Government Network Optimization

I SITUATIONAL PROBLEM

Government agencies have independent databases that makes the registration process lengthy and redundant.

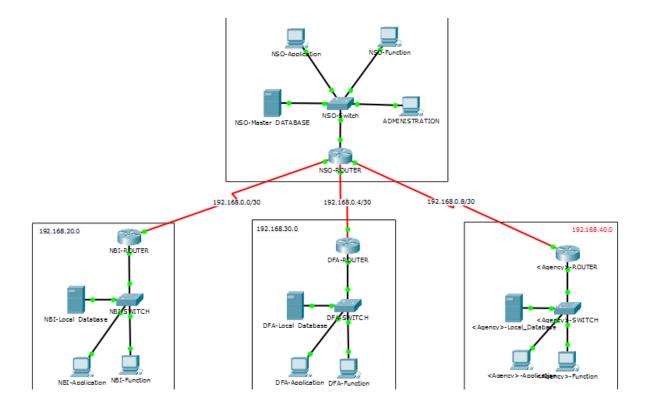
II OBJECTIVES

The intention of this simulation is to implement the concepts, commands, and methods that were learned in the course Routing and Switching Essentials to build and simulate a proposed network design for our design through packet tracer and using Cisco Network Academy Laboratory Equipment.

The specific objectives are as follows:

- To apply concepts in switching such as port security.
- To apply concepts in routing both static and dynamic.
- To provide remote access using SSH.
- To apply dynamic host control protocol (DHCP).
- To restrict certain networks using access lists (ACL).

III PROPOSED NETWORK TOPOLOGY



There are four main networks in this topology namely network NSO, DFA, BIR, and <Agency> and all are connected to a master database and as well as each of them has their own servers. The network of NSO is configured by a switch and a router. In the NSO-Switch, SSH and Port security are set. It has a maximum of 1 changes for f0/1 to 4 and the MAC address sticky are also configured. This setup would be similar to the switches in the other networks (DFA, NBI & <Agency>), they would only change in interfaces where these settings are applied.

Moving on to the NSO router, this is configured to run dynamic routing to R2 and a static routing connection to R3. This static configuration is only necessary to demonstrate the effects of ACL which would be applied at R2.

The router on network 10 (R2) is the router for the main branch, here configurations such as dynamic routing going to R1 and static routing going to R3 are also used. As mentioned before,

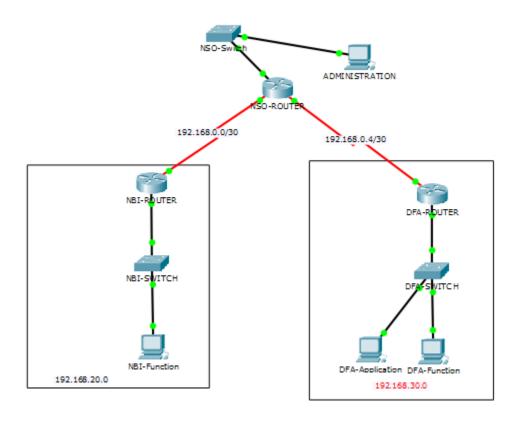
R2 would apply the necessary named ACL restriction for network 20. The ACL would be applied to interface Serial 0/0/1 outbound. This will block any type of connection from network 20 going to network 30.

Lastly, R3 is configured to provide DHCP addressing to its hosts. It is also responsible to have static routing for networks 10 and 20. All of the networking devices have proper housekeeping commands such as banners and encrypted passwords for priv-exec and line con.

IV NETWORK ADDRESSES USED

Allocation size	Network Address	Subnet Mask
14	192.168.10.0/28	255.255.255.240
6	192.168.20.0/29	255.255.255.248
6	192.168.30.0/29	255.255.255.248
6	192.168.40.0/29	255.255.255.248
2	192.168.0.0/30	255.255.255.252
2	192.168.0.4/30	255.255.255.252
2	192.168.0.8/30	255.255.255.252
1st Usable Address	2nd U	sable Address
NSO Router	NS	O Database
NBI Router	NBI Local Database	
DFA Router	DFA Local Database	
Agency Router	Agency Local Database	
Master Router(S0/0/0)	NBI R	outer(S0/0/0)
Master Router(S0/0/1)	DFA R	outer(S0/0/1)
Master Router(S0/1/0)	Agency(S0/1/0)	

V LABORATORY DEMONSTRATION TOPOLOGY



VI RUNNING CONFIGURATIONS

VI RUNNING CONFIGURATIONS	
NGO DOLUMBO	duplex auto
NSO-ROUTER:	speed auto
hostname NSO-ROUTER	shutdown
!	!
!	interface Serial0/0/0
!	ip address 192.168.0.1 255.255.255.252
enable password 7 0822455D0A16	ip access-group NoAgency out
!	!
!	interface Serial0/0/1
ip dhcp excluded-address 192.168.10.1 192.168.10.3	ip address 192.168.0.5 255.255.255.252
!	ip access-group NoAgency out
ip dhcp pool NSO-POOL	!
network 192.168.10.0 255.255.255.240	interface Serial0/1/0
default-router 192.168.10.1	ip address 192.168.0.9 255.255.255.252
dns-server 192.168.10.1	ip access-group NoDFA out
!	clock rate 2000000
	!
	interface Serial0/1/1
no ip cef	no ip address
no ipv6 cef	clock rate 2000000
	shutdown
; 	I
; i	interface Vlan1
username admin password 7 0822455D0A16	no ip address
username admini password / 0622455D0A10	shutdown
; !	Silutdowii
! !:	!
license udi pid CISCO2901/K9 sn FTX1524RP3R	router rip
! !	version 2
!	network 192.168.0.0
!	network 192.168.10.0
!	no auto-summary
!	!
!	ip classless
!	!
!	ip flow-export version 9
!	!
no ip domain-lookup	!
ip domain-name DFA.ph	ip access-list standard NSO
!	permit host 192.168.10.3
!	permit host 192.168.10.2
spanning-tree mode pvst	deny any
!	ip access-list standard NoAgency
!	deny 192.168.40.0 0.0.0.255
!	permit any
!	ip access-list standard NoDFA
!	deny 192.168.20.0 0.0.0.255
!	permit any
interface GigabitEthernet0/0	!
ip address 192.168.10.1 255.255.255.240	banner motd ^CUnauthorized access to this device is
ip access-group NSO in	prohibited!^C
duplex auto	!
speed auto	!
!	!
interface GigabitEthernet0/1	!
no ip address	line con 0
•	

logging synchronous!	shutdown !
line aux 0 !	interface FastEthernet0/7 shutdown
line vty 0 4	!
login local	interface FastEthernet0/8
transport input ssh	shutdown
NSO-SWITCH	interface FastEthernet0/9
hostname NSO-SWITCH	shutdown
!	!
enable password 7 0822455D0A16	interface FastEthernet0/10
!	shutdown
!	!
no ip domain-lookup	interface FastEthernet0/11 shutdown
l domain-100kup	I
· !	interface FastEthernet0/12
spanning-tree mode pvst	shutdown
!	!
interface FastEthernet0/1	interface FastEthernet0/13
switchport mode access	shutdown
switchport port-security switchport port-security mac-address sticky	! interface FastEthernet0/14
switchport port-security mac-address sticky	shutdown
00E0.8F2E.D325	!
!	interface FastEthernet0/15
interface FastEthernet0/2	shutdown
switchport mode access	!
switchport port-security	interface FastEthernet0/16
switchport port-security mac-address sticky	shutdown
switchport port-security mac-address sticky 00E0.8F07.93D5	interface FastEthernet0/17
!	shutdown
interface FastEthernet0/3	!
switchport mode access	interface FastEthernet0/18
switchport port-security	shutdown
switchport port-security mac-address sticky	! : (
switchport port-security mac-address sticky 00D0.D38A.0BCC	interface FastEthernet0/19 shutdown
00D0.D30A.0BCC	Silutuowii
interface FastEthernet0/4	interface FastEthernet0/20
switchport mode access	shutdown
switchport port-security	!
switchport port-security mac-address sticky	interface FastEthernet0/21
switchport port-security mac-address sticky	shutdown
0009.7C72.9635	! interface FastEthernet0/22
interface FastEthernet0/5	shutdown
switchport mode access	!
switchport port-security	interface FastEthernet0/23
switchport port-security mac-address sticky	shutdown
switchport port-security mac-address sticky	!
0030.A325.D7A0	interface FastEthernet0/24
! interface FootEthermat0/6	shutdown
interface FastEthernet0/6	!

interface GigabitEthernet0/1 shutdown	!
1	no ip domain-lookup
interface GigabitEthernet0/2 shutdown	ip domain-name DFA.ph
Shuldown !	! •
! :utanfana Vilanii	!
interface Vlan1	spanning-tree mode pvst
no ip address shutdown	! !
Shutdown I	: !
banner motd ^CUnauthorized access to this device is prohibited!^C	: ! !
!	!
!	interface GigabitEthernet0/0
!	ip address 192.168.20.1 255.255.255.248
line con 0	duplex auto
logging synchronous	speed auto
!	!
line vty 0 4	interface GigabitEthernet0/1
login	no ip address
line vty 5 15	duplex auto
login	speed auto
č	shutdown
NBI-ROUTER	!
hostname NBI-ROUTER	interface Serial0/0/0
!	ip address 192.168.0.2 255.255.255.252
!	clock rate 2000000
!	!
enable password 7 0822455D0A16	interface Serial0/0/1
!	no ip address
!	clock rate 2000000
ip dhcp excluded-address 192.168.20.1 192.168.20.2	shutdown
ip dhcp excluded-address 192.168.20.1 192.168.20.3	!
Î Î	interface Serial0/1/0
ip dhcp pool NBI-POOL	no ip address
network 192.168.20.0 255.255.255.248	clock rate 2000000
default-router 192.168.20.1	shutdown
!	!
!	interface Serial0/1/1
!	no ip address
no ip cef	clock rate 2000000
no ipv6 cef	shutdown
!	!
!	interface Vlan1
!	no ip address
username admin password 7 0822455D0A16	shutdown
!	!
!	router rip
license udi pid CISCO2901/K9 sn FTX1524C9UF	version 2
!	network 192.168.0.0
!	network 192.168.20.0
!	no auto-summary
!	!
!	ip classless
!	!
!	ip flow-export version 9

! !	switchport port-security 0001.42BA.8BBC	mac-address	sticky
banner motd ^CUnauthorized access to this device is prohibited!^C	interface FastEthernet0/5 shutdown		
! ! !	! interface FastEthernet0/6 shutdown		
! line con 0	! interface FastEthernet0/7		
logging synchronous	shutdown		
line aux 0	interface FastEthernet0/8 shutdown		
line vty 0 4	!		
login local transport input ssh	interface FastEthernet0/9 shutdown		
transport input ssii	!		
NBI-SWITCH hostname NBI-SWITCH	interface FastEthernet0/10 shutdown		
enable password 7 0822455D0A16	! interface FastEthernet0/11		
!	shutdown		
!	! interface FastEthernet0/12		
: no ip domain-lookup !	shutdown		
!	interface FastEthernet0/13		
spanning-tree mode pvst	shutdown		
interface FastEthernet0/1 switchport mode access	interface FastEthernet0/14 shutdown		
switchport port-security	! interface FactEthernot0/15		
switchport port-security mac-address sticky switchport port-security mac-address sticky 00D0.9765.87D4	interface FastEthernet0/15 shutdown !		
! interface FastEthernet0/2	interface FastEthernet0/16 shutdown		
switchport mode access switchport port-security	! interface FastEthernet0/17		
switchport port-security mac-address sticky	shutdown		
switchport port-security mac-address sticky	!		
0002.1725.9DA4 ! interface FastEthernet0/3	interface FastEthernet0/18 shutdown		
switchport mode access	interface FastEthernet0/19		
switchport port-security	shutdown		
switchport port-security mac-address sticky switchport port-security mac-address sticky	! interface FastEthernet0/20		
switchport port-security mac-address sticky 00D0.FFE9.A38A	shutdown!		
interface FastEthernet0/4	interface FastEthernet0/21		
switchport mode access	shutdown		
switchport port-security switchport port-security mac-address sticky	! interface FastEthernet0/22		
1 1 7	shutdown		

!	!
interface FastEthernet0/23	!
shutdown	!
: interface FastEthernet0/24	į
shutdown	i
!	i
interface GigabitEthernet0/1	•
shutdown	į.
!	no ip domain-lookup
interface GigabitEthernet0/2	ip domain-name DFA.ph
shutdown	!
!	!
interface Vlan1	spanning-tree mode pvst
no ip address	!
shutdown	!
!	!
banner motd ^CUnauthorized access to this device is	!
prohibited!^C	!
!	!
!	interface GigabitEthernet0/0
!	ip address 192.168.30.1 255.255.255.24
line con 0	ip access-group DFA in
logging synchronous	duplex auto
!	speed auto
line vty 0 4	!
login	interface GigabitEthernet0/1
line vty 5 15	no ip address
login	duplex auto
DEA DOUGED	speed auto
DFA-ROUTER hostname DFA-ROUTER	shutdown
HOSHIAIRE DEA-ROUTER	interface Serial0/0/0
: !	no ip address
: 	clock rate 2000000
enable password 7 0822455D0A16	shutdown
1	I
!	interface Serial0/0/1
ip dhcp excluded-address 192.168.30.1 192.168.30.2	ip address 192.168.0.6 255.255.255.252
ip dhcp excluded-address 192.168.30.1 192.168.30.3	clock rate 2000000
!	!
ip dhep pool DFA-POOL	interface Serial0/1/0
network 192.168.30.0 255.255.255.248	no ip address
default-router 192.168.30.1	clock rate 2000000
!	shutdown
!	!
!	interface Serial0/1/1
no ip cef	no ip address
no ipv6 cef	clock rate 2000000
!	shutdown
!	!
!	interface Vlan1
username admin password 7 0822455D0A16	no ip address
!	shutdown
_	
! license udi pid CISCO2901/K9 sn FTX15241BCV	! router rip

version 2 network 192.168.0.0	interface FastEthernet0/3 switchport mode access
network 192.168.30.0	switchport mode access switchport port-security
no auto-summary	switchport port-security mac-address sticky
!	switchport port-security mac-address sticky
ip classless	0002.1780.41A4
Ī	!
ip flow-export version 9	interface FastEthernet0/4
!	switchport mode access
!	switchport port-security
ip access-list standard DFA	switchport port-security mac-address sticky switchport port-security mac-address sticky
permit host 192.168.30.2 permit host 192.168.30.3	switchport port-security mac-address sticky 0001.437D.29D1
deny any	!
!	interface FastEthernet0/5
banner motd ^CUnauthorized access to this device is	shutdown
prohibited!^C	!
!	interface FastEthernet0/6
!	shutdown
!	!
!	interface FastEthernet0/7
line con 0	shutdown
logging synchronous	: interface FastEthernet0/8
line aux 0	shutdown
!	!
line vty 0 4	interface FastEthernet0/9
login local	shutdown
transport input ssh	!
	interface FastEthernet0/10
DFA-SWITCH	shutdown
hostname DFA-SWITCH	! !!
! oneble pessword 7.0822455D0.416	interface FastEthernet0/11 shutdown
enable password 7 0822455D0A16	silutdowii
!	interface FastEthernet0/12
	shutdown
no ip domain-lookup	!
!	interface FastEthernet0/13
!	shutdown
spanning-tree mode pvst	!
!	interface FastEthernet0/14
interface FastEthernet0/1	shutdown
switchport mode access switchport port-security	: interface FastEthernet0/15
switchport port-security mac-address sticky	shutdown
switchport port-security mac-address sticky	Shutdown
000A.F3DA.A403	interface FastEthernet0/16
!	shutdown
interface FastEthernet0/2	!
switchport mode access	interface FastEthernet0/17
switchport port-security	shutdown
switchport port-security mac-address sticky	!
switchport port-security mac-address sticky	interface FastEthernet0/18
0004.9A30.AC91	shutdown
1	1

```
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
shutdown
interface GigabitEthernet0/2
shutdown
interface Vlan1
no ip address
shutdown
banner motd ^CUnauthorized access to this device is
prohibited!^C
line con 0
logging synchronous
line vty 04
login
line vty 5 15
login
```