TEHNIČKA ŠKOLA
RUĐERA BOŠKOVIĆA
Zagreb, Getaldićeva 4

Nastavni predmet	RAČUNALNE MREŽE_3H
Naslov cjeline	Djelovanje u mrežnom sloju
Naslov jedinice	Vježba 3: IPv6 adresiranje

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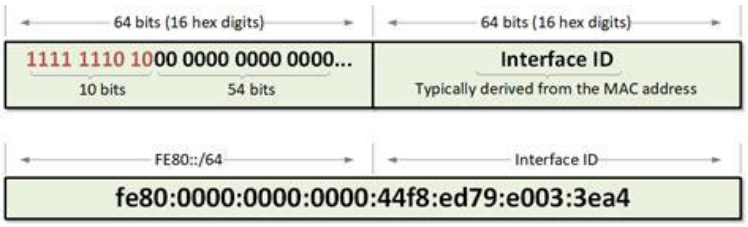
PRIPREMA ZA VJEŽBU

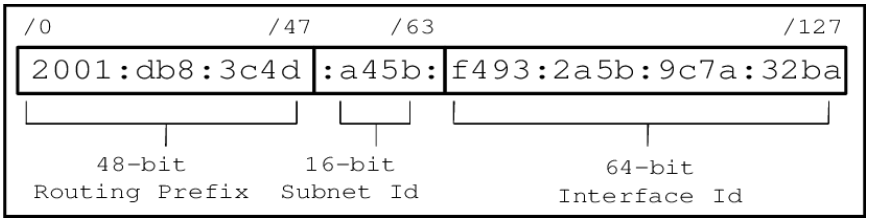
1.Na primjeru objasni format IPv6 adrese.



Prefiks je fe80::, koji označava mrežu.

/64 označava da prvih 64 bita (od ukupno 128 bita IPv6 adrese) čine mrežni prefiks, dok preostalih 64 bita identificiraju pojedinačne uređaje (hostove) unutar te mreže.

2.Skiciraj IPv6 zaglavlje i objasni funkcije pojedinih polja.



3. Ukratko objasni novosti koje donosi IPv6.

Ova nova verzija IP adrese postavlja se kako bi zadovoljila potrebu za više internetskih adresa. Sa 128-bitnim adresnim prostorom dopušta 340 undecillion jedinstvenog adresnog prostora, druge novosti koje donosi IPv6 su hijerarhijsko adresiranje i infrastruktura usmjeravanja, Stateful i Stateless konfiguracija, podrška za kvalitetu usluge (QoS) i idealan je protokol za interakciju susjednih čvorova.

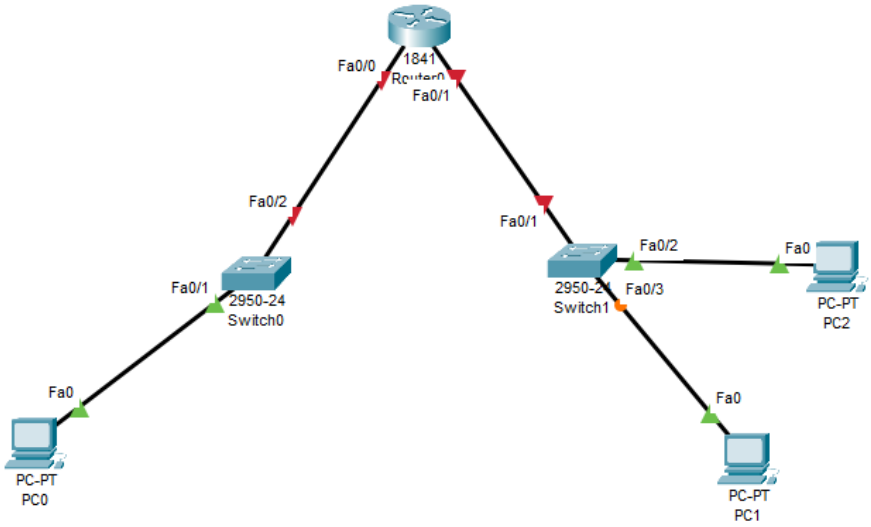
4. Objasni tipove jednoodredišnih IPv6 adresa.

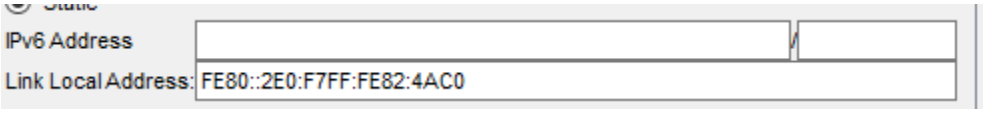
Unicast adresa, Adresa lokalne veze, Globalna adresa, Nespecificirana adresa, Loopback adresa, Anycast adresa.

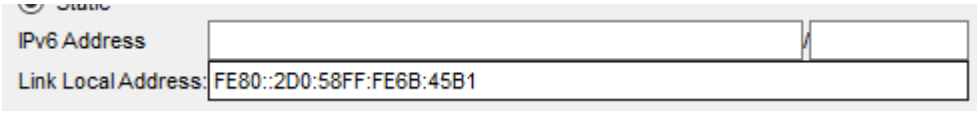
IZVOĐENJE VJEŽBE

1. Formiraj mrežu prema prikazanoj topologiji.

Provjeri da li računala PC1 i PC2 imaju automatski konfigurirane adrese na lokalnoj vezi (engl. link-local address). Pinganjem adrese na lokalnoj vezi, provjeri vezu između PC1 i PC2.








```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping FE80::2D0:58FF:FE6B:45B1

Pinging FE80::2D0:58FF:FE6B:45B1 with 32 bytes of data:

Reply from FE80::2D0:58FF:FE6B:45B1: bytes=32 time<1ms TTL=128
Reply from FE80::2D0:58FF:FE6B:45B1: bytes=32 time<1ms TTL=128
Reply from FE80::2D0:58FF:FE6B:45B1: bytes=32 time<1ms TTL=128
Reply from FE80::2D0:58FF:FE6B:45B1: bytes=32 time<1ms TTL=128

Ping statistics for FE80::2D0:58FF:FE6B:45B1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

2. Usmjernik podrazumijevano nema omogućeno korištenje protokola IPv6 i potrebna je konfiguracija istog. Konfigurirajte adresu na lokalnoj vezi za sučelje FastEthernet 0/0 na sljedeći način:

```
        --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]:

Press RETURN to get started!



Router>enable
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ipv6 unicast-routing
Router(config)#int fastethernet 0/0
Router(config-if)#ipv6 address FE80::1 link-local
Router(config-if)#no shut

Router(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
```

Na isti način, konfigurirajte i adresu za sučelje FastEthernet 0/1. Koji je rezultat ovih akcija? Pinganjem sa računala PC1 i PC2 provjerite dostupnost ovih sučelja.

```
Router>enable
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ipv6 unicast-routing
Router(config)#int fastethernet 0/1
Router(config-if)#ipv6 address FE80::1 link-local
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
```

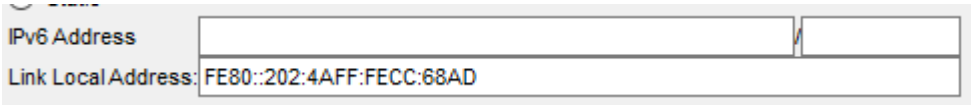
```
C:\>ping FE80::2D0:58FF:FE6B:45B1

Pinging FE80::2D0:58FF:FE6B:45B1 with 32 bytes of data:

Reply from FE80::2D0:58FF:FE6B:45B1: bytes=32 time<1ms TTL=128
Reply from FE80::2D0:58FF:FE6B:45B1: bytes=32 time<1ms TTL=128
Reply from FE80::2D0:58FF:FE6B:45B1: bytes=32 time<1ms TTL=128
Reply from FE80::2D0:58FF:FE6B:45B1: bytes=32 time<1ms TTL=128

Ping statistics for FE80::2D0:58FF:FE6B:45B1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

3. Provjerite da li je konfigurirana adresa na lokalnoj vezi računala PC0. Ukoliko jest, pinganjem provjerite dostupnost računala PC1 i PC2. Kakav je rezultat? Zašto?




```
C:\>ping FE80::2E0:F7FF:FE82:4AC0

Pinging FE80::2E0:F7FF:FE82:4AC0 with 32 bytes of data:

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

Ping statistics for FE80::2E0:F7FF:FE82:4AC0:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping FE80::2D0:58FF:FE6B:45B1

Pinging FE80::2D0:58FF:FE6B:45B1 with 32 bytes of data:

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

Ping statistics for FE80::2D0:58FF:FE6B:45B1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Razlog je to što nemaju globalne adrese, a nisu lokalno povezani.

4. Kako bismo povezali obje mreže, potrebno je konfigurirati globalne adrese (engl. unicast global address). Za naše dvije mreže, koristit ćemo sljedeće adrese:

Mreža A: 2001:0DB8:AAAA:000A:0000:0000:0000:0000/64

Mreža B: 2001:0DB8:AAAA:000B:0000:0000:0000:0000/64

Kako bismo adrese ovih mreža napisali u skraćenom obliku?

Na već opisan način (u naredbi #ipv6 address izostavite link-local), konfigurirajte globalne adrese za sučelja FastEthernet 0/0 i FastEthernet 0/1, pridajući im prvu moguću adresu u pojedinoj mreži.

```
Router(config)#interface FastEthernet0/0
Router(config-if)#ipv6 address 2001:0DB8:AAAA:000B:0000:0000:0000:0000/64
Router(config-if)#exit
Router(config)#interface Fastethernet0/1
Router(config-if)#ipv6 address 2001:0DB8:AAAA:000A:0000:0000:0000:0000/64
Router(config-if)#
```

Mreža A: 2001:DB8:AAAA:A::0/64

Mreža B: 2001:DB8:AAAA:B::0/64

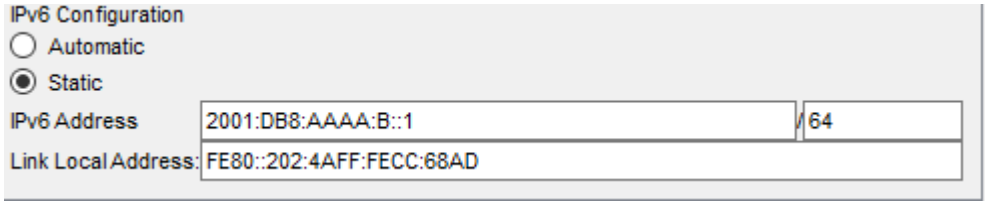
5. Računalima statički dodijelite IPv6 adrese:

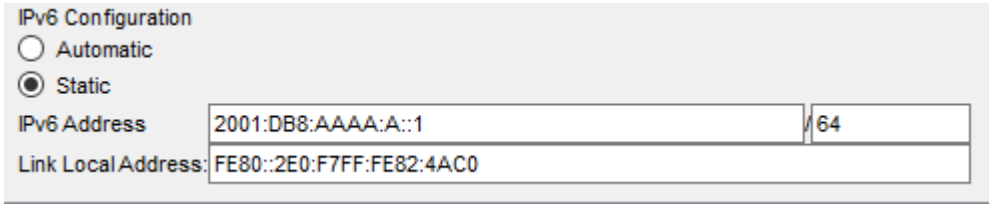
a. mrežni dio adrese je prefiks lokalnog mrežnog segmenta

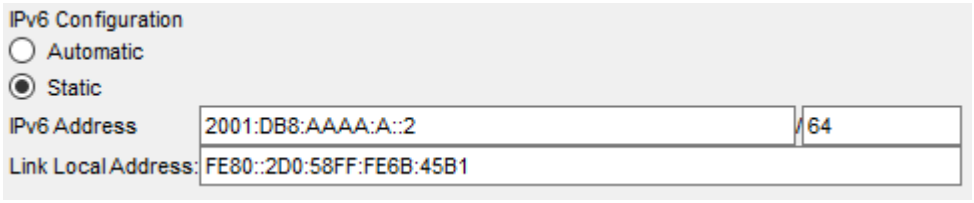
b. host dio adrese je jednak host dijelu adrese na lokalnoj vezi

c. IPv6 Gateway je FE80::1 za sva računala

Pinganjem provjerite povezanost računala.








```
C:\>ping 2001:DB8:AAAA:A::1

Pinging 2001:DB8:AAAA:A::1 with 32 bytes of data:

Reply from 2001:DB8:AAAA:A::1: bytes=32 time<1ms TTL=127
Reply from 2001:DB8:AAAA:A::1: bytes=32 time<1ms TTL=127
Reply from 2001:DB8:AAAA:A::1: bytes=32 time<1ms TTL=127
Reply from 2001:DB8:AAAA:A::1: bytes=32 time<1ms TTL=127

Ping statistics for 2001:DB8:AAAA:A::1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```