Lab5-ACL Step-by-Step Procedure Group 2

Lab Objectives:

- Configure web servers
- Configure ACLs on routers
- Test ACLs

1. **Major Network Address:**
    - Major network address: 2.2.0.0/16
2. **Subnet Requirements:**
    - Subnet 0: 55 hosts
    - Subnet 1: 99 hosts
    - Subnet 2: 22 hosts
    - All other subnets: 2 hosts
3. **VLSM (Variable Length Subnet Masking):**
    - Determine the subnet masks and IP ranges for each subnet.

Subnet Calculations

Using VLSM, we start from the largest subnet to the smallest.

- **Subnet 1 (99 hosts):**
    - Required hosts: 99
    - Subnet mask: /25 (provides 128 - 2 = 126 hosts)
    - IP range: 2.2.0.0/25 (2.2.0.0 to 2.2.0.127)
- **Subnet 0 (55 hosts):**
    - Required hosts: 55
    - Subnet mask: /26 (provides 64 - 2 = 62 hosts)
    - IP range: 2.2.0.128/26 (2.2.0.128 to 2.2.0.191)
- **Subnet 2 (22 hosts):**
    - Required hosts: 22
    - Subnet mask: /27 (provides 32 - 2 = 30 hosts)
    - IP range: 2.2.0.192/27 (2.2.0.192 to 2.2.0.223)
- **All other subnets (2 hosts):**
    - Required hosts: 2
    - Subnet mask: /30 (provides 4 - 2 = 2 hosts)
    - IP ranges:

    - 2.2.0.224/30 (2.2.0.224 to 2.2.0.227)
    - 2.2.0.228/30 (2.2.0.228 to 2.2.0.231)
    - Continue with additional /30 subnets as needed.

Assigning IP Addresses

Subnet 0

- **Router Interface:** 2.2.0.129 / 255.255.255.192
- **PC0:** 2.2.0.190 / 255.255.255.192 (Gateway: 2.2.0.129)

Subnet 1

- **Router Interface:** 2.2.0.1 / 255.255.255.128
- **PC1:** 2.2.0.126 / 255.255.255.128 (Gateway: 2.2.0.1)
- **PC3:** 2.2.0.2 / 255.255.255.128 (Gateway: 2.2.0.1)

Subnet 2

- **Router Interface:** 2.2.0.193 / 255.255.255.224
- **Web Server:** 2.2.0.222 / 255.255.255.224 (Gateway: 2.2.0.193)

Network Topology Diagram

- Label your network diagram with the appropriate IP addresses.
- (Draw or use Packet Tracer for visualization)

Configuration Commands

Router (R0)

```
interface G0/0
 ip address 2.2.0.129 255.255.255.192
 ip ospf 1 area 0
 no shutdown

interface Serial0/0/0
 ip address 2.2.0.225 255.255.255.252
 ip ospf 1 area 0
 no shutdown
```

```
interface Serial0/0/1
 ip address 2.2.0.230 255.255.255.252
 ip ospf 1 area 0
 no shutdown


router ospf 1
router-id 1.1.1.1
network 2.2.0.0 0.0.255.255 area 0
```

Router 1 (R1)

```
interface G0/0
ip address 2.2.0.1 255.255.255.128
ip ospf 1 area 0
no shutdown

interface Serial0/0/0
ip address 2.2.0.233 255.255.255.252
ip ospf 1 area 0
no shutdown


interface Serial0/0/1
ip address 2.2.0.226 255.255.255.252
ip ospf 1 area 0
no shutdown

router ospf 1
router-id 2.2.2.2
network 2.2.0.0 0.0.255.255 area 0
```

Router (R2)

```
interface G0/0
 ip address 2.2.0.193 255.255.255.224
 ip ospf 1 area 0
 no shutdown
```

```
interface Serial0/0/0
 ip address 2.2.0.229 255.255.255.252
 ip ospf 1 area 0
 no shutdown

interface Serial0/0/1
 ip address 2.2.0.234 255.255.255.252
 ip ospf 1 area 0
 no shutdown

router ospf 1
router-id 3.3.3.3
network 2.2.0.0 0.0.255.255 area 0
```

Install Apache Web Server

4. Install Apache on the designated Web Server in Subnet 2. http://apachelounge.com/download
5. Edit the index.htm file to add your full names.
6. Access the webserver from PC1 using http://2.2.0.222
7. Activate httpd.exe on server bin/httpd.exe
8. Take a screenshot of the output and insert it below:

Task 1: ACL for PING from Subnet 0

9. **ACL Statements R0:**

```
access-list 100 permit icmp 2.2.0.128 0.0.0.63 any echo
access-list 101 permit icmp any 2.2.0.128 0.0.0.63 echo-reply
access-list 100 deny ip any any
```

10. **Deploy ACL on Router Interface R0:**

```
int g0/0
ip access-group 100 in
```

11. **Check Your Work:**
    - Ping the web server in Subnet 2 from Subnet 0 (should succeed).
    - Try connecting to the Apache server using a browser (should fail).

- Take screenshots of these outputs and insert them below:

Task 2: ACL for Web Server Access from PC1

12. ACL Statements R1:

access-list 101 permit tcp host 2.2.0.126 host 2.2.0.222 eq www
access-list 101 deny tcp host 2.2.0.2 host 2.2.0.222 eq www
access-list 101 permit ip any any

13. Deploy ACL on Router Interface R1:

int g0/0
ip access-group 101 in

14. Check Your Work:

- Access the server from PC1 using a web browser (should work).
- Ping the server from PC3 (should work).
- Access the server from PC3 using a web browser (should fail).
- Take screenshots of these outputs and insert them below:

Task 3: ACL for PING from First Half of Subnet 1

15. ACL Statements:

On R0

no access-list 100
access-list 100 permit icmp 2.2.0.0 0.0.0.63 2.2.0.128 0.0.0.127
access-list 100 deny icmp 2.2.0.64 0.0.0.63 2.2.0.128 0.0.0.127
access-list 100 permit ip any any

On R1:
access-list 100 permit icmp 2.2.0.0 0.0.0.63 2.2.0.128 0.0.0.63 echo
access-list 100 permit icmp 2.2.0.0 0.0.0.127 2.2.0.128 0.0.0.63 echo-reply

16. **Deploy ACL on Router Interface:**

On R0
interface g0/0
ip access-group 100 in
On R1
Int g0/0
ip access-group 100 in

17. **Check Your Work:**
    - Ping from PC1 to PC0 (must fail).
    - Ping from PC3 to PC0 (must succeed).
    - Ping from PC0 to PC1 and PC3 (must succeed).
    - Take screenshots of these outputs and insert them below:

Hint

Ensure to disable Seneca internet

On task 3

Take screenshot in this order

- Ping from PC0 to PC1 and PC3 (must succeed).
- Ping from PC1 to PC0 (must fail).
- Ping from PC3 to PC0 (must succeed).(take this after setting the ACL statements