**Configure OSPF MD5 Authentication**

**Step 1: Test connectivity. All devices should be able to ping all other IP addresses.**

**Step 2: Configure OSPF MD5 authentication for all the routers in area 0. Router 1 , Router 2 , Router 3**

R1, R2, R3(config)# router ospf 1

R1, R2, R3 (config-router)# area 0 authentication message-digest

**Step 3: Configure the MD5 key for all the routers in area 0. Configure an MD5 key on the serial interfaces on R1, R2 and R3. Use the password MD5pa55 for key 1.**

R1(config)# interface s0/0/0 ………….(enter proper serial no from connection)

R1(config-if)# ip ospf message-digest-key 1 md5 MD5pa55

R2(config)# interface s0/0/0

R2(config-if)# ip ospf message-digest-key 1 md5 MD5pa55

R2(config-if)# interface s0/0/1

R2(config-if)# ip ospf message-digest-key 1 md5 MD5pa55

R3(config)# interface s0/0/1

R3(config-if)# ip ospf message-digest-key 1 md5 MD5pa55

**Step 4: Verify configurations.** a. Verify the MD5 authentication configurations using the commands **show ip ospf interface**. b. Verify end-to-end connectivity.

**Configure NTP**

**Step 1: Enable NTP authentication on PC-A.** a. On PC-A, click NTP under the Services tab to verify NTP service is enabled.b. To configure NTP authentication, click Enable under Authentication. Use key **1** and password **NTPpa55** for authentication.

**Step 2: Configure R1, R2, and R3 as NTP clients.**

R1, R2, R3(config)# ntp server 192.168.1.5 Verify client configuration using the command **show ntp status.**

**Step 3: Configure routers to update hardware clock. Configure R1, R2, and R3 to periodically update the hardware clock with the time learned from NTP.**

R1, R2, R3 (config)# ntp update-calendar Verify that the hardware clock was updated using the command **show clock.**

**Step 4: Configure NTP authentication on the routers. Configure NTP authentication on R1, R2, and R3 using key 1 and password NTPpa55.**

R1, R2, R3 (config)# ntp authenticate

R1, R2, R3 (config)# ntp trusted-key 1

R1, R2, R3 (config)# ntp authentication-key 1 md5 NTPpa55

**Step 5: Configure routers to timestamp log messages. Configure timestamp service for logging on the routers.**

R1, R2, R3 (config)# service timestamps log datetime msec

**Configure Routers to Log Messages to the Syslog Server**

**Step 1: Configure the routers to identify the remote host (Syslog Server) that will receive logging messages.**

R1, R2, R3(config)# logging host 192.168.1.6 …………..(PCB ip address)

**Step 2: Verify logging configuration.**

Use the command **show logging** to verify logging has been enabled.

**Step 3: Examine logs of the Syslog Server.**

From the Services tab of the Syslog Server’s dialogue box, select the Syslog services button. Observe the logging messages received from the routers.