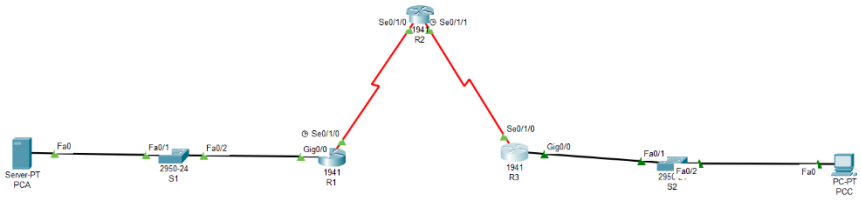
Security In Computing Practical
Practical 5: Configuring a Zone-Based Policy Firewall (ZPF)
Topology:



Addressing Table:

Setting Display Name and Hostname
Device - > Config - > Settings
Router -> R1/R2/R3
Switch S1/S2
Server->PCA
PC->PCC

IP Addressing through CLI
R1>en
R1#config t
R1(config)#interface GigabitEthernet0/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#exit
R1(config)#interface Serial0/1/0
R1(config-if)#ip address 10.1.1.1 255.255.255.252
R1(config-if)#no shut
R1(config-if)#exit

R2>en
R2#config t
R2(config)#int se0/1/0
R2(config-if)#ip address 10.1.1.2 255.255.255.252
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#int se0/1/1
R2(config-if)#ip address 10.2.2.2 255.255.255.252
R2(config-if)#no shut
R2(config-if)#exit

R3>en
R3#config t
R3(config)#interface GigabitEthernet0/0

R3(config-if)#ip address 192.168.3.1 255.255.255.0
R3(config-if)#no shut
R3(config-if)#exit
R3(config)#interface Serial0/1/0
R3(config-if)#ip address 10.1.2.1 255.255.255.252
R3(config-if)#no shut
R3(config-if)#exit

Configure Router:
Step 1: Configure console password on router
Execute command on all routers
R(config) # line console 0
R(config-line) #password conpa55
R(config-line) #login

Step 2: Configure password for vty lines
Execute command on all routers
R(config)# line vty 0 4
R(config-line)# password vtypa55
R(config-line)# login

Step 3: Configure secret on router
Execute command on all routers
R(config) # enable secret enpa55

Step 4: Configure SSH login on router
Execute command on all routers
R(config)# ip domain-name ccnasecurity.com
R(config)# username admin secret adminpa55
R(config)# line vty 0 4
R(config-line)# login local
R(config-line)# crypto key generate rsa
How many bits in the modulus [512]: 1024

Step 5: Configure OSPF routing on routers
R1(config)#router ospf 1
R1(config-R1)#network 192.168.1.0 0.0.0.255 area 0
R1(config-R1)#network 10.1.1.0 0.255.255.255 area 0
R1(config-R1)#exit
R1(config)#exit
R1#show ip ospf interface gig0/0
R1#show ip ospf interface se0/1/0

R2(config)#router ospf 1
R2(config-R2)#network 10.1.1.0 0.255.255.255 area 0
R2(config-R2)#network 10.2.2.0 0.255.255.255 area 0
R2(config-R2)#exit

R2(config)#exit
R2#show ip ospf interface se0/1/0
R2#show ip ospf interface se0/1/1

R3(config)#router ospf 1
R3(config-R3)#network 192.168.3.0 0.0.0.255 area 0
R3(config-R3)#network 10.2.2.0 0.255.255.255 area 0
R3(config-R3)#exit
R3(config)#exit
R3#show ip ospf interface gig0/0
R3#show ip ospf interface se0/1/0

Part 2: Verify Basic Network Connectivity
Step 1: Check connectivity from PCA to PCC
PCA>ping 192.168.3.3
(Successful)

Step 2: Access R2 using SSH.
PCC>ssh –l admin 10.2.2.2
Password:adminpa55
R2>exit

Step 3: From PC-C, open a web browser to the PC-A server.
Desktop -> Web Browser
URL: http://192.168.1.3
(Successful)

Part 3: Create the Firewall Zones on R3
Step 1: Verify that the Security Technology package
R3# show version

Step 2: Enable the Security Technology package
R3(config)# license boot module c1900 technology-package securityk9

Step 3: Save the running-config and reload the router
R3#copy run start
R3# reload

Step 4: Verify that the Security Technology package
R3# show version

Step 5: Create an internal zone.
R3(config)# zone security IN-ZONE
R3(config-sec-zone)# exit

Step 6: Create an external zone.
R3(config)# zone security OUT-ZONE

R3(config-sec-zone)# exit

Part 4: Identify Traffic Using a Class-Map
Step 1: Create an ACL that defines internal traffic.
R3(config)# access-list 101 permit ip 192.168.3.0 0.0.0.255 any

Step 2: Create a class map referencing the internal traffic ACL
R3(config)# class-map type inspect match-all IN-NET-CLASS-MAP
R3(config-cmap)# match access-group 101
R3(config-cmap)# exit

Part 5: Specify Firewall Policies
Step 1: Create a policy map to determine what to do with matched traffic.
R3(config)# policy-map type inspect IN-2-OUT-PMAP

Step 2: Specify a class type of inspect and reference class map IN-NET CLASS-MAP.
R3(config-pmap)# class type inspect IN-NET-CLASS-MAP

Step 3: Specify the action of inspect for this policy map.
R3(config-pmap-c)# inspect
R3(config-pmap-c)# exit
R3(config-pmap)# exit
Part 6: Apply Firewall Policies

Step 1: Create a pair of zones.
R3(config)# zone-pair security IN-2-OUT-ZPAIR source IN-ZONE destination OUT-ZONE

Step 2: Specify the policy map for handling the traffic between the two zones.
R3(config-sec-zone-pair)# service-policy type inspect IN-2-OUT-PMAP
R3(config-sec-zone-pair)# exit
R3(config)#

Step 3: Assign interfaces to the appropriate security zones.
R3(config)# int g0/0
R3(config-if)# zone-member security IN-ZONE
R3(config-if)# exit
R3(config)# int s0/1/0
R3(config-if)# zone-member security OUT-ZONE
R3(config-if)# exit

Step 4: Copy the running configuration to the startup configuration.
R3# copy run start
R3# reload

Part 7: Test Firewall Functionality from IN-ZONE to OUT-ZONE
Step 1: From internal PC-C, ping the external PC-A server.

PCC>ping 192.168.1.3
(Successful)

Step 2: Access R2 using SSH.

PCC>ssh –l admin 10.2.2.2
Password:
R2>

Step 3: View established sessions

R3# show policy-map type inspect zone-pair sessions

Step 4: From PC-C, exit the SSH session on R2 and close the command prompt window.

R2>exit

Step 5: From internal PC-C, open a web browser to the PC-A server web page.

Desktop -> Web Browser
URL: http://192.168.1.3
(Successful)

Step 6: View established sessions

R3# show policy-map type inspect zone-pair sessions

Part 8: Test Firewall Functionality from OUT-ZONE to INZONE

Step 1: From internal PC-A, ping the external PC-C server.

PCA>ping 192.168.3.3
(Unsuccessful – Request timed out)

Step 2: From R2, ping PC-C.

R2# ping 192.168.3.3
(Unsuccessful – Request timed out