

TEHNIČKA ŠKOLA RUĐERA BOŠKOVIĆA

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Konfiguracija RIPv1 protokola

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CILJ VJEŽBE

Naučiti i izvesti usmjernički protokol RIPv1.

PRIPREMA ZA VJEŽBU

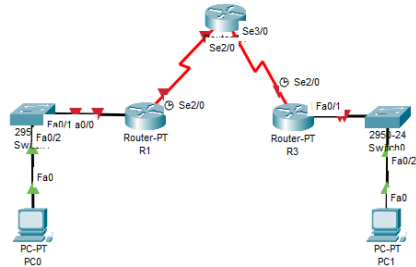
1. Koje su karakteristike protokola RIPv1?

RIPv1 je jedan od najstarijih protokola za dinamičko usmjeravanje.

- Temeljen na algoritmu vektor udaljenosti (*distance vector*).
- Kao metriku koristi **broj skokova**, odnosno broj usmjernika kroz koje paketi moraju proći iz izvorne mreže da bi došli do odredišta. Maksimalni broj skokova paketa je 15; paket koji dosegne 16. skok bit će odbačen. Ovo ograničenje čini RIPv1 pogodnim samo za manje mreže.
- Ne podržava besklasno međudomensko usmjeravanje (engl. Classless Interdomain Routing, CIDR) niti VLSM.
- Oglašava svoju tablicu usmjeravanja svim povezanim susjedima u redovitim intervalima, prema zadanim postavkama: svakih 30 s. Ova ažuriranja šalju se putem sveodredišnog (broadcast) slanja na IP adresu 255.255.255.255.
- Ne provjerava tko sluša ažuriranja koja su poslana, nema autentifikacije, niti su ažuriranja kriptirana.
- Administrativna udaljenost RIPv1 je 120, što je veća vrijednost u usporedbi s drugim protokolima, pa se smatra nepouzdanim.
- Jedna od prednosti RIPv1 je jednostavna konfiguracija (`network 192.168.1.0`) i manji zahtjevi za resursima usmjernika u odnosu na složenije protokole.
- Koristi UDP port 520.

IZVOĐENJE VJEŽBE

1. U PT-u spoji uređaje prema zadanoj topologiji i izvrši temeljnu konfiguraciju usmjernika, koristeći tab CLI.



R1

```
Router>ena
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files! Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
```

R2

```
Router>ena
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files! Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#hostname R2
R2(config)#copy running-config startup-config
^
% Invalid input detected at '^' marker.

R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R2#
```

R3

```
Router>ena
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files! Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#hostname R3
^
% Invalid input detected at '^' marker.

Router(config)#hostname R3
R3(config)#exit
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R3#
```

2. Konfiguriraj sučelja na usmjernicima R1, R2 i R3, koristeći priloženu tablicu adresa i zabilješke s prethodnih vježbi (voditi računa da su IP adrese izmijenjene)

R1

```
R1(config)#interface FastEthernet0/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

R1(config)#interface Serial2/0
R1(config-if)#ip address 192.168.2.1 255.255.255.0
R1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
R1(config-if)#

R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R1#
```

R2

```
R2>enable
R2#
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface Serial2/0
R2(config-if)#ip address 192.168.2.2 255.255.255.0
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

R2(config-if)#interface Serial20
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
R2(config-if)#interface Serial3/0
R2(config-if)#ip address 192.168.3.1 255.255.255.0
R2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial3/0, changed state to down

R2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R2#
```

R3

```
R3(config)#interface FastEthernet0/0
R3(config-if)#ip address 192.168.4.1 255.255.255.0
R3(config-if)#no shutdown

R3(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

R3(config)#interface Serial2/0
R3(config-if)#ip address 192.168.3.2 255.255.255.0
R3(config-if)#no shutdown

R3(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

R3(config-if)#

R3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R3#
```

3. Pinganjem provjeri da li postoji povezanost između PC1 i PC2. Obrazloži zašto je tako.

PC1

| | |
|----------------------------|---|
| IP Configuration | |
| <input type="radio"/> DHCP | <input checked="" type="radio"/> Static |
| IPv4 Address | 192.168.1.10 |
| Subnet Mask | 255.255.255.0 |
| Default Gateway | 192.168.1.1 |
| DNS Server | 0.0.0.0 |

PC2

| | |
|----------------------------|---|
| IP Configuration | |
| <input type="radio"/> DHCP | <input checked="" type="radio"/> Static |
| IPv4 Address | 192.168.4.10 |
| Subnet Mask | 255.255.255.0 |
| Default Gateway | 192.168.4.1 |
| DNS Server | 0.0.0.0 |

PC1 -> PC2

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.4.10

Pinging 192.168.4.10 with 32 bytes of data:

Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.

Ping statistics for 192.168.4.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

Razlog neuspješnosti ping-a jest ne konfigurirana ruta od PC1 do PC2.

4. Pinganjem provjeri do koje razine postoji povezanost:

- PC1 – Fastethernet sučelje 0/0 usmjernika R1
- PC1 – Serijsko sučelje 2/0 usmjernika R1
- PC1 - Serijsko sučelje 2/0 usmjernika R2
- itd.

Obrazloži rezultat pinganja.

```
C:\>tracert 192.168.4.10

Tracing route to 192.168.4.10 over a maximum of 30 hops:

  1  2 ms      0 ms      0 ms      192.168.1.1
  2  0 ms      *          0 ms      192.168.1.1
  3  *          0 ms      *          Request timed out.
  4  1 ms      *          0 ms      192.168.1.1
  5  *          0 ms      *          Request timed out.
```

Povezanost postoji samo do usmjernika R1, jer mreža nije u potpunosti konfigurirana (ne postoje rute do drugih usmjernika).

5. Naredbom `show ip route` na usmjerniku R1 provjeri stanje usmjerničke tablice. Ispiši koje su mreže navedene u tablici.

```
R1>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

C    192.168.1.0/24 is directly connected, FastEthernet0/0
C    192.168.2.0/24 is directly connected, Serial2/0
```

6. Konfiguriraj dinamičku rutu koja će omogućiti povezanost mreža 192.168.1.0/24 i 192.168.4.0/24, korištenjem RIPv1 protokola, kako slijedi:

- a. Na R1:

```
R1(config)#router rip
R1(config-router)#network 192.168.1.0
R1(config-router)#network 192.168.2.0

R1(config)#router rip
R1(config-router)#network 192.168.1.0
R1(config-router)#network 192.168.2.0
R1(config-router)#
```

- b. Na R2:

```
R2(config)#router rip
R2(config-router)#network 192.168.2.0
R2(config-router)#network 192.168.3.0

R2(config)#router rip
R2(config-router)#network 192.168.2.0
R2(config-router)#network 192.168.3.0
R2(config-router)#
```

- c. Na R3:

```
R3(config-router)#router rip
R3(config-router)#network 192.168.3.0
R3(config-router)#network 192.168.4.0

R3(config)#router rip
R3(config-router)#network 192.168.3.0
^
% Invalid input detected at '^' marker.

R3(config-router)#network 192.168.3.0
R3(config-router)#network 192.168.4.0
R3(config-router)#
```

Naredbom `show ip route` na svim usmjernicima provjeri stanje ruting tablica. Ispiši koje su mreže navedene u tablici.

```
R1#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

Gateway of last resort is not set

C    192.168.1.0/24 is directly connected, FastEthernet0/0
C    192.168.2.0/24 is directly connected, Serial2/0
R    192.168.3.0/24 [120/1] via 192.168.2.2, 00:00:10, Serial2/0
R    192.168.4.0/24 [120/2] via 192.168.2.2, 00:00:10, Serial2/0

R1#

R2#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

Gateway of last resort is not set

R    192.168.1.0/24 [120/1] via 192.168.2.1, 00:00:03, Serial2/0
C    192.168.2.0/24 is directly connected, Serial2/0
C    192.168.3.0/24 is directly connected, Serial3/0
R    192.168.4.0/24 [120/1] via 192.168.3.2, 00:00:11, Serial3/0

R2#|

R3#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

Gateway of last resort is not set

R    192.168.1.0/24 [120/2] via 192.168.3.1, 00:00:05, Serial2/0
R    192.168.2.0/24 [120/1] via 192.168.3.1, 00:00:05, Serial2/0
C    192.168.3.0/24 is directly connected, Serial2/0
C    192.168.4.0/24 is directly connected, FastEthernet0/0

R3#|
```

7. Pinging provjeri povezanost PC1 i PC2.

```
C:\>ping 192.168.4.10

Pinging 192.168.4.10 with 32 bytes of data:

Request timed out.
Reply from 192.168.4.10: bytes=32 time=2ms TTL=125
Reply from 192.168.4.10: bytes=32 time=15ms TTL=125
Reply from 192.168.4.10: bytes=32 time=6ms TTL=125

Ping statistics for 192.168.4.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 15ms, Average = 7ms

C:\>|
```