODOS LOS ROUTERS.**

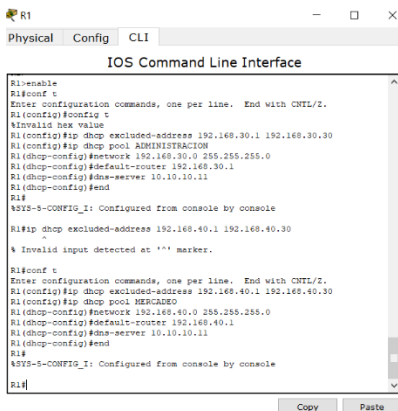
**Imagen 2 Configuración int S0/0/0**



**Imagen 3 OSPF, passive interface y bandwidth**



**Imagen 4 IP dhcp pool, network, default-router, dns-server**





## Imagen 8 router id, router ospf, passive interface, bandwidth

```

R3
Physical Config CLI
IOS Command Line Interface

R3>enable
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#router-id 172.31.21.0
R3(config-router)#end
R3#
R3#>5-COFIG_1: Configured from console by console

R3#ospf 1
-----
% Invalid input detected at '^' marker.

R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ospf 1
-----
% Invalid input detected at '^' marker.

R3(config)#router ospf 1
R3(config-router)#network 172.31.21.0 0.0.0.3 area 0
R3(config-router)#router ospf 1
R3(config-router)#passive-interface f0/0
R3(config-router)#interface s0/0/0
R3(config-if)#bandwidth 10
R3(config-if)#interface serial 0/0/0
R3(config-if)#ip ospf cost 7500
R3(config-if)#
  
```

## Imagen 9 Inicialización

```

R1
Physical Config CLI
IOS Command Line Interface

Router#enable
Router#erase startup-config
-----
% Invalid input detected at '^' marker.

Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]

Erase of nvram complete
R3#>5-0V_BLOCK_INIT: Initialized the geometry of nvram
Router#load
Proceed with reload? [confirm]
System Bootstrap, Version 15.1(1)M3, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2010 by Cisco Systems, Inc.
T648 memory size = 512 MB - Onboard = 512 MB, DIMM0 = 0 MB
C1801941790 platform with 324224 bytes of main memory
Main memory is configured to 64-/1-Onboard(256MB) but mode with EO
disabled

Readonly ROMMON initialized
Program load complete, entry point: 0x81000000, size: 0x1b340
Program load complete, entry point: 0x81000000, size: 0x1b340
IOS Image Load Test

Digitally signed Release Software
Program load complete, entry point: 0x81000000, size: 0x22b1058
Self decompressing the image:
#####
# [OK]
SMART Init is enabled

smart init is starting...
-----
TYPE          MEMORY_REQ
-----
SRM0  S12C  0x00000000      Onboard devices 4
Buffer pools  0x00000000

-----
TOTAL: 0x00268000

Rounded DOWN to 4096.
DRAM & memory sizes: (4096/512MB)

Restricted Rights Legend
Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(d) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706

R2
Physical Config CLI
IOS Command Line Interface

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(d) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706

Cisco IOS Software, C1800 Software (C1800-UNIVERSALK9-M), Vers
15.1(4)M4, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2012 by Cisco Systems, Inc.
Compiled Thu 5-Jan-12 15:41 by pt_team
Image text-base: 0x2103F910, data-base: 0x24729040

This product contains cryptographic features and is subject to
United States and local country laws governing import, export,
transfer and use. Delivery of Cisco cryptographic products does
not imply third-party authority to import, export, distribute or
use encryption. Importers, exporters, distributors and users
are responsible for compliance with U.S. and local country laws.
By using this product you agree to comply with applicable laws
and regulations. If you are unable to comply with U.S. and local
laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products
may be found at:
http://www.cisco.com/wai/export/crypto/cool/stgry.html
If you require further assistance please contact us by sending
email to export@cisco.com.

Cisco C1801941790 (revision 1.0) with 491520K/32768K bytes of
Processor board ID FTL154002E
2 Gigabit Ethernet interface(s)
2 Low-speed serial(sync/asyn) network interface(s)
DRAM configuration is 64 bits wide with parity disabled.
2595 bytes of non-volatile configuration memory.
24986K bytes of ATA System CompactFlash 0 (Read/Write)

--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>

R3
Physical Config CLI
IOS Command Line Interface

Restricted Rights Legend
Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(d) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706

Cisco IOS Software, C1800 Software (C1800-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 Thu 5-Jan-12 15:41 by pt_team
Image text-base: 0x2103F910, data-base: 0x24729040

This product contains cryptographic features and is subject to
United States and local country laws governing import, export,
transfer and use. Delivery of Cisco cryptographic products does
not imply third-party authority to import, export, distribute or
use encryption. Importers, exporters, distributors and users
are responsible for compliance with U.S. and local country laws.
By using this product you agree to comply with applicable laws
and regulations. If you are unable to comply with U.S. and local
laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products
may be found at:
http://www.cisco.com/wai/export/crypto/cool/stgry.html
If you require further assistance please contact us by sending
email to export@cisco.com.

Cisco C1801941790 (revision 1.0) with 491520K/32768K bytes of
Processor board ID FTL154002E
2 Gigabit Ethernet interface(s)
2 Low-speed serial(sync/asyn) network interface(s)
DRAM configuration is 64 bits wide with parity disabled.
2595 bytes of non-volatile configuration memory.
24986K bytes of ATA System CompactFlash 0 (Read/Write)

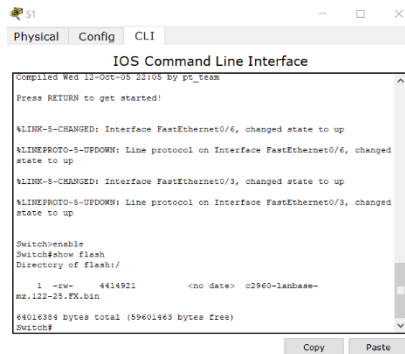
--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>
  
```

# REINICIAR LOS SWITCHES, VERIFICAR LA VLAN EN LOS DOS SWITCHES

Imagen 10 show flash



# CONFIGURAR LA BANDA ANCHA

Imagen 11 Bandwidth

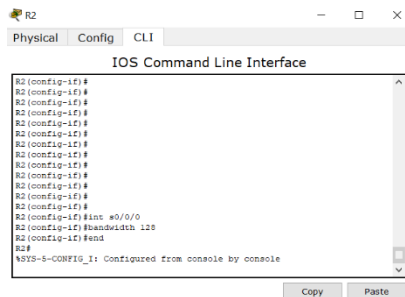
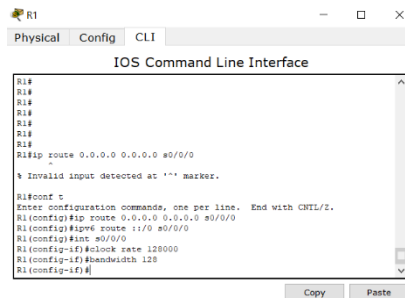


Imagen 12 IPv6 route, clockrate y bandwidth



# REALIZAR LA CONFIGURACIÓN IP

Imagen 13 IP configuration, IP address, subnet mask, default gateway, IPv6 address, link local address, IPV6 gateway

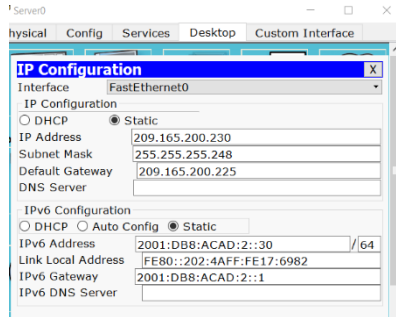
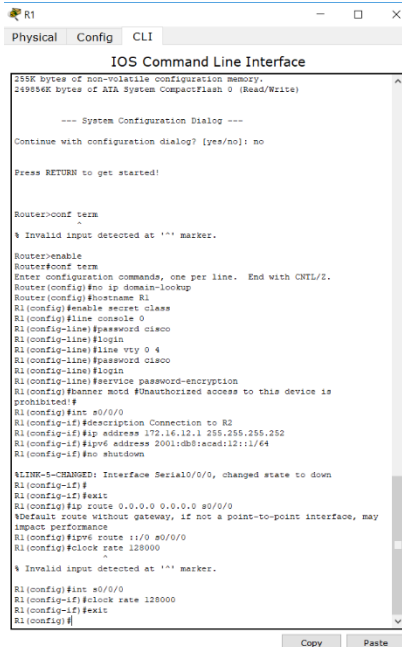
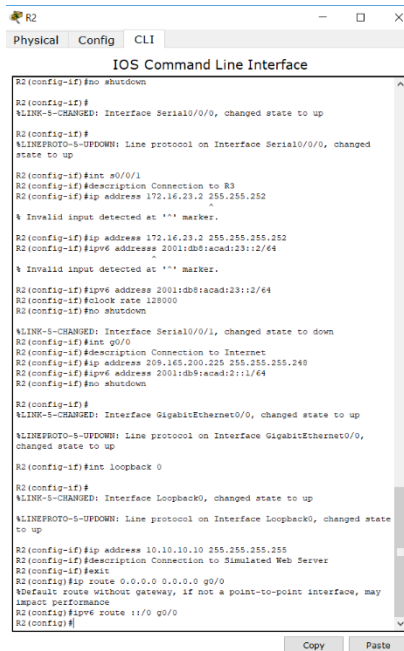


Imagen 14 no IP domain-lookup, hostname, password, line vty, IP address, IPv6 address, IP route, clockrate, interface serial



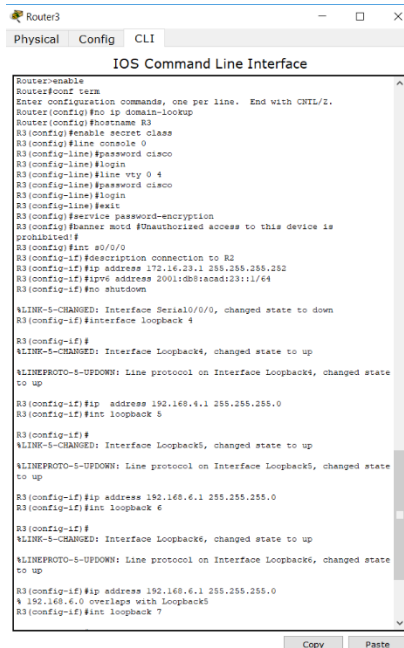


## Imagen 15 Interface serial, IP address, IPv6 address, clock rate, int loopback



```
R2
Physical Config CLI
IOS Command Line Interface
R2 (config-if) #no shutdown
R2 (config-if) #
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
R2 (config-if) #
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
R2 (config-if) #int s0/0/1
R2 (config-if) #description Connection to R3
R2 (config-if) #ip address 172.16.23.2 255.255.252
% Invalid input detected at *** marker.
R2 (config-if) #ip address 172.16.23.2 255.255.252
R2 (config-if) #ipv6 address 2001:db8:acad:23::2/64
% Invalid input detected at *** marker.
R2 (config-if) #ipv6 address 2001:db8:acad:23::2/64
R2 (config-if) #clock rate 120000
R2 (config-if) #no shutdown
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R2 (config-if) #int g0/0
R2 (config-if) #description Connection to Internet
R2 (config-if) #ip address 209.140.200.253 255.255.255.240
R2 (config-if) #ipv6 address 2001:db8:acad:2::1/64
R2 (config-if) #no shutdown
R2 (config-if) #
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
changed state to up
R2 (config-if) #int loopback 0
R2 (config-if) #
%LINK-5-CHANGED: Interface Loopback0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state
to up
R2 (config-if) #ip address 10.10.10.10 255.255.255.255
R2 (config-if) #description Connection to Simulated Web Server
R2 (config-if) #exit
R2 (config-if) #ip route 0.0.0.0 0.0.0.0 g0/0
%Default route without gateway, if not a point-to-point interface, may
impact performance
R2 (config) #ipv6 route ::0 g0/0
R2 (config) #
```

## Imagen 16 no IP domain-lookup, hostname, password, line vty, IP address, IPv6 address, IP route, clockrate, interface serial, int loopback 4, 5, 6, 7



```
Router3
Physical Config CLI
IOS Command Line Interface
Router#enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router (config) #no ip domain-lookup
Router (config) #hostname R3
R3 (config) #enable secret cisco
R3 (config) #line console 0
R3 (config-line) #password cisco
R3 (config-line) #login
R3 (config-line) #line vty 0 4
R3 (config-line) #password cisco
R3 (config-line) #login
R3 (config-line) #exit
R3 (config) #service password-encryption
R3 (config) #banner motd #Unauthorized access to this device is
prohibited#
R3 (config) #int s0/0/0
R3 (config-if) #description connection to R2
R3 (config-if) #ip address 172.16.23.1 255.255.252
R3 (config-if) #ipv6 address 2001:db8:acad:23::1/64
R3 (config-if) #no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R3 (config-if) #interface loopback 4
R3 (config-if) #
%LINK-5-CHANGED: Interface Loopback4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state
to up
R3 (config-if) #ip address 192.168.4.1 255.255.255.0
R3 (config-if) #int loopback 5
R3 (config-if) #
%LINK-5-CHANGED: Interface Loopback5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5, changed state
to up
R3 (config-if) #ip address 192.168.6.1 255.255.255.0
R3 (config-if) #int loopback 6
R3 (config-if) #
%LINK-5-CHANGED: Interface Loopback6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state
to up
R3 (config-if) #ip address 192.168.6.1 255.255.255.0
% 192.168.6.0 overlaps with Loopback5
R3 (config-if) #int loopback 7
```

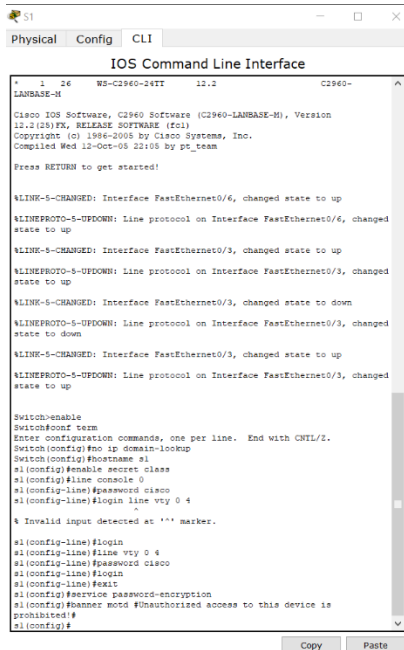
## Imagen 17 IPv6 address, IPv6 route



```
Router3
Physical Config CLI
IOS Command Line Interface
prohibited!#
R3(config)#int s0/0/0
R3(config-if)#description connection to R2
R3(config-if)#ip address 172.16.23.1 255.255.255.252
R3(config-if)#ipv6 address 2001:db8:acad:3::1:1/64
R3(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R3(config-if)#interface loopback 4
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up
R3(config-if)#ip address 192.168.4.1 255.255.255.0
R3(config-if)#int loopback 5
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5, changed state to up
R3(config-if)#ip address 192.168.6.1 255.255.255.0
R3(config-if)#int loopback 6
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state to up
R3(config-if)#ip address 192.168.6.1 255.255.255.0
% 192.168.6.0 overlaps with Loopback5
R3(config-if)#int loopback 7
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback7, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback7, changed state to up
R3(config-if)#ipv6 address 2001:db8:acad:3::1:1/64
R3(config-if)#exit
R3(config)#ip route 0.0.0.0 0.0.0.0 s0/0/1
%Default route without gateway, if not a point-to-point interface, may impact performance
R3(config)#ipv6 route ::/0 s0/0/1
% Ambiguous command "ipv6 route ::/0 s0/0/1"
R3(config)#ipv6 route ::/0 s0/0/1
R3(config)#
```

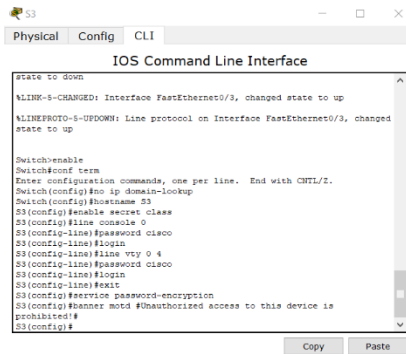
## CONFIGURAR LÍNEAS VTY

## Imagen 18 no IP domain-lookup, hostname, password, line vty.



```
S1
Physical Config CLI
IOS Command Line Interface
* 1 26 WS-C2960-24TT 12.2 C2960-
LANBASE-K
Cisco IOS Software, C2960 Software (C2960-LANBASE-K), Version
12.2(29)TT, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Wed 12-Oct-05 22:05 by ps_team
Press RETURN to get started!
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
SWITCH>enable
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no ip domain-lookup
Switch(config)#hostname s1
s1(config)#enable secret class
s1(config)#line console 0
s1(config-line)#password cisco
s1(config-line)#login line vty 0 4
s1(config-line)#login
% Invalid input detected at '' marker.
s1(config-line)#login
s1(config-line)#line vty 0 4
s1(config-line)#password cisco
s1(config-line)#login
s1(config-line)#exit
s1(config)#service password-encryption
s1(config)#banner motd #Unauthorized access to this device is prohibited!#
s1(config)#
```

## Imagen 19 no IP domain-lookup, hostname, password, line vty.

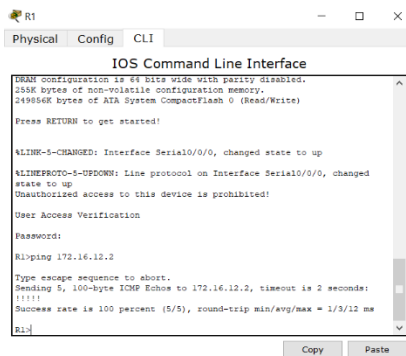


```
State to down
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
state to up

Switch>enable
Switch>conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no ip domain-lookup
Switch(config)#hostname S3
S3(config)#enable secret class
S3(config)#line console 0
S3(config-line)#password cisco
S3(config-line)#login
S3(config-line)#line vty 0 4
S3(config-line)#password cisco
S3(config-line)#login
S3(config-line)#exit
S3(config)#service password-encryption
S3(config)#banner motd #Unauthorized access to this device is
prohibited#
S3(config)#
```

## VERIFICACIÓN CON PING Y CON COMMAND PROMPT

### Imagen 20 verificación ping 172.16.12.2



```
R1
Physical Config CLI
IOS Command Line Interface

DRAM configuration is 64 bits wide with parity disabled.
2598 bytes of non-volatile configuration memory.
349856K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
Unauthorized access to this device is prohibited!

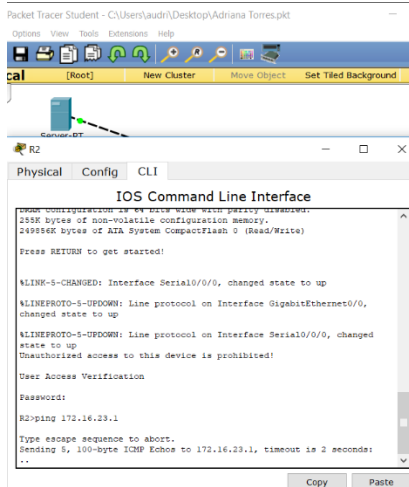
User Access Verification

Password:
R1>ping 172.16.12.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.12.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/12 ms

R1>
```

### Imagen 21 verificación ping 172.16.23.1



```
Packet Tracer Student - C:\Users\audri\Desktop\Adriana Torres.pkt
Options View Tools Extensions Help
[Root] New Cluster Move Object Set Tiled Background

R2
Physical Config CLI
IOS Command Line Interface

DRAM configuration is 64 bits wide with parity disabled.
2598 bytes of non-volatile configuration memory.
349856K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

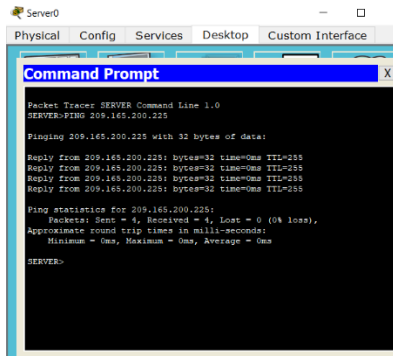
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
Unauthorized access to this device is prohibited!

User Access Verification

Password:
R2>ping 172.16.23.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.23.1, timeout is 2 seconds:
..
```

## Imagen 22 verificación ping 209.165.200.225



```
Server0
Physical Config Services Desktop Custom Interface
Command Prompt
Packet Tracer SERVER Command Line 1.0
SERVER-PING 209.165.200.225
Pinging 209.165.200.225 with 32 bytes of data:
Reply from 209.165.200.225: bytes=32 time=0ms TTL=255
Reply from 209.165.200.225: bytes=32 time=0ms TTL=255
Reply from 209.165.200.225: bytes=32 time=0ms TTL=255
Reply from 209.165.200.225: bytes=32 time=0ms TTL=255
Ping statistics for 209.165.200.225:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
SERVER>
```

**CONFIGURACIONES, IP ROUTE, ASIGNAR HOSTNAME, ASIGNAR IP ADDRESS, ASIGNAR IPV5 ADDRESS y IPV6 ADDRESS, ASIGNAR CLOCK RATE, ASIGNAR INTERFACE S0/0/0, ASIGNAR INTERFACE S0/0/1, ASIGNAR DEFAULT ROUTE**

**Imagen 23 IPv5 address, IPv6 address, interface serial, IP route, IPv6 route, clock rate.**



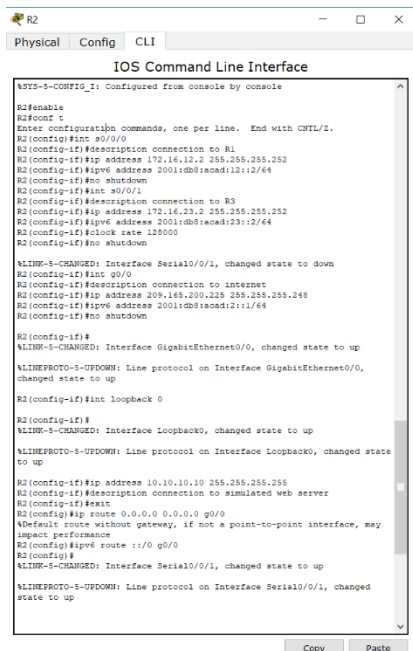
```
R1
Physical Config CLI
IOS Command Line Interface
--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: NO
Press RETURN to get started!
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#hostname R1
R1(config)#int s0/0/0
R1(config-if)#description connection to R2
R1(config-if)#ip address 172.16.12.1 255.255.255.252
R1(config-if)#ip5 address 2001:db8:acad:12::1/64
% Invalid input detected at '^' marker.
R1(config-if)#ip6 address 2001:db8:acad:12::1/64
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#exit
R1(config)#ip route 0.0.0.0 0.0.0.0 s0/0/0
%Default route without gateway, if not a point-to-point interface, may
impact performance
R1(config)#ip6 route ::/0 s0/0/0
R1(config)#int s0/0/0
R1(config-if)#clock rate 128000
R1(config-if)#exit
R1(config)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
R1 con0 is now available
Copy Paste
```

## Imagen 24 Description connection to R1, R3, description connection to Internet.



```
R2
Physical Config CLI
IOS Command Line Interface
Router>enable
Router>conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#hostname R2
R2(config)#int s0/0/0
R2(config-if)#description connection to R1
R2(config-if)#ip address 172.16.12.2 255.255.255.252
R2(config-if)#ipv6 address 2001:db8:acad:12::1/64
R2(config-if)#no shutdown
R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
R2(config-if)#int s0/0/0
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
R2(config-if)#int s0/0/1
R2(config-if)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console
R2#enable
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int s0/0/0
R2(config-if)#description connection to R1
R2(config-if)#ip address 172.16.12.2 255.255.255.252
R2(config-if)#ipv6 address 2001:db8:acad:12::1/64
R2(config-if)#no shutdown
R2(config-if)#int s0/0/1
R2(config-if)#description connection to R3
R2(config-if)#ip address 172.16.23.2 255.255.255.252
R2(config-if)#ipv6 address 2001:db8:acad:23::1/64
R2(config-if)#clock rate 128000
R2(config-if)#no shutdown
R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R2(config-if)#int g0/0
R2(config-if)#description connection to Internet
R2(config-if)#ip address 209.165.200.225 255.255.255.248
R2(config-if)#ipv6 address 2001:db8:acad:2:1::1/64
R2(config-if)#no shutdown
R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
changed state to up
R2(config-if)#int loopback 0
R2(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state
to up
R2(config-if)#ip address 10.10.10.10 255.255.255.255
R2(config-if)#description connection to simulated web server
R2(config-if)#exit
R2(config)#ip route 0.0.0.0 0.0.0.0 g0/0
%Default route without gateway, if not a point-to-point interface, may
impact performance
R2(config)#ipv6 route ::/0 g0/0
R2(config)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
```

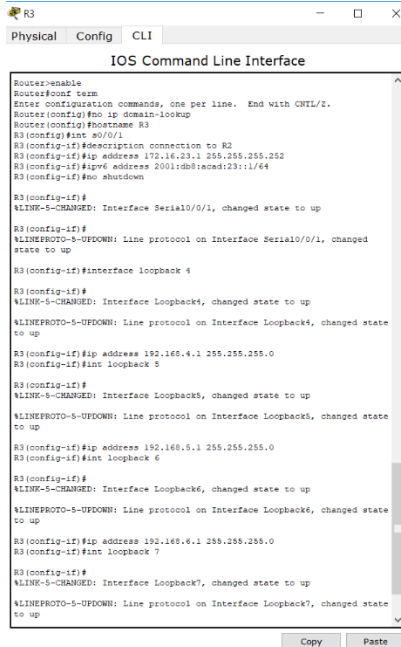
## Imagen 25 description connection to R3, IPv6 address, clock rate, int g0/0, IP address, description connection to simulated web server.



```
R2
Physical Config CLI
IOS Command Line Interface
%SYS-5-CONFIG_I: Configured from console by console
R2#enable
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int s0/0/0
R2(config-if)#description connection to R1
R2(config-if)#ip address 172.16.12.2 255.255.255.252
R2(config-if)#ipv6 address 2001:db8:acad:12::1/64
R2(config-if)#no shutdown
R2(config-if)#int s0/0/1
R2(config-if)#description connection to R3
R2(config-if)#ip address 172.16.23.2 255.255.255.252
R2(config-if)#ipv6 address 2001:db8:acad:23::1/64
R2(config-if)#clock rate 128000
R2(config-if)#no shutdown
R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R2(config-if)#int g0/0
R2(config-if)#description connection to Internet
R2(config-if)#ip address 209.165.200.225 255.255.255.248
R2(config-if)#ipv6 address 2001:db8:acad:2:1::1/64
R2(config-if)#no shutdown
R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
changed state to up
R2(config-if)#int loopback 0
R2(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state
to up
R2(config-if)#ip address 10.10.10.10 255.255.255.255
R2(config-if)#description connection to simulated web server
R2(config-if)#exit
R2(config)#ip route 0.0.0.0 0.0.0.0 g0/0
%Default route without gateway, if not a point-to-point interface, may
impact performance
R2(config)#ipv6 route ::/0 g0/0
R2(config)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
```

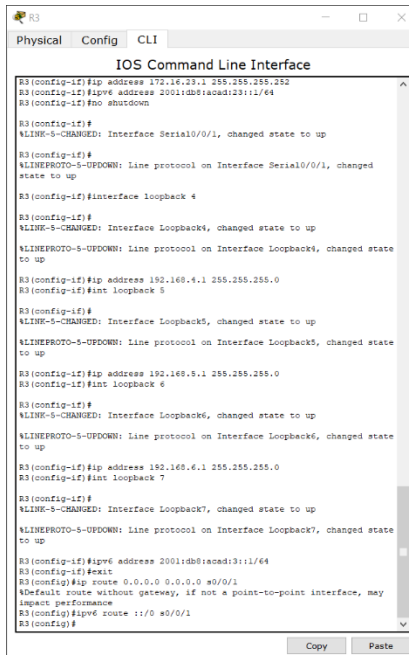
## ASIGNAR INTERFACE LOOPBACK 0, 4, 5, 6, HACER TRUNKING EN INTERFACE F0/3 Y F0/5, ASIGNAR F0/18 AL VLAN 33

### Imagen 26 Description connection to R2, interface loopback 4, 5, 6, 7



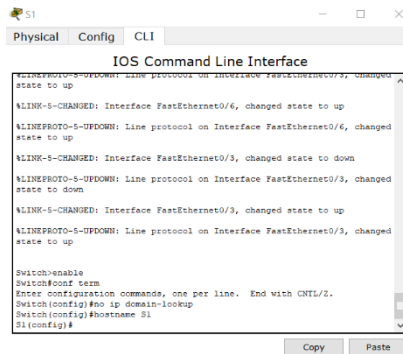
```
R3
Physical Config CLI
IOS Command Line Interface
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#hostname R3
R3(config)#int s0/0/1
R3(config-if)#description connection to R2
R3(config-if)#ip address 192.168.23.1 255.255.255.252
R3(config-if)#ipv6 address 2001:db8:acad:23::1/64
R3(config-if)#no shutdown
R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
R3(config-if)#
R3(config-if)#interface loopback 4
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up
R3(config-if)#ip address 192.168.4.1 255.255.255.0
R3(config-if)#int loopback 5
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5, changed state to up
R3(config-if)#ip address 192.168.5.1 255.255.255.0
R3(config-if)#int loopback 6
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state to up
R3(config-if)#ip address 192.168.6.1 255.255.255.0
R3(config-if)#int loopback 7
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback7, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback7, changed state to up
Copy Paste
```

### Imagen 27 IPv6 address, IP route, IPv6 route



```
R3
Physical Config CLI
IOS Command Line Interface
R3(config-if)#ip address 192.168.23.1 255.255.255.252
R3(config-if)#ipv6 address 2001:db8:acad:23::1/64
R3(config-if)#no shutdown
R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
R3(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
R3(config-if)#interface loopback 4
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up
R3(config-if)#ip address 192.168.4.1 255.255.255.0
R3(config-if)#int loopback 5
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5, changed state to up
R3(config-if)#ip address 192.168.5.1 255.255.255.0
R3(config-if)#int loopback 6
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state to up
R3(config-if)#ip address 192.168.6.1 255.255.255.0
R3(config-if)#int loopback 7
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback7, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback7, changed state to up
R3(config-if)#ipv6 address 2001:db8:acad:3::1/64
R3(config-if)#exit
R3(config)#ip route 0.0.0.0 0.0.0.0 s0/0/1
%Default route without gateway, if not a point-to-point interface, may impact performance
R3(config)#ipv6 route ::/0 s0/0/1
R3(config)#
Copy Paste
```

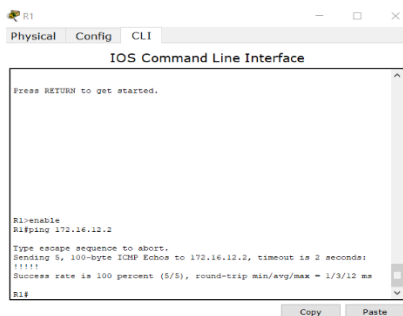
## Imagen 28 no IP domain-lookup, hostname



```
S1
Physical Config CLI
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
state to up
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed
state to up
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
state to down
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
state to up
Switch>enable
Switch#config tarm
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no ip domain-lookup
Switch(config)#hostname S1
S1(config)#
```

## VERIFICACIONES

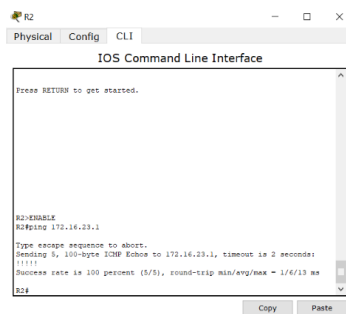
### Imagen 29 verificación ping 172.16.12.2



```
R1
Physical Config CLI
IOS Command Line Interface
Press RETURN to get started.

R1>enable
R1#ping 172.16.12.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 172.16.12.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/12 ms
R1#
```

### Imagen 30 verificación 172.16.23.1

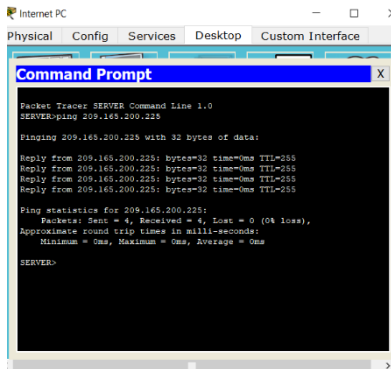


```
R2
Physical Config CLI
IOS Command Line Interface
Press RETURN to get started.

R2>enable
R2#ping 172.16.23.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 172.16.23.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/6/13 ms
R2#
```

# INTERNET SERVER

## Imagen 31 verificación ping 209.165.200.225



**S1 CONFIGURAR VLAN 30 ,40, 200, CREAR DHCP POOL PARA LAS VLAN 30, 40 Y 200, ASIGNAR INT RANGE, ASIGNAR NOMBRE, DNS-SERVER, DOMAIN-NAME Y DEFAULT GATEWAY**

## Imagen 32 configuración VLAN 30 y VLAN 40



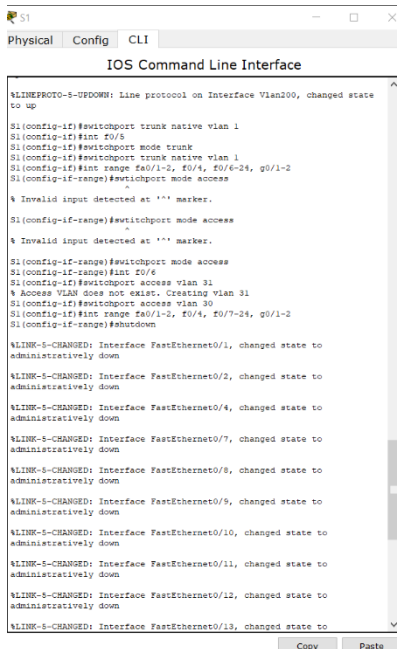


## Imagen 33 configuración VLAN 200



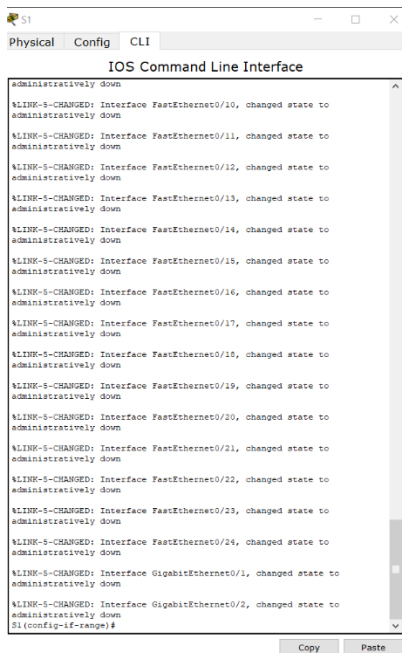
```
S1
Physical Config CLI
IOS Command Line Interface
S1(config-vlan)#exit
S1(config)#int vlan 30
S1(config-if)#
%LINK-5-CHANGED: Interface Vlan30, changed state to up
S1(config-if)#ip address 192.168.30.2 255.255.255.0
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#ip default-gateway 192.168.30.1
S1(config)#exit
S1#
%SYS-5-CONFIG_I: Configured from console by console
S1#vlan 40
S1#
% Invalid input detected at '' marker.
S1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#vlan 40
S1(config-vlan)#ip address 192.168.40.2 255.255.255.0
S1(config-if)#
% Invalid input detected at '' marker.
S1(config-vlan)#int vlan 40
S1(config-if)#
%LINK-5-CHANGED: Interface Vlan40, changed state to up
S1(config-if)#ip address 192.168.40.2 255.255.255.0
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#ip default-gateway 192.168.40.1
S1(config)#exit
S1#
%SYS-5-CONFIG_I: Configured from console by console
S1#int vlan 200
S1#
% Invalid input detected at '' marker.
S1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#int vlan 200
S1(config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up
S1(config-if)#ip address 192.168.200.2 255.255.255.0
S1(config-if)#ip default-gateway 192.168.200.1
S1(config)#exit
S1#
%SYS-5-CONFIG_I: Configured from console by console
S1#
```

## Imagen 34 trunk native VLAN 1, delimitación int range,



```
S1
Physical Config CLI
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed state to up
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#int E0/5
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#int range E0/1-2, E0/4, E0/6-24, g0/1-2
S1(config-if-range)#switchport mode access
S1(config-if-range)#
% Invalid input detected at '' marker.
S1(config-if-range)#switchport mode access
S1(config-if-range)#
% Invalid input detected at '' marker.
S1(config-if-range)#switchport mode access
S1(config-if-range)#int E0/6
S1(config-if)#switchport access vlan 31
% Access VLAN does not exist. Creating vlan 31
S1(config-if)#switchport access vlan 30
S1(config-if)#int range E0/1-2, E0/4, E0/7-24, g0/1-2
S1(config-if-range)#shutdown
S1(config-if-range)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down
S1#
```

## Imagen 35 interfaces FastEthernet



```
Physical Config CLI
IOS Command Line Interface
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to
administratively down
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to
administratively down
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to
administratively down
S1(config-if-range)#
Copy Paste
```

## Imagen 36 int f0/3, switchport mode trunk, int range



```
Physical Config CLI
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed
state to up
Switch>enable
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no ip domain-lookup
Switch(config)#
% Invalid input detected at '^' marker.
Switch(config)#no ip domain-lookup
Switch(config)#hostname S3
S3(config)#vlan 30
S3(config-vlan)#name ADMINISTRACION
S3(config-vlan)#vlan 40
S3(config-vlan)#name MERCADERO
S3(config-vlan)#vlan 200
S3(config-vlan)#name MANTENIMIENTO
S3(config-vlan)#exit
S3(config)#vlan 30
S3(config-vlan)#ip domain-name cna-unad.com
S3(config)#ip name-server 10.10.10.11
S3(config)#vlan 40
S3(config-vlan)#ip domain-name cna-unad.com
S3(config)#ip name-server 10.10.10.11
S3(config)#vlan 200
S3(config-vlan)#name MANTENIMIENTO
S3(config-vlan)#exit
S3(config)#int 30
S3(config-if)#
%LINK-5-CHANGED: Interface Vlan40, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan40, changed state to
up
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#no shutdown
S3(config-if)#exit
S3(config)#default-gateway 192.168.99.1
S3(config)#
% Invalid input detected at '^' marker.
S3(config)#ip default-gateway 192.168.99.1
S3(config)#int f0/3
S3(config-if)#switchport mode trunk
S3(config-if)#switchport trunk native vlan 1
S3(config-if)#int range fa0/1-2, fa0/4-24, g0/1-2
S3(config-if-range)#switchport mode access
S3(config-if-range)#int fa0/18
S3(config-if-range)#switchport access vlan40
S3(config-if-range)#
% Invalid input detected at '^' marker.
Copy Paste
```

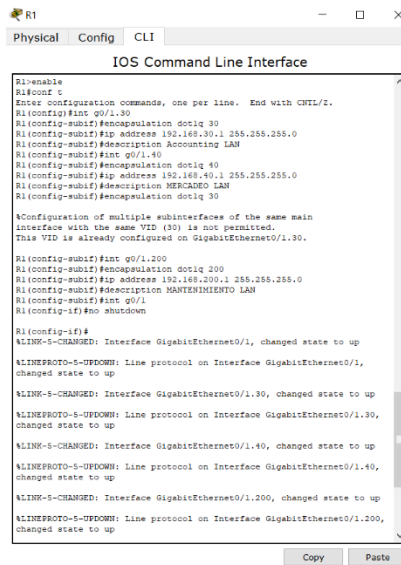
## Imagen 37 int range parte 1

```
S3
Physical Config CLI
IOS Command Line Interface
% Invalid input detected at '^' marker.
S3(config)#ip default-gateway 192.168.99.1
S3(config)#int f0/3
S3(config-if)#switchport mode trunk
S3(config-if)#switchport trunk native vlan 1
S3(config-if)#int range fa0/1-2, f0/4-24, g0/1-2
S3(config-if-range)#switchport mode access
S3(config-if-range)#int fa0/10
S3(config-if)#switchport access vlan40
% Invalid input detected at '^' marker.
S3(config-if)#switchport access vlan 40
S3(config-if)#int range fa0/1-2, f0/4-17, f0/19-24, g0/1-2
S3(config-if-range)#shutdown
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down
```

## Imagen 38 int range parte 2

```
S3
Physical Config CLI
IOS Command Line Interface
administratively down
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to administratively down
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down
S3(config-if-range)#
```

## Imagen 39 Encapsulation dot1q 30, 40 y 120



```
R1
Physical Config CLI
IOS Command Line Interface
R1>enable
R1#conf t
Enter configuration commands, one per line. End with CTRL/Z.
R1(config)#int g0/1.30
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip address 192.168.30.1 255.255.255.0
R1(config-subif)#description Accounting LAN
R1(config-subif)#int g0/1.40
R1(config-subif)#encapsulation dot1q 40
R1(config-subif)#ip address 192.168.40.1 255.255.255.0
R1(config-subif)#description MEXCARGO LAN
R1(config-subif)#encapsulation dot1q 30

!Configuration of multiple subinterfaces of the same main
interface with the same VID (30) is not permitted.
This VID is already configured on GigabitEthernet0/1.30.

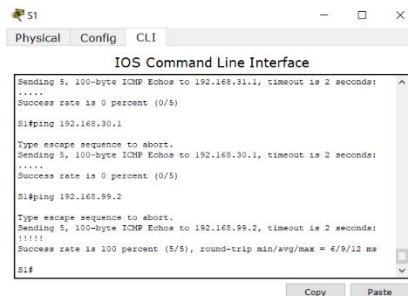
R1(config-subif)#int g0/1.200
R1(config-subif)#encapsulation dot1q 200
R1(config-subif)#ip address 192.168.200.1 255.255.255.0
R1(config-subif)#description MANTENIMIENTO LAN
R1(config-subif)#int g0/1
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1,
changed state to up
%LINK-5-CHANGED: Interface GigabitEthernet0/1.30, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.30,
changed state to up
%LINK-5-CHANGED: Interface GigabitEthernet0/1.40, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.40,
changed state to up
%LINK-5-CHANGED: Interface GigabitEthernet0/1.200, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.200,
changed state to up

Copy Paste
```

## PRUEBA S1

## Imagen 40 prueba ping 192.168.30.1 y 192.168.99.2

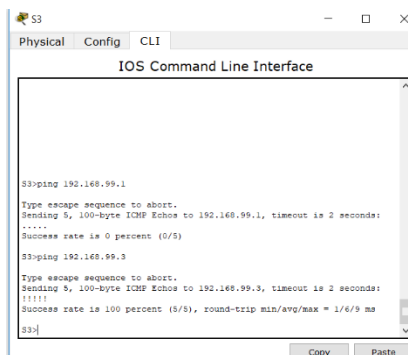


```
S1
Physical Config CLI
IOS Command Line Interface
Sending 5, 100-byte ICMP Echoes to 192.168.31.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
S1#ping 192.168.30.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 192.168.30.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
S1#ping 192.168.99.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 192.168.99.2, timeout is 2 seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 6/9/12 ms
S1#

Copy Paste
```

## PRUEBA S3

## Imagen 41 prueba ping 192.168.99.1 y ping 192.168.99.3



```
S3
Physical Config CLI
IOS Command Line Interface

S3#ping 192.168.99.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 192.168.99.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
S3#ping 192.168.99.3
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 192.168.99.3, timeout is 2 seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/6/9 ms
S3#

Copy Paste
```

# REALIZAR CONFIGURACIONES IPV2

## Imagen 42 router rip

```
R1
Physical Config CLI
IOS Command Line Interface
R1>enable
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#do show ip route connected
C 172.16.12.0/30 is directly connected, Serial0/0/0
C 192.168.30.0/24 is directly connected, GigabitEthernet0/1.30
C 192.168.40.0/24 is directly connected, GigabitEthernet0/1.40
C 192.168.200.0/24 is directly connected, GigabitEthernet0/1.200
R1(config-router)#exit
R1(config)#end
R1#
NSYS-5-CONFIG_1: Configured from console by console

R1#enable
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#do show ip route connected
C 172.16.12.0/30 is directly connected, Serial0/0/0
C 192.168.30.0/24 is directly connected, GigabitEthernet0/1.30
C 192.168.40.0/24 is directly connected, GigabitEthernet0/1.40
C 192.168.200.0/24 is directly connected, GigabitEthernet0/1.200
R1(config-router)#network 172.16.12.0
R1(config-router)#network 192.168.30.0
R1(config-router)#network 192.168.40.0
R1(config-router)#network 192.168.200.0
R1(config-router)#passive-interface g0/1.30
% Invalid input detected at '^' marker.
R1(config-router)#passive-interface g0/1.30
^
% Invalid input detected at '^' marker.
R1(config-router)#passive-interface g0/1.30
^
% Invalid input detected at '^' marker.
R1(config-router)#passive-interface g0/1.30
^
% Invalid input detected at '^' marker.
R1(config-router)#passive-interface g0/1.40
R1(config-router)#passive-interface g0/1.40
R1(config-router)#passive-interface g0/1.200
R1(config-router)#no auto-summary
R1(config-router)#end
R1#
```

## Imagen 43 passive interface, show IP protocols

```
R1
Physical Config CLI
IOS Command Line Interface
% Invalid input detected at '^' marker.
R1(config-router)#passive-interface g0/1.30
^
% Invalid input detected at '^' marker.
R1(config-router)#passive-interface g0/1.30
^
% Invalid input detected at '^' marker.
R1(config-router)#passive-interface g0/1.30
R1(config-router)#passive-interface g0/1.40
R1(config-router)#passive-interface g0/1.200
R1(config-router)#no auto-summary
R1(config-router)#end
R1#
NSYS-5-CONFIG_1: Configured from console by console

R1#show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 4 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip
    Default version control: send version 2, receive 2
  Interface          Send Recv Triggered RIP  Key-chain
  Serial0/0/0        2      2
  Automatic network summarization is not in effect
  Maximum path: 4
  Routing for Networks:
    172.16.0.0
    192.168.30.0
    192.168.40.0
    192.168.200.0
  Passive Interface(s):
    GigabitEthernet0/1.30
    GigabitEthernet0/1.40
    GigabitEthernet0/1.200
  Routing Information Sources:
    Gateway         Distance      Last Update
  172.16.12.2       120           00:00:23
  Distance: (default is 120)
R1#show ip route rip
10.0.0.0/24 is subnetted, 1 subnets
R   10.10.10.10 [120/1] via 172.16.12.2, 00:00:23, Serial0/0/0
172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
R   172.16.12.0/30 [120/1] via 172.16.12.2, 00:00:23, Serial0/0/0
R   192.168.4.0/24 [120/2] via 172.16.12.2, 00:00:23, Serial0/0/0
R   192.168.5.0/24 [120/2] via 172.16.12.2, 00:00:23, Serial0/0/0
R   192.168.6.0/24 [120/2] via 172.16.12.2, 00:00:23, Serial0/0/0
R   192.168.200.0/24 is variably subnetted, 2 subnets, 2 masks
R1#show run section router rip
```

## Imagen 44 default-router, IP domain name, IP dhcp excluded-address, dns-server, default-router.

```

R1
Physical Config CLI
IOS Command Line Interface
R1(dhcp-config)#network 192.168.30.1 255.255.255.0
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-name cnsa-usad.com
R1(dhcp-config)#
% Invalid input detected at *** marker.
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#ip domain-name cnsa-usad.com
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.20
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.20
R1(config)#ip dhcp pool ADMINISTRACION
R1(dhcp-config)#network 192.168.30.1 255.255.255.0
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#ip dhcp pool SERVIDOR
R1(dhcp-config)#network 192.168.40.1 255.255.255.0
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#ip domain-name cnsa-usad.com
R1(dhcp-config)#
Copy Paste

```

## Imagen 45 router rip, do show IP router connected, networks, passive-interface

```

R2
Physical Config CLI
IOS Command Line Interface
R2>enable
R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#do show ip route connected
C 10.10.10.0/24 is directly connected, Loopback0
C 172.16.12.0/30 is directly connected, Serial0/0/0
C 172.16.23.0/30 is directly connected, Serial0/0/1
C 209.165.200.224/29 is directly connected, GigabitEthernet0/0
R2(config-router)#network 10.10.10.0
R2(config-router)#network 172.16.12.0
R2(config-router)#network 172.16.23.0
R2(config-router)#passive-interface loopback 0
R2(config-router)#no auto-summary
R2(config-router)#
Copy Paste

```

## Imagen 46 access-list 1 permit, IP nat pool

```

R2
Physical Config CLI
IOS Command Line Interface
R2#access-list 1 permit 192.168.30.0 0.0.0.255
R2#
% Invalid input detected at *** marker.
R2#access-list 1 permit 192.168.30.0 0.0.0.255
R2#
% Invalid input detected at *** marker.
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#access-list 1 permit 192.168.30.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.40.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.200.0 0.0.0.255
R2(config)#ip nat pool INTERNET
% Incomplete command.
R2(config)#ip nat pool INTERNET 209.165.200.225 209.165.200.228 netmask
255.255.255.248
R2(config)#ip nat inside source list 1 pool INTERNET
R2(config)#
Copy Paste

```

## Imagen 47 router rip, do show IP route connected, passive interfaces

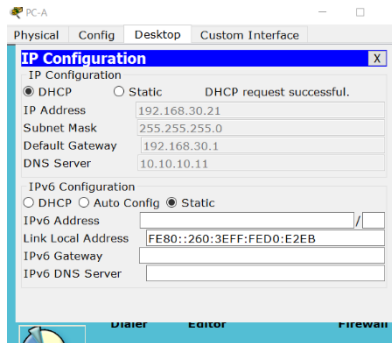
```

R3
Physical Config CLI
IOS Command Line Interface
R3>enable
R3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router rip
R3(config-router)#version 2
R3(config-router)#do show ip route connected
C 172.16.23.0/30 is directly connected, Serial0/0/1
C 192.168.4.0/24 is directly connected, Loopback4
C 192.168.5.0/24 is directly connected, Loopback5
C 192.168.6.0/24 is directly connected, Loopback6
R3(config-router)#network 172.16.23.0
R3(config-router)#
% Invalid input detected at *** marker.
R3(config-router)#network 172.16.23.0
R3(config-router)#network 192.168.4.0
R3(config-router)#network 192.168.5.0
R3(config-router)#network 192.168.6.0
R3(config-router)#passive-interface loopback 4
R3(config-router)#passive-interface loopback 5
R3(config-router)#passive-interface loopback 6
R3(config-router)#no auto-summary
R3(config-router)#
Copy Paste

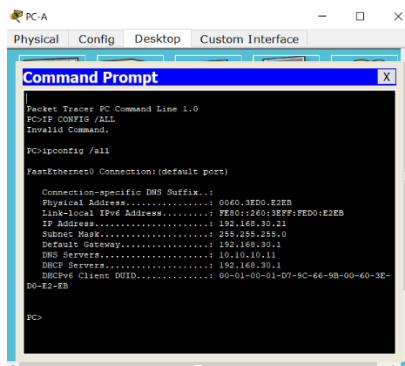
```

## VERIFICACIÓN

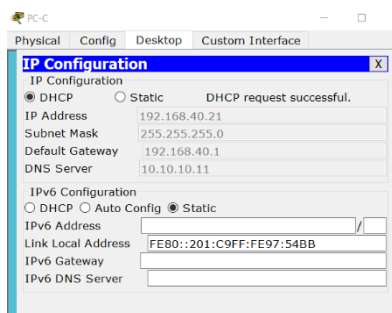
### Imagen 48 Verificación DHCP



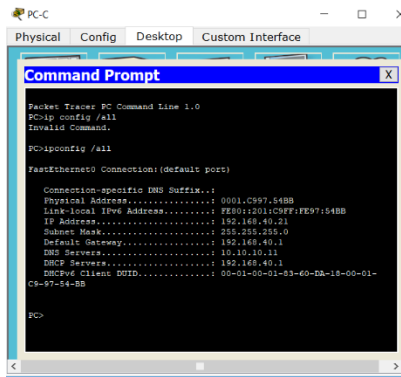
### Imagen 49 PC-A verificación IP config /all



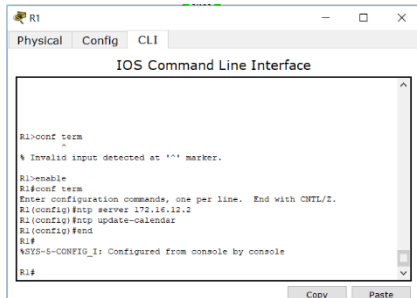
### Imagen 50 PC-B verificación DHCP



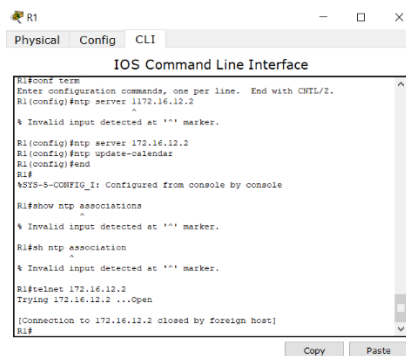
## Imagen 51 PC-C verificación IP config /all



## Imagen 52 ntp server 172.16.12.2, ntp update-calendar




## Imagen 53 telnet 172.16.12.2





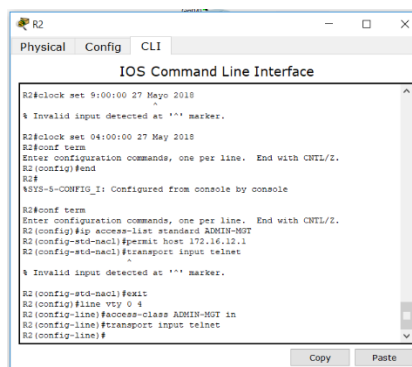
# CONFIGURAR NAT Y ACL, DEFINIR LAS TRADUCCIONES NAT, CREAR UN SERVIDOR WEB ESTÁTIVO NAT, HABILITAR SERVIDOR HTTP, DEFINIR LA TRADUCCIÓN DINÁMICA NAT

## Imagen 54 configuración NAT, clock set



```
R2#
R2#enable
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip nat inside source static 209.149.200.229
R2(config)#int loopback 0
R2(config-if)#ip nat inside
R2(config-if)#ip nat inside
R2(config-if)#ip nat inside
R2(config-if)#ip nat outside
R2(config-if)#exit
R2(config)#access-list 1 permit 192.168.30.0 0.0.0.0.255
R2(config)#access-list 1 permit 192.168.30.0 0.0.0.0.255
R2(config)#access-list 1 permit 192.168.40.0 0.0.0.0.255
R2(config)#ip nat pool INTERNET
R2(config)#ip nat pool INTERNET 209.149.200.229 209.149.200.228 netmask
255.255.255.248
R2(config)#ip nat inside source list 1 pool INTERNET
R2(config)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
R2#clock set 9:00:00
R2#clock set 9:00:00
R2#clock set 9:00:00
R2#clock set 9:00:00 27 Mayo 2018
R2#clock set 9:00:00 27 Mayo 2018
R2#clock set 04:00:00 27 May 2018
R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
R2#
```

## Imagen 55 transport input telnet, line vty



```
R2#
R2#clock set 9:00:00 27 Mayo 2018
R2#clock set 9:00:00 27 Mayo 2018
R2#clock set 04:00:00 27 May 2018
R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip access-list standard ADMIN-MGT
R2(config-std-acl)#permit host 172.16.12.1
R2(config-std-acl)#transport input telnet
R2(config-std-acl)#exit
R2(config)#line vty 0 4
R2(config-line)#access-class ADMIN-MGT in
R2(config-line)#transport input telnet
R2(config-line)#
```

## Imagen 56 line vty, transport import telnet, show access list, show IP interface

```
R2
Physical Config CLI
IOS Command Line Interface
R2#enable
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#line vty 0 4
R2(config-line)#access-class ADMIN-MOT in
R2(config-line)#transport input telnet
R2(config-line)#end
R2#
R2#show access-list
Standard IP access list 1
 10 permit 192.168.30.0 0.0.0.255
 20 permit 192.168.40.0 0.0.0.255
 30 permit 192.168.4.0 0.0.3.255
 40 permit 192.168.200.0 0.0.0.255
 50 permit 192.168.4.0 0.0.0.255
Standard IP access list ADMIN-MOT
 10 permit host 172.16.12.1 (2 match(es))
R2#clear ip access-list counters
% Invalid input detected at *** marker.
R2#show ip interface
Serial0/0/0 is up, line protocol is up (connected)
Internet address is 209.165.200.225/29
Broadcast address is 255.255.255.255
Address determined by setup command
MTU is 1500 bytes
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound access list is not set
Proxy ARP is enabled
Security level is default
Split horizon is enabled
ICMP redirects are always sent
ICMP unreachable are always sent
ICMP mask replies are never sent
IP fast switching is disabled
IP fast switching on the same interface is disabled
IP flow switching is disabled
IP fast switching turbo vector
IP multicast fast switching is disabled
IP multicast distributed fast switching is disabled
Router Discovery is disabled
IP output packet accounting is disabled
IP access violation accounting is disabled
TCP/IP header compression is disabled
RTT/IP header compression is disabled
Route proxy name replies are disabled
Policy routing is disabled
```

## Imagen 57 IP interface parte 1

```
R2
Physical Config CLI
IOS Command Line Interface
Internet address is 209.165.200.225/29
Broadcast address is 255.255.255.255
Address determined by
MTU is 1500 bytes
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound access list is not set
Proxy ARP is enabled
Security level is default
Split horizon is enabled
ICMP redirects are always sent
ICMP unreachable are always sent
ICMP mask replies are never sent
IP fast switching is disabled
IP fast switching on the same interface is disabled
IP flow switching is disabled
IP fast switching turbo vector
IP multicast fast switching is disabled
IP multicast distributed fast switching is disabled
Router Discovery is disabled
IP output packet accounting is disabled
IP access violation accounting is disabled
TCP/IP header compression is disabled
RTT/IP header compression is disabled
Route proxy name replies are disabled
Policy routing is disabled
Network address translation is disabled
NAT Policy Mapping is disabled
Input Features: NFI Check
WCCP Redirect outbound is disabled
WCCP Redirect inbound is disabled
WCCP Redirect exclude is disabled
GigabitEthernet0/1 is administratively down, line protocol is down
(disabled)
Internet protocol processing disabled
Serial0/0/0 is up, line protocol is up (connected)
Internet address is 172.16.12.2/30
Broadcast address is 255.255.255.255
Address determined by setup command
MTU is 1500
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound access list is not set
Proxy ARP is enabled
Security level is default
Split horizon is enabled
ICMP redirects are always sent
ICMP unreachable are always sent
ICMP mask replies are never sent
IP fast switching is disabled
IP fast switching on the same interface is disabled
```

## Imagen 58 IP interface parte 2

```
IOS Command Line Interface
TCP/IP header compression is disabled
RTP/IP header compression is disabled
Probe proxy name replies are disabled
Policy routing is disabled
Network address translation is disabled
WCCP Redirect outbound is disabled
WCCP Redirect exclude is disabled
BGP Policy Mapping is disabled
Serial10/0/1 is up, line protocol is up (connected)
Internet address is 10.10.10.2/24
Broadcast address is 255.255.255.255
Address determined by setup command
MTU is 1500
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound access list is not set
Proxy ARP is enabled
Security level is default
Split horizon is enabled
ICMP redirects are always sent
ICMP unreachable are always sent
ICMP mask replies are never sent
IP fast switching is disabled
IP fast switching on the same interface is disabled
IP Flow switching is disabled
IP Fast switching turbo vector
IP multicast fast switching is disabled
IP multicast distributed fast switching is disabled
Router Discovery is disabled
IP output packet accounting is disabled
IP access violation accounting is disabled
TCP/IP header compression is disabled
RTP/IP header compression is disabled
Probe proxy name replies are disabled
Policy routing is disabled
Network address translation is disabled
WCCP Redirect outbound is disabled
WCCP Redirect exclude is disabled
BGP Policy Mapping is disabled
Loopback0 is up, line protocol is up (connected)
Internet address is 10.10.10.1/24
Broadcast address is 255.255.255.255
Address determined by setup command
MTU is 1514 bytes
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound access list is not set
Proxy ARP is enabled
Security level is default
Split horizon is enabled
ICMP redirects are always sent
some
```

## Imagen 59 IP interface parte 3

```
IOS Command Line Interface
ICMP mask replies are never sent
IP fast switching is disabled
IP fast switching on the same interface is disabled
IP Flow switching is disabled
IP Fast switching turbo vector
IP multicast fast switching is disabled
IP multicast distributed fast switching is disabled
Router Discovery is disabled
IP output packet accounting is disabled
IP access violation accounting is disabled
TCP/IP header compression is disabled
RTP/IP header compression is disabled
Probe proxy name replies are disabled
Policy routing is disabled
Network address translation is disabled
WCCP Redirect outbound is disabled
WCCP Redirect exclude is disabled
BGP Policy Mapping is disabled
Loopback0 is up, line protocol is up (connected)
Internet address is 10.10.10.1/24
Broadcast address is 255.255.255.255
Address determined by setup command
MTU is 1514 bytes
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound access list is not set
Proxy ARP is enabled
Security level is default
Split horizon is enabled
ICMP redirects are always sent
ICMP unreachable are always sent
ICMP mask replies are never sent
IP fast switching is disabled
IP fast switching on the same interface is disabled
IP Flow switching is disabled
IP Fast switching turbo vector
IP multicast fast switching is disabled
IP multicast distributed fast switching is disabled
Router Discovery is disabled
IP output packet accounting is disabled
IP access violation accounting is disabled
TCP/IP header compression is disabled
RTP/IP header compression is disabled
Probe proxy name replies are disabled
Policy routing is disabled
Network address translation is disabled
BGP Policy Mapping is disabled
Input features: NCI Check
WCCP Redirect outbound is disabled
WCCP Redirect inbound is disabled
WCCP Redirect exclude is disabled
Vlan1 is administratively down, line protocol is down
```

## Imagen 60 telnet 172.16.12.2

```

R3#enable
R3#telnet 172.16.12.2
Trying 172.16.12.2 ...
% Connection refused by remote host
R3#
  
```

## Imagen 61 access-class admin-mot in, show access-list

```

R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#line vty 0 4
R2(config-line)#access-class ADMIN-MOT in
R2(config-line)#transport input telnet
R2(config-line)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#show access-list
Standard IP access list 1
 10 permit 192.168.30.0 0.0.0.255
 20 permit 192.168.40.0 0.0.0.255
 30 permit 192.168.4.0 0.0.3.255
 40 permit 192.168.200.0 0.0.0.255
 50 permit 192.168.4.0 0.0.0.255
Standard IP access list ADMIN-MOT
 10 permit host 172.16.12.1 (2 match(es))
R2#
  
```

## VERIFICACIÓN DE TRADUCCIONES

## Imagen 62 show IP nat translations

```

R2#show ip nat translations
Pro Inside global Inside local Outside local Outside global
--- 209.148.200.229 10.10.10.10 ---
tcp 209.148.200.229:89 10.10.10.10:80 209.148.200.230:102909 148.200.230:1029
R2#show ip nat translations
Pro Inside global Inside local Outside local Outside global
--- 209.148.200.229 10.10.10.10 ---
tcp 209.148.200.229:89 10.10.10.10:80 209.148.200.230:102909 148.200.230:1029
R2#
  
```

## Imagen 63 show IP nat translations parte 2

```

R2#show ip nat translations
Pro Inside global Inside local Outside local Outside global
--- 209.148.200.229 10.10.10.10 ---
tcp 209.148.200.229:89 10.10.10.10:80 209.148.200.230:102909 148.200.230:1029
R2#show ip nat translations
Pro Inside global Inside local Outside local Outside global
--- 209.148.200.229 10.10.10.10 ---
tcp 209.148.200.229:89 10.10.10.10:80 209.148.200.230:102909 148.200.230:1029
R2#
  
```

# INTERNET SERVER

## Imagen 64 Verificación 209.166.200.226

```
Command Prompt

Packet Tracer SERVER Command Line 1.0
C:\>ping 209.166.200.226

Pinging 209.166.200.226 with 32 bytes of data:

Reply from 209.166.200.226: bytes=32 time=1ms TTL=255
Reply from 209.166.200.226: bytes=32 time=1ms TTL=255
Reply from 209.166.200.226: bytes=32 time=1ms TTL=255
Reply from 209.166.200.226: bytes=32 time=1ms TTL=255

Ping statistics for 209.166.200.226:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

## Imagen 65 Ping 209.165.200.230

```
Pinging 209.165.200.230 with 32 bytes of data:

Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126

Ping statistics for 209.165.200.230:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 209.165.200.230

Pinging 209.165.200.230 with 32 bytes of data:

Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126

Ping statistics for 209.165.200.230:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 209.165.200.230
```

## Imagen 66 Ping 192.168.33.21

```
Connection-specific DNS Suffix...:
Physical Address. . . . .: 0090.2118.E610
Link-local IPv6 Address . . . . .: FE80::230:11FF:FE1B:E610
IP Address. . . . .: 192.168.33.21
Subnet Mask . . . . .: 255.255.255.0
Default Gateway . . . . .: 192.168.33.1
DNS Servers . . . . .: 10.10.10.10
DHCP Servers . . . . .: 192.168.33.1
DHCP Client GUID . . . . .: 90-91-91-91-92-97-92-C5-00-90-21-3B-24-18

C:\>ping 192.168.33.21

Pinging 192.168.33.21 with 32 bytes of data:

Request timed out.
Reply from 192.168.33.21: bytes=32 time=1ms TTL=127
Reply from 192.168.33.21: bytes=32 time=1ms TTL=127
Reply from 192.168.33.21: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.33.21:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

## Imagen 67 IP nat inside, show IP nat translations

```
Physical Config CLI Attributes IOS Command Line Interface
R2#show ip nat translations
--- 209.168.200.229 10.10.10.10 ---
top 209.168.200.229:80 10.10.10.10:80 209.168.200.230:102809.168.200.230:1028

R2#show ip nat translations
R2#conf t
Enter configuration commands, one per line. End with CTRL/Z.
R2(config)#ip nat inside
R2(config)#ip nat inside
R2(config)#ip nat inside
R2(config)#end
R2#
R2#show ip nat translations
R2#
R2#show ip nat translations
--- 209.168.200.229 10.10.10.10 ---
top 209.168.200.229:80 10.10.10.10:80 209.168.200.230:102809.168.200.230:1028

R2#
```

## Imagen 68 clear IP nat translation, show IP nat translation

```
Physical Config CLI Attributes R2 IOS Command Line Interface
R2#show ip nat translations
--- 209.168.200.229 10.10.10.10 ---
top 209.168.200.229:80 10.10.10.10:80 209.168.200.230:102809.168.200.230:1028

R2#clear ip nat translation *
R2#show ip nat translations
--- 209.168.200.229 10.10.10.10 ---
top 209.168.200.229:80 10.10.10.10:80 209.168.200.230:102809.168.200.230:1028

R2#
```

## 7. COMANDOS APLICADOS

### Routers

```
R(config)#hostname R1
R1(config)#line console 0
R1(config-line)#password
```

```
R1(config-line)#login
R1(config)#line vty
R1(config-line)#password
R1(config-line)#login
```

### Switches

```
S(config)#hostname S1
S1(config)#line console 0
S1(config-line)#password
```

```
S1(config-line)#login
S1(config)#line vty
S1(config-line)#password
S1(config-line)#login
```

### Configuración de VLANs

```
S1(config)#VLAN
S1(config-VLAN)#name
```

```
S1(config-VLAN)#end
S1(config)#interface f0/1
S1(config-if)#switchport mode access
```

```
S1(config-if)#switchport access VLAN 30
S1 (config)#interface FastEthernet0/0
S1 (config-if)#IP address 209.165.205.225 255.255.255.248
```

## **Enrutamiento OSPFv2**

```
R(config)#router ospf 1
R(config-router)#router-id 1.1.1.1
R(config-router)#end
R(config-router)#network 172.31.23.0 0.0.0.3 area 0
R(config-router)#passive-interface f0/0
R(config)#IP route 0.0.0.0 0.0.0.0 172.31.25.2
R(config)#interface f0/0.200
```

```
R(config-subif)#encapsulation dot1q 200
R(config)#IP dhcp pool ADMINISTRACION
R(dhcp-config)#network 192.168.30.0 255.255.255.0
R(dhcp-config)#default-router 192.168.30.1
R(dhcp-config)#dns-server 10.10.10.11
R(dhcp-config)#end
```



## **Configuración NAT en Routers**

```
R2(config)#IP nat pool public_access 209.165.201.225 209.165.201.230 netmask  
255.255.255.248
```

## **Configuración ACL'S**

```
R2(config)#access-list 1 permit 192.168.99.0 0.0.0.255
```

## **Ancho de Banda**

```
R1(config)#interface s0/0/0
```

```
R1(config-if)#bandwidth 128
```

## **Costo De Métrica En S0/0/0**

```
R1(config)#interface serial 0/0/0
```

```
R1(config-if) #IP ospf cost 7500
```

## **Visualizaciones**

```
#show IP route
```

```
#show IP ospf
```

```
#show IP ospf interface serial 0/0/0
```

```
#show IP protocols
```

## **Crear las VLAN**

```
S1(config)#VLAN 30
```

```
S1(config-VLAN)#name Administracion
```

```
S1(config-VLAN)#end
```

Puertos troncales S1(config-if)#interface [interface]

S1(config-if)#switchport mode trunk

S1(config-if)#switchport trunk native VLAN [VLAN number]

### **Encapsulamiento**

R1(config)#interface [INTERFAZ. Un Número] (1)

R1(config-subif)#encapsulation dot1Q [número de VLAN] (2)

R1(config-subif) #IP address [IP] [máscara de red]

### **Switch 3 Deshabilitar Dns Lookup**

S3(config)#no IP domain-lookup

Desactivar las interfaces en desuso.

(config)#interface FastEthernet0/1

(config-if)#shutdown

(config)#interface Serial0/0/1

(config-if)#shutdown

### **Habilitar el DHCP y NAT para IPv4**

R1#config t

R1(config)#IP dhcp excluded-address 192.168.30.1 192.168.30.30

R1(config)#IP dhcp pool ADMINISTRACION

R1(dhcp-config)#network 192.168.30.0 255.255.255.0

R1(dhcp-config)#default-router 192.168.30.1

R1(dhcp-config)#dns-server 10.10.10.11

R1(dhcp-config)#end

### **Configurar DHCP pool para VLAN 40**

```
R1(config)#IP dhcp excluded-address 192.168.40.1 192.168.40.30
```

```
R1(config)#IP dhcp pool MERCADEO
```

```
R1(dhcp-config) #network 192.168.40.0 255.255.255.0
```

```
R1(dhcp-config) #default-router 192.168.40.1
```

```
R1(dhcp-config) #dns-server 10.10.10.11
```

```
R1(dhcp-config) #end
```

### **Configurar NAT en R2, salida a Internet de los hosts**

#### **Ruta estática en R2**

```
R2(config)#IP route 209.165.200.224 255.255.255.252 172.31.21.1
```

```
R2#show IP route static
```

#### **Ruta predeterminada en R1**

```
R1(config)#IP route 0.0.0.0 0.0.0.0 172.31.21.2 R1#show IP route static
```

#### **Lista de control de acceso (ACL)**

```
Gateway(config)# access-list 1 permit 192.168.30.0 0.0.0.255
```

```
Gateway(config)# access-list 1 permit 192.168.40.0 0.0.0.255
```

## 8. CONCLUSIONES

- La capacidad de troncalizar VLAN a través de múltiples computadores hace que agregar usuarios, mover usuarios y cambiar las membresías de VLAN de los usuarios sea mucho más fácil.
- La Lista de control de acceso de Cisco (ACL) se usa para filtrar el tráfico según un criterio de filtrado determinado en un enrutador o interfaz de conmutador. En función de las condiciones proporcionadas por la ACL, un paquete está permitido o bloqueado para un mayor movimiento.
- La Traducción de direcciones de red (NAT) reemplaza las direcciones IP dentro de un paquete con diferentes direcciones IP. Es útil para conservar la dirección IP y conectar una red privada usando una dirección no registrada a una red pública como Internet. Los dos tipos principales de configuraciones NAT son estáticas y dinámicas.
- Las ACL para el filtrado de tráfico TCP/IP se dividen principalmente en dos tipos que son las listas de acceso estándar, y las listas de acceso extendidas.
- Las VLAN aumentan el número de dominios de difusión mientras reducen su tamaño; este es el mismo efecto que tienen los enrutadores, pero sin la necesidad de comprar muchos enrutadores o un enrutador grande con muchos puertos, por lo que es menos costoso y más fácil de administrar.
- Las VLAN brindan una capa adicional de seguridad: ningún dispositivo en ninguna VLAN puede comunicarse con un dispositivo en ninguna otra VLAN hasta que no haya configurado deliberadamente la manera de hacerlo.

- Las VLAN pueden abarcar múltiples computadores utilizando enlaces troncales. Esto le permite crear una agrupación lógica de usuarios de red por función en lugar de ubicación.
- Las VLAN son flexibles en términos de cómo se usan en el equipo de red y pueden usarse independientemente.
- Otra forma de traducción dinámica es la sobrecarga o la traducción de direcciones de puertos (PAT), que permite asignar muchos hosts a una sola dirección al mismo tiempo. Cuando PAT está configurado, el enrutador utiliza los números del puerto de origen para distinguir las sesiones de diferentes hosts. PAT crea una entrada de traducción extendida en la tabla NAT al incluir el protocolo y la información del puerto. PAT se configura agregando la opción de sobrecarga al comando de configuración de NAT dinámico, que vincula los hosts y el grupo.
- Una configuración de NAT estática crea una asignación de uno a uno y traduce una dirección específica a otra dirección. Este tipo de configuración crea una entrada permanente en la tabla NAT siempre que la configuración esté presente y permite que tanto los hosts internos como externos inicien una conexión. Esto es principalmente útil para hosts que proporcionan servicios de aplicaciones como correo, web, FTP y otros.

## REFERENCIAS BIBLIOGRÁFICAS

CISCO. (2014). Conceptos de Routing. Principios de Enrutamiento y Conmutación. Recuperado de: <https://static-course-assets.s3.amazonaws.com/RSE50ES/module4/index.html#4.0.1.1>

CISCO. (2014). Configuración y conceptos básicos de Switching. Principios de Enrutamiento y Conmutación. Recuperado de: <https://static-course-assets.s3.amazonaws.com/RSE50ES/module2/index.html#2.0.1.1>

CISCO. (2014). Evaluación Prueba de habilidades prácticas CCNA. Guía desarrollo práctica final. Cisco Networking Academy.

CISCO. (2014). DHCP. Principios de Enrutamiento y Conmutación. Recuperado de: <https://static-course-assets.s3.amazonaws.com/RSE50ES/module10/index.html#10.0.1.1>

CISCO. (2014). Enrutamiento Dinámico. Principios de Enrutamiento y Conmutación. Recuperado de: <https://static-course-assets.s3.amazonaws.com/RSE50ES/module7/index.html#7.0.1.1>

CISCO. (2014). Enrutamiento entre VLANs. Principios de Enrutamiento y Conmutación. Recuperado de: <https://static-course-assets.s3.amazonaws.com/RSE50ES/module5/index.html#5.0.1.1>

CISCO. (2014). Enrutamiento Estático. Principios de Enrutamiento y Conmutación. Recuperado de: <https://static-course-assets.s3.amazonaws.com/RSE50ES/module6/index.html#6.0.1.1>

CISCO. (2014). Introducción a redes conmutadas. Principios de Enrutamiento y Conmutación. Recuperado de: <https://static-course-assets.s3.amazonaws.com/RSE50ES/module1/index.html#1.0.1.1>

CISCO. (2014). Listas de control de acceso. Principios de Enrutamiento y Conmutación. Recuperado de: <https://static-course-assets.s3.amazonaws.com/RSE50ES/module9/index.html#9.0.1.1>

CISCO. (2014). OSPF de una sola área. Principios de Enrutamiento y Conmutación. Recuperado de: <https://static-course-assets.s3.amazonaws.com/RSE50ES/module8/index.html#8.0.1.1>

CISCO. (2014). Traducción de direcciones IP para IPv4. Principios de Enrutamiento y Conmutación. Recuperado de: <https://static-course-assets.s3.amazonaws.com/RSE50ES/module11/index.html#11.0.1.1>

CISCO. (2014). VLANs. Principios de Enrutamiento y Conmutación. Recuperado de: <https://static-course-assets.s3.amazonaws.com/RSE50ES/module3/index.html#3.0.1.1>

UNAD (2014). Configuración de Switches y Routers [OVA]. Recuperado de: <https://1drv.ms/u/s!AmlJYei-NT1lhgL9QChD1m9EuGqC>