Ex.10 PPP Authentication with PAP and CHAP

AIM:

To configure PPP encapsulation on serial links and also configure PAP authentication and PPP CHAP authentication. Test the connectivity between all the devices.

DESCRIPTION:

PAP:

Password Authentication Protocol (PAP) is used by PPP links to validate users. PAP authentication requires the calling device to enter the username and password. If the credentials match with the local database of the called device or in the remote AAA database then it is allowed to access otherwise denied**.**

CHAP:

The Challenge-Handshake Authentication Protocol (CHAP) is an identity checking protocol that periodically re-authenticates the user during an online session. Properly implemented CHAP is replay attack resistant, and far more secure than the Password Authentication Protocol (PAP).

CONFIGURATION COMMANDS:

ROUTER

```
Router#conft
Router(config)#intfa0/0
Router(config-if)#exit
Router(config)#hostnameR1
R1(config)#int fa0/0
R1(config-if)#ip addr 192.16.10.1 255.255.255.0
R1(config-if)#no sh
R1(config-if)#int se2/0
R1(config-if)#ip addr 192.16.20.1 255.255.255.0
R1(config-if)#no sh
R1(config-if)#clock rate 64000
R1(config-if)#ip route 192.16.30.0 255.255.255.0 se2/0
R1(config)#ip route 192.16.40.0 255.255.255.0 se2/0
{Likewise, setup static routing on the other routers}
PPP Configuration: R1(config)# interface s0/0/0
R1(config-if)# encapsulation ppp
R2(config)# interface s0/0/1
R2(config-if)# encapsulation ppp
R2(config)# interface s0/0/3
R2(config-if)# encapsulation ppp
R3(config)# interface s0/0/0
R3(config-if)# encapsulation ppp
PAP Configuration:
R1(config)# username R2 secret class
```

R1(config)# interface se2/0
R1(config-if)# ppp authentication pap
R1(config-if)# ppp pap sent-username R1 password cisco
R2(config)# username R1 secret cisco

PROCEDURE:

1. Make the connections as per the topology and perform static routing.
2. Configure R1 to use PPP encapsulation with R2 and R2 to use PPP with
R1 and R3. Likewise, configure R3 to use PPP with R3.
3. Configure PPP-PAP Authentication between R1 and R2.
4. Configure PPP-CHAP Authentication between R2 and R3

TOPOLOGY DIAGRAM:
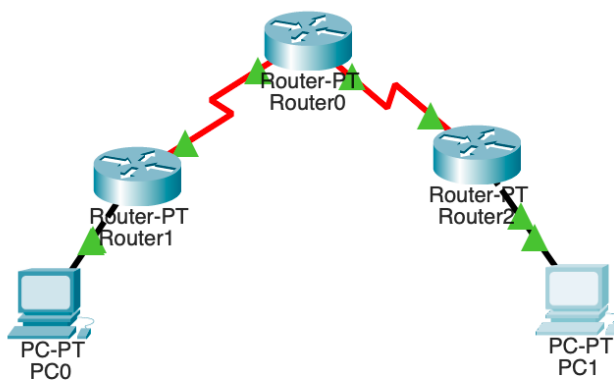
ADDRESSING TABLE:

Device	Interface	IP Address	Subnet Mask	Default Gateway
R0	Fa0/0	192.16.10.0	255.255.255.0	192.16.10.1
	Se2/0	192.16.20.0	255.255.255.0	192.16.20.1
R1	Se2/0	192.16.20.0	255.255.255.0	192.16.20.1
	Se3/0	192.16.30.0	255.255.255.0	192.16.30.1
R2	Fa0/0	192.16.40.0	255.255.255.0	192.16.40.1
	Se2/0	192.16.30.0	255.255.255.0	192.16.30.1
PC0	Fa0	192.16.10.2	255.255.255.0	192.16.10.1
PC1	Fa0	192.16.40.2	255.255.255.0	192.16.40.1

OUTPUT

Screenshot of successful ping between PCs:

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
●	Successful	PC0	PC1	ICMP	■	0.000	N	0	(edit)	(delete)

Screenshot of show running-config of all 3 routers:

Router 0:

```
R1#show running-config
Building configuration...

Current configuration : 947 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R1
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!              .
```

```
interface FastEthernet0/0
 ip address 192.168.1.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet1/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial2/0
 ip address 10.0.0.2 255.0.0.0
 encapsulation ppp
 ppp authentication pap
 ppp pap sent-username R1 password 0 class
 no keepalive
 clock rate 2000000
!
interface Serial3/0
 no ip address
 clock rate 2000000
 shutdown
!
interface FastEthernet4/0
 no ip address
 shutdown
!
interface FastEthernet5/0
 no ip address
 shutdown
!
router rip
 network 10.0.0.0
 network 192.168.1.0
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
```

Router1:

```
R2#show running-config
Building configuration...

Current configuration : 1013 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R2
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
```

```
!
interface FastEthernet0/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface FastEthernet1/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial2/0
 ip address 192.16.20.1 255.255.255.0
!
interface Serial3/0
 ip address 192.16.30.1 255.255.255.0
 clock rate 64000
!
interface FastEthernet4/0
 no ip address
 shutdown
!
interface FastEthernet5/0
 no ip address
 shutdown
!
ip classless
ip route 192.16.10.0 255.255.255.255 Serial2/0
ip route 192.16.40.0 255.255.255.255 Serial3/0
!
ip flow-export version 9
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
```

Router2:

```
R3>en
R3#show running-config
Building configuration...

Current configuration : 890 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R3
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
username R2 secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCil
!
```

```
interface FastEthernet0/0
 ip address 192.16.40.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet1/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial2/0
 ip address 192.16.30.1 255.255.255.0
!
interface Serial3/0
 no ip address
 clock rate 2000000
 shutdown
!
interface FastEthernet4/0
 no ip address
 shutdown
!
interface FastEthernet5/0
 no ip address
 shutdown
!
ip classless
ip route 192.16.20.0 255.255.255.0 Serial2/0
ip route 192.16.10.0 255.255.255.0 Serial2/0
!
ip flow-export version 9
!
!
```

Screenshot of show ip int brief:

```
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        192.168.2.1     YES manual up                    up
FastEthernet1/0        unassigned      YES unset  administratively down down
Serial2/0              11.0.0.3        YES manual up                    up
Serial3/0              unassigned      YES unset  administratively down down
FastEthernet4/0        unassigned      YES unset  administratively down down
FastEthernet5/0        unassigned      YES unset  administratively down down
```

Screenshot of show controller se2/0

```
Interface Serial2/0
Hardware is PowerQUICC MPC860
DTE V.35 TX and RX clocks detected
idb at 0x81081AC4, driver data structure at 0x81084AC0
SCC Registers:
General [GSMR]=0x2:0x00000000, Protocol-specific [PSMR]=0x8
Events [SCCE]=0x0000, Mask [SCCM]=0x0000, Status [SCCS]=0x00
Transmit on Demand [TODR]=0x0, Data Sync [DSR]=0x7E7E
Interrupt Registers:
Config [CICR]=0x00367F80, Pending [CIPR]=0x0000C000
Mask   [CIMR]=0x00200000, In-srv  [CISR]=0x00000000
Command register [CR]=0x580
Port A [PADIR]=0x1030, [PAPAR]=0xFFFF
       [PAODR]=0x0010, [PADAT]=0xCBFF
Port B [PBDIR]=0x09C0F, [PBPAR]=0x0800E
       [PBODR]=0x00000, [PBDAT]=0x3FFFD
Port C [PCDIR]=0x00C, [PCPAR]=0x200
       [PCSO]=0xC20,  [PCDAT]=0xDF2, [PCINT]=0x00F
Receive Ring
       rmd(68012830): status 9000 length 60C address 3B6DAC4
       rmd(68012838): status B000 length 60C address 3B6D444
Transmit Ring
       tmd(680128B0): status 0 length 0 address 0
       tmd(680128B8): status 0 length 0 address 0
       tmd(680128C0): status 0 length 0 address 0
       tmd(680128C8): status 0 length 0 address 0
       tmd(680128D0): status 0 length 0 address 0
       tmd(680128D8): status 0 length 0 address 0
       tmd(680128E0): status 0 length 0 address 0
       tmd(680128E8): status 0 length 0 address 0
       tmd(680128F0): status 0 length 0 address 0
       tmd(680128F8): status 0 length 0 address 0
       tmd(68012900): status 0 length 0 address 0
       tmd(68012908): status 0 length 0 address 0
       tmd(68012910): status 0 length 0 address 0
       tmd(68012918): status 0 length 0 address 0
       tmd(68012920): status 0 length 0 address 0
       tmd(68012928): status 2000 length 0 address 0

tx_limited=1(2)

SCC GENERAL PARAMETER RAM (at 0x68013C00)
Rx BD Base [RBASE]=0x2830, Fn Code [RFCR]=0x18
Tx BD Base [TBASE]=0x28B0, Fn Code [TFCR]=0x18
Max Rx Buff Len [MRBLR]=1548
Rx State [RSTATE]=0x0, BD Ptr [RBPTR]=0x2830
Tx State [TSTATE]=0x4000, BD Ptr [TBPTR]=0x28B0

SCC HDLC PARAMETER RAM (at 0x68013C38)
CRC Preset [C_PRES]=0xFFFF, Mask [C_MASK]=0xF0B8
Errors: CRC [CRCEC]=0, Aborts [ABTSC]=0, Discards [DISFC]=0
Nonmatch Addr Cntr [NMARC]=0
Retry Count [RETRC]=0
Max Frame Length [MFLR]=1608
```

Screenshot of show int se2/0

```
R2#show int se2/0
Serial2/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 10.0.0.3/8
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP, loopback not set, keepalive set (10 sec)
  LCP Open
  Open: IPCP, CDPCP
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/0/256 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
     Available Bandwidth 96 kilobits/sec
  5 minute input rate 15 bits/sec, 0 packets/sec
  5 minute output rate 21 bits/sec, 0 packets/sec
     70 packets input, 3476 bytes, 0 no buffer
     Received 63 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     60 packets output, 4144 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
     DCD=up  DSR=up  DTR=up  RTS=up  CTS=up
```

RESULT:

The experiment to configure PPP Encapsulation on serial links and also configure PPPPAP Authentication and PPP-CHAP Authentication using Cisco Packet Tracer has been performed successfully.