Vježba br. 14 – PPP WAN enkapsulacija - rad na uređajima

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Uvod:

PPP je složeni WAN protokol koji se temelji na HDLC (defaultni) protokolu. Kada povezujemo dva Cisco rutera, HDLC je zadani protokol. Kod povezivanja Cisco i ne-Cisco rutera moramo na obje strane primijeniti PPP protokol.

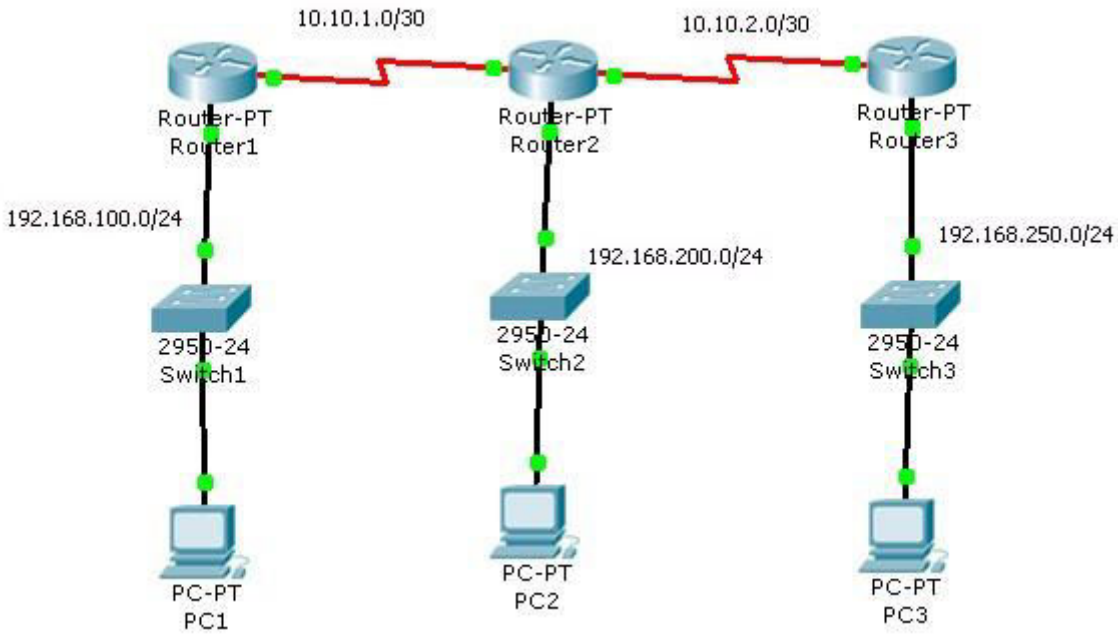
- Omogućava nadzor kvalitete veze, ako je broj grešaka u prijenosu velik, veza pada.
- Omogućava sigurnosne postavke za autentifikaciju, kako bi se spriječilo neovlašteno spajanje, primjenom PAP ili CHAP protokola.
- Uspostavljanje veze i održavanje veze tijekom korištenja PPP je složeni postupak tijekom kojeg se strane (ruteri) „dogovaraju“ o nekim detaljima,

kao što su:

- Autentifikacija
- Kompresija i
- Brzina

Zadaci

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

4. Konfigurirati RIPv1 ruting protokol na R1, R2 i R3. Vezu provjeriti pinganjem između PC1, PC2 i PC3. Rezultate pinganja zapiši u bilježnicu

Ako je pinganje bilo uspješno, obavijestiti nastavnika.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.250.10

Pinging 192.168.250.10 with 32 bytes of data:

Request timed out.
Reply from 192.168.250.10: bytes=32 time=10ms TTL=125
Reply from 192.168.250.10: bytes=32 time=2ms TTL=125
Reply from 192.168.250.10: bytes=32 time=24ms TTL=125

Ping statistics for 192.168.250.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 24ms, Average = 12ms

C:\>
```

5. Izdavanjem naredbe ***show interface serial XX*** (gdje je XX oznaka serijskog sučelja usmjernika), provjeriti koja je enkapsulacija postavljena. Iz izvještaja prepiši čitav redak u bilježnicu.

R1

```
Router#show interface serial2/0
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)
  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 24 bits/sec, 0 packets/sec
  5 minute output rate 15 bits/sec, 0 packets/sec
     34 packets input, 3076 bytes, 0 no buffer
     Received 31 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     36 packets output, 2176 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 output buffer failures, 0 output buffers swapped out
 --More--
```

R2

```
Router>enable
Router#show interface serial2/0
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)
  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 26 bits/sec, 0 packets/sec
     42 packets input, 2488 bytes, 0 no buffer
     Received 37 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     38 packets output, 3484 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 output buffer failures, 0 output buffers swapped out
 --More--
```

```
Router#
Router#show interface serial3/0
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)
  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 26 bits/sec, 0 packets/sec
     37 packets input, 2152 bytes, 0 no buffer
     Received 34 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     41 packets output, 3836 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

R3

```
Router>enable
Router#show interface serial3/0
Serial3/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 10.10.2.2/30
  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)
  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 26 bits/sec, 0 packets/sec
  5 minute output rate 15 bits/sec, 0 packets/sec
     43 packets input, 3980 bytes, 0 no buffer
     Received 38 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     38 packets output, 2204 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 output buffer failures, 0 output buffers swapped out
 --More--
```

6. Konfigurirati PPP WAN protokol na svim upotrijebljenim serijskim sučeljima svih usmjernika, na slijedeći način:
   R(config)# interface serial xx
   R(config-if)# encapsulation ppp

```
Router#config
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down
t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface serial2/0
Router(config-if)#encapsulation ppp
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config-if)#exit
Router(config)#interface serial3/0
Router(config-if)#encapsulation ppp
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to down
```

7. Provjeri koja je enkapsulacija postavljena, koristeći isti postupak kao u t.5 Iz izvještaja prepiši čitav redak u bilježnicu.

R1

```
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show interface serial2/0
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)
  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)
```

R2

```
Router#show interface serial2/0
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 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 29 bits/sec, 0 packets/sec
```

```
Router#show interface serial3/0
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 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 14 bits/sec, 0 packets/sec
  5 minute output rate 24 bits/sec, 0 packets/sec
     49 packets input, 2776 bytes, 0 no buffer
     Received 45 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     52 packets output, 4788 bytes, 0 underruns
```

R3

```
Router#show interface serial3/0
Serial3/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 10.10.2.2/30
  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)
  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 28 bits/sec, 0 packets/sec
  5 minute output rate 15 bits/sec, 0 packets/sec
     57 packets input, 5168 bytes, 0 no buffer
     Received 51 broadcasts, 0 runts, 0 giants, 0 throttles
```

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

   R2(config)# interface serial xx
   R2(config-if)# encapsulation hdlc

   R2

```
Router#show interface serial2/0
Serial2/0 is up, line protocol is down (disabled)
  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)
  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)
```

9. Provjeri pinganjem veze između računala, zapiši rezultate i komentiraj ih u bilježnici.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.250.10

Pinging 192.168.250.10 with 32 bytes of data:

Request timed out.
Reply from 192.168.250.10: bytes=32 time=10ms TTL=125
Reply from 192.168.250.10: bytes=32 time=2ms TTL=125
Reply from 192.168.250.10: bytes=32 time=24ms TTL=125

Ping statistics for 192.168.250.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 24ms, Average = 12ms

C:\>ping 192.168.200.10

Pinging 192.168.200.10 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

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

C:\>ping 192.168.250.10

Pinging 192.168.250.10 with 32 bytes of data:

Request timed out.
```

Pinganje ne radi zbog različito postavljenih protokola na usmjernicima.