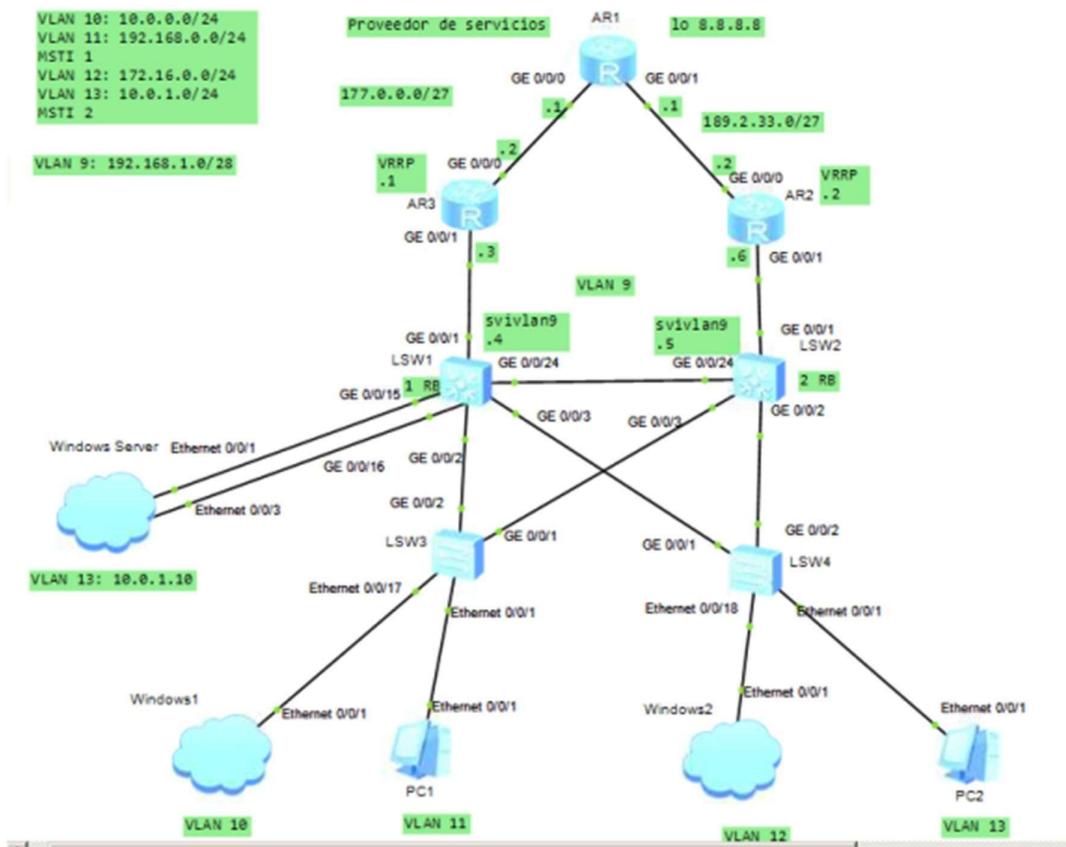


ENSP:



- Configure los switches de capa 3 SW1 y SW2 con interfaces SVI, las cuales trabajarán como gateway de cada vlan.

```

LSW1
AR1 AR3 AR2 LSW2 LSW1 LSW3 LSW4
The number of interface that is DOWN in Physical is 1
The number of interface that is UP in Protocol is 6
The number of interface that is DOWN in Protocol is 2

Interface          IP Address/Mask      Physical   Protocol
METH0/0/1          unassigned           down       down
NULL0              unassigned           up        up(s)
Vlanif1            unassigned           up        down
Vlanif9            192.168.1.4/28       up        up
Vlanif10           10.0.0.2/24          up        up
Vlanif11           192.168.0.2/24       up        up
Vlanif12           172.16.0.2/24         up        up
Vlanif13           10.0.1.2/24          up        up
[Huawei]
[Huawei]

```

LSW2

AR1	AR3	AR2	LSW2	LSW1	LSW3	LSW4
(s): spoofing						
The number of interface that is UP in Physical is 7						
The number of interface that is DOWN in Physical is 1						
The number of interface that is UP in Protocol is 6						
The number of interface that is DOWN in Protocol is 2						
Interface IP Address/Mask Physical Protocol						
Metho/0/1	unassigned	down	down			
NULL0	unassigned	up	up(s)			
Vlanif1	unassigned	up	down			
Vlanif9	192.168.1.5/28	up	up			
Vlanif10	10.0.0.3/24	up	up			
Vlanif11	192.168.0.3/24	up	up			
Vlanif12	172.16.0.3/24	up	up			
Vlanif13	10.0.1.3/24	up	up			
[Huawei]						
[Huawei]						

- Configure VRRP en eSNP y HSRP en GNS3 en los dos routers. Estos deberán estar en la red 192.168.1.0/28. El máster deberá ser el R1 y el Backup el R2, para el vrid 1; y el máster deberá ser el R2 y el Backup el R1, para el vrid 2.

AR3

AR1	AR3	AR2	LSW2	LSW1	LSW3	LSW4
<Huawei>display vr						
<Huawei>display vrrp						
GigabitEthernet0/0/1 Virtual Router 1						
State : Master						
Virtual IP : 192.168.1.1						
Master IP : 192.168.1.3						
PriorityRun : 120						
PriorityConfig : 120						
MasterPriority : 120						
Preempt : YES Delay Time : 0 s						
TimerRun : 1 s						
TimerConfig : 1 s						
Auth type : NONE						
Virtual MAC : 0000-5e00-0101						
Check TTL : YES						
Config type : normal-vrrp						
Backup-forward : disabled						
Create time : 2025-09-01 23:45:01 UTC-08:00						
Last change time : 2025-09-01 23:45:05 UTC-08:00						
GigabitEthernet0/0/1 Virtual Router 2						
State : Backup						
Virtual IP : 192.168.1.2						
Master IP : 192.168.1.6						
PriorityRun : 100						
PriorityConfig : 100						
MasterPriority : 120						
Preempt : YES Delay Time : 0 s						
TimerRun : 1 s						
TimerConfig : 1 s						

AR3

AR1	AR3	AR2	LSW2	LSW1	LSW3	LSW4
-----	-----	-----	------	------	------	------

```
Backup-forward : disabled
Create time : 2025-09-01 23:45:01 UTC-08:00
Last change time : 2025-09-01 23:45:05 UTC-08:00

GigabitEthernet0/0/1 | Virtual Router 2
State : Backup
Virtual IP : 192.168.1.2
Master IP : 192.168.1.6
PriorityRun : 100
PriorityConfig : 100
MasterPriority : 120
Preempt : YES Delay Time : 0 s
TimerRun : 1 s
TimerConfig : 1 s
Auth type : NONE
Virtual MAC : 0000-5e00-0102
Check TTL : YES
Config type : normal-vrrp
Backup-forward : disabled
Create time : 2025-09-01 23:45:33 UTC-08:00
Last change time : 2025-09-02 00:29:42 UTC-08:00

<Huawei>display vrrp br
<Huawei>display vrrp brief
Total:2 Master:1 Backup:1 Non-active:0
VRID State Interface Type Virtual IP
--->
1 Master GEOF/0/1 Normal 192.168.1.1
2 Backup GEOF/0/1 Normal 192.168.1.2
<Huawei>
```

AR2

AR1	AR3	AR2	LSW2	LSW1	LSW3	LSW4
-----	-----	-----	------	------	------	------

```
<Huawei>display vrrp
GigabitEthernet0/0/1 | Virtual Router 1
State : Backup
Virtual IP : 192.168.1.1
Master IP : 192.168.1.3
PriorityRun : 100
PriorityConfig : 100
MasterPriority : 120
Preempt : YES Delay Time : 0 s
TimerRun : 1 s
TimerConfig : 1 s
Auth type : NONE
Virtual MAC : 0000-5e00-0101
Check TTL : YES
Config type : normal-vrrp
Backup-forward : disabled
Create time : 2025-09-01 23:47:18 UTC-08:00
Last change time : 2025-09-02 00:29:42 UTC-08:00

GigabitEthernet0/0/1 | Virtual Router 2
State : Master
Virtual IP : 192.168.1.2
Master IP : 192.168.1.6
PriorityRun : 120
PriorityConfig : 120
MasterPriority : 120
Preempt : YES Delay Time : 0 s
TimerRun : 1 s
TimerConfig : 1 s
---- More ----
```

AR2

VRID	State	Interface	Type	Virtual IP
1	Backup	GEO/0/1	Normal	192.168.1.1
2	Master	GEO/0/1	Normal	192.168.1.2

- Configurar una ruta por defecto que tenga como siguiente salto la dirección del router virtual, desde el SW1 a la virtual ip del vrid 1 y el SW2 a la virtual ip del vrid 2.

LSW1

Destination/Mask	Proto	Pre	Cost	Flags	NextHop	Interface
0.0.0.0/0	Static	60	0	RD	192.168.1.1	Vlanif9
10.0.0.0/24	Direct	0	0	D	10.0.0.2	Vlanif10
10.0.0.1/32	Direct	0	0	D	127.0.0.1	Vlanif10
10.0.0.2/32	Direct	0	0	D	127.0.0.1	Vlanif10
10.0.1.0/24	Direct	0	0	D	10.0.1.2	Vlanif13
10.0.1.2/32	Direct	0	0	D	127.0.0.1	Vlanif13
127.0.0.0/8	Direct	0	0	D	127.0.0.1	InLoopBack0
127.0.0.1/32	Direct	0	0	D	127.0.0.1	InLoopBack0
172.16.0.0/24	Direct	0	0	D	172.16.0.2	Vlanif12
172.16.0.2/32	Direct	0	0	D	127.0.0.1	Vlanif12
192.168.0.0/24	Direct	0	0	D	192.168.0.2	Vlanif11
192.168.0.1/32	Direct	0	0	D	127.0.0.1	Vlanif11
192.168.0.2/32	Direct	0	0	D	127.0.0.1	Vlanif11
192.168.1.0/28	Direct	0	0	D	192.168.1.4	Vlanif9
192.168.1.4/32	Direct	0	0	D	127.0.0.1	Vlanif9

LSW1

interface GigabitEthernet0/0/24	port link-type trunk	port trunk allow-pass vlan 9 to 13
#	interface NULL0	#
#	ip route-static 0.0.0.0 0.0.0.0 192.168.1.1	#
#	user-interface con 0	user-interface vty 0 4
#	return	

LSW2

AR1	AR3	AR2	LSW2	LSW1	LSW3	LSW4
-----	-----	-----	------	------	------	------

```
[Huawei]
[Huawei]
[Huawei]
[Huawei]dis
[Huawei]display ip ro
[Huawei]display ip routing-table
Route Flags: R - relay, D - download to fib
-----
Routing Tables: Public
    Destinations : 15      Routes : 15

Destination/Mask   Proto   Pre  Cost      Flags NextHop       Interface
0.0.0.0/0          Static  60   0          RD   192.168.1.2   Vlanif9
10.0.0.0/24        Direct  0   0          D   10.0.0.3     Vlanif10
10.0.0.3/32        Direct  0   0          D   127.0.0.1     Vlanif10
10.0.1.0/24        Direct  0   0          D   10.0.1.3     Vlanif13
10.0.1.1/32        Direct  0   0          D   127.0.0.1     Vlanif13
10.0.1.3/32        Direct  0   0          D   127.0.0.1     Vlanif13
127.0.0.0/8         Direct  0   0          D   127.0.0.1     InLoopBack0
127.0.0.1/32        Direct  0   0          D   127.0.0.1     InLoopBack0
172.16.0.0/24       Direct  0   0          D   172.16.0.3    Vlanif12
172.16.0.1/32       Direct  0   0          D   127.0.0.1     Vlanif12
172.16.0.3/32       Direct  0   0          D   127.0.0.1     Vlanif12
192.168.0.0/24      Direct  0   0          D   192.168.0.3   Vlanif11
192.168.0.3/32      Direct  0   0          D   127.0.0.1     Vlanif11
192.168.1.0/28      Direct  0   0          D   192.168.1.5   Vlanif9
192.168.1.5/32      Direct  0   0          D   127.0.0.1     Vlanif9

[Huawei]
```

LSW2

AR1	AR3	AR2	LSW2	LSW1
-----	-----	-----	------	------

```
interface GigabitEthernet0/0/24
port link-type trunk
port trunk allow-pass vlan 9 to 13
#
interface NULL0
#
ip route-static 0.0.0.0 0.0.0.0 192.168.1.2
#
user-interface con 0
user-interface vty 0 4
#
return

[Huawei]
```

- Configurar las rutas de vuelta hacia las redes privadas, desde los routers Router1 y Router2.

AR3

AR1	AR3	AR2	LSW2	LSW1	LSW3	LSW4
-----	-----	-----	------	------	------	------

```
interface GigabitEthernet0/0/1
ip address 192.168.1.3 255.255.255.240
vrrp vrid 1 virtual-ip 192.168.1.1
vrrp vrid 1 priority 120
vrrp vrid 2 virtual-ip 192.168.1.2
#
interface NULL0
#
ip route-static 0.0.0.0 0.0.0.0 177.0.0.1
ip route-static 10.0.0.0 255.255.255.0 192.168.1.4
ip route-static 10.0.1.0 255.255.255.0 192.168.1.4
ip route-static 172.16.0.0 255.255.255.0 192.168.1.4
ip route-static 192.168.0.0 255.255.255.0 192.168.1.4
#
user-interface con 0
authentication-mode password
user-interface vty 0 4
user-interface vty 16 20
#
wlan ac
#
```

AR2

AR1	AR3	AR2	LSW2	LSW1	LSW3	LSW4
-----	-----	-----	------	------	------	------

```
#
interface GigabitEthernet0/0/1
ip address 192.168.1.6 255.255.255.240
vrrp vrid 1 virtual-ip 192.168.1.1
vrrp vrid 2 virtual-ip 192.168.1.2
vrrp vrid 2 priority 120
#
interface NULL0
#
ip route-static 0.0.0.0 0.0.0.0 189.2.33.1
ip route-static 10.0.0.0 255.255.255.0 192.168.1.5
ip route-static 10.0.1.0 255.255.255.0 192.168.1.5
ip route-static 172.16.0.0 255.255.255.0 192.168.1.5
ip route-static 192.168.0.0 255.255.255.0 192.168.1.5
#
user-interface con 0
authentication-mode password
user-interface vty 0 4
user-interface vty 16 20
#
wlan ac
#
return
<Huawei>
<Huawei>
<Huawei>
#
```

- Configure las vlans indicadas, en todos los switches y también los enlaces troncales.

LSW1

Port	Link Type	PVID	Trunk VLAN List
GigabitEthernet0/0/1	access	9	-
GigabitEthernet0/0/2	trunk	1	1 10-13
GigabitEthernet0/0/3	trunk	1	1 10-13
GigabitEthernet0/0/4	hybrid	1	-
GigabitEthernet0/0/5	hybrid	1	-
GigabitEthernet0/0/6	hybrid	1	-
GigabitEthernet0/0/7	hybrid	1	-
GigabitEthernet0/0/8	hybrid	1	-
GigabitEthernet0/0/9	hybrid	1	-
GigabitEthernet0/0/10	hybrid	1	-
GigabitEthernet0/0/11	hybrid	1	-
GigabitEthernet0/0/12	hybrid	1	-
GigabitEthernet0/0/13	hybrid	1	-
GigabitEthernet0/0/14	hybrid	1	-
GigabitEthernet0/0/15	access	13	-
GigabitEthernet0/0/16	access	13	-
GigabitEthernet0/0/17	hybrid	1	-
GigabitEthernet0/0/18	hybrid	1	-
GigabitEthernet0/0/19	hybrid	1	-
GigabitEthernet0/0/20	hybrid	1	-
GigabitEthernet0/0/21	hybrid	1	-
GigabitEthernet0/0/22	hybrid	1	-
GigabitEthernet0/0/23	hybrid	1	-
GigabitEthernet0/0/24	trunk	1	1 9-13

<Huawei>

LSW2

Port	Link Type	PVID	Trunk VLAN List
GigabitEthernet0/0/1	access	9	-
GigabitEthernet0/0/2	trunk	1	1 10-13
GigabitEthernet0/0/3	trunk	1	1 10-13
GigabitEthernet0/0/4	hybrid	1	-
GigabitEthernet0/0/5	hybrid	1	-
GigabitEthernet0/0/6	hybrid	1	-
GigabitEthernet0/0/7	hybrid	1	-
GigabitEthernet0/0/8	hybrid	1	-
GigabitEthernet0/0/9	hybrid	1	-
GigabitEthernet0/0/10	hybrid	1	-
GigabitEthernet0/0/11	hybrid	1	-
GigabitEthernet0/0/12	hybrid	1	-
GigabitEthernet0/0/13	hybrid	1	-
GigabitEthernet0/0/14	hybrid	1	-
GigabitEthernet0/0/15	hybrid	1	-
GigabitEthernet0/0/16	hybrid	1	-
GigabitEthernet0/0/17	hybrid	1	-
GigabitEthernet0/0/18	hybrid	1	-
GigabitEthernet0/0/19	hybrid	1	-
GigabitEthernet0/0/20	hybrid	1	-
GigabitEthernet0/0/21	hybrid	1	-
GigabitEthernet0/0/22	hybrid	1	-
GigabitEthernet0/0/23	hybrid	1	-
GigabitEthernet0/0/24	trunk	1	1 9-13

<Huawei>

LSW3

Port	Link Type	PVID	Trunk VLAN List
Ethernet0/0/1	access	11	-
Ethernet0/0/2	hybrid	1	-
Ethernet0/0/3	hybrid	1	-
Ethernet0/0/4	hybrid	1	-
Ethernet0/0/5	hybrid	1	-
Ethernet0/0/6	hybrid	1	-
Ethernet0/0/7	hybrid	1	-
Ethernet0/0/8	hybrid	1	-
Ethernet0/0/9	hybrid	1	-
Ethernet0/0/10	hybrid	1	-
Ethernet0/0/11	hybrid	1	-
Ethernet0/0/12	hybrid	1	-
Ethernet0/0/13	hybrid	1	-
Ethernet0/0/14	hybrid	1	-
Ethernet0/0/15	hybrid	1	-
Ethernet0/0/16	hybrid	1	-
Ethernet0/0/17	access	10	-
Ethernet0/0/18	hybrid	1	-
Ethernet0/0/19	hybrid	1	-
Ethernet0/0/20	hybrid	1	-
Ethernet0/0/21	hybrid	1	-
Ethernet0/0/22	hybrid	1	-
GigabitEthernet0/0/1	trunk	1	1 10-13
GigabitEthernet0/0/2	trunk	1	1 10-13

<Huawei>

LSW4

Port	Link Type	PVID	Trunk VLAN List
Ethernet0/0/1	access	13	-
Ethernet0/0/2	hybrid	1	-
Ethernet0/0/3	hybrid	1	-
Ethernet0/0/4	hybrid	1	-
Ethernet0/0/5	hybrid	1	-
Ethernet0/0/6	hybrid	1	-
Ethernet0/0/7	hybrid	1	-
Ethernet0/0/8	hybrid	1	-
Ethernet0/0/9	hybrid	1	-
Ethernet0/0/10	hybrid	1	-
Ethernet0/0/11	hybrid	1	-
Ethernet0/0/12	hybrid	1	-
Ethernet0/0/13	hybrid	1	-
Ethernet0/0/14	hybrid	1	-
Ethernet0/0/15	hybrid	1	-
Ethernet0/0/16	hybrid	1	-
Ethernet0/0/17	hybrid	1	-
Ethernet0/0/18	access	12	-
Ethernet0/0/19	hybrid	1	-
Ethernet0/0/20	hybrid	1	-
Ethernet0/0/21	hybrid	1	-
Ethernet0/0/22	hybrid	1	-
GigabitEthernet0/0/1	trunk	1	1 10-13
GigabitEthernet0/0/2	trunk	1	1 10-13

<Huawei>

- Configurar VRRP en los switches de capa 3 SW1 y SW2. Para que así cada Gateway tenga alta disponibilidad. Los gws de las vlans 10 y 11 deben ser maestros en el SW1; y los gws de las vlans 12 y 13 deben ser maestros en el SW2.

LSW1

VRID	State	Interface	Type	Virtual IP
10	Master	Vlanif10	Normal	10.0.0.1
11	Master	Vlanif11	Normal	192.168.0.1
12	Backup	Vlanif12	Normal	172.16.0.1
13	Backup	Vlanif13	Normal	10.0.1.1

Total:4 Master:2 Backup:2 Non-active:0

LSW2

VRID	State	Interface	Type	Virtual IP
10	Backup	Vlanif10	Normal	10.0.0.1
11	Backup	Vlanif11	Normal	192.168.0.1
12	Master	Vlanif12	Normal	172.16.0.1
13	Master	Vlanif13	Normal	10.0.1.1

Total:4 Master:2 Backup:2 Non-active:0

- Configurar en eNSP MSTP, teniendo dos instancias: la primera con las vlans 10 y 11; la segunda con las vlans 12 y 13. Con MSTP establezca el SW1 como root bridge para la instancia 1 y el SW2 como root para la instancia 2.

LSW1

MSTID	Port	Role	STP State	Protection
0	GigabitEthernet0/0/1	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/2	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/3	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/15	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/16	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/24	ROOT	FORWARDING	NONE
1	GigabitEthernet0/0/2	DESI	FORWARDING	NONE
1	GigabitEthernet0/0/3	DESI	FORWARDING	NONE
1	GigabitEthernet0/0/24	DESI	FORWARDING	NONE
2	GigabitEthernet0/0/2	DESI	FORWARDING	NONE
2	GigabitEthernet0/0/3	DESI	FORWARDING	NONE
2	GigabitEthernet0/0/15	DESI	FORWARDING	NONE
2	GigabitEthernet0/0/16	DESI	FORWARDING	NONE
2	GigabitEthernet0/0/24	ROOT	FORWARDING	NONE

LSW1

MSTID	Port	Role	STP State	Protection
0	GigabitEthernet0/0/1	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/2	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/3	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/15	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/16	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/24	ROOT	FORWARDING	NONE
1	GigabitEthernet0/0/2	DESI	FORWARDING	NONE
1	GigabitEthernet0/0/3	DESI	FORWARDING	NONE
1	GigabitEthernet0/0/24	DESI	FORWARDING	NONE
2	GigabitEthernet0/0/2	DESI	FORWARDING	NONE
2	GigabitEthernet0/0/3	DESI	FORWARDING	NONE
2	GigabitEthernet0/0/15	DESI	FORWARDING	NONE
2	GigabitEthernet0/0/16	DESI	FORWARDING	NONE
2	GigabitEthernet0/0/24	ROOT	FORWARDING	NONE

LSW2

MSTID	Port	Role	STP State	Protection
0	GigabitEthernet0/0/1	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/2	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/3	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/24	DESI	FORWARDING	NONE
1	GigabitEthernet0/0/2	DESI	FORWARDING	NONE
1	GigabitEthernet0/0/3	DESI	FORWARDING	NONE
1	GigabitEthernet0/0/24	ROOT	FORWARDING	NONE
2	GigabitEthernet0/0/2	DESI	FORWARDING	NONE
2	GigabitEthernet0/0/3	DESI	FORWARDING	NONE
2	GigabitEthernet0/0/24	DESI	FORWARDING	NONE

LSW2

AR1	AR3	AR2	LSW2	LSW1	LSW3
-----	-----	-----	------	------	------

```
<Huawei>display current-configuration
#
sysname Huawei
#
vlan batch 9 to 13
#
stp instance 1 root secondary
stp instance 2 root primary
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
stp region-configuration
region-name huawei
instance 1 vlan 10 to 11
instance 2 vlan 12 to 13
active region-configuration
#
drop-profile default
#
aaa
```

- Configure PAT para que las redes de las vlans 10, 11, 12 y 13 para que puedan acceder a Internet. Realice pruebas de conexión a Internet haciendo ping a la dirección remota 8.8.8.8. Esto se debe realizar en los dos routers, Router 1 y Router2. Tanto en eSNP y GNS3.

AR3

AR1	AR3	AR2	LSW2	LSW1	LSW3	LSW4
-----	-----	-----	------	------	------	------

```
[Huawei]display current-configuration
[V200R003C00]
#
snmp-agent local-engineid 800007DB0300000000000000
snmp-agent
#
clock timezone China-Standard-Time minus 08:00:00
#
portal local-server load portalpage.zip
#
drop illegal-mac alarm
#
set cpu-usage threshold 80 restore 75
#
acl number 2000
rule 10 permit source 10.0.0.0 0.0.0.255
rule 20 permit source 10.0.1.0 0.0.0.255
rule 30 permit source 192.168.0.0 0.0.0.255
rule 40 permit source 172.16.0.0 0.0.0.255
#
aaa
authentication-scheme default
authorization-scheme default
accounting-scheme default
domain default
domain default admin
```

AR3

AR1	AR3	AR2	LSW2	LSW1	LSW3	LSW4
-----	-----	-----	------	------	------	------

```
rule 20 permit source 10.0.1.0 0.0.0.255
rule 30 permit source 192.168.0.0 0.0.0.255
rule 40 permit source 172.16.0.0 0.0.0.255
#
aaa
    authentication-scheme default
    authorization-scheme default
    accounting-scheme default
    domain default
    domain default_admin
    local-user admin password cipher %$%$K8m.Nt84DZ)e#<0`8bmE3Uw)%$%
    local-user admin service-type http
#
firewall zone Local
priority 15
#
nat address-group 1 177.0.0.5 177.0.0.10
#
interface Ethernet0/0/0
#
interface Ethernet0/0/1
#
```

AR3

AR3	AR2
-----	-----

```
#
interface Ethernet0/0/6
#
interface Ethernet0/0/7
#
interface GigabitEthernet0/0/0
ip address 177.0.0.2 255.255.255.224
nat static global 177.0.0.3 inside 10.0.1.10 netmask 255.255.255.255
nat outbound 2000 address-group 1
#
interface GigabitEthernet0/0/1
ip address 192.168.1.3 255.255.255.240
vrrp vrid 1 virtual-ip 192.168.1.1
vrrp vrid 1 priority 120
vrrp vrid 2 virtual-ip 192.168.1.2
#
interface NULL0
#
ip route-static 0.0.0.0 0.0.0.0 177.0.0.1
ip route-static 10.0.0.0 255.255.255.0 192.168.1.4
ip route-static 10.0.1.0 255.255.255.0 192.168.1.4
ip route-static 172.16.0.0 255.255.255.0 192.168.1.4
ip route-static 192.168.0.0 255.255.255.0 192.168.1.4
#
user-interface con 0
```

AR2

AR1	AR3	AR2	LSW2	LSW1	LSW3	LSW4
-----	-----	-----	------	------	------	------

```
[Huawei]display current-configuration
[V200R003C00]
#
snmp-agent local-engineid 800007DB03000000000000
snmp-agent
#
clock timezone China-Standard-Time minus 08:00:00
#
portal local-server load portalpage.zip
#
drop illegal-mac alarm
#
set cpu-usage threshold 80 restore 75
#
acl number 2000
rule 10 permit source 10.0.0.0 0.0.0.255
rule 20 permit source 10.0.1.0 0.0.0.255
rule 30 permit source 192.168.0.0 0.0.0.255
rule 40 permit source 172.16.0.0 0.0.0.255
#
aaa
authentication-scheme default
authorization-scheme default
accounting-scheme default
domain default
domain default_admin
local-user admin password cipher %S%$K8m.Nt84DZ)e#<0`8bmE3Uw)%S%
local-user admin service-type http
#
```

AR2

AR1	AR3	AR2	LSW2	LSW1	LSW3	LSW4
-----	-----	-----	------	------	------	------

```
authentication-scheme default
authorization-scheme default
accounting-scheme default
domain default
domain default_admin
local-user admin password cipher %S%$K8m.Nt84DZ)e#<0`8bmE3Uw)%S%
local-user admin service-type http
#
firewall zone Local
priority 15
#
nat address-group 1 189.2.33.5 189.2.33.10
#
interface Ethernet0/0/0
#
interface Ethernet0/0/1
#
```

AR2

AR3 AR2

```
#  
interface Ethernet0/0/6  
#  
interface Ethernet0/0/7  
#  
interface GigabitEthernet0/0/0  
ip address 189.2.33.2 255.255.255.224  
nat static global 189.2.33.3 inside 10.0.1.10 netmask 255.255.255.255  
nat outbound 2000 address-group 1  
#  
interface GigabitEthernet0/0/1  
ip address 192.168.1.6 255.255.255.240  
vrrp vrid 1 virtual-ip 192.168.1.1  
vrrp vrid 2 virtual-ip 192.168.1.2  
vrrp vrid 2 priority 120  
#  
interface NULL0  
#  
ip route-static 0.0.0.0 0.0.0.0 189.2.33.1  
ip route-static 10.0.0.0 255.255.255.0 192.168.1.5
```

PC2

Basic Config Command MCPacket UDPacket Console

```
PC>ping 8.8.8.8

Ping 8.8.8.8: 32 data bytes, Press Ctrl_C to break
Request timeout!
From 8.8.8.8: bytes=32 seq=2 ttl=253 time=297 ms
From 8.8.8.8: bytes=32 seq=3 ttl=253 time=47 ms
From 8.8.8.8: bytes=32 seq=4 ttl=253 time=78 ms
From 8.8.8.8: bytes=32 seq=5 ttl=253 time=62 ms

--- 8.8.8.8 ping statistics ---
5 packet(s) transmitted
4 packet(s) received
20.00% packet loss
round-trip min/avg/max = 0/121/297 ms

PC>
PC>
PC>
```

PC1

Basic Config Command MCPacket UdpPacket Console

```
Link local IPv6 address.....: fe80::5689:98ff:fef8:1bd8
IPv6 address.....: :: / 128
IPv6 gateway.....: ::
IPv4 address.....: 192.168.0.254
Subnet mask.....: 255.255.255.0
Gateway.....: 192.168.0.1
Physical address.....: 54-89-98-F8-1B-D8
DNS server.....: 8.8.8.8

PC>ping 8.8.8.8

Ping 8.8.8.8: 32 data bytes, Press Ctrl_C to break
From 8.8.8.8: bytes=32 seq=1 ttl=253 time=234 ms
From 8.8.8.8: bytes=32 seq=2 ttl=253 time=110 ms
From 8.8.8.8: bytes=32 seq=3 ttl=253 time=109 ms
From 8.8.8.8: bytes=32 seq=4 ttl=253 time=63 ms
From 8.8.8.8: bytes=32 seq=5 ttl=253 time=78 ms

--- 8.8.8.8 ping statistics ---
5 packet(s) transmitted
5 packet(s) received
0.00% packet loss
round-trip min/avg/max = 63/118/234 ms
```

Windows 7_1 practica4 ENSP [Corriendo] - Oracle VM VirtualBox

Archivo Máquina Ver Entrada Dispositivos Ayuda

C:\Windows\system32\cmd.exe

```
C:>Users>pc-1>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=92ms TTL=253
Reply from 8.8.8.8: bytes=32 time=71ms TTL=253
Reply from 8.8.8.8: bytes=32 time=104ms TTL=253
Reply from 8.8.8.8: bytes=32 time=112ms TTL=253

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 71ms, Maximum = 112ms, Average = 94ms

C:>Users>pc-1>
C:>Users>pc-1>
C:>Users>pc-1>
```

Windows 7_2 practica4 ENSP [Corriendo] - Oracle VM VirtualBox

Archivo Máquina Ver Entrada Dispositivos Ayuda

C:\Windows\system32\cmd.exe

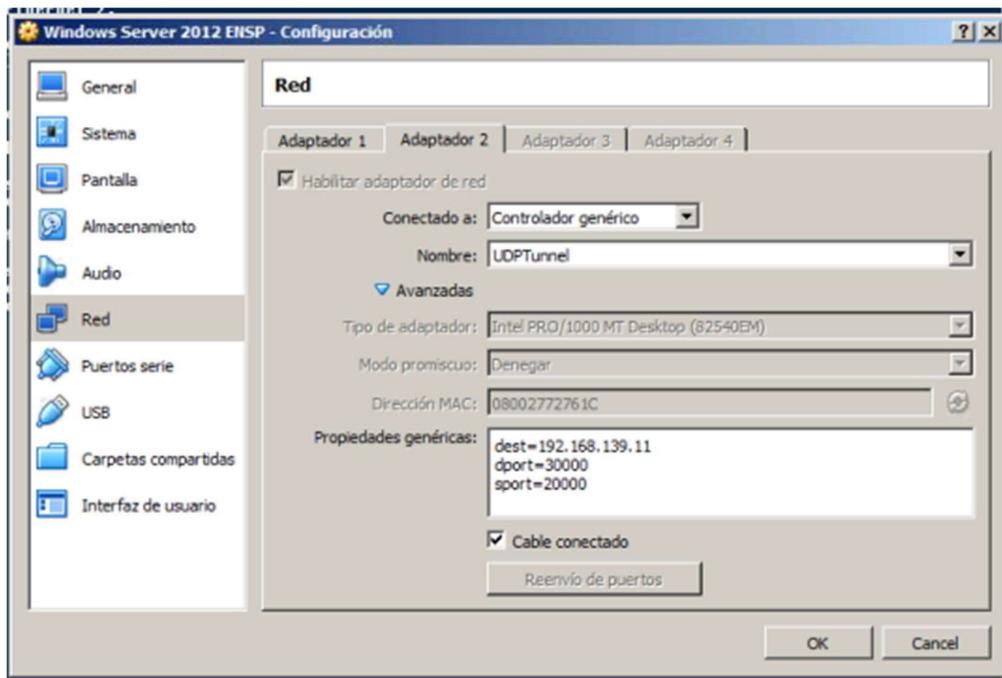
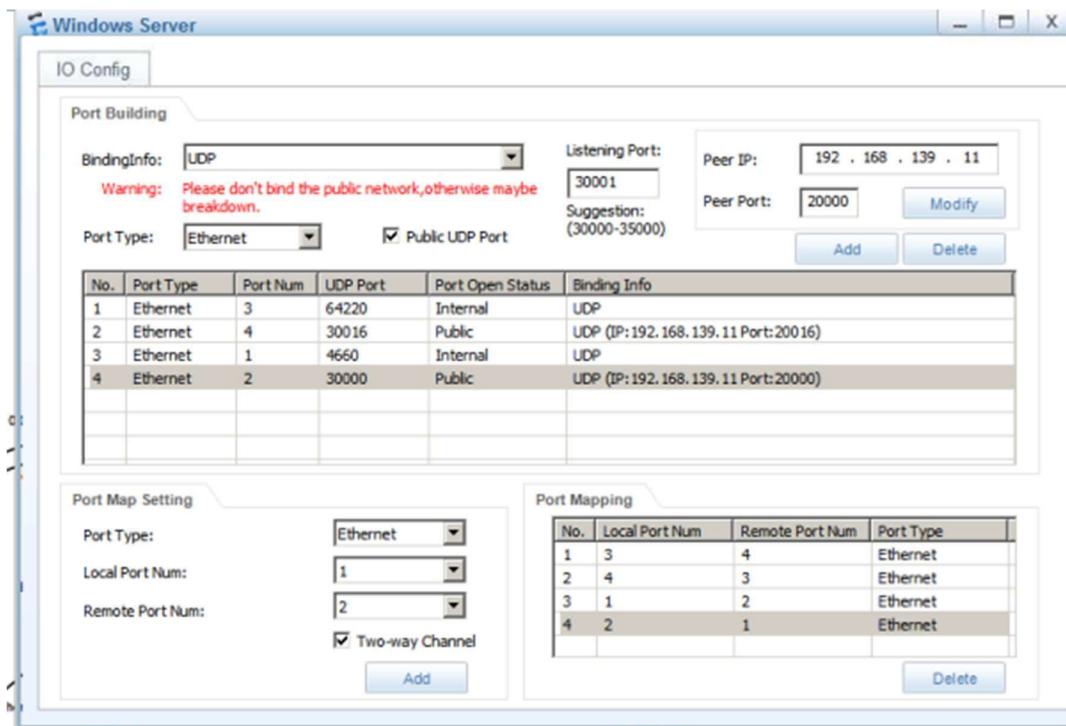
```
C:>Users>pc-1>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=88ms TTL=253
Reply from 8.8.8.8: bytes=32 time=47ms TTL=253
Reply from 8.8.8.8: bytes=32 time=60ms TTL=253
Reply from 8.8.8.8: bytes=32 time=52ms TTL=253

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 47ms, Maximum = 88ms, Average = 61ms

C:>Users>pc-1>
C:>Users>pc-1>
C:>Users>pc-1>
C:>Users>pc-1>
```

- Configure nat estático para el servidor con Windows Server, en ambos routers.



AR2

AR3	AR2
-----	-----

```
#  
interface Ethernet0/0/6  
#  
interface Ethernet0/0/7  
#  
interface GigabitEthernet0/0/0  
ip address 189.2.33.2 255.255.255.224  
nat static global 189.2.33.3 inside 10.0.1.10 netmask 255.255.255.255  
nat outbound 2000 address-group 1  
#  
interface GigabitEthernet0/0/1  
ip address 192.168.1.6 255.255.255.240  
vrrp vrid 1 virtual-ip 192.168.1.1  
vrrp vrid 2 virtual-ip 192.168.1.2  
vrrp vrid 2 priority 120  
#  
interface NULL0  
#  
ip route-static 0.0.0.0 0.0.0.0 189.2.33.1  
ip route-static 10.0.0.0 255.255.255.0 192.168.1.5
```

AR3

AR3	AR2
-----	-----

```
#  
interface Ethernet0/0/6  
#  
interface Ethernet0/0/7  
#  
interface GigabitEthernet0/0/0  
ip address 177.0.0.2 255.255.255.224  
nat static global 177.0.0.3 inside 10.0.1.10 netmask 255.255.255.255  
nat outbound 2000 address-group 1  
#  
interface GigabitEthernet0/0/1  
ip address 192.168.1.3 255.255.255.240  
vrrp vrid 1 virtual-ip 192.168.1.1  
vrrp vrid 1 priority 120  
vrrp vrid 2 virtual-ip 192.168.1.2  
#  
interface NULL0  
#  
ip route-static 0.0.0.0 0.0.0.0 177.0.0.1  
ip route-static 10.0.0.0 255.255.255.0 192.168.1.4  
ip route-static 10.0.1.0 255.255.255.0 192.168.1.4  
ip route-static 172.16.0.0 255.255.255.0 192.168.1.4  
ip route-static 192.168.0.0 255.255.255.0 192.168.1.4  
#  
user-interface con 0
```

Windows Server 2012 ENSP [Corriendo] - Oracle VM VirtualBox

Archivo Máquina Ver Entrada Dispositivos Ayuda

Administrador: Windows PowerShell

```
Windows PowerShell
Copyright (C) 2013 Microsoft Corporation. Todos los derechos reservados.

PS C:\Users\Administrador> ipconfig

Configuración IP de Windows

Adaptador de Ethernet Ethernet 2:

  Sufijo DNS específico para la conexión. . . .
  Vínculo: dirección IPv6 local. . . : fe80::3d65:29ba:6e3e:211a%14
  Dirección IPv4. . . . . : 10.0.1.10
  Máscara de subred . . . . . : 255.255.255.0
  Puerta de enlace predeterminada . . . . . : 10.0.1.1

Adaptador de Ethernet Ethernet:

  Estado de los medios. . . . . : medios desconectados
  Sufijo DNS específico para la conexión. . . .

Adaptador de túnel isatap.(CCBEFF7F-6159-4BB9-948B-F671CA5F420E):

  Estado de los medios. . . . . : medios desconectados
  Sufijo DNS específico para la conexión. . . .

PS C:\Users\Administrador>
```

Windows Server 2012 ENSP [Corriendo] - Oracle VM VirtualBox

Archivo Máquina Ver Entrada Dispositivos Ayuda

Administrador: Windows PowerShell

```
PS C:\Users\Administrador> ping 8.8.8.8

Haciendo ping a 8.8.8.8 con 32 bytes de datos:
Tiempo de espera agotado para esta solicitud.
Respuesta desde 8.8.8.8: bytes=32 tiempo=325ms TTL=253
Respuesta desde 8.8.8.8: bytes=32 tiempo=29ms TTL=253
Respuesta desde 8.8.8.8: bytes=32 tiempo=42ms TTL=253

Estadísticas de ping para 8.8.8.8:
  Paquetes: enviados = 4, recibidos = 3, perdidos = 1
    (25% perdidos),
  Tiempos aproximados de ida y vuelta en milisegundos:
    Minimo = 29ms, Máximo = 325ms, Media = 132ms
PS C:\Users\Administrador>
PS C:\Users\Administrador>
PS C:\Users\Administrador>
PS C:\Users\Administrador>
```

No.	Tiempo	Source	Destination	Protocol	Length	Info
24	236.813...	8.8.8.8	177.0.0.3	ICMP	74	Echo (ping) reply
25	237.844...	177.0.0.3	8.8.8.8	ICMP	74	Echo (ping) request
26	237.844...	8.8.8.8	177.0.0.3	ICMP	74	Echo (ping) reply
27	256.016...	177.0.0.3	8.8.8.8	ICMP	74	Echo (ping) request
28	256.032...	8.8.8.8	177.0.0.3	ICMP	74	Echo (ping) reply
29	257.094...	177.0.0.3	8.8.8.8	ICMP	74	Echo (ping) request
30	257.094...	8.8.8.8	177.0.0.3	ICMP	74	Echo (ping) reply
31	258.110...	177.0.0.3	8.8.8.8	ICMP	74	Echo (ping) request
32	258.110...	8.8.8.8	177.0.0.3	ICMP	74	Echo (ping) reply
33	259.110...	177.0.0.3	8.8.8.8	ICMP	74	Echo (ping) request
34	259.125...	8.8.8.8	177.0.0.3	ICMP	74	Echo (ping) reply
35	262.860...	177.0.0.3	8.8.8.8	ICMP	74	Echo (ping) request
36	262.875...	8.8.8.8	177.0.0.3	ICMP	74	Echo (ping) reply
37	264.079...	177.0.0.3	8.8.8.8	ICMP	74	Echo (ping) request
38	264.094...	8.8.8.8	177.0.0.3	ICMP	74	Echo (ping) reply

- Realice pruebas de alta disponibilidad de los routers, R1 y R2, con pings continuos para ver que no se corte la conexión a Internet. Esto desde las computadoras con Windows 7 y con el servidor con Windows Server.

Windows 7_1 practica4 ENSP [Corriendo] - Oracle VM VirtualBox

```
C:\Windows\system32\cmd.exe
^C
C:\Users\pc-1>ping 8.8.8.8 -t
Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=94ms TTL=253
Reply from 8.8.8.8: bytes=32 time=120ms TTL=253
Reply from 8.8.8.8: bytes=32 time=94ms TTL=253
Reply from 8.8.8.8: bytes=32 time=100ms TTL=253
Reply from 8.8.8.8: bytes=32 time=70ms TTL=253
Request timed out.
Reply from 8.8.8.8: bytes=32 time=82ms TTL=253
Reply from 8.8.8.8: bytes=32 time=73ms TTL=253
Reply from 8.8.8.8: bytes=32 time=320ms TTL=253
Reply from 8.8.8.8: bytes=32 time=91ms TTL=253
Reply from 8.8.8.8: bytes=32 time=73ms TTL=253
Reply from 8.8.8.8: bytes=32 time=69ms TTL=253
Reply from 8.8.8.8: bytes=32 time=82ms TTL=253
Reply from 8.8.8.8: bytes=32 time=73ms TTL=253
Reply from 8.8.8.8: bytes=32 time=77ms TTL=253
Reply from 8.8.8.8: bytes=32 time=103ms TTL=253
Reply from 8.8.8.8: bytes=32 time=107ms TTL=253
Reply from 8.8.8.8: bytes=32 time=71ms TTL=253
Reply from 8.8.8.8: bytes=32 time=80ms TTL=253
Reply from 8.8.8.8: bytes=32 time=89ms TTL=253
Reply from 8.8.8.8: bytes=32 time=88ms TTL=253
```

Windows 7_2 practica4 ENSP [Corriendo] - Oracle VM VirtualBox

```
C:\Windows\system32\cmd.exe
C:\Users\pc-1>ping 8.8.8.8 -t
Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=60ms TTL=253
Reply from 8.8.8.8: bytes=32 time=63ms TTL=253
Reply from 8.8.8.8: bytes=32 time=55ms TTL=253
Reply from 8.8.8.8: bytes=32 time=83ms TTL=253
Reply from 8.8.8.8: bytes=32 time=84ms TTL=253
Request timed out.
Reply from 8.8.8.8: bytes=32 time=128ms TTL=253
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Reply from 172.16.0.254: Destination host unreachable.
Reply from 172.16.0.254: Destination host unreachable.
Request timed out.
Reply from 172.16.0.254: Destination host unreachable.
Request timed out.
Reply from 8.8.8.8: bytes=32 time=47ms TTL=253
Reply from 8.8.8.8: bytes=32 time=48ms TTL=253
Reply from 8.8.8.8: bytes=32 time=72ms TTL=253
Reply from 8.8.8.8: bytes=32 time=82ms TTL=253
Reply from 8.8.8.8: bytes=32 time=81ms TTL=253
Reply from 8.8.8.8: bytes=32 time=68ms TTL=253
Reply from 8.8.8.8: bytes=32 time=51ms TTL=253
Reply from 8.8.8.8: bytes=32 time=54ms TTL=253
Reply from 8.8.8.8: bytes=32 time=73ms TTL=253
Reply from 8.8.8.8: bytes=32 time=56ms TTL=253
Reply from 8.8.8.8: bytes=32 time=84ms TTL=253
Reply from 8.8.8.8: bytes=32 time=61ms TTL=253
Reply from 8.8.8.8: bytes=32 time=51ms TTL=253
Reply from 8.8.8.8: bytes=32 time=79ms TTL=253
Reply from 8.8.8.8: bytes=32 time=65ms TTL=253
Reply from 8.8.8.8: bytes=32 time=70ms TTL=253
Reply from 8.8.8.8: bytes=32 time=51ms TTL=253
Reply from 8.8.8.8: bytes=32 time=62ms TTL=253
```

Windows Server 2012 ENSP [Corriendo] - Oracle VM VirtualBox

Archivo Máquina Ver Entrada Dispositivos Ayuda

Seleccionar Administrador

```
PS C:\Users\Administrador> ping 8.8.8.8 -t
>>
PS C:\Users\Administrador> ping 8.8.8.8 -t

Haciendo ping a 8.8.8.8 con 32 bytes de datos:
Respueta desde 8.8.8.8: bytes=32 tiempo=86ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=56ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=67ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=27ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=26ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=43ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=25ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=59ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=61ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=50ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=28ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=57ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=37ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=41ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=38ms TTL=253
Tiempo de espera agotado para esta solicitud.
Respueta desde 8.8.8.8: bytes=32 tiempo=69ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=65ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=59ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=55ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=60ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=69ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=86ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=57ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=57ms TTL=253
Respueta desde 8.8.8.8: bytes=32 tiempo=58ms TTL=253
```

- Conecte un servidor con DHCP, usando RouterOS, para así poder dar IPs a las VLANs 10, 11 y 12.

Windows Server

IO Config

Port Building

BindingInfo:	UDP	Listening Port:	30001	Peer IP:	192 . 168 . 139 . 11	
Warning:	Please don't bind the public network, otherwise maybe breakdown.				Peer Port:	20000
Port Type:	Ethernet	<input checked="" type="checkbox"/> Public UDP Port	Suggestion:	(30000-35000)		
<input type="button" value="Add"/> <input type="button" value="Delete"/>						

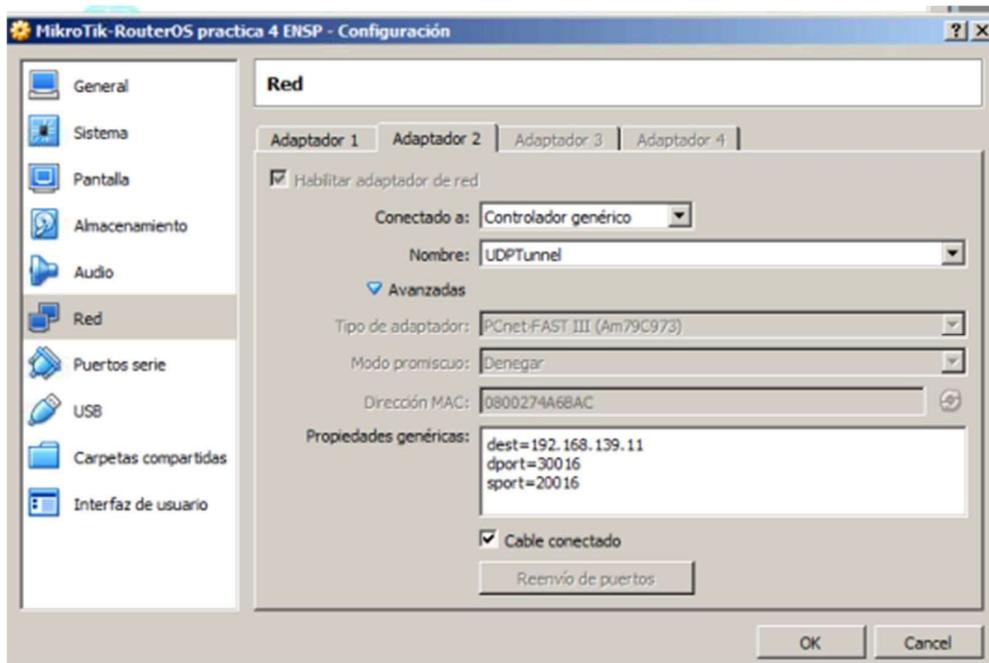
No.	Port Type	Port Num	UDP Port	Port Open Status	Binding Info
1	Ethernet	3	64220	Internal	UDP
2	Ethernet	4	30016	Public	UDP (IP:192.168.139.11 Port:20016)
3	Ethernet	1	4660	Internal	UDP
4	Ethernet	2	30000	Public	UDP (IP:192.168.139.11 Port:20000)

Port Map Setting

Port Type:	Ethernet
Local Port Num:	1
Remote Port Num:	2
<input checked="" type="checkbox"/> Two-way Channel	
<input type="button" value="Add"/>	

Port Mapping

No.	Local Port Num	Remote Port Num	Port Type
1	3	4	Ethernet
2	4	3	Ethernet
3	1	2	Ethernet
4	2	1	Ethernet



DHCP Server

The 'DHCP' tab is selected. The table shows three relay configurations:

Name	Interface	Relay	Lease Time	Address Pool	Add AR...
dhcp_vlan12	ether2	172.16.0.1	1d 00:00:00	dhcp_pool8	no
dhcp_vlan11	ether2	192.168.0.1	1d 00:00:00	dhcp_pool7	no
dhcp_vlan10	ether2	10.0.0.1	1d 00:00:00	dhcp_pool6	no

Address List

The table lists static IP addresses:

Address	Network	Interface
10.0.0.5/24	10.0.0.0	unknown
10.0.1.11/24	10.0.1.0	ether2

DHCP Server

The 'Leases' tab is selected. The table shows active leases:

Address	MAC Address	Client ID	Server	Active Address	Active MAC Addre...	Active Hos...	Active Cla...	Bridge Port	Expires After	Status
10.0.0.254	08:00:27:E2:7B:AD	1:8:0:27:e2:7b:ad	dhcp_vlan10	10.0.0.254	08:00:27:E2:7B:AD	pc-1-PC	MSFT 5.0		23:54:26	bound
172.16.0.254	08:00:27:33:83:72	1:8:0:27:33:83:72	dhcp_vlan12	172.16.0.254	08:00:27:33:83:72	pc-1-PC	MSFT 5.0		23:54:24	bound
192.168.0.254	54:89:98:F8:1B:D8	1:54:89:98:f8:1b:d8	dhcp_vlan11	192.168.0.254	54:89:98:F8:1B:D8				23:48:56	bound

PC1

Basic Config | Command | MCPacket | UdpPacket | Console

```
PC>ipconfig

Link local IPv6 address.....: fe80::5689:98ff:fe80:1bd8
IPv6 address.....: :: / 128
IPv6 gateway.....: ::
IPv4 address.....: 192.168.0.254
Subnet mask.....: 255.255.255.0
Gateway.....: 192.168.0.1
Physical address.....: 54-89-98-F8-1B-D8
DNS server.....: 8.8.8.8

PC>ipconfig

Link local IPv6 address.....: fe80::5689:98ff:fe80:1bd8
IPv6 address.....: :: / 128
IPv6 gateway.....: ::
IPv4 address.....: 192.168.0.254
Subnet mask.....: 255.255.255.0
Gateway.....: 192.168.0.1
Physical address.....: 54-89-98-F8-1B-D8
DNS server.....: 8.8.8.8
```

Windows 7_1 practica4 ENSP [Corriendo] - Oracle VM VirtualBox

Archivo Máquina Ver Entrada Dispositivos Ayuda

```
C:\Windows\system32\cmd.exe

Ethernet adapter Local Area Connection 2:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . . . . . : 

Ethernet adapter Local Area Connection:
  Connection-specific DNS Suffix . . . . . :
  Link-local IPv6 Address . . . . . : fe80::a028:ad4c:a448:5259%11
  IPv4 Address . . . . . : 10.0.0.254
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 10.0.0.1

Tunnel adapter isatap.{C7EACD73-0AC4-43A9-B390-BA664A1A4EF6}:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . . . . . : 

Tunnel adapter isatap.{?19D4344-28D1-4208-AA91-82CCEE1722DE}:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . . . . . : 

C:\Users\pc-1>
```

windows 7_2 practica4 ENSP [Corriendo] - Oracle VM VirtualBox

Archivo Máquina Ver Entrada Dispositivos Ayuda

```
c:\ C:\Windows\system32\cmd.exe

Ethernet adapter Local Area Connection 2:
  Media State . . . . : Media disconnected
  Connection-specific DNS Suffix . . .

Ethernet adapter Local Area Connection:
  Connection-specific DNS Suffix . . .
  Link-local IPv6 Address . . . . . : fe80::d831:45e0:fd8d:2c06%11
  IPv4 Address. . . . . : 172.16.0.254
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 172.16.0.1

Tunnel adapter isatap.<C7EACD73-0AC4-43A9-B390-BA664A1A4EF6>:
  Media State . . . . : Media disconnected
  Connection-specific DNS Suffix . . .

Tunnel adapter isatap.<719D4344-28D1-4208-AA91-82CCEE1722DE>:
  Media State . . . . : Media disconnected
  Connection-specific DNS Suffix . . .

C:\Users\pc-1>
```