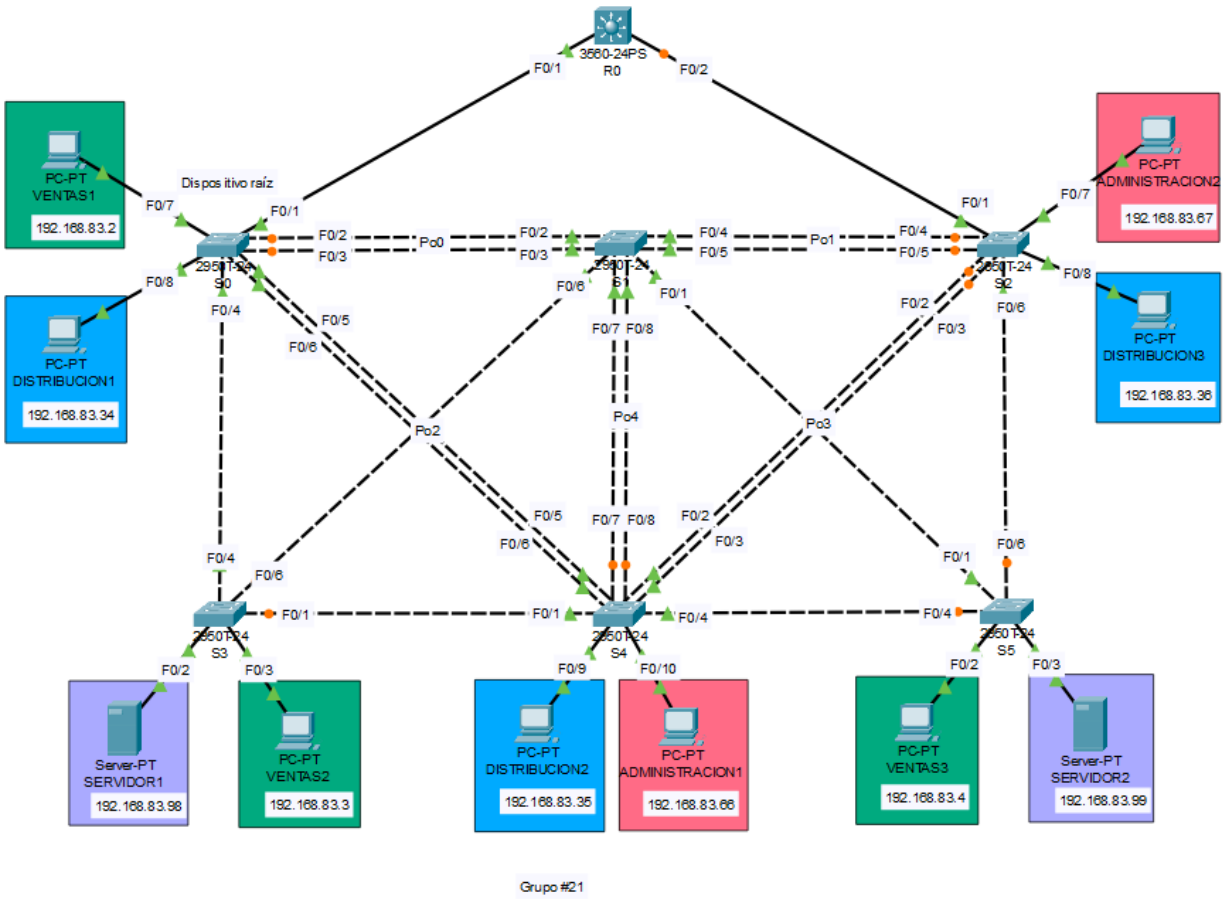
Grupo 21

Nombre	Carné
Cristian Francisco Meoño Canel	201801397
Josue Guillermo Orellana Cifuentes	201801366
Carlos Ojani Ng Valladares	201801434
Adriana Marié Gómez Dávila	201504236

Manual Técnico

Topología



Configuraciones realizadas

Vlans

Vlan	Nombre
13	Ventas
23	Distribuvión
33	Administración
43	Servidores
99	Management&Native
999	Black Hole

Vtp

Dominio y password: g21

Switch	Modo
R0	Server
S0	Client
S1	Client
S2	Client
S3	Client
S4	Client
S5	Client

Tabla de subredes

Aprovechamiento del 71% de 192.168.83.0/24

Vlan	Host	Ip de Red	Mascara	Primer Host	Ultimo Host	Broadcast
13	30	192.168.83.0 /27	255.255.255.224	192.168.83.1	192.168.83.30	192.168.83.31
23	30	192.168.83.32 /27	255.255.255.224	192.168.83.33	192.168.83.62	192.168.83.63
33	30	192.168.83.64 /27	255.255.255.224	192.168.83.65	192.168.83.94	192.168.83.95
43	30	192.168.83.96 /27	255.255.255.224	192.168.83.97	192.168.83.126	192.168.83.95
99	30	192.168.83.128 /27	255.255.255.224	192.168.83.129	192.168.83.158	192.168.83.159
999	30	192.168.83.160 /27	255.255.255.224	192.168.83.161	192.168.83.190	192.168.83.191

Configuración de Hosts

Host	Vlan	Ip	Mask	Gateway
VENTAS1	13	192.168.83.2	255.255.255.224	192.168.83.1
VENTAS2	13	192.168.83.3	255.255.255.224	192.168.83.1
VENTAS3	13	192.168.83.4	255.255.255.224	192.168.83.1
DISTRIBUCION1	23	192.168.83.34	255.255.255.224	192.168.83.33
DISTRIBUCION2	23	192.168.83.35	255.255.255.224	192.168.83.33
DISTRIBUCION3	23	192.168.83.36	255.255.255.224	192.168.83.33
ADMINISTRACION1	33	192.168.83.66	255.255.255.224	192.168.83.65
ADMINISTRACION2	33	192.168.83.67	255.255.255.224	192.168.83.65
SERVIDOR1	43	192.168.83.98	255.255.255.224	192.168.83.97
SERVIDOR2	43	192.168.83.99	255.255.255.224	192.168.83.97

Configuraciones de los dispositivos

Switch R0

Vtp, Vlan y Routing

config t
vlan 13
name ventas
exit

vlan 23
name distribucion
exit

vlan 33
name administracion
exit

vlan 43
name servidores
exit

vlan 99
name management&native
exit

vlan 999
name blackhole
exit

vtp domain g21
vtp password g21
vtp mode server
vtp version 2

interface vlan 13
ip add 192.168.83.1 255.255.255.224
no shutdown
exit

interface vlan 23
ip add 192.168.83.33 255.255.255.224
no shutdown
exit

interface vlan 33
ip add 192.168.83.65 255.255.255.224
no shutdown
exit

interface vlan 43
ip add 192.168.83.97 255.255.255.224
no shutdown
exit

ip routing

Seguridad de interfaces

config t
int range f0/3 - 24
switchport mode access
switchport access vlan 999
exit

int range f0/1 - 2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk native vlan 99
switchport trunk allowed vlan 1,13,23,33,43,99,999,1002-1005
exit

Switch S0

Vlan y EtherChannel

config t
int range f0/1 - 6
switchport mode trunk
switchport trunk allowed vlan 1,13,23,33,43,99,999,1002-1005
exit

vtp domain g21
vtp password g21
vtp mode client

interface f0/7
switchport mode access
switchport access vlan 13
exit

interface f0/8
switchport mode access
switchport access vlan 23
exit

int range f0/2 - 3
channel-protocol lacp
channel-group 1 mode active
exit

int range f0/5 - 6
channel-protocol lacp
channel-group 3 mode active
exit

Seguridad de interfaces

config t
int range f0/9 - 24
switchport mode access
switchport access vlan 999
exit

int range f0/1 - 6
switchport trunk native vlan 99
exit

interface f0/7
switchport port-security
switchport port-security maximum 5
switchport port-security mac-address sticky
exit

interface f0/8
switchport port-security
switchport port-security maximum 1
switchport port-security mac-address sticky
switchport port-security violation shutdown
exit

Switch S1

Vtp, Vlan y EtherChannel

config t
int range f0/1 - 8
switchport mode trunk
switchport trunk allowed vlan 1,13,23,33,43,99,999,1002-1005
exit

vtp domain g21
vtp password g21
vtp mode client

int range f0/2 - 3
channel-protocol lacp
channel-group 1 mode active
exit

int range f0/4 - 5
channel-protocol lacp
channel-group 2 mode active
exit

int range f0/7 - 8
channel-protocol lacp
channel-group 5 mode active
exit

Seguridad de interfaces

config t
int range f0/9 - 24
switchport mode access
switchport access vlan 999
exit

int range f0/1 - 8
switchport trunk native vlan 99
exit

Switch S2

Vtp, Vlan y EtherChannel

config t
int range f0/1 - 6
switchport mode trunk
switchport trunk allowed vlan 1,13,23,33,43,99,999,1002-1005
exit

vtp domain g21
vtp password g21
vtp mode client

interface f0/7
switchport mode access
switchport access vlan 33
exit

interface f0/8
switchport mode access
switchport access vlan 23
exit

int range f0/4 - 5
channel-protocol lacp
channel-group 2 mode active
exit

int range f0/2 - 3
channel-protocol lacp
channel-group 4 mode active
exit

Seguridad de interfaces

config t
int range f0/9 - 24
switchport mode access
switchport access vlan 999
exit

int range f0/1 - 6
switchport trunk native vlan 99
exit

int range f0/7 - 8
switchport port-security
switchport port-security maximum 1
switchport port-security mac-address sticky
switchport port-security violation shutdown
exit

Switch S3

Vtp, Vlan y EtherChannel

config t
int range f0/1,f0/4,f0/6
switchport mode trunk
switchport trunk allowed vlan 1,13,23,33,43,99,999,1002-1005
exit

vtp domain g21
vtp password g21
vtp mode client

interface f0/2
switchport mode access
switchport access vlan 43
exit

interface f0/3
switchport mode access
switchport access vlan 13
exit

Seguridad de interfaces

config t
int range f0/7 - 24,f0/5
switchport mode access
switchport access vlan 999
exit

int range f0/1,f0/4,f0/6
switchport trunk native vlan 99
exit

interface f0/3
switchport port-security
switchport port-security maximum 5
switchport port-security mac-address sticky
exit

Switch S4

Vtp, Vlan y EtherChannel

config t
int range f0/1 - 8
switchport mode trunk
switchport trunk allowed vlan 1,13,23,33,43,99,999,1002-1005
exit

vtp domain g21
vtp password g21
vtp mode client

interface f0/9
switchport mode access
switchport access vlan 23
exit

interface f0/10
switchport mode access
switchport access vlan 33
exit

int range f0/5 - 6
channel-protocol lacp
channel-group 3 mode active
exit

int range f0/2 - 3
channel-protocol lacp
channel-group 4 mode active
exit

int range f0/7 - 8
channel-protocol lacp
channel-group 5 mode active
exit

Seguridad de interfaces

config t
int range f0/11 - 24
switchport mode access
switchport access vlan 999
exit

int range f0/1 - 8
switchport trunk native vlan 99
exit

int range f0/9 - 10
switchport port-security
switchport port-security maximum 1
switchport port-security mac-address sticky
switchport port-security violation shutdown
exit

Switch S5

Vtp, Vlan y EtherChannel

config t
int range f0/1,f0/4,f0/6
switchport mode trunk
switchport trunk allowed vlan 1,13,23,33,43,99,999,1002-1005

vtp domain g21
vtp password g21
vtp mode client

interface f0/2
switchport mode access
switchport access vlan 13
exit

interface f0/3
switchport mode access
switchport access vlan 43
exit

Seguridad de interfaces

config t
int range f0/7 - 24,f0/5
switchport mode access
switchport access vlan 999
exit

int range f0/1,f0/4,f0/6
switchport trunk native vlan 99
exit

interface f0/2
switchport port-security
switchport port-security maximum 5
switchport port-security mac-address sticky
exit

Escenario 1 – LACP y PVST
De los switches S0 - S5, activar STP y definir modo PVST
enable
config t
spanning-tree mode pvst

Escenario 2 – LACP y RPVST
De los switches S0 - S5, activar STP y definir modo PVST
enable
config t
spanning-tree mode rapid-pvst

Escenario de mejor convergencia

Para determiar el dispositivo raíz, hay que observar que en Root y Bridge tengan la misma dirección MAC y que en las interfaces estén con el rol "desg"
En el escenario 1 y 2, el dispositivo raíz es S0
sh spanning-tree

Luego, hay que verificar en qué modo esta el switch con el siguiente comando (PVST o RPVST)
do show sp sum

Después, debemos mantener un ping extendido en las máquinas
ping -t numero_ip

En este punto, debemos de cambiar al modo contrario del que se encuentra el switch, con el siguiente comando:
spanning-tree mode pvst

o bien
spanning-tree mode rapid-pvst

Tomamos nota con cronómetro para medir la convergencia y estos fueron los resultados:

Escenario	Tipo Ethernet channel	Protocolo spanning tree	Tiempo en tomar la conexión
1	LACP	PVST	46 segundos
2	LACP	R-PVST	16 segundos
3	PAgP	PVST	63 segundos
4	PAgP	R-PVST	42 segundos

Como conclusión, dejamos la configuración RPVST porque como se puede apreciar en la tabla, su tiempo de reacción es más rápido que el PVST.

El EtherChannel se configuro con LACP
Para cambiar a PAGP, se debe cambiar en la configuracion DE CADA SWITCH y cada interfaz que tenga EtherChannel
Por ejemplo en S0

Cambiar esto

int range f0/2 - 3
channel-protocol lacp
channel-group 1 mode active
exit

int range f0/5 - 6
channel-protocol lacp
channel-group 3 mode active
exit

por esto

int range f0/2 - 3
channel-protocol pagp
channel-group 1 mode on auto
exit

int range f0/5 - 6
channel-protocol pagp
channel-group 3 mode on auto
exit