PRUEBA DE HABILIDADES PRÁCTICAS CNNA DIPLOMADO DE PROFUNDIZACIÓN CISCO (DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN/WAN)

ESTUDIANTE JOSE DAVID PEREZ ARANGO

TRABAJO ESCRITO PARA OPTAR POR EL TIUTULO DE: INGENIERO ELECTRÓNICO

TUTOR: DIEGO EDINSON RAMIREZ CLARO

DIRECTOR DE DIPLOMADO PHD. JUAN CARLOS VESGA FERREIRA

UNIVERSIDAD NACIONAL ABIERTA Y ADISTANCIA UNAD ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA PROGRAMA DE INGENIERIA ELECTRONICA DIPLOMADO DE PROFUNDIZACIÓN CISCO DOSQUEBRADAS DICIEMBRE DE 2019

Contenido

| Resumen | 6 |
|--|-----|
| Abstract | 7 |
| Introducción | 8 |
| 1. Objetivos | 9 |
| 1.1. Objetivo General | 9 |
| 1.2. Objetivos Especificos | 9 |
| 2. Escenario 1 | 10 |
| 2.1. Topología de red | 10 |
| 2.2. Desarrollo | 11 |
| 2.3. Parte 1: Asignación de direcciones IP: | 11 |
| 2.4. Parte 2: Configuración Básica. | 19 |
| 2.5. Parte 3: Configuración de Enrutamiento | 41 |
| 2.6. Parte 4: Configuración de las listas de Control de Acceso | 50 |
| 2.7. Parte 5: Comprobación de la red instalada | 58 |
| 3. ESCENARIO 2 | 62 |
| 3.1. Desarrollo | 62 |
| 3.2. Aspectos a tener en cuenta | 63 |
| 3.3. Todos los routers deberan tener la siguiente cofiguración | 64 |
| 3.4. Listas de control de acceso: | 94 |
| CONCLUSIONES | 112 |
| BIBLIOGRAFIA | 114 |

Tabla de Ilustraciones

| Ilustración 1: Topología de Red | .10 |
|---|-----|
| Ilustración 2: Topología de Red con Sucursales | .11 |
| Ilustración 3: Topología de Red en Packet Tracer | .11 |
| Ilustración 4: Subneteo de la Red | .12 |
| Ilustración 5: Configuración IP PC3 | .13 |
| Ilustración 6: Configuración IP PC4 | .13 |
| Ilustración 7: Configuración IP PC1 | .14 |
| Ilustración 8: Configuración IP PC2 | .14 |
| Ilustración 9: Configuración IP WS1 | .15 |
| Ilustración 10: Configuración IP SERVIDOR | .15 |
| Ilustración 11: Estado de Red con la Configuración de Routers | .19 |
| Ilustración 12: Configuración Básica Routers | .19 |
| Ilustración 13: Tabla de enrutamiento Router BOGOTA | .20 |
| Ilustración 14: Tabla de enrutamiento Router MEDELLIN | .21 |
| Ilustración 15: Tabla de enrutamiento Router CALI | .22 |
| Ilustración 16: Balanceo de carga en el Router BOGOTA antes de la configuraci | ión |
| | .23 |
| Ilustración 17: Balanceo de carga en el Router BOGOTA después de la | |
| configuración | .24 |
| Ilustración 18: Balanceo de carga en el Router MEDELLIN antes de la | |
| configuración | .25 |
| Ilustración 19: Balanceo de carga en el Router MEDELLIN después de la | |
| configuración | .26 |
| Ilustración 20: Balanceo de carga en el Router CALI antes de la configuración | .27 |
| Ilustración 21: Balanceo de carga en el Router CALI después de la configuración | n |
| | .28 |
| Ilustración 22: Diagnóstico de vecinos en el Router BOGOTA | .29 |
| Ilustración 23: Diagnóstico de vecinos en el Router MEDELLIN | .30 |
| Ilustración 24: Diagnóstico de vecinos en el Router CALI | .31 |
| Ilustración 25: Prueba desde WS 1 a SERVIDOR | .32 |
| Ilustración 26: Prueba desde WS 1 a PC1 Y PC2 | .32 |
| Ilustración 27: Prueba desde WS 1 a PC3 y PC4 | .33 |
| Ilustración 28: Prueba desde SERVIDOR a WS 1 | .33 |
| Ilustración 29: Prueba desde SERVIDOR a PC1 y PC2 | .34 |
| Ilustración 30: Prueba desde SERVIDOR a PC3 y PC4 | .34 |
| Ilustración 31: Prueba desde PC1 a PC2 | .35 |
| Ilustración 32: Prueba desde PC1 a PC3 Y PC4 | .35 |
| Ilustración 33: Prueba desde PC1 a WS 1 y SERVIDOR | .36 |
| Ilustración 34: Prueba desde PC2 a PC1 | .36 |

| Ilustración 35: Prueba desde PC2 a PC3 y PC4 | 37 |
|---|----|
| Ilustración 36: Prueba desde PC2 a WS 1 y SERVIDOR | 37 |
| Ilustración 37: Prueba desde PC3 a PC4 | 38 |
| Ilustración 38: Prueba desde PC3 a PC4 | 38 |
| Ilustración 39: Prueba desde PC3 a SW 1 y SERVIDOR | 39 |
| Ilustración 40: Prueba desde PC4 a PC3 | 39 |
| Ilustración 41: Prueba desde PC4 a PC1 y PC2 | 40 |
| Ilustración 42: Prueba desde PC4 a SW 1 y SERVIDOR | 40 |
| Ilustración 43: Vecindad con el Router BOGOTA | 43 |
| Ilustración 44: Vecindad con el Router MEDELLIN | 44 |
| Ilustración 45: Vecindad con el Router CALI | 45 |
| Ilustración 46: Tabla de enrutamiento Router BOGOTA | 46 |
| Ilustración 47: Tabla de enrutamiento Router CALI | 47 |
| Ilustración 48: Tabla de enrutamiento Router MEDELLIN | 48 |
| Ilustración 49: Prueba desde PC1 hasta PC3 y desde PC1 hasta SERVIDOR | 49 |
| Ilustración 50: Telnet desde Router BOGOTA a Router MEDELLIN | 52 |
| Ilustración 51: Telnet desde Router CALI a Router BOGOTA | 53 |
| Ilustración 52: Telnet desde Router MEDELLIN a Router CALI | 54 |
| Ilustración 53: Listas de Acceso en Router BOGOTA | 58 |
| Ilustración 54: Listas de Acceso en Router MEDELLIN | 59 |
| Ilustración 55: Listas de Acceso en Router CALI | 60 |
| Ilustración 56: Comunicación Final Escenario 1 | 61 |
| Ilustración 57: Topología Escenario 2 | 62 |
| Ilustración 58: Configuración WEB EXTERNO | 79 |
| Ilustración 59: Almacenamiento Archivos Router TUNJA | 80 |
| Ilustración 60: Servidor TFTP | 81 |
| Ilustración 61: Configuración PC0 | 84 |
| Ilustración 62: Configuración PC1 | 84 |
| Ilustración 63: Configuración PC2 | 85 |
| Ilustración 64: Configuración PC6 | 85 |
| Ilustración 65: Configuración PC7 | 86 |
| Ilustración 66: Configuración PC8 | 86 |
| Ilustración 67: Configuración WEB INTERNO | 87 |
| Ilustración 68: Configuración WEB EXTERNO | 87 |
| Ilustración 69: Ruta IP del Router TUNJA | 89 |
| Ilustración 70: Ruta IP del Router BUCARAMANGA | 89 |
| Ilustración 71: Ruta IP del Router CUNDINAMARCA | 90 |
| Ilustración 72: Ruta IP del Router TUNJA | 90 |
| Ilustración 73: Comunicación entre PC8 y Servidor WEB EXTERNO | 91 |
| Ilustración 74: Prueba desde PC2 | 95 |
| Ilustración 75: Prueba desde PC6 | 97 |

| Ilustración 76: Prueba desde PC6 a URL | 98 |
|---|-----|
| Ilustración 77: Prueba desde PC7 | 99 |
| Ilustración 78: Prueba desde PC1 | 101 |
| Ilustración 79: Prueba desde PC0 | 102 |
| Ilustración 80: Prueba desde PC0 a Servidor EXTERNO | 103 |
| Ilustración 81: Prueba desde PC7 | 106 |
| Ilustración 82: Prueba desde PC0 | 106 |
| Ilustración 83: Prueba desde PC8 | 107 |
| Ilustración 84: Prueba desde Switch BUCARAMANGA | 110 |
| Ilustración 85: Prueba desde Switch TUNJA | 110 |
| Ilustración 86: Comunicación Final Escenario 2 | 111 |

Resumen

La prueba de habilidades CCNA de CISCO pretende abordar de una manera practica los principios basicos del Roting y el Switching estudiados durante el curso, fortaleciendo las habilidades para conectar, configurar y administrar una red de computadoras con el fin de intercambiar información, recursos y servicios entre estos.

En esta prueba de habilidades se desarrollaran dos escenarios. En el primer escenario, una empresa posee sucursales distribuidas en las ciudades de Bogotá, Medellín y Cali en donde se debera 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. En el Segundo escenario, una empresa tiene la conexión a internet en una red Ethernet, lo cual se debe adaptar para facilitar que sus routers y las redes que incluyen puedan, por esa vía, conectarse a internet, pero empleando las direcciones de la red LAN original.

Para el desarrollo de la actividad se cuenta con el programa Packet Tracer, el cual es una herramienta de aprendizaje y simulación de redes interactiva que permite crear topologías de red, configurar dispositivos, insertar paquetes, simular e interactuar con dispositivos finales como PC`s o intermedios (host) como Swich y Routers.

Abstract

The CISCO CCNA skills test attempts to address in a practical way the basic principles of Roting and Switching studied during the course, strengthening the skills to connect, configure and manage a computer network in order to exchange information, resources and services between these.

In this skill test two scenarios will be developed. In the first scenario, a company has branches distributed in the cities of Bogotá, Medellín and Cali where each of the devices that are part of the scenario must be configured and interconnected, in accordance with the guidelines established for IP addressing, protocols of routing and other aspects that are part of the network topology. In the second scenario, a company has an internet connection in an Ethernet network, which must be adapted to facilitate that its routers and the networks they include can, through that route, contact the internet, but using the LAN network addresses original.

For the development of the activity there is the Packet Tracer program, which is a learning and simulation tool for interactive networks that allows you to create network topologies, configure devices, insert packages, simulate and interact with end devices such as PCs or intermediates (host) like Swich and Routers.

Introducción

Una red de computadoras en un elemento indispensable para asegurar la comunicación entre dos o más equipos permitiendo el intercambio de información, recursos y servicios entre estos. De esta manera no solamente las empresas pueden beneficiarse de las potencialidades de las redes de computadoras. A nivel doméstico los usuarios también pueden aprovechar sus bondades para compartir cualquier información que sea de su interés. De este modo, las redes informáticas constituyen uno de los avances tecnológicos mas relevantes en la actualidad.

El presente trabajo se realiza con el fin de realizar 2 escenarios propuestos para la prueba de habilidades CCNA 16-4 2019 del diplomado de profundización cisco. Gracias a este trabajo podremos configurar y administrar dispositivos de Networking, crear herramientas de simulación y laboratorios de acceso remoto con el fin de establecer escenarios LAN/WAN que permitan realizar un análisis sobre diversos protocolos y métricas de enrutamiento, evaluando el comportamiento de enrutadores mediante el uso de comandos de administración de tablas de enrutamiento, por medio del desarrollo de una metodología basada en problemas reales, al dar respuesta a cada uno de los problemas planteados dentro del curso.

1. Objetivos

1.1. Objetivo General

Elaborar los escenarios propuestos para la prueba de habilidades CCNA 16-4 2019 del diplomado de profundización cisco.

1.2. Objetivos Especificos

- Realizar la configuración de la red y de cada uno de los equipos que lo conforman.
- Establecer la conectividad de la red y el óptimo funcionamiento del sistema.
- Poner a prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking.
- Identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado.

2. Escenario 1

Una empresa posee sucursales distribuidas en las ciudades de Bogotá, Medellín y Cali en donde el estudiante 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.

2.1. Topología de red

Los requerimientos solicitados son los siguientes:

Parte 1: Para el direccionamiento IP debe definirse una dirección de acuerdo con el número de hosts requeridos.

Parte 2: Considerar la asignación de los parámetros básicos y la detección de vecinos directamente conectados.

Parte 3: La red y subred establecidas deberán tener una interconexión total, todos los hosts deberán ser visibles y poder comunicarse entre ellos sin restricciones.

Parte 4: Implementar la seguridad en la red, se debe restringir el acceso y comunicación entre hosts de acuerdo con los requerimientos del administrador de red.

Parte 5: Comprobación total de los dispositivos y su funcionamiento en la red.

Parte 6: Configuración final.



Ilustración 1: Topología de Red



Ilustración 2: Topología de Red con Sucursales

2.2. Desarrollo

Como trabajo inicial se debe realizar lo siguiente.

- Realizar las rutinas de diagnóstico y dejar los equipos listos para su configuración (asignar nombres de equipos, asignar claves de seguridad, etc).
- Realizar la conexión fisica de los equipos con base en la topología de red

Configurar la topología de red, de acuerdo con las siguientes especificaciones.

2.3. Parte 1: Asignación de direcciones IP:

a. Se debe dividir (subnetear) la red creando una segmentación en ocho partes, para permitir creciemiento futuro de la red corporativa.



Ilustración 3: Topología de Red en Packet Tracer

Si se toman prestados 3 bits, se crean 8 subredes. **2^3 = 8 subredes**.

Mascara de Subred: 255.255.255.224

| | Red | 192.168.1.0 |
|-------|-----------|---------------|
| Dod 1 | Primero | 192.168.1.1 |
| Red 1 | Ultima | 192.168.1.30 |
| | Broadcast | 192.168.1.31 |
| | Red | 192.168.1.32 |
| Pod 2 | Primero | 192.168.1.33 |
| neu z | Ultima | 192.168.1.62 |
| | Broadcast | 192.168.1.63 |
| | Red | 192.168.1.64 |
| Pod 2 | Primero | 192.168.1.65 |
| Red 3 | Ultima | 192.168.1.94 |
| | Broadcast | 192.168.1.95 |
| | Red | 192.168.1.96 |
| Red 4 | Primero | 192.168.1.97 |
| | Ultima | 192.168.1.126 |
| | Broadcast | 192.168.1.127 |
| | Red | 192.168.1.128 |
| Rod F | Primero | 192.168.1.129 |
| neu S | Ultima | 192.168.1.158 |
| | Broadcast | 192.168.1.159 |
| | Red | 192.168.1.160 |
| Pod 6 | Primero | 192.168.1.161 |
| Reu o | Ultima | 192.168.1.190 |
| | Broadcast | 192.168.1.191 |
| | Red | 192.168.1.192 |
| Pod 7 | Primero | 192.168.1.193 |
| Red 7 | Ultima | 192.168.1.222 |
| | Broadcast | 192.168.1.223 |
| | Red | 192.168.1.224 |
| Rod 9 | Primero | 192.168.1.225 |
| Red 8 | Ultima | 192.168.1.254 |
| | Broadcast | 192.168.1.255 |

Ilustración 4: Subneteo de la Red

b. Asignar una dirección IP a la red.

Se le asigna la siguiente dirección IP a la Red: 192.168.1.0 /27

Se configuran los Host de cada una de las Redes.

| RC3 | | | - | | \times |
|----------------------|-----------|-------------------|----|------|----------|
| Physical Config | Desktop | Custom Interface | | | |
| IP Configuration | on | | | Х | C ^ |
| -IP Configuration | | | | | |
| O DHCP 🔘 S | Static | | | | |
| IP Address | 192.168. | 1.34 | | | |
| Subnet Mask | 255.255. | 255.224 | | | |
| Default Gateway | 192.168 | .1.33 | | | |
| DNS Server | | | | | |
| - IPv6 Configuration | ı | | | | |
| O DHCP O Auto C | onfig 🖲 S | tatic | | | |
| IPv6 Address | | | | / | |
| Link Local Address | FE80::: | 2D0:BCFF:FEB6:67E | 39 | | _ * |
| IPv6 Gateway | | | | | |
| IPv6 DNS Server | | | | | |
| | | | | | |
| | | | | | |
| | | | | newa | |
| | | | | | ~ |
| < | | | | | > |

Ilustración 5: Configuración IP PC3

| é | PC4 | | | | - | | \times |
|---|--|---|---|--------------------------|---|-------|------------|
| F | Physical | Config | Desktop | Custom Interface | | | |
| | IP Con IP Con O DHCP IP Addr Subnet Default DNS Se | figuration figuration sess Mask Gateway rver | Static 192.168. 255.255. 192.168 | 1.35 255.224 .1.33 | | X | |
| | IPv6 C O DHCF IPv6 Ad | onfiguratio O Auto Idress | on Config | tatic | | / | |
| | Link Loo IPv6 Ga IPv6 DN | al Addres teway IS Server | s FE80::: | 290:21FF:FE3C:C26 | 1 | |] t |
| | | | aier | Eaitor | | rewai | • |
| < | | | | | | | > |

Ilustración 6: Configuración IP PC4

| 🢐 PC1 | | | — | | \times |
|--|----------------------|-------------------|---|-------|----------|
| Physical Config | Desktop | Custom Interface | | | |
| IP Configuration IP Configuration O DHCP | n tatic | | | X | ^ |
| IP Address Subnet Mask Default Gateway | 192.168. 255.255. | 1.66 255.224 | | | |
| DNS Server | 192.100 | .1.05 | | | |
| O DHCP O Auto Co | onfig 🖲 S | tatic | | | |
| IPv6 Address Link Local Address | FE80::: | 260:5CFF:FE02:7B2 | 2 | | it (|
| IPv6 Gateway IPv6 DNS Server | | | | | |
| | | | | | |
| | | | | newan | ~ |

Ilustración 7: Configuración IP PC1

| RC2 | | | _ | | × | |
|----------------------|-----------|-------------------|----|-------|-----|---|
| Physical Config | Desktop | Custom Interface | | | | |
| IP Configuratio | n | | | Х | 1 | ^ |
| IP Configuration | | | | | | |
| O DHCP 💿 S | tatic | | | | | |
| IP Address | 192.168. | 1.67 | | | | |
| Subnet Mask | 255.255. | 255.224 | | | | |
| Default Gateway | 192.168 | .1.65 | | | | |
| DNS Server | | | | | | |
| - IPv6 Configuration | | | | | | |
| O DHCP O Auto Co | onfig 🖲 S | tatic | | | | |
| IPv6 Address | | | | / | | |
| Link Local Address | FE80::: | 250:FFF:FE7D:81C8 | | |] 🖣 | |
| IPv6 Gateway | | | | | | |
| IPv6 DNS Server | | | | | | |
| | | | | | 1 | |
| | | | | | | |
| | er i | Eaitor | FI | rewai | | |
| | | | | | | ~ |
| < | | | | | > | |

Ilustración 8: Configuración IP PC2

| 💐 WS1 | | | — | | \times |
|--------------------|------------|-------------------|---|--------|----------|
| Physical Config | Desktop | Custom Interface | | | |
| IP Configurati | on | | | Х | ^ |
| IP Configuration | | | | | |
| ○ DHCP ● | Static | | | | |
| IP Address | 192.168. | 1.3 | | | |
| Subnet Mask | 255.255. | 255.224 | | | |
| Default Gateway | 192.168 | .1.1 | | | |
| DNS Server | | | | | |
| IPv6 Configuratio | n | | | | |
| ○ DHCP ○ Auto C | Config 🔘 S | tatic | | | |
| IPv6 Address | | | | / | |
| Link Local Address | FE80::2 | 202:4AFF:FEB0:B42 | 9 | | |
| IPv6 Gateway | | | | | |
| IPv6 DNS Server | | | | | |
| | | | | | |
| | | | | IFOLIA | |
| | | uitor | | newan | |
| | | | | | ~ |
| < | | | | | > |

Ilustración 9: Configuración IP WS1

| RERVIDOR | | | | _ | | × |
|------------------|--------|---------------|------------|------------------|---------|-----|
| Physical | Config | Services | Desktop | Custom Inte | rface | |
| GLOBAL | ^ | | FastEth | ernet0 | | |
| Settings | P | ort Status | | | ☑ (| Dn |
| Algorithm Settin | g: E | Bandwidth | 100 | Mbps 🔿 10 Mbp | os 🗹 Au | ito |
| EastEthernet | | uplex 🛛 | Half Dup | lex 🖲 Full Duple | ex 🗹 Au | ito |
| Tastemente | - N | IAC Address | | 0003.E4D1.77A | ٨C | |
| | | IP Configurat | ion | | | |
| | | ○ DHCP | | | | |
| | | Static | | | | |
| | | IP Address | | 192.168.1.2 | | |
| | | Subnet Mask | | 255.255.255.22 | 24 | |
| | | IPv6 Configu | ration | | | _ |
| | | Орнср | | | | |
| | | O Auto Confi | a | | | |
| | | Static | 9 | | | |
| | | IPv6 Address | | | / | |
| | | Link Local Ad | dress:80:: | 203:E4FF:FED | 1:77AC | 1 |
| | | | | | | |
| | \sim | | | | | |

Ilustración 10: Configuración IP SERVIDOR

Se configura el Router BOGOTA

Router>enable

Router#config terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname BOGOTA

BOGOTA(config)#interface fastethernet 0/0

BOGOTA(config-if)#ip address 192.168.1.1 255.255.255.224

BOGOTA(config-if)#no shutdown

BOGOTA(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

BOGOTA(config-if)#exit

BOGOTA(config)#interface serial 0/0

BOGOTA(config-if)#ip address 192.168.1.98 255.255.255.224

BOGOTA(config-if)#no shutdown

BOGOTA(config-if)#exit

BOGOTA(config)#interface serial0/1

BOGOTA(config-if)#ip address 192.168.1.130 255.255.255.224

BOGOTA(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1, changed state to down

BOGOTA(config-if)#exit

BOGOTA(config)#end

BOGOTA#

%SYS-5-CONFIG_I: Configured from console by console

BOGOTA#

Se configura el Router MEDELLIN

Router>enable

Router#config terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname MEDELLIN

MEDELLIN(config)#interface fastethernet 0/0

MEDELLIN(config-if)#ip address 192.168.1.33 255.255.255.224

MEDELLIN(config-if)#no shutdown

MEDELLIN(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

MEDELLIN(config-if)#exit

MEDELLIN(config)#interface s0/0

MEDELLIN(config-if)#ip address 192.168.1.99 255.255.255.224

MEDELLIN(config-if)#no shutdown

MEDELLIN(config-if)#

%LINK-5-CHANGED: Interface Serial0/0, changed state to up

MEDELLIN(config-if)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to up

MEDELLIN(config-if)#exit

MEDELLIN(config)#end

MEDELLIN#

%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN#

Se Configura el Router CALI

Router>enable

Router#config terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname CALI

CALI(config)#interface fastethernet0/0

CALI(config-if)#ip address 192.168.1.65 255.255.255.224

CALI(config-if)#no shutdown

CALI(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

CALI(config-if)#exit

CALI(config)#interface s0/0

CALI(config-if)#ip address 192.168.1.131 255.255.255.224

CALI(config-if)#no shutdown

CALI(config-if)#

%LINK-5-CHANGED: Interface Serial0/0, changed state to up

CALI(config-if)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to up

CALI(config-if)#exit

CALI(config)#end

CALI#

%SYS-5-CONFIG_I: Configured from console by console

CALI#



Ilustración 11: Estado de Red con la Configuración de Routers

2.4. Parte 2: Configuración Básica.

a. Completar la siguiente tabla con la configuración básica de los routers, teniendo en cuenta las subredes diseñadas.

| | R1 | R2 | R3 |
|--------------------------------|--------------|---------------|---------------|
| Nombre de Host | MEDELLIN | BOGOTA | CALI |
| Dirección de lp en interfaz | 192.168.1.99 | 192.168.1.98 | 192.168.1.131 |
| Serial 0/0 | | | |
| Dirección de lp en interfaz | | 192.168.1.130 | |
| Serial 0/1 | | | |
| Dirección de lp en interfaz FA | 192.168.1.33 | 192.168.1.1 | 192.168.1.65 |
| 0/0 | | | |
| Protocolo de enrutamiento | Eigrp | Eigrp | Eigrp |
| Sistema Autónomo | 200 | 200 | 200 |
| Afirmaciones de red | 192.168.1.0 | 192.168.1.0 | 192.168.1.0 |

Ilustración 12: Configuración Básica Routers

b. Después de cargada la configuración en los dispositivos, verificar la tabla de enrutamiento en cada uno de los routers para comprobar las redes y sus rutas.

Se muestra la Tabla de enrutamiento Router BOGOTA con el comando show ip route.

BOGOTA>enable show ip route

| 💐 BOGOTA | _ | | \times |
|---|---|---------------------------------------|----------|
| Physical Config CLI | | | |
| IOS Command Line Interfa | ce | | |
| <pre>BOGOTA>enable BOGOTA#show ip route Codes: C - connected, S - static, I - IGRP, R - RIP, M D - EIGRP, EX - EIGRP external, O - OSPF, IA - O N1 - OSPF NSSA external type 1, N2 - OSPF NSSA e E1 - OSPF external type 1, E2 - OSPF external ty i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level- area * - candidate default, U - per-user static route P - periodic downloaded static route Gateway of last resort is not set 192.168.1.0/27 is subnetted, 3 subnets C 192.168.1.0 is directly connected, FastEthernet C 192.168.1.128 is directly connected, Serial0/0 C 192.168.1.128 is directly connected, Serial0/1 BOGOTA# BOGOTA#</pre> | - mobile, B DSPF inter a external typ ype 2, E - E -2, ia - IS- 2, o - ODR | - BGP rea e 2 GP IS inter | |
| | Сору | Paste | |
| | | | |

Ilustración 13: Tabla de enrutamiento Router BOGOTA

Se muestra la Tabla de enrutamiento Router MEDELLIN con el comando show ip route.

MEDELLIN>enable

MEDELLIN#show ip route

| REDELLIN | | | | _ | | × |
|--|--|---|--|---|--|---|
| Physical Conf | g CLI | | | | | |
| | IOS Co | ommand Line | e Interface | е | | |
| MEDELLIN>enable MEDELLIN#show ip Codes: C - connec D - EIGRP, N1 - OSPF E1 - OSPF i - IS-IS, inter area * - candid P - period Gateway of last r 192.168.1.0/ C 192.168.1 C 192.168.1 MEDELLIN# | oute ed, S - st SSA extern xternal ty L1 - IS-IS te default c download sort is no 7 is subne 32 is dire 96 is dire | tatic, I - IGRP, P external, O - 9 hal type 1, N2 - ype 1, E2 - OSPF S level-1, L2 - t, U - per-user ded static route ot set etted, 2 subnets ectly connected, ectly connected, | R - RIP, M OSPF, IA - O OSPF NSSA e external ty IS-IS level- static route FastEtherne Serial0/0 | - mobile, SPF inter xternal t pe 2, E - 2, ia - 1 ;, o - ODF t0/0 Copy | , B - BG r area type 2 - EGP IS-IS R Paste | P |

Ilustración 14: Tabla de enrutamiento Router MEDELLIN

Se muestra la Tabla de enrutamiento Router CALI con el comando show ip route.

CALI>enable

CALI#show ip route

| 💐 CALI | | | | | - | _ | | \times |
|---|--|--|---|--|--|---|---------------------------------------|----------|
| Physical | Config | CLI | | | | | | |
| | IC | DS Co | mmand L | ine Interf | face | | | |
| CALI>enabl CALI#show Codes: C - D - N1 El i - inter area * - P - Gateway of | e ip route connected, EIGRP, EX - OSPF NSSA - OSPF exte IS-IS, L1 candidate periodic d last resor | S - sta - EIGRP . externa rnal typ - IS-IS default, ownloade t is not | tic, I - IC external, C I type 1, N De 1, E2 - C level-1, L2 U - per-us cd static ro set | GRP, R - RIP,) - OSPF, IA 12 - OSPF NSS OSPF external 2 - IS-IS lev per static ro ute | M - mok - OSPF i A extern . type 2, rel-2, ia oute, o - | bile, 1 inter a nal typ , E - 1 a - IS - ODR | B - BGP area pe 2 EGP -IS | ~ |
| 192.1 C 19 C 19 CALI# | 68.1.0/27 i 2.168.1.64 2.168.1.128 | s subnet is direc is dire | ted, 2 subr tly connect ctly connec | ets ed, FastEthe ted, Serial0 | rnet0/0 | | | |
| | | | | | Сору | у | Paste |) |

Ilustración 15: Tabla de enrutamiento Router CALI

c. Verificar el balanceo de carga que presentan los routers.

Balanceo de carga en el Router BOGOTA antes de la configuración

BOGOTA>enable

BOGOTA#show ip eigrp topology

| 💐 BOGOTA | | | | — | | × |
|-------------------------------------|-------------------|----------|------|-----------|-----|----------|
| Physical | Config | CLI | | | | |
| | IOS Co | mmand | Line | Interface | e | |
| Press RETU | RN to get s | tarted. | | | | ^ |
| BOGOTA>ena BOGOTA#sho BOGOTA# | ble w ip eigrp | topology | | Сору | Pas | v ste |

Ilustración 16: Balanceo de carga en el Router BOGOTA antes de la configuración

Balanceo de carga en el Router BOGOTA después de la configuración

BOGOTA>enable

Password:

BOGOTA#show ip eigrp topology

| 💐 BOGOTA | | | | _ | | × |
|--|---|---|---|--|----------|---|
| Physical | Config | CLI | | | | |
| | IOS | Com | mand Line In | terface | | |
| BOGOTA>ena Password: BOGOTA#sho IP-EIGRP T Codes: P - r - | ble w ip eigrp opology Tab Passive, A Reply stat | topolog le for - Acti us | JY AS 200 Lve, U - Update, C |) - Query, R | - Reply, | ^ |
| P 192.168. V P 192.168. V P 192.168. V P 192.168. | <pre>1.0/27, 1 s ia Connecte 1.32/27, 1 ia 192.168. 1.64/27, 1 ia 192.168. 1.96/27, 1</pre> | uccesso d, Fast success 1.99 (2 success 1.131 (success | ors, FD is 28160 Ethernet0/0 sors, FD is 217241 2172416/28160), Se sors, FD is 217241 (2172416/28160), S sors, FD is 216985 | .6 rial0/0 .6 Gerial0/1 56 | | |
| v P 192.168. v BOGOTA# | ia Connecte 1.128/27, 1 ia Connecte | d, Seri succes d, Seri | Lal0/0 ssors, FD is 21698 Lal0/1 | 356 | 2 | ~ |
| | | | | Сору | Past | e |

Ilustración 17: Balanceo de carga en el Router BOGOTA después de la configuración

Balanceo de carga en el Router MEDELLIN antes de la configuración

MEDELLIN>enable

MEDELLIN#show ip eigrp topology

| 💐 MEDELLIN | N | | | _ | | × |
|---------------------------------------|----------------------|-------------|--------|----------|-----|--------|
| Physical | Config | CLI | | | | |
| | IOS Co | mmand I | Line I | nterface | | |
| Press RETU | 'RN to get : | started. | | | | ^ |
| MEDELLIN>e MEDELLIN#s MEDELLIN# | nable how ip eig: | rp topology | | Сору | Pas | ↓ × |

Ilustración 18: Balanceo de carga en el Router MEDELLIN antes de la configuración

Balanceo de carga en el Router MEDELLIN después de la configuración

MEDELLIN>enable

Password:

MEDELLIN#show ip eigrp topology

CLI

REDELLIN

Physical Config



Х

Copy

Paste

Ilustración 19: Balanceo de carga en el Router MEDELLIN después de la configuración

Balanceo de carga en el Router CALI antes de la configuración

CALI>en

CALI#show ip eigrp topology

| Real Cali | _ | | \times |
|---|---------|-----|----------|
| Physical Config CLI | | | |
| IOS Command Line In | terface | 9 | |
| Press RETURN to get started. | | | < |
| CALI>enable CALI#show ip eigrp topology CALI# | Сору | Pas | v te |

Ilustración 20: Balanceo de carga en el Router CALI antes de la configuración

Balanceo de carga en el Router CALI después de la configuración

CALI>enable

Password: CALI#show ip eigrp topology

| 💐 CALI | | | | _ | | × |
|---|--|--|--|------|-----|----|
| Physical | Config | CLI | | | | |
| | | IOS | Command Line Interface | | | |
| CALI>enabl Password: CALI\$show IP-EIGRP T Codes: P - r - P 192.168. v P 192.168. v P 192.168. v P 192.168. v P 192.168. v CALI\$ | e ip eigrp to opology Tab Passive, A Reply stat 1.0/27, 1 s ia 192.168. 1.32/27, 1 ia 192.168. 1.64/27, 1 ia Connecte 1.96/27, 1 ia 192.168. 1.128/27, 1 ia Connecte | ppology le for A - Activ us successon 1.130 (2 successon d, FastE successon 1.130 (2 successon d, FastE successon 1.130 (2 successon d, FastE successon 1.130 (2 successon d, FastE successon 1.130 (2 successon d, FastE successon d, FastE successon d, FastE successon d, FastE successon d, FastE successon d, FastE successon d, FastE successon d, FastE successon d, FastE d, | S 200 e, U - Update, Q - Query, R - Reply, s, FD is 2172416 172416/28160), Serial0/0 rs, FD is 2684416 684416/2172416), Serial0/0 rs, FD is 28180 thernet0/0 rs, FD is 2681856 681856/2169856), Serial0/0 ors, FD is 2169856 10/0 | | | ~ |
| | | | C | Сору | Pas | te |

Ilustración 21: Balanceo de carga en el Router CALI después de la configuración

d. Realizar un diagnóstico de vecinos uando el comando cdp.

Diagnóstico de vecinos en el Router BOGOTA

BOGOTA>enable

BOGOTA#show cdp neighbors

| 💐 Bogota | | | | | | — | | × |
|------------|-------------|-----------|-----------|-------------|------------|-------------|------|--------|
| Physical | Config | CLI | | | | | | |
| | | IOS | Commai | nd Line Int | terface | | | |
| | | | | | | | | ^ |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| BOGOTA>ena | ble | | | | | | | |
| BOGOTA#sho | w cdp neigh | nbors | | | | | | |
| Capability | Codes: R - | Router, | T - Trans | Bridge, B - | Source Rot | ute Bridge | | |
| | S - | - Switch, | H - Host, | I - IGMP, r | - Repeate: | r, P - Phon | e | |
| Device ID | Local In | trfce | Holdtme | Capability | Platform | Port ID | | |
| Switch | Fas 0/0 | | 145 | S | 2960 | Fas 0/1 | | |
| MEDELLIN | Ser 0/0 | | 152 | R | C2600 | Ser 0/0 | | |
| CALI | Ser 0/1 | | 177 | R | C2600 | Ser 0/0 | | |
| BOGOTA# | | | | | | | | \sim |
| | | | | | | Сору | Past | e |
| | | | | | | | | |

Ilustración 22: Diagnóstico de vecinos en el Router BOGOTA

Diagnóstico de vecinos en el Router MEDELLIN

MEDELLIN>enable

MEDELLIN#show cdp neighbors

| REDELLIN | I | | | | | _ | | × |
|-------------|-------------|-----------|-------------|-------------|-----------|------------|-------|--------------|
| Physical | Config | CLI | | | | | | |
| | | IOS C | Command | d Line Inte | erface | | | |
| | | | | | | | | \sim |
| _ | | | | | | | | |
| Press RETU | RN to get s | tarted. | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| MEDELLIN>e | nable | | | | | | | |
| MEDELLIN#s | how cdp nei | .ghbors | | | | | | |
| Capability | Codes: R - | Router | , T - Trans | Bridge, B - | Source Ro | ute Bri | idge | |
| Derri de TD | S - | · Switch, | , н - Host, | I - IGMP, r | - Repeate | r, P - | Phone | |
| Switch | Eac 0/0 | urice | 146 | capability | 2960 | For | - 0/1 | |
| BOGOTA | fas 0/0 | | 146 | | 2360 | rd: Sou | s 0/1 | |
| MEDELLIN# | SEL 0/0 | | 110 | R | 02000 | 561 | ,. | \checkmark |
| | | | | | | | Dag | ta |
| | | | | | C | ору | Pas | te |
| | | | | | | | | |

Ilustración 23: Diagnóstico de vecinos en el Router MEDELLIN

Diagnóstico de vecinos en el Router CALI

CALI>enable

CALI#show cdp neighbors

| 💐 CALI | | | | | | — | | \times |
|--|---|-----------------------------------|-----------------------------------|--|--------------------------------------|-------------------------------|----------------|----------|
| Physical | Config | CLI | | | | | | |
| | | IOS C | Comman | d Line Int | erface | | | |
| Press RETU | RN to get s | tarted. | | | | | | ^ |
| CALI>enabl CALI#show Capability Device ID | e cdp neighbo Codes: R - S - Local In Local In | rs Router, Switch, trfce | T - Trans H - Host, Holdtme | Bridge, B - I - IGMP, r Capability | Source Rou - Repeater Platform | te Bridg ;, P - Ph Port | e one ID | |
| Switch BOGOTA CALI# | Fas 0/0 Ser 0/0 | | 169 151 | S R | 2960 C2600 | Fas O Ser O | /1 /1 | × |
| | | | | | | Сору | Pas | te |

Ilustración 24: Diagnóstico de vecinos en el Router CALI

e. Realizar una prueba de conectividad en cada tramo de la ruta usando Ping.

Prueba desde WS 1 a SERVIDOR

```
PC>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time=14ms TTL=128
Reply from 192.168.1.2: bytes=32 time=0ms TTL=128
Reply from 192.168.1.2: bytes=32 time=0ms TTL=128
Reply from 192.168.1.2: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 14ms, Average = 3ms
```

Ilustración 25: Prueba desde WS 1 a SERVIDOR

Prueba desde WS 1 a PC1 Y PC2

```
PC>ping 192.168.1.66
Pinging 192.168.1.66 with 32 bytes of data:
Reply from 192.168.1.1: Destination host unreachable.
Ping statistics for 192.168.1.66:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 192.168.1.67
Pinging 192.168.1.67 with 32 bytes of data:
Reply from 192.168.1.1: Destination host unreachable.
Ping statistics for 192.168.1.67:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Ilustración 26: Prueba desde WS 1 a PC1 Y PC2

Prueba desde WS 1 a PC3 y PC4

PC>ping 192.168.1.34 Pinging 192.168.1.34 with 32 bytes of data: Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. Request timed out. Ping statistics for 192.168.1.34: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss), PC>ping 192.168.1.35 Pinging 192.168.1.35 with 32 bytes of data: Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. Request timed out. Ping statistics for 192.168.1.35: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

Ilustración 27: Prueba desde WS 1 a PC3 y PC4

Prueba desde SERVIDOR a WS 1

| Pinging 192.168.1.3 with 32 bytes of data: |
|--|
| Reply from 192.168.1.3: bytes=32 time=0ms TTL=128 |
| Ping statistics for 192.168.1.3: |
| Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), |
| Approximate round trip times in milli-seconds: |
| Minimum = Oms, Maximum = Oms, Average = Oms |

Ilustración 28: Prueba desde SERVIDOR a WS 1

Prueba desde SERVIDOR a PC1 y PC2

```
SERVER>ping 192.168.1.66
Pinging 192.168.1.66 with 32 bytes of data:
Reply from 192.168.1.1: Destination host unreachable.
Ping statistics for 192.168.1.66:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
SERVER>ping 192.168.1.67
Pinging 192.168.1.67 with 32 bytes of data:
Reply from 192.168.1.1: Destination host unreachable.
Ping statistics for 192.168.1.67:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Ilustración 29: Prueba desde SERVIDOR a PC1 y PC2

Prueba desde SERVIDOR a PC3 y PC4

| SERVER>ping 192.168.1.34 |
|---|
| Pinging 192.168.1.34 with 32 bytes of data: |
| Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. Request timed out. |
| <pre>Ping statistics for 192.168.1.34: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),</pre> |
| SERVER>ping 192.168.1.35 |
| Pinging 192.168.1.35 with 32 bytes of data: |
| Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. |
| Reply from 192.168.1.1: Destination host unreachable. |
| <pre>Ping statistics for 192.168.1.35: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),</pre> |

Ilustración 30: Prueba desde SERVIDOR a PC3 y PC4

Prueba desde PC1 a PC2

PC>ping 192.168.1.67 Pinging 192.168.1.67 with 32 bytes of data: Reply from 192.168.1.67: bytes=32 time=1ms TTL=128 Reply from 192.168.1.67: bytes=32 time=0ms TTL=128 Reply from 192.168.1.67: bytes=32 time=0ms TTL=128 Reply from 192.168.1.67: bytes=32 time=0ms TTL=128 Ping statistics for 192.168.1.67: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds: Minimum = 0ms, Maximum = 1ms, Average = 0ms

Ilustración 31: Prueba desde PC1 a PC2

Prueba desde PC1 a PC3 Y PC4

```
PC>ping 192.168.1.34
Pinging 192.168.1.34 with 32 bytes of data:
Reply from 192.168.1.65: Destination host unreachable.
Reply from 192.168.1.65: Destination host unreachable.
Reply from 192.168.1.65: Destination host unreachable.
Request timed out.
Ping statistics for 192.168.1.34:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 192.168.1.35
Pinging 192.168.1.35 with 32 bytes of data:
Reply from 192.168.1.65: Destination host unreachable.
Ping statistics for 192.168.1.35:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>
```

Ilustración 32: Prueba desde PC1 a PC3 Y PC4

Prueba desde PC1 a WS 1 y SERVIDOR

```
PC>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.65: Destination host unreachable.
Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 192.168.1.3
Pinging 192.168.1.3 with 32 bytes of data:
Reply from 192.168.1.65: Destination host unreachable.
Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Ilustración 33: Prueba desde PC1 a WS 1 y SERVIDOR

Prueba desde PC2 a PC1

PC>ping 192.168.1.66 Pinging 192.168.1.66 with 32 bytes of data: Reply from 192.168.1.66: bytes=32 time=0ms TTL=128 Ping statistics for 192.168.1.66: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds: Minimum = 0ms, Maximum = 0ms, Average = 0ms

Ilustración 34: Prueba desde PC2 a PC1
Prueba desde PC2 a PC3 y PC4

```
PC>ping 192.168.1.34
Pinging 192.168.1.34 with 32 bytes of data:
Reply from 192.168.1.65: Destination host unreachable.
Ping statistics for 192.168.1.34:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 192.168.1.35
Pinging 192.168.1.35 with 32 bytes of data:
Reply from 192.168.1.65: Destination host unreachable.
Ping statistics for 192.168.1.35:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>
```

Ilustración 35: Prueba desde PC2 a PC3 y PC4

Prueba desde PC2 a WS 1 y SERVIDOR

| PC>ping 192.168.1.2 |
|--|
| Pinging 192.168.1.2 with 32 bytes of data: |
| Reply from 192.168.1.65: Destination host unreachable. Reply from 192.168.1.65: Destination host unreachable. Reply from 192.168.1.65: Destination host unreachable. Reply from 192.168.1.65: Destination host unreachable. |
| <pre>Ping statistics for 192.168.1.2: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),</pre> |
| PC>ping 192.168.1.3 |
| Pinging 192.168.1.3 with 32 bytes of data: |
| Reply from 192.168.1.65: Destination host unreachable. Reply from 192.168.1.65: Destination host unreachable. Reply from 192.168.1.65: Destination host unreachable. Reply from 192.168.1.65: Destination host unreachable. |
| <pre>Ping statistics for 192.168.1.3: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),</pre> |

Ilustración 36: Prueba desde PC2 a WS 1 y SERVIDOR

Prueba desde PC3 a PC4

```
PC>ping 192.168.1.35
Pinging 192.168.1.35 with 32 bytes of data:
Reply from 192.168.1.35: bytes=32 time=11ms TTL=128
Reply from 192.168.1.35: bytes=32 time=1ms TTL=128
Reply from 192.168.1.35: bytes=32 time=4ms TTL=128
Reply from 192.168.1.35: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.35:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 11ms, Average = 4ms
```

Ilustración 37: Prueba desde PC3 a PC4

Prueba desde PC3 a PC1 y PC2

```
PC>ping 192.168.1.66
Pinging 192.168.1.66 with 32 bytes of data:
Reply from 192.168.1.33: Destination host unreachable.
Ping statistics for 192.168.1.66:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 192.168.1.67
Pinging 192.168.1.67 with 32 bytes of data:
Reply from 192.168.1.33: Destination host unreachable.
Ping statistics for 192.168.1.67:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Ilustración 38: Prueba desde PC3 a PC4

Prueba desde PC3 a SW 1 y SERVIDOR

PC>ping 192.168.1.2 Pinging 192.168.1.2 with 32 bytes of data: Reply from 192.168.1.33: Destination host unreachable. Reply from 192.168.1.33: Destination host unreachable. Reply from 192.168.1.33: Destination host unreachable. Request timed out. Ping statistics for 192.168.1.2: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss), PC>ping 192.168.1.3 Pinging 192.168.1.3 with 32 bytes of data: Reply from 192.168.1.33: Destination host unreachable. Reply from 192.168.1.33: Destination host unreachable. Reply from 192.168.1.33: Destination host unreachable. Request timed out. Ping statistics for 192.168.1.3: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

Ilustración 39: Prueba desde PC3 a SW 1 y SERVIDOR

Prueba desde PC4 a PC3

| PC>ping 192.168.1.34 |
|--|
| Pinging 192.168.1.34 with 32 bytes of data: |
| Reply from 192.168.1.34: bytes=32 time=1ms TTL=128 |
| Reply from 192.168.1.34: bytes=32 time=0ms TTL=128 |
| Reply from 192.168.1.34: bytes=32 time=0ms TTL=128 |
| Reply from 192.168.1.34: bytes=32 time=0ms TTL=128 |
| Ping statistics for 192.168.1.34: |
| Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), |
| Approximate round trip times in milli-seconds: |
| Minimum = Oms, Maximum = 1ms, Average = Oms |

Ilustración 40: Prueba desde PC4 a PC3

Prueba desde PC4 a PC1 y PC2

```
PC>ping 192.168.166
Ping request could not find host 192.168.166. Please check the name and
try again.
PC>ping 192.168.1.66
Pinging 192.168.1.66 with 32 bytes of data:
Reply from 192.168.1.33: Destination host unreachable.
Ping statistics for 192.168.1.66:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 192.168.1.67
Pinging 192.168.1.67 with 32 bytes of data:
Reply from 192.168.1.33: Destination host unreachable.
Ping statistics for 192.168.1.67:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Ilustración 41: Prueba desde PC4 a PC1 y PC2

Prueba desde PC4 a SW 1 y SERVIDOR

| Ping statistics for 192.168.1.66: |
|---|
| Packets: Sent = 4, Received = 0, Lost = 4 (100% loss), |
| PC>ping 192.168.1.67 |
| Pinging 192.168.1.67 with 32 bytes of data: |
| Reply from 192.168.1.33: Destination host unreachable. |
| <pre>Ping statistics for 192.168.1.67: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),</pre> |
| PC>ping 192.168.1.2 |
| Pinging 192.168.1.2 with 32 bytes of data: |
| Reply from 192.168.1.33: Destination host unreachable. |
| Ping statistics for 192.168.1.2: |
| Packets: Sent = 4. Received = 0. Lost = 4 (100% loss). |

Ilustración 42: Prueba desde PC4 a SW 1 y SERVIDOR

2.5. Parte 3: Configuración de Enrutamiento.

a. Asignar el protocolo de enrutamiento EIGRP a los routers considerando el direccionamiento diseñado.

Enrutamiento EIGRP al Router BOGOTA

BOGOTA>enable BOGOTA#config terminal Enter configuration commands, one per line. End with CNTL/Z. BOGOTA(config)#router eigrp 200 BOGOTA(config-router)#no auto-summary BOGOTA(config-router)#network 192.168.1.96 BOGOTA(config-router)#network 192.168.1.0 BOGOTA(config-router)#network 192.168.1.128 BOGOTA(config-router)#network 192.168.1.128 BOGOTA(config-router)#end BOGOTA#

Enrutamiento EIGRP al Router MEDELLIN

MEDELLIN> enable MEDELLIN#config terminal Enter configuration commands, one per line. End with CNTL/Z. MEDELLIN(config)#router eigrp 200 MEDELLIN(config-router)#no auto-summary MEDELLIN(config-router)#network 192.168.1.32 MEDELLIN(config-router)# %DUAL-5-NBRCHANGE: IP-EIGRP 200: Neighbor 192.168.1.98 (Serial0/0/0) is up: new adjacency MEDELLIN(config-router)#network 192.168.1.32 MEDELLIN(config-router)#network 192.168.1.96 MEDELLIN(config-router)#end MEDELLIN# %SYS-5-CONFIG_I: Configured from console by console

Enrutamiento EIGRP al Router CALI

CALI>enable CALI#config terminal Enter configuration commands, one per line. End with CNTL/Z. CALI(config)#router eigrp 200 CALI(config-router)#no auto-summary CALI(config-router)#network 192.168.1.128 CALI(config-router)# %DUAL-5-NBRCHANGE: IP-EIGRP 200: Neighbor 192.168.1.130 (Serial0/0) is up: new adjacency CALI(config-router)#network 192.168.1.128 CALI(config-router)#network 192.168.1.128 CALI(config-router)#network 192.168.1.64 CALI(config-router)#network 192.168.1.64 CALI(config-router)#end

%SYS-5-CONFIG_I: Configured from console by console

b. Verificar si existe vecindad con los routers configurados con EIGRP.

Vecindad con el Router BOGOTA

BOGOTA>enable

BOGOTA#show ip eigrp neighbors

| R ≷ | BOGOTA | | | | | | | | _ | | | × |
|-----|-----------|---------|--------------------------|--------------|--------------|----------|------------|-----|-----|----------|------------|------|
| Phy | ysical | Config | CLI | | | | | | | | | |
| | | | IOS Co | mma | and | Line Int | erfa | ace | | | | |
| | | | | | | | | | | | | ^ |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| BOG | GOTA>enab | le | | | | | | | | | | |
| BOG | GOTA#show | ighbors | p neighbo: for proces | :S 20 200 | | | | | | | | |
| Н | Address | Ignoois | Interface | 200 | Hold (sec | l Uptime | SRT (ms | T R | то | Q Cnt | Seq Num | |
| 0 | 192.168 | .1.99 | Se0/0 | | 13 | 00:06:40 | 40 | 1 | 000 | 0 | 7 | |
| 1 | 192.168 | .1.131 | Se0/1 | | 11 | 00:02:32 | 40 | 1 | 000 | 0 | 7 | 1.00 |
| BOG | GOTA# | | | | | | | | | | | ~ |
| | | | | | | | | Co | ру | | Pas | te |
| | | | | | | | | | | | | |

Ilustración 43: Vecindad con el Router BOGOTA

Vecindad con el Router MEDELLIN

MEDELLIN>enable

MEDELLIN#show ip eigrp neighbors

| REDELLIN | | | | | | | _ | | | × |
|-------------|------------|------------------------|--------|-------|----------|-------|------|-----|------|--------|
| Physical | Config | CLI | | | | | | | | |
| | I | OS Co | mma | and I | _ine Int | erfac | e | | | |
| | | | | | | | | | | ^ |
| Press RETUR | N to get : | started. | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| MEDELLIN>en | able | | | | | | | | | |
| MEDELLIN#sh | ow ip eig | rp neighb | ors | | | | | | | |
| H Address | ignbors I | or proces Interface | is 200 | Hold | Uptime | SRTT | RTO | Q | Seq | |
| | 1.00 | | | (sec) | | (ms) | | Cnt | Num | |
| 0 192.168 | .1.98 | 5e0/0 | | 12 | 00:29:11 | 40 | 1000 | 0 | 5 | |
| MEDELLIN# | | | | | | | | | | \sim |
| | | | | | | | Сору | | Past | e |
| | | | | | | | | | | |

Ilustración 44: Vecindad con el Router MEDELLIN

Vecindad con el Router CALI

CALI>enable

CALI#show ip eigrp neighbors

| Realization of the second seco | _ | | × |
|--|----------------------|-----------------|---|
| Physical Config CLI | | | |
| IOS Command Line Interface | | | |
| Press RETURN to get started. | | | ~ |
| CALI>enable CALI\$show ip eigrp neighbors IP-EIGRP neighbors for process 200 H Address Interface Hold Uptime SRTT R (sec) (ms) 0 192.168.1.130 Se0/0 13 00:25:57 40 1 CALI\$ | TO Q Cnt 000 0 | Seq Num 6 | * |
| C | Сору | Paste | |

Ilustración 45: Vecindad con el Router CALI

c. Realizar la comprobación de las tablas de enrutamiento en cada uno de los routers para verificar cada una de las rutas establecidas.

Tabla de enrutamiento Router BOGOTA

BOGOTA>enable BOGOTA#show ip route 💐 BOGOTA Х Config CLI Physical IOS Command Line Interface ~ BOGOTA>enable BOGOTA#show ip route Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area * - candidate default, U - per-user static route, o - ODR P - periodic downloaded static route Gateway of last resort is not set 192.168.1.0/27 is subnetted, 5 subnets С 192.168.1.0 is directly connected, FastEthernet0/0 D 192.168.1.32 [90/2172416] via 192.168.1.99, 00:41:46, Serial0/0 192.168.1.64 [90/2172416] via 192.168.1.131, 00:37:38, Serial0/1 D С 192.168.1.96 is directly connected, Serial0/0 С 192.168.1.128 is directly connected, Serial0/1 BOGOTA# Copy Paste

Ilustración 46: Tabla de enrutamiento Router BOGOTA

Tabla de enrutamiento Router CALI

CALI>en

CALI#show ip route

| 💐 CALI | | | | _ | | \times |
|---|---|---|---|---|-------|----------|
| Physical | Config | CLI | | | | |
| | | IOS | Command Line Interface | | | |
| CALI>en CALI#show Codes: C - D - N1 E1 i - * - P - Gateway of 192.1 D 19 D 19 C 19 | ip route connected, EIGRP, EX - OSPF NSSA - OSPF exte IS-IS, L1 candidate periodic d last resor 68.1.0/27 i 2.168.1.0 [2.168.1.32 2.168.1.64 | S - sta - EIGRP A external tyn - IS-IS default, downloade t is not s subnet [90/21724 [90/2684 is direct | <pre>tic, I - IGRP, R - RIP, M - mobile external, 0 - OSPF, IA - OSPF inte l type 1, N2 - OSPF NSSA external e 1, E2 - OSPF external type 2, E level-1, L2 - IS-IS level-2, ia - U - per-user static route, o - OI d static route set ted, 5 subnets 16] via 192.168.1.130, 00:38:43, S 416] via 192.168.1.130, 00:38:43, s</pre> | e, B - BGP er area type 2 - EGP IS-IS inter DR Serial0/0 Serial0/0 | area | ^ |
| D 19 C 19 | 2.168.1.96 2.168.1.128 | [90/268] 3 is dire | 856] via 192.168.1.130, 00:38:43, ctly connected, Serial0/0 | Serial0/0 | | |
| CALI# | | | | | | ~ |
| | | | | Сору | Paste | • |
| | | | | | | |

Ilustración 47: Tabla de enrutamiento Router CALI

Tabla de enrutamiento Router MEDELLIN

MEDELLIN>en

MEDELLIN#show ip route

| 💐 MEDELLII | N | | | | | | _ | | \times |
|--------------------------|--------------------------------|-----------|----------------------|------------------------|--------------------------|----------|---------|-------|----------|
| Physical | Config | CLI | | | | | | | |
| | | IOS | Comma | nd Line | Interfa | ace | | | |
| | | | | | | | | | ^ |
| | | | | | | | | | |
| | | | | | | | | | |
| MEDELLIN>e MEDELLIN#s | n show in rout | e | | | | | | | |
| Codes: C - | connected, | S - sta | atic, I - | IGRP, R | - RIP, M - | - mobile | , в – в | BGP | |
| D - | · EIGRP, EX | - EIGRP | external | , O - OSP | F, IA - 09 | SPF inte | r area | | |
| N1 F1 | - OSPF NSSA | A externa | al type 1 ne 1 F2 | , N2 - OS - OSPE ev | PF NSSA ex ternal tur | ternal | type 2 | | |
| i - | - IS-IS, L1 | - IS-IS | level-1, | L2 - IS- | IS level-2 | 2, ia - | IS-IS : | inter | |
| area | | | | | | | | | |
| * - | candidate | default, | U - per | -user sta | tic route, | , o - OD | R | | |
| P - | · periodic o | lownloade | ed static | route | | | | | |
| Gateway of | last resor | t is not | t set | | | | | | |
| 192.1 | 168.1.0/27 j | is subnet | tted, 5 s | ubnets | | | | | |
| D 19 | 2.168.1.0 | 90/21724 | 416] via | 192.168.1 | .98, 00:43 | 3:45, Se | rial0/ | 0 | |
| C 19 | 2.168.1.32 | is dired | ctly conn | ected, Fa | stEthernet | :0/0 | | | |
| D 19 | 2.168.1.64 | [90/2684 | 4416] via | 192.168. | 1.98, 00:3 | 39:38, S | erial0, | /0 | |
| C 19 | 2.168.1.96 | is direc | ctly conn | ected, Se | rial0/0 | | | | |
| D 19 | 2.168.1.128 | 8 [90/268 | 81856] vi | a 192.168 | .1.98, 00: | 43:45, | Serial(| 0/0 | |
| MEDELLIN# | | | | | | | | | \sim |
| | | | | | | Co | ору | Pas | ste |
| | | | | | | | | | |

Ilustración 48: Tabla de enrutamiento Router MEDELLIN

d. Realizar un diagnóstico para comprobar que cada uno de los puntos de la red se puedan ver y tengan conectividad entre sí. Realizar esta prueba desde un host de la red LAN del router CALI, primero a la red de MEDELLIN y luego al servidor.

Prueba desde PC1 hasta PC3 y desde PC1 hasta SERVIDOR

```
PC>ping 192.168.1.34
Pinging 192.168.1.34 with 32 bytes of data:
Reply from 192.168.1.34: bytes=32 time=3ms TTL=125
Reply from 192.168.1.34: bytes=32 time=3ms TTL=125
Reply from 192.168.1.34: bytes=32 time=38ms TTL=125
Reply from 192.168.1.34: bytes=32 time=11ms TTL=125
Ping statistics for 192.168.1.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
   Minimum = 3ms, Maximum = 38ms, Average = 13ms
PC>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time=3ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=12ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
   Minimum = 1ms, Maximum = 12ms, Average = 4ms
```

Ilustración 49: Prueba desde PC1 hasta PC3 y desde PC1 hasta SERVIDOR

2.6. Parte 4: Configuración de las listas de Control de Acceso.

En este momento cualquier usuario de la red tiene acceso a todos sus dispositivos y estaciones de trabajo. El jefe de redes le solicita implementar seguridad en la red. Para esta labor se decide configurar listas de control de acceso (ACL) a los routers.

Las condiciones para crear las ACL son las siguientes:

a. Cada Router debe estar habilitado para establecer conexiones Telnet con los demás Routers y tener acceso a cualquier dispositivo en la red.

Habilitar conexión Telnet al Router BOGOTA

BOGOTA>en BOGOTA#conf t Enter configuration commands, one per line. End with CNTL/Z. BOGOTA(config)#line vty 0 4 BOGOTA(config-line)#password cisco BOGOTA(config-line)#login BOGOTA(config-line)#exit BOGOTA(config)#enable secret cisco BOGOTA(config)#enable secret cisco

Habilitar conexión Telnet al Router MEDELLIN MEDELLIN>en MEDELLIN#conf t Enter configuration commands, one per line. End with CNTL/Z. MEDELLIN(config)#line vty 0 4 MEDELLIN(config-line)#password cisco MEDELLIN(config-line)#login MEDELLIN(config-line)#exit MEDELLIN(config)#enable secret cisco MEDELLIN(config)#exit MEDELLIN# %SYS-5-CONFIG_I: Configured from console by console

Habilitar conexión Telnet al Router CALI

CALI>en CALI#conf t Enter configuration commands, one per line. End with CNTL/Z. CALI(config)#line vty 0 4 CALI(config-line)#password cisco CALI(config-line)#login CALI(config-line)#exit CALI(config)#enable secret cisco CALI(config)#enable secret cisco CALI(config)#exit CALI# Telnet desde Router BOGOTA a Router MEDELLIN

BOGOTA>en

Password:

BOGOTA#telnet 192.168.1.99

| Rogota | _ | | × |
|----------------------------|--------------|------|--------|
| Physical Config CLI | | | |
| IOS Command Lin | ne Interface | • | |
| | | | ^ |
| | | | |
| | | | |
| | | | |
| BOGOTA>en | | | |
| BOGOTA#telnet 192.168.1.99 | | | |
| Trying 192.168.1.99 Open | | | |
| User Access Verification | | | |
| Password: | | | |
| MEDELLIN> | | | \sim |
| | Сору | Past | te |
| | | | |

Ilustración 50: Telnet desde Router BOGOTA a Router MEDELLIN

Telnet desde Router CALI a Router BOGOTA

CALI>en

Password:

CALI#telnet 192.168.1.130

| ≷ CALI | | | | _ | | × |
|---|--|-----------------------|------------|----------|------|--------|
| Physical | Config | CLI | | | | |
| | IOS C | Comma | and Line I | nterface | | |
| CALI>en Password: CALI#telne Trying 192 User Acces Password: | t 192.168.3 .168.1.130 s Verificat | 1.130 Open tion | | | | ^ |
| BOGOTA> | | | | | | \sim |
| | | | | Сору | Past | е |
| | | | | | | |

Ilustración 51: Telnet desde Router CALI a Router BOGOTA

Telnet desde Router MEDELLIN a Router CALI

MEDELLIN>en

Password:

MEDELLIN#telnet 192.168.1.131

| REDELLIN | _ | | × |
|--|-----------|-----|--------|
| Physical Config CLI | | | |
| IOS Command Line | Interface | | |
| | | | ^ |
| | | | |
| | | | |
| | | | |
| MEDELLIN>en | | | |
| Password: MEDELLIN#telnet 192.168.1.131 | | | |
| Trying 192.168.1.131 Open | | | |
| User Access Verification | | | |
| Password: | | | |
| CALI> | | | \sim |
| | Сору | Pas | te |
| | | | |

Ilustración 52: Telnet desde Router MEDELLIN a Router CALI

a. El equipo WS1 y el servidor se encuentran en la subred de administración. Solo el servidor de la subred de administración debe tener acceso a cualquier otro dispositivo en cualquier parte de la red.

Configuración Router BOGOTA

BOGOTA>enable

Password:

BOGOTA#config terminal

Enter configuration commands, one per line. End with CNTL/Z.

BOGOTA(config)#ip access-list extended ServerPT

BOGOTA(config-ext-nacl)#permit ip 192.168.1.2 0.0.0.0 0.0.0.0 255.255.255.255

BOGOTA(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.99 0.0.0.0

BOGOTA(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.1 0.0.0.0

BOGOTA(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.131 0.0.0.0

BOGOTA(config-ext-nacl)# exit

BOGOTA(config)#interface fa0/0

BOGOTA(config-if)#ip access-group ServerPT in

BOGOTA(config-if)#end

BOGOTA#

%SYS-5-CONFIG_I: Configured from console by console

Configuración Router MEDELLIN

MEDELLIN>enable Password: MEDELLIN#configure terminal Enter configuration commands, one per line. End with CNTL/Z. MEDELLIN(config)#ip access-list extended ServerPT MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.192.168.1.2 0.0.00 MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0255.255.255.255 192.168.1.33 0.0.0 MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0255.255.255.255 192.168.1.98 0.0.0 MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0255.255.255.255 192.168.1.131 0.0.0 MEDELLIN(config-ext-nacl)#exit MEDELLIN(config)#interface fa0/0 MEDELLIN(config-if)#ip access-group ServerPT in MEDELLIN(config-if)#end MEDELLIN# %SYS-5-CONFIG_I: Configured from console by console

Configuración Router CALI

CALI>enable

Password:

CALI#config terminal

Enter configuration commands, one per line. End with CNTL/Z.

CALI(config)#ip access-list extended ServerPT

CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.2 0.0.0.0 CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.99 0.0.0.0 CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.1 0.0.0.0 CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.65 0.0.0.0 CALI(config-ext-nacl)#exit CALI(config)#int fa0/0 CALI(config-if)#ip access-group ServerPT in CALI(config-if)#end

CALI#

%SYS-5-CONFIG_I: Configured from console by console

b. Las estaciones de trabajo en las LAN de MEDELLIN y CALI no deben tener acceso a ningún dispositivo fuera de su subred, excepto para interconectar con el servidor.

Configuración Router MEDELLIN

MEDELLIN>enable Password: MEDELLIN#config terminal Enter configuration commands, one per line. End with CNTL/Z. MEDELLIN(config)#ip access-list extended ServerPT MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0 255.255.255 192.168.1.2 0.0.0.0 MEDELLIN(config-ext-nacl)#exit MEDELLIN(config)#int f0/0 MEDELLIN(config.if)#ip access-group ServerPT in MEDELLIN(config-if)#end MEDELLIN# %SYS-5-CONFIG_I: Configured from console by console

Configuración Router CALI

CALI>enable Password: CALI#config t Enter configuration commands, one per line. End with CNTL/Z. CALI(config)#ip access-list extended ServerPT CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.192.168.1.2 0.0.0.0 CALI(config-ext-nacl)#exit CALI(config)#int f0/0 CALI(config-if)#ip access-group ServerPT in

CALI(config-if)#end

CALI#

%SYS-5-CONFIG_I: Configured from console by console

2.7. Parte 5: Comprobación de la red instalada.

a. Se debe probar que la configuración de las listas de acceso fue exitosa.

Listas de Acceso en Router BOGOTA

BOGOTA>enable Password:

BOGOTA#show access-list

| 💐 BOGOTA | | | | _ | | × |
|------------|-------------|------------|----------|-----------|------|--------|
| Physical | Config | CLI | | | | |
| | IOS Co | mmand | Line I | Interface | 9 | |
| | | | | | | ^ |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| BOGOTA>ena | ble | | | | | |
| Password: | | | | | | |
| BOGOTA#sho | w access-li | lst | | | | |
| Extended I | P access li | lst Server | 160 1 00 | | | |
| 20 per | mit ip any | host 192. | 168.1.1 | 2 | | |
| 30 per | mit ip any | host 192. | 168.1.13 | 31 | | |
| 40 per | mit ip host | : 192.168. | 1.3 any | | | |
| BOGOTA# | | | | | | \sim |
| | | | | Copy | Pag | eto |
| | | | | 00p) | 1 64 | 500 |

Ilustración 53: Listas de Acceso en Router BOGOTA

Listas de Acceso en Router MEDELLIN

MEDELLIN>enable

Password:

MEDELLIN#show Access-list

| REDELLIN | | | | | _ | | × |
|------------|------------|---------|-----------------|------|-------|------|--------|
| Physical | Config | CLI | | | | | |
| | IOS Co | mman | d Line | Inte | rface | 1 | |
| | | | | | | | ^ |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| MEDELLIN>e | nable | | | | | | |
| Password: | | | | | | | |
| MEDELLIN#s | how Access | -list | - | | | | |
| Extended 1 | P access I | host 10 | erPT 2 160 1 | 22 | | | |
| 20 per | mit ip any | host 19 | 2.168.1. | 98 | | | |
| 30 per | mit ip any | host 19 | 2.168.1. | 131 | | | |
| 40 per | mit ip any | host 19 | 2.168.1. | 3 | | | |
| MEDELLIN# | | | | | | | \sim |
| | | | | _ | | | |
| | | | | Co | ру | Past | e |
| | | | | | | | |

Ilustración 54: Listas de Acceso en Router MEDELLIN

Listas de Acceso en Router CALI

CALI>enable

Password:

CALI#show access-list

| 💐 CALI | | | | | — | | \times |
|---------------|-----------|---------|------------|------|-------|-------|----------|
| Physical C | Config | CLI | | | | | |
| IC | OS Con | nmar | nd Line | Inte | rface | | |
| | | | | | | | ^ |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| CALI>enable | | | | | | | |
| Password: | | | | | | | |
| CALI#show acc | ess-list | | | | | | |
| Extended IP a | ccess lis | st Serv | /erPT | | | | |
| 10 permit | ip any h | nost 19 | 92.168.1.9 | 99 | | | |
| 20 permit | ip any f | nost 19 | 92.168.1. | 1 | | | |
| 30 permit | ip any r | 103t 19 | 92.168.1.0 | | | | |
| CALI# | транун | 1050 15 | 2.100.1. | 2 | | | \sim |
| · · · · | | | | Co | ру | Paste |) |
| | | | | | | | |

Ilustración 55: Listas de Acceso en Router CALI

b. Comprobar y Completar la siguiente tabla de condiciones de prueba para confirmar el óptimo funcionamiento de la red e.

| | ORIGEN | DESTINO | RESULTADO |
|--------|-------------------------|-------------------------|-----------|
| TELNET | Router MEDELLIN | Router CALI | CORRECTO |
| | WS_1 | Router BOGOTA | CORRECTO |
| | Servidor | Router CALI | CORRECTO |
| | Servidor | Router MEDELLIN | CORRECTO |
| TELNET | LAN del Router MEDELLIN | Router CALI | FALLA |
| | LAN del Router CALI | Router CALI | CORRECTO |
| | LAN del Router MEDELLIN | Router MEDELLIN | CORRECTO |
| | LAN del Router CALI | Router MEDELLIN | FALLA |
| PING | LAN del Router CALI | WS_1 | FALLA |
| | LAN del Router MEDELLIN | WS_1 | FALLA |
| | LAN del Router MEDELLIN | LAN del Router CALI | FALLA |
| | LAN del Router CALI | Servidor | CORRECTO |
| PING | LAN del Router MEDELLIN | Servidor | CORRECTO |
| | Servidor | LAN del Router MEDELLIN | CORRECTO |
| | Servidor | LAN del Router CALI | CORRECTO |
| | Router CALI | LAN del Router MEDELLIN | CORRECTO |
| | Router MEDELLIN | LAN del Router CALI | CORRECTO |

Tabla 1: Tabla de condiciones de prueba



Ilustración 56: Comunicación Final Escenario 1

3. ESCENARIO 2

Una empresa tiene la conexión a internet en una red Ethernet, lo cual deben adaptarlo para facilitar que sus routers y las redes que incluyen puedan, por esa vía, conectarse a internet, pero empleando las direcciones de la red LAN original.



Ilustración 57: Topología Escenario 2

3.1. Desarrollo

Los siguientes son los requerimientos necesarios:

- 1. Todos los routers deberán tener los siguiente:
 - Configuración básica.
 - Autenticación local con AAA.
 - Cifrado de contraseñas.
 - Un máximo de internos para acceder al router.
 - Máximo tiempo de acceso al detectar ataques.
 - Establezca un servidor TFTP y almacene todos los archivos necesarios de los routers.

- 2. El DHCP deberá proporcionar solo direcciones a los hosts de Bucaramanga y Cundinamarca
- 3. El web server deberá tener NAT estático y el resto de los equipos de la topología emplearan NAT de sobrecarga (PAT).
- 4. El enrutamiento deberá tener autenticación.
- 5. Listas de control de acceso:
 - Los hosts de VLAN 20 en Cundinamarca no acceden a internet, solo a la red interna de Tunja.
 - Los hosts de VLAN 10 en Cundinamarca si acceden a internet y no a la red interna de Tunja.
 - Los hosts de VLAN 30 en Tunja solo acceden a servidores web y ftp de internet.
 - Los hosts de VLAN 20 en Tunja solo acceden a la VLAN 20 de Cundinamarca y VLAN 10 de Bucaramanga.
 - Los hosts de VLAN 30 de Bucaramanga acceden a internet y a cualquier equipo de VLAN 10.
 - Los hosts de VLAN 10 en Bucaramanga acceden a la red de Cundinamarca (VLAN 20) y Tunja (VLAN 20), no internet.
 - Los hosts de una VLAN no pueden acceder a los de otra VLAN en una ciudad.
 - Solo los hosts de las VLAN administrativas y de la VLAN de servidores tienen accedo a los routers e internet.
 - VLSM: utilizar la dirección 172.31.0.0 /18 para el direccionamiento.

3.2. Aspectos a tener en cuenta

- Habilitar VLAN en cada switch y permitir su enrutamiento.
- Enrutamiento OSPF con autenticación en cada router.
- Servicio DHCP en el router Tunja, mediante el helper address, para los routers Bucaramanga y Cundinamarca.
- Configuración de NAT estático y de sobrecarga.
- Establecer una lista de control de acceso de acuerdo con los criterios señalados.
- Habilitar las opciones en puerto consola y terminal virtual

3.3. Todos los routers deberan tener la siguiente cofiguración

Configuración Router BUCARAMANGA

Router>enable

Router#conf term

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname BUCARAMANGA

BUCARAMANGA(config)#no ip domain-lookup

BUCARAMANGA(config)#enable secret cisco

BUCARAMANGA(config)#banner motd #ACCESO RESTRINGIDO#

BUCARAMANGA(config)#line console 0

BUCARAMANGA(config-line)#password cisco

BUCARAMANGA(config-line)#login

BUCARAMANGA(config-line)#logging synchronous

BUCARAMANGA(config-line)#line vty 0 15

BUCARAMANGA(config-line)#password cisco

BUCARAMANGA(config-line)#login

BUCARAMANGA(config-line)#logging synchronous

BUCARAMANGA(config-line)#int f0/0.1

BUCARAMANGA(config-subif)#encapsulation dot1q 1

BUCARAMANGA(config-subif)#ip address 172.31.2.1 255.255.255.248

BUCARAMANGA(config-subif)#int f0/0.10

BUCARAMANGA(config-subif)#encapsulation dot1q 10

BUCARAMANGA(config-subif)#ip address 172.31.0.1 255.255.255.192

BUCARAMANGA(config-subif)#int f0/0.30

BUCARAMANGA(config-subif)#encapsulation dot1q 30

BUCARAMANGA(config-subif)#ip address 172.31.0.65 255.255.255.192

BUCARAMANGA(config-subif)#int f0/0

BUCARAMANGA(config-if)#no shutdown

BUCARAMANGA(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.10, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.30, changed state to up

BUCARAMANGA(config-if)#int s0/0/0

BUCARAMANGA(config-if)#ip address 172.31.2.34 255.255.255.252

BUCARAMANGA(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down

BUCARAMANGA(config-if)#router ospf 1

BUCARAMANGA(config-router)#network 172.31.0.0 0.0.0.63 area 0

BUCARAMANGA(config-router)#network 172.31.0.64 0.0.0.63 area 0

BUCARAMANGA(config-router)#network 172.31.2.0 0.0.0.7 area 0

BUCARAMANGA(config-router)#network 172.31.2.32 0.0.0.3 area 0

BUCARAMANGA(config-router)#end

BUCARAMANGA#

%SYS-5-CONFIG_I: Configured from console by console

BUCARAMANGA#

Configuración Router TUNJA

Router>enable

Router#conf term

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname TUNJA

TUNJA(config)#no ip domain-lookup

TUNJA(config)#enable secret cisco

TUNJA(config)#banner motd #ACCESO RESTRINGIDO#

TUNJA(config)#line console 0

TUNJA(config-line)#password cisco

TUNJA(config-line)#login

TUNJA(config-line)#logging synchronous

TUNJA(config-line)#line vty 0 15

TUNJA(config-line)#password cisco

TUNJA(config-line)#login

TUNJA(config-line)#logging synchronous

TUNJA(config-line)#int f0/0.1

TUNJA(config-subif)#encapsulation dot1q 1

TUNJA(config-subif)#ip address 172.3.2.9 255.255.255.248

TUNJA(config-subif)#int f0/0.20

TUNJA(config-subif)#encapsulation dot1q 20

TUNJA(config-subif)#ip address 172.31.0.129 255.255.255.192

TUNJA(config-subif)#int f0/0.30

TUNJA(config-subif)#encapsulation dot1q 30

TUNJA(config-subif)#ip address 172.31.0.193 255.255.255.192

TUNJA(config-subif)#int f0/0

TUNJA(config-if)#no shutdown

TUNJA(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.20, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.30, changed state to up

TUNJA(config-if)#int s0/0/0

TUNJA(config-if)#ip address 172.31.2.33 255.255.255.252

TUNJA(config-if)#no shutdown

TUNJA(config-if)#

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

TUNJA(config-if)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

TUNJA(config-if)#int s0/0/1

TUNJA(config-if)#ip address 172.31.2.37 255.255.255.252

TUNJA(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down

TUNJA(config-if)#int f0/1

TUNJA(config-if)#ip address 209.165.220.1 255.255.255.0

TUNJA(config-if)#no shutdown

TUNJA(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

TUNJA(config-if)#router ospf 1

TUNJA(config-router)#network 172.3.2.8 0.0.0.7 area 0

TUNJA(config-router)#network 172.31.0.128 0.0.0.63 area 0

TUNJA(config-router)#network 172.31.0.192 0.0.0.63 area 0

TUNJA(config-router)#network 172.31.2.32 0.0.0.3 area 0

TUNJA(config-router)#

01:53:30: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.34 on Serial0/0/0 from LOADING to FULL, Loading Done

TUNJA(config-router)#network 172.31.2.36 0.0.0.3 area 0

TUNJA(config-router)#end

TUNJA#

%SYS-5-CONFIG_I: Configured from console by console

TUNJA#

Configuración Router CUNDINAMARCA

Router>enable Router#conf term Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname CUNDINAMARCA CUNDINAMARCA(config)#no ip domain-lookup CUNDINAMARCA(config)#enable secret cisco CUNDINAMARCA(config)#banner motd #ACCESO RESTRINGIDO# CUNDINAMARCA(config)#line console 0 CUNDINAMARCA(config)#line console 0

CUNDINAMARCA(config-line)#login CUNDINAMARCA(config-line)#logging synchronous CUNDINAMARCA(config-line)#line vty 0 15 CUNDINAMARCA(config-line)#password cisco CUNDINAMARCA(config-line)#login CUNDINAMARCA(config-line)#logging synchronous CUNDINAMARCA(config-line)#int f0/0.1 CUNDINAMARCA(config-subif)#encapsulation dot1q 1 CUNDINAMARCA(config-subif)#ip address 172.31.2.9 255.255.255.248 CUNDINAMARCA(config-subif)#int f0/0.20 CUNDINAMARCA(config-subif)#encapsulation dot1g 20 CUNDINAMARCA(config-subif)#ip address 172.31.1.65 255.255.255.192 CUNDINAMARCA(config-subif)#int f0/0.30 CUNDINAMARCA(config-subif)#encapsulation dot1g 30 CUNDINAMARCA(config-subif)#ip address 172.31.1.1 255.255.255.192 CUNDINAMARCA(config-subif)#int f0/0.88 CUNDINAMARCA(config-subif)#encapsulation dot1g 88 CUNDINAMARCA(config-subif)#ip address 172.31.2.25 255.255.255.248 CUNDINAMARCA(config-subif)#int f0/0 CUNDINAMARCA(config-if)#no shutdown CUNDINAMARCA(config-if)# %LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up %LINK-5-CHANGED: Interface FastEthernet0/0.1, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.20, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.30, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.88, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.88, changed state to up

CUNDINAMARCA(config-if)#int s0/0/0

CUNDINAMARCA(config-if)#ip address 172.31.2.38 255.255.255.252

CUNDINAMARCA(config-if)#no shutdown

CUNDINAMARCA(config-if)#

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

CUNDINAMARCA(config-if)#router ospf 1

CUNDINAMARCA(config-router)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

CUNDINAMARCA(config-router)#network 172.31.1.0 0.0.0.63 area 0

CUNDINAMARCA(config-router)#network 172.31.1.64 0.0.0.63 area 0

CUNDINAMARCA(config-router)#network 172.31.2.8 0.0.0.7 area 0

CUNDINAMARCA(config-router)#network 172.31.2.24 0.0.0.7 area 0

CUNDINAMARCA(config-router)#network 172.31.2.36 0.0.0.3 area 0

CUNDINAMARCA(config-router)#

00:17:55: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.220.1 on Serial0/0/0 from LOADING to FULL, Loading Done

CUNDINAMARCA(config-router)#end

CUNDINAMARCA#

%SYS-5-CONFIG_I: Configured from console by console

CUNDINAMARCA#

Configuración Switch BUCARAMANGA

Switch>enable

Switch#conf term

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname BUCARAMANGA-SW

BUCARAMANGA-SW(config)#vlan 1

BUCARAMANGA-SW(config-vlan)#vlan 10

BUCARAMANGA-SW(config-vlan)#vlan 30

BUCARAMANGA-SW(config-vlan)#int f0/1

BUCARAMANGA-SW(config-if)#switchport mode access

BUCARAMANGA-SW(config-if)#switchport access vlan 10

BUCARAMANGA-SW(config-if)#int f0/2

BUCARAMANGA-SW(config-if)#switchport mode access

BUCARAMANGA-SW(config-if)#switchport access vlan 30

BUCARAMANGA-SW(config-if)#int f0/3

BUCARAMANGA-SW(config-if)#switchport mode trunk

BUCARAMANGA-SW(config-if)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

BUCARAMANGA-SW(config-if)#int vlan 1

BUCARAMANGA-SW(config-if)#ip address 172.31.2.3 255.255.255.248

BUCARAMANGA-SW(config-if)#no shutdown

BUCARAMANGA-SW(config-if)#

%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

BUCARAMANGA-SW(config-if)#ip default-gateway 172.31.2.1 BUCARAMANGA-SW(config)#exit BUCARAMANGA-SW# %SYS-5-CONFIG_I: Configured from console by console

Configuración Switch TUNJA

| Switch>enable |
|--|
| Switch#conf term |
| Enter configuration commands, one per line. End with CNTL/Z. |
| Switch(config)#hostname TUNJA-SW |
| TUNJA-SW(config)#vlan 1 |
| TUNJA-SW(config-vlan)#vlan 20 |
| TUNJA-SW(config-vlan)#vlan 30 |
| TUNJA-SW(config-vlan)#int f0/1 |
| TUNJA-SW(config-if)#switchport mode access |
| TUNJA-SW(config-if)#switchport access vlan 20 |
| TUNJA-SW(config-if)#int f0/2 |
| TUNJA-SW(config-if)#switchport mode access |
| TUNJA-SW(config-if)#switchport access vlan 30 |
| TUNJA-SW(config-if)#int f0/3 |
| TUNJA-SW(config-if)#switchport mode trunk |
| TUNJA-SW(config-if)# |
| %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down |
| %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up |

TUNJA-SW(config-if)#int vlan 1

TUNJA-SW(config-if)#ip address 172.3.2.11 255.255.255.248
TUNJA-SW(config-if)#no shutdown TUNJA-SW(config-if)# %LINK-5-CHANGED: Interface Vlan1, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up TUNJA-SW(config-if)#ip default-gateway 172.3.2.9 TUNJA-SW(config)#exit TUNJA-SW# %SYS-5-CONFIG_I: Configured from console by console TUNJA-SW#

Configuración Switch CUNDINAMARCA

Switch>enable

Switch#conf term

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname CUNDINAMARCA-SW

CUNDINAMARCA-SW(config)#vlan 1

CUNDINAMARCA-SW(config-vlan)#vlan 20

CUNDINAMARCA-SW(config-vlan)#vlan 30

CUNDINAMARCA-SW(config-vlan)#vlan 88

CUNDINAMARCA-SW(config-vlan)#exit

CUNDINAMARCA-SW(config)#int f0/1

CUNDINAMARCA-SW(config-if)#switchport mode access

CUNDINAMARCA-SW(config-if)#switchport access vlan 20

CUNDINAMARCA-SW(config-if)#int f0/2

CUNDINAMARCA-SW(config-if)#switchport mode access

CUNDINAMARCA-SW(config-if)#switchport access vlan 30

CUNDINAMARCA-SW(config-if)#int f0/4

CUNDINAMARCA-SW(config-if)#switchport mode access

CUNDINAMARCA-SW(config-if)#switchport access vlan 88

CUNDINAMARCA-SW(config-if)#int f0/3

CUNDINAMARCA-SW(config-if)#switchport mode trunk

CUNDINAMARCA-SW(config-if)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

CUNDINAMARCA-SW(config-if)#int vlan 1

CUNDINAMARCA-SW(config-if)#ip address 172.31.2.11 255.255.255.248

CUNDINAMARCA-SW(config-if)#no shutdown

CUNDINAMARCA-SW(config-if)#

%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

CUNDINAMARCA-SW(config-if)#ip default-gateway 172.31.2.9

CUNDINAMARCA-SW(config)#exit

CUNDINAMARCA-SW#

%SYS-5-CONFIG_I: Configured from console by console

Configuración Router BUCARAMANGA Autenticación local con AAA

ACCESO RESTRINGIDO User Access Verification Password: BUCARAMANGA>enable Password: BUCARAMANGA#conf term Enter configuration commands, one per line. End with CNTL/Z. BUCARAMANGA(config)#line console 0 BUCARAMANGA(config-line)#username administrador secret cisco00000 BUCARAMANGA(config)#aaa new-model BUCARAMANGA(config)#aaa authentication login AUTH local BUCARAMANGA(config)#line console 0 BUCARAMANGA(config-line)#login authentication AUTH BUCARAMANGA(config-line)#login authentication AUTH BUCARAMANGA(config-line)#line vty 0 15 BUCARAMANGA(config-line)#login authentication AUTH BUCARAMANGA(config-line)#exit BUCARAMANGA(config-line)#exit BUCARAMANGA(config)#exit BUCARAMANGA(config)#exit BUCARAMANGA#

Configuración Router TUNJA Autenticación local con AAA

ACCESO RESTRINGIDO User Access Verification Password: TUNJA>enable Password: TUNJA#conf term Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#line console 0 TUNJA(config-line)#username administrador secret cisco00000 TUNJA(config)#aaa new-model TUNJA(config)#aaa authentication login AUTH local TUNJA(config)#ine console 0 TUNJA(config-line)#login authentication AUTH TUNJA(config-line)#line vty 0 15 TUNJA(config-line)#login authentication AUTH TUNJA(config-line)#exit TUNJA(config)#exit TUNJA# %SYS-5-CONFIG_I: Configured from console by console TUNJA#

Configuración Router CUNDINAMARCA Autenticación local con AAA

ACCESO RESTRINGIDO User Access Verification Password: CUNDINAMARCA>enable Password: CUNDINAMARCA#conf term Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#line console 0 CUNDINAMARCA(config-line)#username administrador secret cisco00000 CUNDINAMARCA(config)#aaa new-model CUNDINAMARCA(config)#aaa authentication login AUTH local CUNDINAMARCA(config)#line console 0 CUNDINAMARCA(config-line)#login authentication AUTH CUNDINAMARCA(config-line)#line vty 0 15 CUNDINAMARCA(config-line)#login authentication AUTH CUNDINAMARCA(config-line)#exit CUNDINAMARCA(config)#exit

CUNDINAMARCA#

%SYS-5-CONFIG_I: Configured from console by console

Cifrado de contraseñas en Router BUCARAMANGA BUCARAMANGA#conf term Enter configuration commands, one per line. End with CNTL/Z. BUCARAMANGA(config)#service password-encryption BUCARAMANGA(config)#exit BUCARAMANGA# %SYS-5-CONFIG_I: Configured from console by console BUCARAMANGA#

Cifrado de contraseñas en Router TUNJA

TUNJA#conf term Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#service password-encryption TUNJA(config)#exit TUNJA# %SYS-5-CONFIG_I: Configured from console by console

Cifrado de contraseñas en Router CUNDINAMARCA

CUNDINAMARCA#conf term Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#service password-encryption CUNDINAMARCA(config)#exit CUNDINAMARCA# %SYS-5-CONFIG_I: Configured from console by console Configuración internos para acceder al Router y tiempo de acceso al detectar ataques en Router BUCARAMANGA

BUCARAMANGA#conf term Enter configuration commands, one per line. End with CNTL/Z. BUCARAMANGA(config)#line console 0 BUCARAMANGA(config-line)#login block-for 10 attempts 3 within 60 BUCARAMANGA(config)#exit BUCARAMANGA# %SYS-5-CONFIG_I: Configured from console by console

Configuración internos para acceder al Router y tiempo de acceso al detectar ataques en Router TUNJA

TUNJA#conf term Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#line console 0 TUNJA(config-line)#login block-for 10 attempts 3 within 60 TUNJA(config)#exit TUNJA# %SYS-5-CONFIG_I: Configured from console by console

Configuración internos para acceder al Router y tiempo de acceso al detectar ataques en Router CUNDINAMARCA

CUNDINAMARCA#conf term Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#line console 0 CUNDINAMARCA(config-line)#login block-for 10 attempts 3 within 60 CUNDINAMARCA(config)#exit CUNDINAMARCA# %SYS-5-CONFIG_I: Configured from console by console

CUNDINAMARCA#

Establecer un servidor TFTP y almacenar todos los archivos necesarios de los routers

| 💐 WEB EXTERNO | | | — | | \times |
|--------------------|-----------|------------|-------------|-------|----------|
| Physical Config S | ervices | Desktop | Custom Inte | rface | |
| | a 🗆 🗖 | | | ~ | ^ |
| IP Configuration | on | | | | Х |
| Interface Fas | tEthernet | :0 | | | • |
| IP Configuration | | | | | |
| O DHCP O S | Static | | | | |
| IP Address | 209.165 | .220.3 | | | |
| Subnet Mask | 255.255 | .255.0 | | | |
| Default Gateway | 209.16 | 5.220.1 | | | |
| DNS Server | | | | | |
| IPv6 Configuration | 1 | | | | |
| O DHCP O Auto C | onfig 🔘 | Static | | | _ |
| IPv6 Address | | | | / | |
| Link Local Address | FE80: | :20C:CFFF: | FE59:91 | | _ |
| IPv6 Gateway | | | | | _ |
| IPv6 DNS Server | | | | | |
| | | | | | |
| Collector | | | | | |
| | | | | | ~ |
| < | | | | | > |

Ilustración 58: Configuración WEB EXTERNO

TUNJA#show flash

TUNJA#copy flash tftp

Source filename []? c1841-advipservicesk9-mz.124-15.T1.bin

Address or name of remote host []? 209.165.220.3

Destination filename [c1841-advipservicesk9-mz.124-15.T1.bin]? TUNJA

| 💐 TUNJA | | | | | | | | _ | | | × |
|---|---|---|---|-------------------|-------------------|------------------------|----|-----|---|------|--------|
| Physical | Config | CLI | | | | | | | | | |
| | | ios d | Comm | and | Line I | Interfa | ce | | | | |
| TUNJA#show f. System flash File Length 3 335917 2 28282 | lash director Name/s 68 cl841- sigdef | y: tatus advipse: -catego: | rvicesks ry.xml | 9-mz.1 | 24-15.T | l.bin | | | | | ^ |
| 1 227537 [33847587 by 63488K bytes | sigdef tes used, of proce | -default 3016879 ssor boa | t.xml 97 avai: ard Syst | lable, tem fla | 640163 ash (Re | 84 total] ad/Write) | | | | | |
| TUNJA#copy flash tftp Source filename []? cl841-advipservicesk9-mz.124-15.T1.bin Address or name of remote host []? 209.165.220.3 Destination filename [cl841-advipservicesk9-mz.124-15.T1.bin]? TUNJA | | | | | | | | | | | |
| mz.124-15.T1 | 1-adv1pse .bin!! !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! | rvicesk !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! | 9- ! | | | | | | | | |
| | | | | | | | | | | | |
| [OK - 335917 33591768 byte TUNJA# | 68 bytes] es copied | in 1.10 | 04 secs | (3194 | 743 byt | es/sec) | | | | | ► * |
| | | | | | | | C | ору | P | aste | |

Ilustración 59: Almacenamiento Archivos Router TUNJA

| Physical Config Services Desktop Custom Interface HTTP DHCPv6 TFTP DHCPv6 Service Image: Onic off Config DNS SYSLOG AAA AAA asa842-k8.bin File TUNJA asa842-k8.bin c1841-advipservicesk9-mz.124-15.T1.bin c1841-ipbase-mz.123-14.T7.bin c1841-ipbasek9-mz.124-15.T1.bin c2600-advipservicesk9-mz.124-15.T1.bin c2600-ipbasek9-mz.124-8.bin c2600-ipbasek9-mz.124-15.T1.bin c2600-ipbasek9-mz.124-8.bin c2800nm-advipservicesk9-mz.124-15.T1.bin | 💐 WEB EXTE | RNO | | | | | _ | | \times | | | |
|--|------------|--------|----------------------------|-------------------------------------|------------------|--|----|------------|----------|--|--|--|
| SERVICES TFTP DHCP Service Image: On Off DHCPv6 File Image: TUNJA Image: On Off SYSLOG AAA asa842-k8.bin Image: On Image: On | Physical | Config | Services | Desktop | Custom Interface | | | | | | | |
| DHCP Service On Off DHCPv6 File TFTP DNS SYSLOG AAA asa842-k8.bin NTP c1841-advipservicesk9-mz.124-15.T1.bin c1841-ipbase-mz.123-14.T7.bin EMAIL FTP c1841-ipbase/mz.124-12.bin c2600-advipservicesk9-mz.124-15.T1.bin c2600-idvipservicesk9-mz.124-15.T1.bin c2600-idvipservicesk9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.124-15.T1.bin | SERVICE | S ^ | | | TFTP | | | | | | | |
| TFTP File DNS TUNJA SYSLOG asa842-k8.bin AAA c1841-advipservicesk9-mz.124-15.T1.bin EMAIL c1841-ipbase-mz.123-14.T7.bin FTP c1841-ipbasek9-mz.124-15.T1.bin c2600-advipservicesk9-mz.124-15.T1.bin c2600-advipservicesk9-mz.124-15.T1.bin c2600-i-mz.122-28.bin c2600-ipbasek9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.124-15.T1.bin | DHCP | | Service | | On | | | \bigcirc | Off | | | |
| DNSSYSLOGAAAATPC1841-advipservicesk9-mz.124-15.T1.binC1841-ipbase-mz.123-14.T7.binC1841-ipbasek9-mz.124-12.binC1841-ipbasek9-mz.124-12.binC2600-advipservicesk9-mz.124-15.T1.binC2600-i-mz.122-28.binC2600-i-mz.122-28.binC2800nm-advipservicesk9-mz.124-15.T1.binC2800nm-advipservicesk9-mz.124-15.T1.bin | TETP | | | | File | | | | ^ | | | |
| SYSLOGAAANTPEMAILFTPC1841-advipservicesk9-mz.124-15.T1.binc1841-ipbase-mz.123-14.T7.binc1841-ipbasek9-mz.124-12.binc2600-advipservicesk9-mz.124-15.T1.binc2600-irmz.122-28.binc2600-ipbasek9-mz.124-8.binc2800nm-advipservicesk9-mz.124-15.T1.binc2800nm-advipservicesk9-mz.124-15.T1.bin | DNS | | τυνιά | | | | | | | | | |
| AAAasad42-ko.DiffNTPc1841-advipservicesk9-mz.124-15.T1.binEMAILc1841-ipbase-mz.123-14.T7.binFTPc1841-ipbasek9-mz.124-12.binc2600-advipservicesk9-mz.124-15.T1.binc2600-i-mz.122-28.binc2600-ipbasek9-mz.124-8.binc2800nm-advipservicesk9-mz.124-15.T1.binc2800nm-advipservicesk9-mz.124-15.T1.bin | SYSLOG | | aca942 k9 bin | | | | | | | | | |
| NTPc1841-advipservicesk9-mz.124-15.T1.binEMAILc1841-ipbase-mz.123-14.T7.binFTPc1841-ipbasek9-mz.124-12.binc2600-advipservicesk9-mz.124-15.T1.binc2600-i-mz.122-28.binc2600-ipbasek9-mz.124-8.binc2800nm-advipservicesk9-mz.124-15.T1.binc2800nm-advipservicesk9-mz.124-15.T1.bin | AAA | | d5d042-K0.DIII | | | | | | | | | |
| EMAILc1841-ipbase-mz.123-14.T7.binFTPc1841-ipbasek9-mz.124-12.binc2600-advipservicesk9-mz.124-15.T1.binc2600-i-mz.122-28.binc2600-ipbasek9-mz.124-8.binc2800nm-advipservicesk9-mz.124-15.T1.binc2800nm-advipservicesk9-mz.124-15.T1.bin | NTP | | c1841-advipser | 11-advipservicesk9-mz.124-15.T1.bin | | | | | | | | |
| FTP c1841-ipbasek9-mz.124-12.bin c2600-advipservicesk9-mz.124-15.T1.bin c2600-i-mz.122-28.bin c2600-ipbasek9-mz.124-8.bin c2800nm-advipservicesk9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.124-15.T1.bin | EMAIL | | c1841-ipbase-r | 841-ipbase-mz.123-14.T7.bin | | | | | | | | |
| c2600-advipservicesk9-mz.124-15.T1.bin c2600-i-mz.122-28.bin c2600-ipbasek9-mz.124-8.bin c2800nm-advipservicesk9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.151-4.M4.bin | FIP | | c1841-inbasek ^o | 841_inhasok9_mz 124_12 hin | | | | | | | | |
| c2600-imz.122-28.bin c2600-ipbasek9-mz.124-8.bin c2800nm-advipservicesk9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.151-4.M4.bin | | | c2600-advincor | vicosk9-mz 1 | 24-15 T1 bin | | | | | | | |
| c2600-i-mz.122-28.bin c2600-ipbasek9-mz.124-8.bin c2800nm-advipservicesk9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.151-4.M4.bin | | | czooo-advipsei | VICESKJ-IIIZ. I | 24-13.11.DIT | | | | | | | |
| c2600-ipbasek9-mz.124-8.bin c2800nm-advipservicesk9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.151-4.M4.bin | | | c2600-i-mz.122 | 2-28.bin | | | | | | | | |
| c2800nm-advipservicesk9-mz.124-15.T1.bin c2800nm-advipservicesk9-mz.151-4.M4.bin | | | c2600-ipbasek | 9-mz.124-8.bi | in | | | | | | | |
| c2800nm-advipservicesk9-mz.151-4.M4.bin | | | c2800nm-advip | oservicesk9-m | nz.124-15.T1.bin | | | | | | | |
| | | | c2800nm-advip | oservicesk9-m | nz.151-4.M4.bin | | | | | | | |
| c2800nm-inhaco-mz 122-14 T7 hin ✓ | | | c2800nm-inhad | | T7 bin | | | | \sim | | | |
| Remove File | | ~ | | | | | Re | move F | ile | | | |

Ilustración 60: Servidor TFTP

El DHCP deberá proporcionar solo direcciones a los hosts de Bucaramanga y Cundinamarca

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

TUNJA>enable

Password:

TUNJA#conf term

Enter configuration commands, one per line. End with CNTL/Z.

TUNJA(config)#ip dhcp excluded-address 172.31.0.1

TUNJA(config)#ip dhcp excluded-address 172.31.0.65

TUNJA(config)#ip dhcp excluded-address 172.31.1.65 TUNJA(config)#ip dhcp excluded-address 172.31.1.1 TUNJA(config)#ip dhcp pool V10B TUNJA(dhcp-config)#network 172.31.0.0 255.255.255.192 TUNJA(dhcp-config)#default-router 172.31.0.1 TUNJA(dhcp-config)#dns-server 172.31.2.28 TUNJA(dhcp-config)#ip dhcp pool V30B TUNJA(dhcp-config)#network 172.31.0.64 255.255.255.192 TUNJA(dhcp-config)#default-router 172.31.0.65 TUNJA(dhcp-config)#dns-server 172.31.2.28 TUNJA(dhcp-config)#ip dhcp pool V20C TUNJA(dhcp-config)#network 172.31.1.64 255.255.255.192 TUNJA(dhcp-config)#default-router 172.31.1.65 TUNJA(dhcp-config)#dns-server 172.31.2.28 TUNJA(dhcp-config)#ip dhcp pool V30C TUNJA(dhcp-config)#network 172.31.1.0 255.255.255.192 TUNJA(dhcp-config)#default-router 172.31.1.1 TUNJA(dhcp-config)#dns-server 172.31.2.28 TUNJA(dhcp-config)#exit TUNJA(config)#exit TUNJA# %SYS-5-CONFIG_I: Configured from console by console TUNJA#

ACCESO RESTRINGIDO User Access Verification

Username: administrador

Password:

BUCARAMANGA>enable

Password:

BUCARAMANGA#conf term

Enter configuration commands, one per line. End with CNTL/Z.

BUCARAMANGA(config)#int f0/0.10

BUCARAMANGA(config-subif)#ip helper-address 172.31.2.33

BUCARAMANGA(config-subif)#int f0/0.30

BUCARAMANGA(config-subif)#ip helper-address 172.31.2.33

BUCARAMANGA(config-subif)#end

BUCARAMANGA#

%SYS-5-CONFIG_I: Configured from console by console

BUCARAMANGA#

ACCESO RESTRINGIDO

User Access Verification Username: administrador Password: CUNDINAMARCA>enable Password: CUNDINAMARCA#conf term Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#int f0/0.20 CUNDINAMARCA(config-subif)#ip helper-address 172.31.2.37 CUNDINAMARCA(config-subif)#int f0/0.30 CUNDINAMARCA(config-subif)#ip helper-address 172.31.2.37 CUNDINAMARCA(config-subif)#ip helper-address 172.31.2.37 CUNDINAMARCA(config-subif)#ip helper-address 172.31.2.37

CUNDINAMARCA#

%SYS-5-CONFIG_I: Configured from console by console

CUNDINAMARCA#

| PC0 | | | _ | | × |
|--------------------------------------|------------|-------------------|---------|--------|----------|
| Physical Config | Desktop | Custom Interface | | | |
| IP Configuration | n | | | X | ^ |
| DHCP O S | static | DHCP request suc | cessful | I. | |
| IP Address | 172.31.0 | .2 | | | |
| Subnet Mask | 255.255. | 255.192 | | | |
| Default Gateway | 172.31.0 | 0.1 | | | |
| DNS Server | 172.31.2 | .28 | | | |
| IPv6 Configuration DHCP O Auto Co | onfig () S | tatic | | | |
| IPv6 Address | | | | 1 | |
| Link Local Address | FE80::: | 20A:41FF:FE46:AD0 | 26 | | t, |
| IPv6 Gateway | | | | | |
| IPv6 DNS Server | | | | | |
| | | | | | |
| Diai | er | Ealtor | - | irewai | |
| | | | | | ~ |
| < | | | | | > |

Ilustración 61: Configuración PCO



Ilustración 62: Configuración PC1

| 💐 PC2 | | | — | | \times |
|--------------------|------------|-------------------|---------|---------|----------|
| Physical Config | Desktop | Custom Interface | | | |
| IP Configuratio | n | | | X | ^ |
| IP Configuration | | | | | |
| ● DHCP ○ S | Static | DHCP request suc | cessful | l. | |
| IP Address | 172.31.1. | .66 | | | |
| Subnet Mask | 255.255.2 | 255.192 | | | |
| Default Gateway | 172.31.1 | .65 | | | |
| DNS Server | 172.31.2 | .28 | | | |
| IPv6 Configuration | | | | | |
| 🔿 DHCP 🔿 Auto Co | onfig 🖲 St | tatic | | | |
| IPv6 Address | | | | / | |
| Link Local Address | FE80::2 | 200:CFF:FE94:B26C | | | t' |
| IPv6 Gateway | | | | | |
| IPv6 DNS Server | | | | | |
| | | | | | |
| | | | | | |
| | er i | | F | irewaii | |
| | | | | | ~ |
| < | | | | | > |

Ilustración 63: Configuración PC2

| 6 | PC6 | | | | _ | | × |
|---|---|--|---|--------------------------|---|--------|---|
| | Physical | Config | Desktop | Custom Interface | | | |
| | IP Cont IP Cont O DHCF IP Addre Subnet Default | figuration figuration ess Mask Gateway | Static 172.31.0. 255.255. 172.31.0 | .194 255.192).193 | | X | |
| | - IPv6 Co O DHCF IPv6 Ad | onfiguratio | Config I S | tatic | | | |
| | Link Loc IPv6 Ga IPv6 DN | al Address teway IS Server | s FE80::2 | 2E0:8FFF:FE79:D2C | 7 | / [| |
| - | | - | aier i | Editor | | Firewa | • |

Ilustración 64: Configuración PC6

| 💐 PC7 | | | | _ | | × |
|--|--|---|--------------------------------|---|--------|--------------------------|
| Physical | Config | Desktop | Custom Interface | | | |
| IP Con IP Con O DHCI IP Addr Subnet Default DNS Se | figuration figuration sess Mask Gateway erver | Static 172.31.0. 255.255. 172.31.0 172.31.2 | 130 255.192).129 _28 | | X | |
| - IPv6 C O DHCI IPv6 Ac | onfiguratio P () Auto (Idress | Config S | tatic | | |]]] (t) |
| IPv6 Ga IPv6 DN | iteway S Server | | 200:2AFF:FE43:3404 | + | | |
| | - 01 | aier i | Editor | F | irewai | • |
| < | | | | | | > |

Ilustración 65: Configuración PC7

| RC8 ≷ | | | | _ | | × |
|----------|-------------|------------|------------------|----------|--------|----|
| Physical | Config | Desktop | Custom Interface | | | |
| IP Cor | figurat | ion | | | Х | |
| IP Con | figuration | | | | | |
| OHCI | • • | Static | DHCP request su | ccessful | | |
| IP Addr | ess | 172.31.1 | .2 | | | |
| Subnet | Mask | 255.255. | 255.192 | | | |
| Default | Gateway | 172.31. | 1.1 | | | |
| DNS Se | rver | 172.31.2 | .28 | | | |
| IPv6 C | onfiguratio | on | | | | |
| | P 🔿 Auto | Config 🖲 S | tatic | | | |
| IPv6 Ad | dress | | | | / | |
| Link Loo | al Addres | s FE80:: | 203:E4FF:FE1B:BB | E4 | | t' |
| IPv6 Ga | iteway | | | | | |
| IPv6 DN | IS Server | | | | | |
| | | | | | | |
| | | | | | | |
| Sh | | aler | Eaitor | - | irewai | |
| | _ | | | | | ~ |
| < | | | | | | > |

Ilustración 66: Configuración PC8

| Reb Interno | | _ | | × |
|--|---|----------------|----|---|
| Physical Config S | ervices Desktop | Custom Interfa | се | |
| IP Configuration DHCP S IP Address Subnet Mask Default Gateway DNS Server IPv6 Configuration DHCP Auto C IPv6 Address Link Local Address IPv6 Gateway IPv6 DNS Server Collector | 0 n tEthernet0 5tatic 172.31.2.28 255.255.255.248 172.31.2.25 172.31.2.28 onfig ● Static FE80::2E0:B0FF: | FEB6:82B5 | | ~ |
| < | | | > | |

Ilustración 67: Configuración WEB INTERNO

| 💐 WEB EXTERNO | | | - | | × | |
|--|---|---------|-----------|---------|---|--|
| Physical Config S | ervices | Desktop | Custom In | terface | | |
| IP Configuration Interface Fast IP Configuration DHCP S IP Address Subnet Mask Default Gateway DNS Server IPv6 Configuration DHCP Auto C IPv6 Address Link Local Address IPv6 Gateway IPv6 DNS Server | n Ethernel 209.165 255.255 209.16 | t0 | FE59:91 | | | |
| < | | | | | > | |

Ilustración 68: Configuración WEB EXTERNO

El web server deberá tener NAT estático y el resto de los equipos de la topología emplearan NAT de sobrecarga (PAT).

TUNJA#conf term

Enter configuration commands, one per line. End with CNTL/Z.

TUNJA(config)#ip dhcp pool V10B

TUNJA(dhcp-config)#ip nat inside source static 172.31.2.28 209.165.220.4

TUNJA(config)#access-list 1 permit 172.0.0.0 0.255.255.255

TUNJA(config)#ip nat inside source list 1 interface f0/1 overload

TUNJA(config)#int f0/1

TUNJA(config-if)#ip nat outside

TUNJA(config-if)#int f0/0.1

TUNJA(config-subif)#ip nat inside

TUNJA(config-subif)#int f0/0.20

TUNJA(config-subif)#ip nat inside

TUNJA(config-subif)#int f0/0.30

TUNJA(config-subif)#ip nat inside

TUNJA(config-subif)#int s0/0/0

TUNJA(config-if)#ip nat inside

TUNJA(config-if)#int s0/0/1

TUNJA(config-if)#ip nat inside

TUNJA(config-if)#exit

TUNJA(config)#ip route 0.0.0.0 0.0.0.0 209.165.220.3

TUNJA(config)#router ospf 1

TUNJA(config-router)#default-information originate

TUNJA(config-router)#exit

TUNJA(config)#exit

| Physical | Config | CLI | | | | | | |
|--|--|--|---|--|--|-------------|---|---|
| | | IO | S Comma | nd Line In | terface | | | |
| TUNJA#show | v ip route | | | | | | | ^ |
| Codes: C - | - connected, | S - sta | tic, I - IGR | P, R - RIP, M | - mobile, B - H | BGP | | |
| D - | - EIGRP, EX | - EIGRP | external, 0 · | - OSPF, IA - C | SPF inter area | | | |
| Nl | - OSPF NSSA | externa | l type 1, N2 | - OSPF NSSA e | external type 2 | | | |
| El | - OSPF exte | rnal typ | e 1, E2 - OSI | PF external ty | npe 2, E - EGP | | | |
| 1 - | - 15-15, LI | - 15-15 | Tevel-1, L2 · | - 15-15 level- | -2, 1a - 15-15 1 | inter are | a | |
| P - | - candidate | lownloade | d static row | - SLALIC FOULE | , 0 - ODR | | | |
| 2 | - periodic d | lowingoade | u static iou | | | | | |
| Gateway of | f last resor | t is 209 | .165.220.3 t | network 0.0. | 0.0 | | | |
| | | | | | | | | |
| 172.3 | 3.0.0/29 is | subnette | d, 1 subnets | | | | | |
| C 17 | 72.3.2.8 is | directly | connected, 1 | FastEthernet0/ | 0.1 | | | |
| 172.3 | 31.0.0/16 is | variabl | y subnetted, | 11 subnets, 3 | masks | | | |
| | | 1110/05 | 1 wis 172 31 | | | | | |
| 0 17 | 72.31.0.0/26 | 0 [110/65 | J VIA 1/2.51 | .2.34, 00:56:1 | 16, Serial0/0/0 | | | |
| 0 17 0 17 | 72.31.0.0/26 72.31.0.64/2 | 6 [110/65 | 5] via 172.31 | .2.34, 00:56:1 1.2.34, 00:56: | 16, Serial0/0/0 16, Serial0/0/0 | 0 | | |
| 0 17 0 17 C 17 | 72.31.0.0/26 72.31.0.64/2 72.31.0.128/ | 6 [110/65 6 [110/6 26 is di | 5] via 172.31 rectly connect | .2.34, 00:56:1 1.2.34, 00:56: cted, FastEthe | 16, Serial0/0/0 16, Serial0/0/0 ernet0/0.20 | 0 | | |
| 0 17 0 17 C 17 C 17 | 72.31.0.0/26 72.31.0.64/2 72.31.0.128/ 72.31.0.192/ | 6 [110/65 6 [110/6 26 is di 26 is di | 5] via 172.31 rectly connectly connectly connectly | .2.34, 00:56:1 1.2.34, 00:56: cted, FastEthe cted, FastEthe | <pre>16, Serial0/0/0 16, Serial0/0/0 ernet0/0.20 ernet0/0.30</pre> | 0 | | |
| 0 17 0 17 C 17 C 17 0 17 | 72.31.0.0/26 72.31.0.64/2 72.31.0.128/ 72.31.0.192/ 72.31.1.0/26 | 26 [110/65 26 [110/6 26 is di 26 is di 26 is di 5 [110/65 | 5] via 172.31 rectly connectly conne | .2.34, 00:56:1 1.2.34, 00:56: cted, FastEthe cted, FastEthe .2.38, 00:56:1 | <pre>.6, Serial0/0/0 .16, Serial0/0/0 ernet0/0.20 ernet0/0.30 .6, Serial0/0/1</pre> | | | |
| 0 17 0 17 C 17 C 17 0 17 0 17 | 72.31.0.0/26 72.31.0.64/2 72.31.0.128/ 72.31.0.192/ 72.31.1.0/26 72.31.1.64/2 | 26 [110/65 26 [110/6 26 is di 26 is di 5 [110/65 26 [110/6 | <pre>> via 172.31 > via 172.33 rectly connec rectly connec] via 172.31 5] via 172.31</pre> | .2.34, 00:56:1 1.2.34, 00:56: tted, FastEthe tted, FastEthe .2.38, 00:56:1 1.2.38, 00:56: | <pre>.6, Serial0/0/0 .16, Serial0/0/0 ernet0/0.20 ernet0/0.30 .6, Serial0/0/1 .16, Serial0/0/1</pre> | L | | |
| 0 1 0 1 C 1 C 1 0 1 0 1 0 1 0 1 0 1 | 72.31.0.0/26 72.31.0.64/2 72.31.0.128/ 72.31.0.192/ 72.31.1.0/26 72.31.1.64/2 72.31.2.0/29 72.31.2.0/29 | <pre>[110/65 6 [110/6 26 is di 26 is di 5 [110/65 6 [110/65 [110/65</pre> | <pre>yia 172.31 5] via 172.32 rectly connec rectly connec l via 172.31 5] via 172.31] via 172.31 </pre> | .2.34, 00:56:1 1.2.34, 00:56: tted, FastEthe tted, FastEthe .2.38, 00:56:1 1.2.38, 00:56: .2.34, 00:56:1 | <pre>16, Serial0/0/0 16, Serial0/0/0 ernet0/0.20 ernet0/0.30 16, Serial0/0/1 16, Serial0/0/1 16, Serial0/0/0 </pre> | L | | |
| 0 1 0 1 C 1 C 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 | 72.31.0.0/26 72.31.0.64/2 72.31.0.128/ 72.31.0.192/ 72.31.1.0/26 72.31.1.64/2 72.31.2.0/29 72.31.2.8/29 | <pre>26 [110/65 26 [110/6 26 is di 26 is di 5 [110/65 26 [110/65 20 [110/65 20 [110/65</pre> | <pre>> via 172.31 5] via 172.31 rectly connee rectly connee } via 172.31 5] via 172.31 } via 172.31] via 172.31 </pre> | .2.34, 00:56:1 1.2.34, 00:56: 5ted, FastEthe 5ted, FastEthe 2.38, 00:56:1 1.2.38, 00:56: .2.34, 00:56:1 .2.38, 00:56:1 | <pre>.6, Serial0/0/0 .16, Serial0/0/0 ernet0/0.20 ernet0/0.30 .6, Serial0/0/1 .16, Serial0/0/1 .6, Serial0/0/0 .6, Serial0/0/1 .6, Serial0/0/1</pre> | ı | | |
| 0 17 0 17 C 17 C 17 0 17 0 17 0 17 0 17 0 17 0 17 0 17 0 17 0 17 | 72.31.0.0/26 72.31.0.64/2 72.31.0.128/ 72.31.0.192/ 72.31.1.0/26 72.31.1.64/2 72.31.2.0/29 72.31.2.8/29 72.31.2.24/2 | (110/65 6 [110/6 26 is di 26 is di 5 [110/65 6 [110/65 110/65 9 [110/6 9 [110/6 | <pre>5] via 172.31 5] via 172.31 rectly connee rectly connee] via 172.31 5] via 172.31] via 172.31] via 172.31 5] via 172.32</pre> | .2.34, 00:56:1 1.2.34, 00:56: 5ted, FastEthe 5ted, FastEthe 2.38, 00:56:1 1.2.38, 00:56: .2.34, 00:56:1 1.2.38, 00:56:1 | <pre>16, Serial0/0/0 16, Serial0/0/0 16, Serial0/0/0 ernet0/0.20 ernet0/0.30 16, Serial0/0/1 16, Serial0/1 16, Serial0/0/1 16, Serial0/0/1 16, Serial0/1 16,</pre> |) L | | |
| 0 17 0 17 C 17 C 17 0 17 0 17 0 17 0 17 0 17 17 17 17 17 17 17 17 17 17 | 72.31.0.0/26 72.31.0.64/2 72.31.0.128/ 72.31.0.192/ 72.31.1.0/26 72.31.1.64/2 72.31.2.0/29 72.31.2.8/29 72.31.2.24/2 | (110/65 6 [110/6 26 is di 26 is di 5 [110/65 6 [110/65 9 [110/65 9 [110/6 | <pre>5] via 172.3 rectly connec rectly connec] via 172.31 5] via 172.31] via 172.31 5] via 172.31</pre> | <pre>.2.34, 00:56:] 1.2.34, 00:56:] ted, FastEthe ted, FastEthe .2.38, 00:56:] 1.2.38, 00:56:] .2.38, 00:56:1 1.2.38, 00:56:1 1.2.38, 00:56:1</pre> | <pre>16, Serial0/0/0 '16, Serial0/0/0 '16, Serial0/0/0 'rnet0/0.20 'rnet0/0.30 '6, Serial0/0/1 '16, Serial0/0/1 '16, Serial0/0/1 '16, Serial0/0/1</pre> |) 1 | | |
| 0 11 0 12 C 12 C 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12 | 72.31.0.0/26 72.31.0.64/2 72.31.0.192/ 72.31.1.0.192/ 72.31.1.0/26 72.31.1.64/2 72.31.2.0/29 72.31.2.8/29 72.31.2.8/29 | (110/65 (110/65) (26 is di (26 is di (110/65) (110/65) (110/65) (110/65) (110/65) | <pre>5] via 172.3 rectly connec rectly connec] via 172.31 5] via 172.31] via 172.31] via 172.31 5] via 172.31</pre> | <pre>.2.34, 00:56: 1.2.34, 00:56: ted, FastEthe cted, FastEthe .2.38, 00:56:1 1.2.38, 00:56: .2.34, 00:56:1 1.2.38, 00:56:1 1.2.38, 00:56:</pre> | <pre>16, Serial0/0/0 216, Serial0/0/0 216, Serial0/0/0 217000.20 2100000 21000 21</pre> |) L L | | ~ |

Ilustración 69: Ruta IP del Router TUNJA

| 💐 BUCARAMANGA | | | | | _ | | \times |
|---|---|--|--|---|---|----------------|----------|
| Physical Config | CLI | | | | | | |
| | IOS | Command | l Line Inte | rface | | | |
| BUCARAMANGA‡show ip r Codes: C - connected, D - EIGRP, EX N1 - OSPF NSSA El - OSPF exte i - IS-IS, L1 * - candidate P - periodic d | S - sta S - sta - EIGRP externa rnal ty - IS-IS default lownload | atic, I - IGF external, O al type 1, N2 pe 1, E2 - OS level-1, L2 , U - per-use ed static rou | P, R - RIP, M - OSPF, IA - - OSPF NSSA PF external t - IS-IS level rr static rout | 1 - mobile OSPF inte external type 2, E L-2, ia - te, o - OD | , B - BG r area type 2 - EGP IS-IS in DR | GP nter are | a |
| Gateway of last resor 172.3.0.0/29 is 0 172.3.2.8 [11 172.31.0.0/16 is C 172.31.0.0/26 C 172.31.0.128/ 0 172.31.0.192/ 0 172.31.0.192/ 0 172.31.1.0/26 0 172.31.1.64/2 C 172.31.2.0/29 0 172.31.2.8/29 0 172.31.2.8/29 0 172.31.2.24/2 | t is 17: subnett: 0/65] v. s variab i is dire 6 is dir 26 [110/1 6 [110/1] 6 [110/1] 9 [110/1] | 2.31.2.33 to ed, 1 subnets ia 172.31.2.3 ly subnetted, ectly connect rectly connect (65] via 172. (29] via 172.3 29] via 172.3 ectly connect 29] via 172.3 129] via 172.3 | network 0.0.0 3, 00:58:19, 11 subnets, ted, FastEther ted, FastEther 31.2.33, 00:5 31.2.33, 00:5 31.2.33, 00:5 31.2.33, 00:5 31.2.33, 00:5 31.2.33, 00:5 31.2.33, 00:5 31.2.33, 00:5 | Serial0/0 3 masks rnet0/0.10 rnet0/0.3 58:19, Ser 3:09, Ser rnet0/0.1 3:09, Ser 3:09, Ser 58:09, Ser | //0 :ial0/0/0 .al0/0/0 .ial0/0/0 :ial0/0/0 .al0/0/0 :ial0/0/0 |)) | |
| Doordennoorg | | | | | Сору | Pas | te |

Ilustración 70: Ruta IP del Router BUCARAMANGA

| 🗶 CUNDI | NAMARCA | | | | | _ | | \times |
|---|-------------------------------|---|--|--|---|--|-----------------|----------|
| Physica | l Config | CLI | | | | | | |
| | | IOS | Commar | nd Line I | nterface | e | | |
| CUNDINAN Codes: (I I I I I I I I I I I I I I I I I I I | <pre>IARCA#show ip</pre> | route , S - sta - EIGRP A externa ernal typ - IS-IS default, downloade | atic, I - I external, al type 1, pe 1, E2 - level-1, I , U - per-u ed static r | GRP, R - R O - OSPF, N2 - OSPF : OSPF exter: .2 - IS-IS :ser static | IP, M - mc IA - OSPF NSSA exter nal type 2 level-2, i route, o | obile, B - inter area rnal type 2 2, E - EGP La - IS-IS - ODR | BGP inter ar | ea ^ |
| Gateway | of last reso | rt is 172 | 2.31.2.37 t | o network | 0.0.0.0 | | | |
| 0 172 | 172.3.2.8 [1 2.31.0.0/16 i | 10/65] vi s variabl | ia 172.31.2 Ly subnette | .37, 01:00 d, 11 subn | :06, Seria ets, 3 mas | al0/0/0 sks | | |
| 0 | 172.31.0.0/2 | 6 [110/12 | 29] via 172 | .31.2.37, | 01:00:06, | Serial0/0/ | 0 | |
| 0 | 172.31.0.64/ | 26 [110/1 | 129] via 17 (651 via 17 | 2.31.2.37, | 01:00:06, | Serial0/0 | /0 | |
| 0 | 172.31.0.120 | /26 [110/ | /65] via 1/ | 2.31.2.37, | 01:00:06, | Serial0/0 | /0 | |
| c | 172.31.1.0/2 | 6 is dire | ectly conne | cted. Fast | Ethernet0/ | 0.30 | | |
| С | 172.31.1.64/ | 26 is din | rectly conn | ected, Fas | tEthernet0 | 0/0.20 | | |
| 0 | 172.31.2.0/2 | 9 [110/12 | 29] via 172 | .31.2.37, | 01:00:06, | Serial0/0/ | 0 | |
| С | 172.31.2.8/2 | 9 is dire | ectly conne | cted, Fast | Ethernet0/ | 0.1 | | |
| С | 172.31.2.24/ | 29 is din | rectly conn | ected, Fas | tEthernet0 | 0/0.88 | | |
| CUNDINAN | IARCA# | | | | | | | ~ |
| | | | | | | | | |

Ilustración 71: Ruta IP del Router CUNDINAMARCA

| | | IOS Comma | and Line Interface | | | |
|-------|-------------------------------------|------------------|-------------------------|--------------|---------|---|
| | 3 CONTIG 1. CONT. | IUS COmmo | Sole by console | | | |
| | - | | | | | 1 |
| Code | A#show ip route s: C - connected | S - static T | - TGRP R - RTP M - m | bile B - F | BGP | |
| oouci | D - EIGRP, EX | - EIGRP external | 1, 0 - OSPF, IA - OSPF | inter area | | |
| | N1 - OSPF NSSA | external type | 1, N2 - OSPF NSSA exter | nal type 2 | | |
| | E1 - OSPF exte | rnal type 1, E2 | - OSPF external type 2 | 2, E - EGP | | |
| | i - IS-IS, Ll | - IS-IS level-1 | , L2 - IS-IS level-2, 1 | ia – IS-IS : | inter | |
| area | * - candidate | default. U - pe | r-user static route, o | - ODR | | |
| | P - periodic d | ownloaded stati | c route | 0.Dit | | |
| | - | | | | | |
| Gate | way of last resor | t is 209.165.22 | 0.3 to network 0.0.0.0 | | | |
| | 172 2 0 0/20 10 | subpotted 1 sul | pote | | | |
| с | 172.3.2.8 is | directly connect | ted. FastEthernet0/0.1 | | | |
| - | 172.31.0.0/16 is | variably subne | tted, 11 subnets, 3 mas | sks | | |
| 0 | 172.31.0.0/26 | [110/65] via 1 | 72.31.2.34, 01:18:08, 5 | Serial0/0/0 | | |
| 0 | 172.31.0.64/2 | 6 [110/65] via : | 172.31.2.34, 01:18:08, | Serial0/0/ | 0 | |
| C | 172.31.0.128/ | 26 is directly | connected, FastEthernet | :0/0.20 | | |
| 0 | 172.31.0.192/ | fll0/651 via 1 | 72 31 2 38 01.14.38 | Seria10/0/1 | | |
| õ | 172.31.1.64/2 | 6 [110/65] via : | 172.31.2.38, 01:14:38, | Seria10/0/ | 1 | |
| 0 | 172.31.2.0/29 | [110/65] via 1 | 72.31.2.34, 01:18:08, 5 | Serial0/0/0 | | |
| 0 | 172.31.2.8/29 | [110/65] via 1 | 72.31.2.38, 01:14:38, 5 | Serial0/0/1 | | |
| 0 | 172.31.2.24/2 | 9 [110/65] via : | 172.31.2.38, 01:14:38, | Serial0/0/ | 1 | |
| TUNJ | A#enable | | | | | |
| TUNJ | A#show ip nat tra | nslation | | | | 1 |
| Pro | Inside global | Inside local | Outside local | Outside (| global | |
| icmp | 209.165.220.1:8 | 172.31.1.2:8 | 209.165.220.3:8 | 209.165.2 | 220.3:8 | |
| | 209.165.220.4 | 1/2.31.2.28 | | | | |
| | | | | | | |

Ilustración 72: Ruta IP del Router TUNJA



Ilustración 73: Comunicación entre PC8 y Servidor WEB EXTERNO

El enrutamiento deberá tener autenticación Router BUCARAMANGA

ACCESO RESTRINGIDO User Access Verification Username: administrador Password: BUCARAMANGA>enable BUCARAMANGA#enable BUCARAMANGA#conf t Enter configuration commands, one per line. End with CNTL/Z. BUCARAMANGA(config)#int s0/0/0 BUCARAMANGA(config-if)#ip ospf authentication message-digest BUCARAMANGA(config-if)#ip ospf message-digest-key 1 md5 cisco000 OSPF: Key 1 already exists BUCARAMANGA(config-if)#exit BUCARAMANGA(config)#exit BUCARAMANGA(config)#exit BUCARAMANGA#

El enrutamiento deberá tener autenticación Router CUNDINAMARCA

ACCESO RESTRINGIDO User Access Verification Username: administrador Password: CUNDINAMARCA>enable Password: CUNDINAMARCA#conf t Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#int s0/0/0 CUNDINAMARCA(config-if)#ip ospf authentication message-digest CUNDINAMARCA(config-if)#ip ospf message-digest-key 1 md5 cisco000 CUNDINAMARCA(config-if)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA# %SYS-5-CONFIG_I: Configured from console by console CUNDINAMARCA#

El enrutamiento deberá tener autenticación Router TUNJA

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

TUNJA>enable

Password:

TUNJA#conf t

Enter configuration commands, one per line. End with CNTL/Z.

TUNJA(config)#int s0/0/0

TUNJA(config-if)#ip ospf authentication message-digest

TUNJA(config-if)#ip ospf message-digest-key 1 md5 cisco000

TUNJA(config-if)#int s0/0/1

04:24:23: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.34 on Serial0/0/0 from LOADING to FULL, Loading Done

TUNJA(config-if)#int s0/0/1

TUNJA(config-if)#ip ospf authentication message-digest

TUNJA(config-if)#ip ospf message-digest-key 1 md5 cisco000

TUNJA(config-if)#

04:24:55: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.38 on Serial0/0/1 from LOADING to FULL, Loading Done

TUNJA(config-if)#exit

TUNJA(config)#exit

TUNJA#

%SYS-5-CONFIG_I: Configured from console by console

3.4. Listas de control de acceso:

Los hosts de VLAN 20 en Cundinamarca no acceden a internet, solo a la red interna de Tunja

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

CUNDINAMARCA>enable

Password:

CUNDINAMARCA#conf t

Enter configuration commands, one per line. End with CNTL/Z.

CUNDINAMARCA(config)#int s0/0/0

CUNDINAMARCA(config-if)#access-list 111 deny ip 172.31.1.64 0.0.0.63 209.165.220.0 0.0.0.255

CUNDINAMARCA(config)#access-list 111 permit ip any any

CUNDINAMARCA(config)#int f0/0.20

CUNDINAMARCA(config-subif)#ip access-group 111 in

CUNDINAMARCA(config-subif)#exit

CUNDINAMARCA(config)#exit

CUNDINAMARCA#

%SYS-5-CONFIG_I: Configured from console by console

CUNDINAMARCA#



Ilustración 74: Prueba desde PC2

Los host de VLAN10 en Cundinamarca si acceden a internet y no a la red interna de Tunja.

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

CUNDINAMARCA>en

Password:

CUNDINAMARCA#conf t

CUNDINAMARCA(config)#int f0/0.30 CUNDINAMARCA(config-subif)#access-list 112 permit ip 172.31.1.0 0.0.0.63 209.165.220.0 0.0.0.255 CUNDINAMARCA(config)#access-list 112 deny ip any any CUNDINAMARCA(config)#int f0/0.30 CUNDINAMARCA(config-subif)#ip access-group 112 in CUNDINAMARCA(config-subif)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA# %SYS-5-CONFIG_I: Configured from console by console CUNDINAMARCA#

Enter configuration commands, one per line. End with CNTL/Z.

Los hosts de VLAN 30 en Tunja solo acceden a servidores web y ftp de internet.

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

TUNJA>enable

Password:

TUNJA#conf t

Enter configuration commands, one per line. End with CNTL/Z.

TUNJA(config)#access-list 111 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0 0.0.0.255 eq 80

TUNJA(config)#access-list 111 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0 0.0.0.255 eq 21

TUNJA(config)#access-list 111 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0 0.0.0.255 eq 20

TUNJA(config)#int f0/0.30 TUNJA(config-subif)#ip access-group 111 in TUNJA(config-subif)#exit TUNJA(config)#exit TUNJA# %SYS-5-CONFIG_I: Configured from console by console



Ilustración 75: Prueba desde PC6



Ilustración 76: Prueba desde PC6 a URL

Los hosts de VLAN 20 en Tunja solo acceden a la VLAN 20 de Cundinamarca y VLAN 10 de Bucaramanga.

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

TUNJA>en

Password:

TUNJA#conf t

Enter configuration commands, one per line. End with CNTL/Z.

TUNJA(config)#int f0/0.20

TUNJA(config-subif)#access-list 112 permit ip 172.31.0.128 0.0.0.63 172.31.1.64 0.0.0.63

TUNJA(config)#access-list 112 permit ip 172.31.0.128 0.0.0.63 172.31.0.0 0.0.0.63

TUNJA(config)#int f0/0.20

TUNJA(config-subif)#ip access-group 112 in

TUNJA(config-subif)#exit

TUNJA(config)#exit

TUNJA#

%SYS-5-CONFIG_I: Configured from console by console



Ilustración 77: Prueba desde PC7

Los hosts de VLAN 30 de Bucaramanga acceden a internet y a cualquier equipo de VLAN 10.

ACCESO RESTRINGIDO User Access Verification Username: administrador Password: BUCARAMANGA>enable Password: BUCARAMANGA#conf t Enter configuration commands, one per line. End with CNTL/Z. BUCARAMANGA(config)#access-list 111 permit ip 172.31.0.64 0.0.0.63 209.165.220.0 0.0.0.255 BUCARAMANGA(config)#int f0/0.30 BUCARAMANGA(config-subif)#ip access-group 111 in BUCARAMANGA(config-subif)#exit BUCARAMANGA(config)#exit **BUCARAMANGA#** %SYS-5-CONFIG_I: Configured from console by console **BUCARAMANGA#**



Ilustración 78: Prueba desde PC1

Los hosts de VLAN 10 en Bucaramanga acceden a la red de Cundinamarca (VLAN 20) y Tunja (VLAN 20), no internet.

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

BUCARAMANGA>enable

Password:

BUCARAMANGA#conf t

Enter configuration commands, one per line. End with CNTL/Z.

BUCARAMANGA(config)#int f0/0.10

BUCARAMANGA(config-subif)#access-list 112 permit ip 172.31.0.0 0.0.0.63 172.31.1.64 0.0.0.63

BUCARAMANGA(config)#access-list 112 permit ip 172.31.0.0 0.0.0.63 172.31.0.128 0.0.0.63

BUCARAMANGA(config)#int f0/0.10

BUCARAMANGA(config-subif)#ip access-group 112 in

BUCARAMANGA(config-subif)#exit

BUCARAMANGA(config)#exit

BUCARAMANGA#

%SYS-5-CONFIG_I: Configured from console by console

BUCARAMANGA#



Ilustración 79: Prueba desde PCO



Ilustración 80: Prueba desde PCO a Servidor EXTERNO

Los hosts de una VLAN no pueden acceder a los de otra VLAN en una ciudad.

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

BUCARAMANGA>enable

Password:

BUCARAMANGA#conf t

Enter configuration commands, one per line. End with CNTL/Z.

BUCARAMANGA(config)#int f0/0.10

BUCARAMANGA(config-subif)#access-list 113 deny ip 172.31.2.0 0.0.0.7 172.31.0.0 0.0.0.63

BUCARAMANGA(config)#access-list 113 deny ip 172.31.0.64 0.0.0.63 172.31.0.0 0.0.0.63

BUCARAMANGA(config)#access-list 113 permit ip any any

BUCARAMANGA(config)#int f0/0.10

BUCARAMANGA(config-subif)#ip access-group 113 out

BUCARAMANGA(config-subif)#exit

BUCARAMANGA(config)#exit

BUCARAMANGA#

%SYS-5-CONFIG_I: Configured from console by console

BUCARAMANGA#

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

TUNJA>enable

Password:

TUNJA#conf t

Enter configuration commands, one per line. End with CNTL/Z.

TUNJA(config)#access-list 113 deny ip 172.3.2.8 0.0.0.7 172.31.0.128 0.0.0.63

TUNJA(config)#access-list 113 deny ip 172.3.0.192 0.0.0.63 172.31.0.128 0.0.0.63

TUNJA(config)#access-list 113 permit ip any any

TUNJA(config)#int f0/0.20

TUNJA(config-subif)#ip access-group 113 out

TUNJA(config-subif)#exit

TUNJA(config)#exit

%SYS-5-CONFIG_I: Configured from console by console

TUNJA#

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

CUNDINAMARCA>enable

Password:

CUNDINAMARCA#conf t

Enter configuration commands, one per line. End with CNTL/Z.

CUNDINAMARCA(config)#access-list 113 deny ip 172.31.2.8 0.0.0.7 172.31.1.64 0.0.0.63

CUNDINAMARCA(config)#access-list 113 deny ip 172.31.1.0 0.0.0.63 172.31.1.64 0.0.0.63

CUNDINAMARCA(config)#access-list 113 deny ip 172.31.2.24 0.0.0.7 172.31.1.64 0.0.0.63

CUNDINAMARCA(config)#access-list 113 permit ip any any

CUNDINAMARCA(config)#int f0/0.20

CUNDINAMARCA(config-subif)#ip access-group 113 out

CUNDINAMARCA(config-subif)#exit

CUNDINAMARCA(config)#exit

CUNDINAMARCA#

%SYS-5-CONFIG_I: Configured from console by console

CUNDINAMARCA#



Ilustración 81: Prueba desde PC7



Ilustración 82: Prueba desde PCO



Ilustración 83: Prueba desde PC8

Solo los hosts de las VLAN administrativas y de la VLAN de servidores tienen accedo a los routers e internet.

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

BUCARAMANGA>enable

Password:

BUCARAMANGA#config t

Enter configuration commands, one per line. End with CNTL/Z.

BUCARAMANGA(config)#int f0/0.10

BUCARAMANGA(config-subif)#access-list 3 permit 172.31.2.0 0.0.0.7

BUCARAMANGA(config)#access-list 3 permit 172.3.2.8 0.0.0.7 BUCARAMANGA(config)#access-list 3 permit 172.31.2.8 0.0.0.7 BUCARAMANGA(config)#line vty 0 15 BUCARAMANGA(config-line)#access-class 3 in BUCARAMANGA(config-line)#exit BUCARAMANGA(config)#exit BUCARAMANGA(config)#exit BUCARAMANGA# %SYS-5-CONFIG_I: Configured from console by console BUCARAMANGA#

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

TUNJA>enable

Password:

TUNJA#config t

Enter configuration commands, one per line. End with CNTL/Z.

TUNJA(config)#int f0/0.20

TUNJA(config-subif)#access-list 3 permit 172.31.2.0 0.0.0.7

TUNJA(config)#access-list 3 permit 172.3.2.8 0.0.0.7

TUNJA(config)#access-list 3 permit 172.31.2.8 0.0.0.7

TUNJA(config)#line vty 0 15

TUNJA(config-line)#access-class 3 in

TUNJA(config-line)#exit

TUNJA(config)#exit
%SYS-5-CONFIG_I: Configured from console by console

TUNJA#

ACCESO RESTRINGIDO

User Access Verification

Username: administrador

Password:

CUNDINAMARCA>enable

Password:

CUNDINAMARCA#config t

Enter configuration commands, one per line. End with CNTL/Z.

CUNDINAMARCA(config)#int f0/0.20

CUNDINAMARCA(config-subif)#access-list 3 permit 172.31.2.0 0.0.0.7

CUNDINAMARCA(config)#access-list 3 permit 172.3.2.8 0.0.0.7

CUNDINAMARCA(config)#access-list 3 permit 172.31.2.8 0.0.0.7

CUNDINAMARCA(config)#line vty 0 15

CUNDINAMARCA(config-line)#access-class 3 in

CUNDINAMARCA(config-line)#exit

CUNDINAMARCA(config)#exit

CUNDINAMARCA#

%SYS-5-CONFIG_I: Configured from console by console

CUNDINAMARCA#

| Revitch BUCARAMANG | A | | | | _ | | Х | | |
|--|----------|-------------|-----------|---------|-----------|---------|------------|--|--|
| Physical Config | CLI | | | | | | | | |
| IOS Command Line Interface | | | | | | | | | |
| %LINEPROTO-5-UPDOWN: state to up | Line pro | otocol on 3 | Interface | FastEth | ernet0/2, | changed | ۱ ^ | | |
| <pre>%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up</pre> | | | | | | | | | |
| %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up | | | | | | | | | |
| &LINEPROTO-5-UPDOWN: Line protocol on Interface Vlanl, changed state to up | | | | | | | | | |
| BUCARAMANGA-SW>en BUCARAMANGA-SW#telnet 172.31.2.1 Trying 172.31.2.1OpenACCESO RESTRINGIDO | | | | | | | | | |
| User Access Verificat | ion | | | | | | | | |
| Username: administrac Password: BUCARAMANGA>enable Password: BUCARAMANGA# | lor | | | | | | ~ | | |
| | | | | | Сору | Paste | • | | |

Ilustración 84: Prueba desde Switch BUCARAMANGA

| 💐 Switch TU | ALNI | | | | | | _ | | × |
|---|---------------------------------|----------|----------|-----------|---------|-------|--------|----------|----|
| Physical | Config | CLI | | | | | | | |
| IOS Command Line Interface | | | | | | | | | |
| changed st | ate to up | | | | | | | | ^ |
| <pre>%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up</pre> | | | | | | | | | |
| <pre>%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up</pre> | | | | | | | | | |
| %LINEPROTO to up | -5-UPDOWN: | Line pro | otocol (| on Interi | face Vl | lanl, | change | ed state | |
| TUNJA-SW>enable TUNJA-SW#telnet 172.31.2.9 Trying 172.31.2.9OpenACCESO RESTRINGIDO | | | | | | | | | |
| User Access Verification | | | | | | | | | |
| Username: Password: CUNDINAMAR Password: CUNDINAMAR | administrac CA>enable CA# | lor | | | | | | | > |
| | | | | | | C | ору | Pas | te |

Ilustración 85: Prueba desde Switch TUNJA



Ilustración 86: Comunicación Final Escenario 2

CONCLUSIONES

- Packet Tracer es la herramienta de aprendizaje y simulación de redes interactiva que permite crear topologías de red, configurar dispositivos, insertar paquetes, simular e interactuar con dispositivos finales como PC`s o intermedios (host) como Swich y Routers. Además de una gran variedad de medios de transmisión en redes LAN y WAN soportando múltiples protocolos como por ejemplo, HTTP, TCP/IP, Telnet, SSH, TFTP, DHCP y DNS 2. TCP/UDP, IPv4, IPv6, Ethernet 802.3 y 802.11.
- Al desarrollar esta actividad se puede concluir que, existen protocolos sencillos y fáciles de implementar, los cuales ayudan a asignar un hostname, como también unas contraseñas de consola y del modo EXEC privilegiado las direcciones lp de las diferentes interfaces de los distintos dispositivos que conforman una red; haciendo énfasis en el router, donde se pueden usar protocolos para enrutar y comunicar a diferentes redes, tanto LAN como WAN.
- Los switches de capa 3 cada vez se hacen más imprescindible en centros de datos, redes empresariales complejas, aplicaciones comerciales e incluso en proyectos avanzados para clientes, ya que puede ejecutar enrutamiento estático y enrutamiento dinámico utilizando una tabla de direcciones MAC y una tabla de enrutamiento o de direcciones IP.
- Los switches de red Cisco están compuestos por una variedad de configuraciones que permiten administrar y Proteger de manera adecuada los sistemas de comunicaciones y los controles de acceso hacia los mismos, manteniendo así un óptimo desempeño y estabilidad den las comunicaciones
- La función Ping es un comando o una herramienta de diagnóstico que permite hacer una verificación del estado de una determinada conexión de un host local con al menos un equipo remoto de la red. Además, nos permite determinar si una dirección IP específica o host es accesible desde la red o no.
- Es muy importante guardar las configuraciones realizadas en una red y almacenarlas como archivos de copia de seguridad en caso de que se produzca un problema. Esto es una forma de proteger el tiempo y el esfuerzo invertidos en configurar un determinado equipo. Los archivos de configuración y los documentos de red se pueden almacenar en un servidor de protocolo trivial de transferencia de archivos (TFTP) o en una unidad USB. Esta práctica es parte fundamental del desarrollo de algún tipo de tolerancia a fallos dentro de la interconexión de redes construida.

BIBLIOGRAFIA

- CISCO. (2014). Exploración de la red. Fundamentos de Networking. Recuperado de <u>https://static-course-</u> assets.s3.amazonaws.com/ITN50ES/module1/index.html#1.0.1.1
- CISCO. (2014). Configuración de un sistema operativo de red. Fundamentos de Networking. Recuperado de <u>https://static-course-</u> <u>assets.s3.amazonaws.com/ITN50ES/module2/index.html#2.0.1.1</u>
- CISCO. (2014). Protocolos y comunicaciones de red. Fundamentos de Networking. Recuperado de <u>https://static-course-assets.s3.amazonaws.com/ITN50ES/module2/index.html#3.0.1.1</u>
- CISCO. (2014). Acceso a la red. Fundamentos de Networking. Recuperado de <u>https://static-course-</u> assets.s3.amazonaws.com/ITN50ES/module2/index.html#4.0.1.1
- CISCO. (2014). Capa de red. Fundamentos de Networking. Recuperado de <u>https://static-course-</u> <u>ssets.s3.amazonaws.com/ITN50ES/module2/index.html#6.0.1.1</u>