LV14: PPP WAN enkapsulacija - rad na uređajima

1) Objasni PAP protokol.

Protokol provjere autentičnosti lozinkom (PAP) koristi dvostrano rukovanje kako bi omogućio ravnopravnim sistemima jednostavnu metodu dokazivanja svog identiteta.

Rukovanje se provodi dok se uspostavlja veza. Kada se uspostavi veza, udaljeni uređaj šalje korisnički ID i lozinku sistemu za provjeru autentičnosti. Ovisno o ispravnosti tog para šifri, sistem koji provjerava identitet ili nastavlja ili prekida vezu.

PAP provjera zahtijeva da ime korisnika i lozinka budu poslani udaljenom sistemu u obliku čistog teksta. S PAP-om korisnički ID i lozinka se nikad ne šifriraju što ih čini osjetljivim na hakerski napad i praćenje. Iz ovog razloga trebali biste koristiti Protokol provjere autentičnosti izazovom rukovanja (CHAP) kad god je moguće.

2) Objasni CHAP protokol.

Challenge-Handshake Authentication Protocol (CHAP) je protokol za provjeru identiteta koji povremeno ponovno autentificira korisnika tijekom online sesije. Ispravno implementiran CHAP otporan je na napade ponavljanjem i daleko je sigurniji od protokola za provjeru autentičnosti lozinke (PAP).

CHAP se ne oslanja na prijenos zajedničkih tajni između usluge i strane koja traži pristup. Međutim, ovisi o uspostavi zajedničke tajne za pristup usluzi, osoba koja zahtijeva pristup i usluga provode kriptografsku razmjenu ili "rukovanje". Naknadni izazovi se zatim šalju iz usluge već povezanoj strani što im omogućuje ponovnu provjeru autentičnosti tijekom iste sesije. Uzastopni izazovi također se postupno razlikuju od prethodnih, čineći napade ponavljanja neizvodljivima.

Izvođenje vježbe:

1) Oformiti mrežu prema zadanoj topologiji.
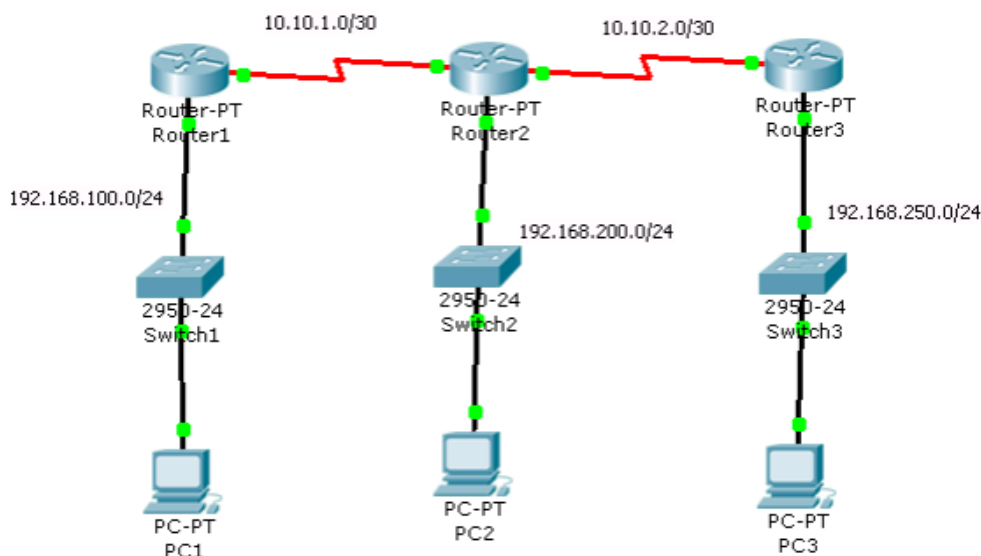
2) Izvršiti temeljnu konfiguraciju usmjernika koristeći ranije zabilješke.

3) Izvršiti konfiguraciju sučelja usmjernika i računala PC1, PC2 i PC3 prema podacima zadanim u tablici. Preklopnici rade sa zadanim (default) postavkama.

Ruter	Adresa Fastethernet sučelja	Mrežna maska	Oznaka ser. sučelja	Tip ser. sučelja	Adresa serijskog sučelja	Mrežna maska	Default gateway
R1	192.168.100.1	255.255.255.0	S2/0	DCE	10.10.1.1	255.255.255.252	
R2	192.168.200.1	255.255.255.0	S2/0	DTE	10.10.1.2	255.255.255.252	
			S3/0	DCE	10.10.2.1	255.255.255.252	
R3	192.168.250.1	255.255.255.0	S3/0	DTE	10.10.2.2	255.255.255.252	
PC1	192.168.100.10	255.255.255.0					192.168.100.1
PC2	192.168.200.10	255.255.255.0					192.168.200.1
PC3	192.168.250.10	255.255.255.0					192.168.250.1

R1:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 192.168.100.1 255.255.255.0
Router(config-if)#no shutdown
```

```
Router(config-if)#exit
Router(config)#interface serial 2/0
Router(config-if)#ip address 10.10.1.1 255.255.255.252
Router(config-if)#no shutdown
```

R2:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 192.168.200.1 255.255.255.0
Router(config-if)#no shutdown
```

```
Router(config-if)#exit
Router(config)#interface serial 2/0
Router(config-if)#ip address 10.10.1.2 255.255.255.252
Router(config-if)#no shutdown
```

```
Router(config-if)#exit
Router(config)#interface serial 3/0
Router(config-if)#ip address 10.10.2.1 255.255.255.252
Router(config-if)#no shutdown
```

R3:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 192.168.250.1 255.255.255.0
Router(config-if)#no shutdown
```

```
Router(config-if)#exit
Router(config)#interface serial 3/0
Router(config-if)#ip address 10.10.2.2 255.255.255.252
Router(config-if)#no shutdown
```

4) Konfigurirati RIPv1 ruting protokol na R1, R2 i R3. Vezu provjeriti pinganjem između PC1, PC2 i PC3.

R1:

```
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 192.168.100.0
Router(config-router)#network 10.10.10
                                       ^
% Invalid input detected at '^' marker.

Router(config-router)#network 10.10.1.0
```

```
Pinging 192.168.200.10 with 32 bytes of data:

Request timed out.
Reply from 192.168.200.10: bytes=32 time=21ms TTL=126
Reply from 192.168.200.10: bytes=32 time=24ms TTL=126
Reply from 192.168.200.10: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.200.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 24ms, Average = 15ms

C:\>
```

R2:

```
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 10.10.1.0
Router(config-router)#network 192.168.200.0
Router(config-router)#network 192.168.250.0
```

```
Pinging 192.168.250.10 with 32 bytes of data:

Request timed out.
Reply from 192.168.250.10: bytes=32 time=1ms TTL=126
Reply from 192.168.250.10: bytes=32 time=2ms TTL=126
Reply from 192.168.250.10: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.250.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>
```

R3:

```
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 10.10.2.0
Router(config-router)#network 192.168.250.0
```

```
Pinging 192.168.100.10 with 32 bytes of data:

Reply from 192.168.100.10: bytes=32 time=32ms TTL=125
Reply from 192.168.100.10: bytes=32 time=25ms TTL=125
Reply from 192.168.100.10: bytes=32 time=2ms TTL=125
Reply from 192.168.100.10: bytes=32 time=2ms TTL=125

Ping statistics for 192.168.100.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 32ms, Average = 15ms

C:\>
```

5) Izdavanjem naredbe show interface serial XX (gdje je XX oznaka serijskog sučelja usmjernika), provjeriti koja je enkapsulacija postavljena.

R1:

```
Router>show interface serial 2/0
Serial2/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 10.10.1.1/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
```

R2:

```
Router>show interface serial 2/0
Serial2/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 10.10.1.2/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)

Router>show interface serial 3/0
Serial3/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 10.10.2.1/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
```

R3:

```
Router>show interface serial 2/0
Serial2/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 10.10.1.1/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
```

6) Konfigurirati PPP WAN protokol na svim upotrijebljenim serijskim sučeljima svih usmjernika.

R1:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface serial 2/0
Router(config-if)#encapsulation ppp
```

R2:

```
Router>enable
Router#configure terminal
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down

Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface serial 2/0
Router(config-if)#encapsulation ppp
```

```
Router(config-if)#exit
Router(config)#interface serial 3/0
Router(config-if)#encapsulation ppp
```

R3:

```
Router(config)#interface serial 2/0
Router(config-if)#encapsulation ppp
```

7) Provjeri koja je enkapsulacija postavljena.

R1:

```
Router>show interface serial 2/0
Serial2/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 10.10.1.1/30
  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)
```

R2:

```
Router>show interface serial 2/0
Serial2/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 10.10.1.1/30
  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)

Router>show interface serial 3/0
Serial3/0 is up, line protocol is down (disabled)
  Hardware is HD64570
  Internet address is 10.10.2.1/30
  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)
```

R3:

```
Router>show interface serial 2/0
Serial2/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 10.10.1.1/30
  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)
```

8) Na usmjerniku R2 promijeniti enkapsulaciju na sučelju prema R1 ponovno u HDLC.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface serial 2/0
Router(config-if)#ancapsulation hdlc
                    ^
% Invalid input detected at '^' marker.

Router(config-if)#encapsulation hdlc
```

9) Provjeri pinganjem veze između računala.

R1-R3:

```
C:\>ping 192.168.250.10

Pinging 192.168.250.10 with 32 bytes of data:

Reply from 192.168.100.1: Destination host unreachable.
Reply from 192.168.100.1: Destination host unreachable.
Reply from 192.168.100.1: Destination host unreachable.
Reply from 192.168.100.1: Destination host unreachable.

Ping statistics for 192.168.250.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

R2-R1:

```
C:\>ping 192.168.100.10

Pinging 192.168.100.10 with 32 bytes of data:

Reply from 192.168.200.1: Destination host unreachable.
Reply from 192.168.200.1: Destination host unreachable.
Reply from 192.168.200.1: Destination host unreachable.
Reply from 192.168.200.1: Destination host unreachable.

Ping statistics for 192.168.100.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

R3-R2:

```
C:\>ping 192.168.200.10

Pinging 192.168.200.10 with 32 bytes of data:

Reply from 192.168.250.1: Destination host unreachable.
Reply from 192.168.250.1: Destination host unreachable.
Reply from 192.168.250.1: Destination host unreachable.
Reply from 192.168.250.1: Destination host unreachable.

Ping statistics for 192.168.200.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Pinganje između računala nije uspješno jer nije postavljena ista enkapsulacija na svakom usmjerniku. Promjenili smo enkapsulaciju na usmjerniku R2, iz tog razloga pinganje nije bilo uspješno.