

Cisco Networking Academy

Cisco R&S Essentials

Case Study

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Contents

ACL Restrictions

NAT Configuration

Subnetting Scheme

Device Configurations

Rt-Belfast0

Rt-Galway0

Rt-Limerick0

Rt-Cork0

Sw-Cork0

ACL Restrictions

Deny Limerick FTP and HTTP access to HR VLAN

```
Extended IP access list NO_LIMERICK_FTP_HTTP
 10 deny tcp any 172.16.3.0 0.0.0.127 eq 20
 20 deny tcp any 172.16.3.0 0.0.0.127 eq ftp
 30 deny tcp any 172.16.3.0 0.0.0.127 eq www
 40 permit ip any any
```

```
Rt-Limerick0# show ip interface G0/0
Inbound access list is NO_LIMERICK_FTP_HTTP
```

Permit only HR VLAN to access Belfast LAN

```
Extended IP access list HR_ONLY
 10 permit ip 172.16.3.0 0.0.0.127 any
 20 permit tcp any any established
 30 permit icmp any any echo-reply
```

```
Rt-Belfast0# show ip interface G0/0
Outgoing access list is HR_ONLY
```

Deny unsolicited external traffic

```
Extended IP access list EST_ONLY
 10 permit tcp any any established
 20 permit icmp any any echo-reply
```

```
Rt-Belfast0# show ip interface G0/1
Inbound access list is EST_ONLY
```

Control Rt-Limerick0 VTY Access

```
Standard IP access list VTY_ACCESS
 10 permit 172.16.3.128 0.0.0.63
```

```
Rt-Limerick0# show running-config
line vty 0 15
 access-class VTY_ACCESS in
 password class
 logging synchronous
 login
```

NAT Configuration

Dynamic Pool

```
ip access-list standard NAT
  permit 172.16.0.0 0.0.7.255

ip nat pool INTERNET 200.10.10.74 200.10.10.127 netmask 255.255.255.192
ip nat inside source list NAT pool INTERNET
```

NAT Inside

```
GigabitEthernet0/0
```

NAT Outside

```
GigabitEthernet0/1
Serial 0/0/0
Serial 0/0/1
```

Subnetting Scheme

Division	Network Address/Prefix	Significant Addresses	
Cork	172.16.0.0/22 255.255.252.0	(Subnetted Further, see below)	
Galway	172.16.4.0/23 255.255.254.0	Rt-Galway0 G0/0	172.16.4.1
		Hosts	172.16.4.2-172.16.5.254
		Broadcast	172.16.5.255
Limerick	172.16.6.0/24 255.255.255.0	Rt-Limerick0 G0/0	172.16.6.1
		Hosts	172.16.6.2-172.16.6.254
		Broadcast	172.16.6.255
Belfast	172.16.7.0/27 255.255.255.224	Rt-Belfast0 G0/0	172.16.7.1
		Hosts	172.16.7.2-172.16.7.30
		Broadcast	172.16.7.31

Cork

VLAN	Network Address/Prefix	Significant Addresses	
VLAN 4 (Production)	172.16.0.0/23 255.255.254.0	Rt-Cork0 G0/0.4	172.16.0.1
		Hosts	172.16.0.2-172.16.1.254
		Broadcast	172.16.1.255
VLAN 3(R&D)	172.16.2.0/24 255.255.255.0	Rt-Cork0 G0/0.3	172.16.2.1
		Hosts	172.16.2.2-172.16.2.254
		Broadcast	172.16.2.255
VLAN 2 (HR)	172.16.3.0/25 255.255.255.128	Rt-Cork0 G0/0.2	172.16.3.1
		Hosts	172.16.3.2-172.16.3.126
		Broadcast	172.16.3.127
VLAN 99 (Management)	172.16.3.128/26 255.255.255.192	Rt-Cork0 G0/0.99	172.16.3.129
		Hosts	172.16.3.130-172.16.3.190
		Broadcast	172.16.3.191

Routers

Link	Network Address/Prefix	Significant Addresses	
Galway-Cork	172.16.7.244/30 255.255.255.252	Rt-Galway0 – S0/0/0	172.16.7.245
		Rt-Cork0 – S0/0/1	172.16.7.246
		Broadcast	172.16.7.247
Cork-Belfast	172.16.7.248/30 255.255.255.252	Rt-Cork0 – S0/0/0	172.16.7.249
		Rt-Belfast0 – S0/0/1	172.16.7.250
		Broadcast	172.16.7.251
Belfast-Limerick	172.16.7.252/30 255.255.255.252	Rt-Belfast0 – S0/0/0	172.16.7.253
		Rt-Limerick0 – S0/0/1	172.16.7.254
		Broadcast	172.16.7.255

Connectivity Tests

		Destination							
		Galway	VLAN 2	VLAN 3	VLAN 4	VLAN 99	Belfast	Limerick	Internet
Source	Galway								
	VLAN 2								
	VLAN 3								
	VLAN 4								
	VLAN 99								
	Belfast								
	Limerick		No FTP/HTTP						
	Internet								

```
! William Stevens - 1/9/2015
! CCNA4 Case Study - Rt-Belfast0 - Final Configuration
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname Rt-Belfast0
!
!
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
!
license udi pid CISCO2901/K9 sn FTX15240429
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
 ip address 172.16.7.1 255.255.255.224
 ip access-group HR_ONLY out
 ip nat inside
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 ip address 10.0.0.1 255.255.255.252
 ip access-group EST_ONLY in
 ip nat outside
```

```
duplex auto
speed auto
!
interface Serial0/0/0
 ip address 172.16.7.253 255.255.255.252
 ip nat inside
 clock rate 2000000
!
interface Serial0/0/1
 ip address 172.16.7.250 255.255.255.252
 ip nat inside
 clock rate 2000000
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 1
 log-adjacency-changes
 passive-interface GigabitEthernet0/0
 passive-interface GigabitEthernet0/1
 network 172.16.7.248 0.0.0.3 area 0
 network 172.16.7.252 0.0.0.3 area 0
 network 172.16.7.0 0.0.0.31 area 0
 default-information originate
!
ip nat pool INTERNET 200.10.10.74 200.10.10.127 netmask 255.255.255.192
ip nat inside source list NAT pool INTERNET
ip classless
ip route 0.0.0.0 0.0.0.0 10.0.0.2
!
ip flow-export version 9
!
!
ip access-list extended EST_ONLY
 permit tcp any any established
 permit icmp any any echo-reply
ip access-list extended HR_ONLY
 permit tcp any any established
 permit icmp any any echo-reply
 permit ip 172.16.3.0 0.0.0.127 any
ip access-list standard NAT
 permit 172.16.0.0 0.0.7.255
!
no cdp run
!
!
!
!
!
line con 0
 password 7 0822455D0A16
 logging synchronous
```



```
login
!
line aux 0
!
line vty 0 4
password 7 0822455D0A16
logging synchronous
login
line vty 5 15
password 7 0822455D0A16
logging synchronous
login
!
!
!
end
```

```
! William Stevens - 1/9/2015
! CCNA4 Case Study - Rt-Galway0 - Final Configuration
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname Rt-Galway0
!
!
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
ip dhcp excluded-address 172.16.4.1 172.16.4.10
ip dhcp excluded-address 172.16.0.1 172.16.0.10
ip dhcp excluded-address 172.16.2.1 172.16.2.10
ip dhcp excluded-address 172.16.3.1 172.16.3.10
!
ip dhcp pool Galway
 network 172.16.4.0 255.255.254.0
 default-router 172.16.4.1
ip dhcp pool Cork2
 network 172.16.3.0 255.255.255.128
 default-router 172.16.3.1
ip dhcp pool Cork3
 network 172.16.2.0 255.255.255.0
 default-router 172.16.2.1
ip dhcp pool Cork4
 network 172.16.0.0 255.255.254.0
 default-router 172.16.0.1
!
no ip cef
no ipv6 cef
!
!
!
!
license udi pid CISCO2901/K9 sn FTX1524ROZ3
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
```

```
!  
!  
!  
!  
!  
!  
interface GigabitEthernet0/0  
  ip address 172.16.4.1 255.255.254.0  
  duplex auto  
  speed auto  
!  
interface GigabitEthernet0/1  
  no ip address  
  duplex auto  
  speed auto  
  shutdown  
!  
interface Serial0/0/0  
  ip address 172.16.7.245 255.255.255.252  
  clock rate 128000  
!  
interface Serial0/0/1  
  no ip address  
  clock rate 2000000  
!  
interface Vlan1  
  no ip address  
  shutdown  
!  
router ospf 1  
  log-adjacency-changes  
  passive-interface GigabitEthernet0/0  
  passive-interface GigabitEthernet0/1  
  network 172.16.4.0 0.0.1.255 area 0  
  network 172.16.7.244 0.0.0.3 area 0  
!  
ip classless  
!  
ip flow-export version 9  
!  
!  
!  
!  
!  
!  
!  
!  
line con 0  
  password 7 0822455D0A16  
  logging synchronous  
  login  
!  
line aux 0  
!  
line vty 0 4
```

```
password 7 0822455D0A16
logging synchronous
login
line vty 5 15
password 7 0822455D0A16
logging synchronous
login
!
!
!
end
```

```
! William Stevens - 1/9/2015
! CCNA4 Case Study - Rt-Limerick0 - Final Configuration
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname Rt-Limerick0
!
!
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
!
license udi pid CISCO2901/K9 sn FTX1524T9N5
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
 ip address 172.16.6.1 255.255.255.0
 ip access-group NO_LIMERICK_FTP_HTTP in
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
```

```
!  
interface Serial0/0/0  
  no ip address  
  clock rate 2000000  
  shutdown  
!  
interface Serial0/0/1  
  ip address 172.16.7.254 255.255.255.252  
  clock rate 2000000  
!  
interface Vlan1  
  no ip address  
  shutdown  
!  
router ospf 1  
  log-adjacency-changes  
  passive-interface GigabitEthernet0/0  
  passive-interface GigabitEthernet0/1  
  network 172.16.7.252 0.0.0.3 area 0  
  network 172.16.6.0 0.0.0.255 area 0  
!  
ip classless  
!  
ip flow-export version 9  
!  
!  
ip access-list standard VTY_ACCESS  
  permit 172.16.3.128 0.0.0.63  
ip access-list extended NO_LIMERICK_FTP_HTTP  
  deny tcp any 172.16.3.0 0.0.0.127 eq 20  
  deny tcp any 172.16.3.0 0.0.0.127 eq ftp  
  deny tcp any 172.16.3.0 0.0.0.127 eq www  
  permit ip any any  
!  
no cdp run  
!  
!  
!  
!  
!  
line con 0  
  password 7 0822455D0A16  
  logging synchronous  
  login  
!  
line aux 0  
!  
line vty 0 4  
  access-class VTY_ACCESS in  
  password 7 0822455D0A16  
  logging synchronous  
  login  
line vty 5 15
```

```
access-class VTY_ACCESS in
password 7 0822455D0A16
logging synchronous
login
!
!
!
end
```

```
! William Stevens - 1/9/2015
! CCNA4 Case Study - Rt-Cork0 - Final Configuration
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname Rt-Cork0
!
!
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
!
license udi pid CISCO2901/K9 sn FTX15242S46
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
no ip address
duplex auto
speed auto
!
interface GigabitEthernet0/0.2
encapsulation dot1Q 2
ip address 172.16.3.1 255.255.255.128
ip helper-address 172.16.7.245
!
interface GigabitEthernet0/0.3
```



```
encapsulation dot1Q 3
ip address 172.16.2.1 255.255.255.0
ip helper-address 172.16.7.245
!
interface GigabitEthernet0/0.4
encapsulation dot1Q 4
ip address 172.16.0.1 255.255.254.0
ip helper-address 172.16.7.245
!
interface GigabitEthernet0/0.99
encapsulation dot1Q 99 native
ip address 172.16.3.129 255.255.255.192
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/0/0
ip address 172.16.7.249 255.255.255.252
clock rate 128000
!
interface Serial0/0/1
ip address 172.16.7.246 255.255.255.252
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
!
router ospf 1
log-adjacency-changes
passive-interface GigabitEthernet0/0
passive-interface GigabitEthernet0/1
network 172.16.7.244 0.0.0.3 area 0
network 172.16.0.0 0.0.3.255 area 0
network 172.16.7.248 0.0.0.3 area 0
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
line con 0
password 7 0822455D0A16
logging synchronous
login
```

```
!  
line aux 0  
!  
line vty 0 4  
password 7 0822455D0A16  
logging synchronous  
login  
line vty 5 15  
password 7 0822455D0A16  
logging synchronous  
login  
!  
!  
!  
end
```

```
! William Stevens - 1/9/2015
! CCNA4 Case Study - Sw-Cork0 - Final Configuration
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname Sw-Cork0
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
no ip domain-lookup
!
!
no spanning-tree vlan 2-4,99
spanning-tree mode pvst
!
interface FastEthernet0/1
 shutdown
!
interface FastEthernet0/2
 shutdown
!
interface FastEthernet0/3
 switchport access vlan 99
 switchport mode access
!
interface FastEthernet0/4
 switchport access vlan 2
 switchport mode access
!
interface FastEthernet0/5
 switchport access vlan 2
 switchport mode access
!
interface FastEthernet0/6
 switchport access vlan 2
 switchport mode access
!
interface FastEthernet0/7
 switchport access vlan 2
 switchport mode access
!
interface FastEthernet0/8
 switchport access vlan 3
 switchport mode access
!
interface FastEthernet0/9
 switchport access vlan 3
 switchport mode access
```

```
!  
interface FastEthernet0/10  
  switchport access vlan 3  
  switchport mode access  
!  
interface FastEthernet0/11  
  switchport access vlan 3  
  switchport mode access  
!  
interface FastEthernet0/12  
  switchport access vlan 4  
  switchport mode access  
!  
interface FastEthernet0/13  
  switchport access vlan 4  
  switchport mode access  
!  
interface FastEthernet0/14  
  switchport access vlan 4  
  switchport mode access  
!  
interface FastEthernet0/15  
  switchport access vlan 4  
  switchport mode access  
!  
interface FastEthernet0/16  
  shutdown  
!  
interface FastEthernet0/17  
  shutdown  
!  
interface FastEthernet0/18  
  shutdown  
!  
interface FastEthernet0/19  
  shutdown  
!  
interface FastEthernet0/20  
  shutdown  
!  
interface FastEthernet0/21  
  shutdown  
!  
interface FastEthernet0/22  
  shutdown  
!  
interface FastEthernet0/23  
  shutdown  
!  
interface FastEthernet0/24  
  shutdown  
!  
interface GigabitEthernet0/1
```

```
switchport trunk native vlan 99
switchport mode trunk
!
interface GigabitEthernet0/2
switchport trunk native vlan 99
switchport mode trunk
shutdown
!
interface Vlan1
no ip address
shutdown
!
interface Vlan99
ip address 172.16.3.190 255.255.255.192
!
ip default-gateway 172.16.3.129
!
!
!
!
line con 0
password 7 0822455D0A16
logging synchronous
login
!
line vty 0 4
password 7 0822455D0A16
logging synchronous
login
line vty 5 15
password 7 0822455D0A16
logging synchronous
login
!
!
end
```