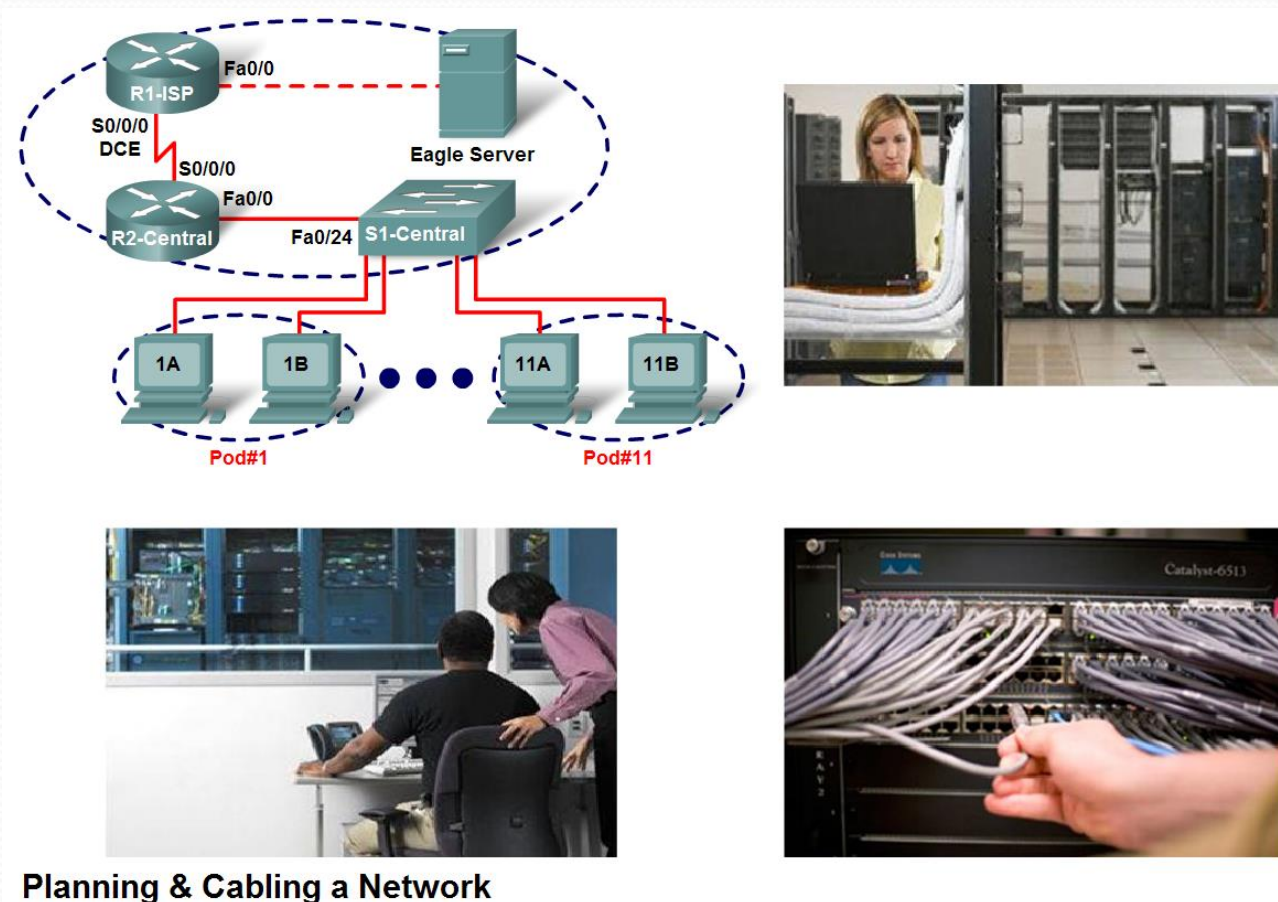


RAČUNARSKE MREŽE

10.1 – Planiranje i kabliranje mreže

Uvod

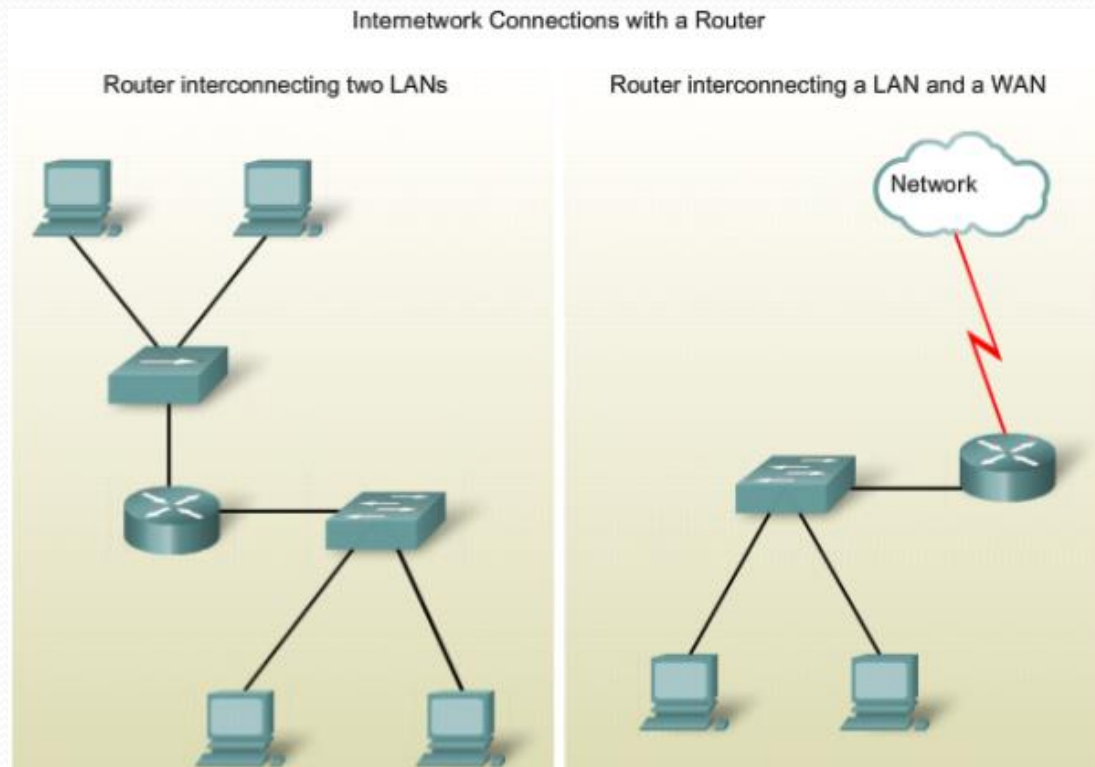
- Prije korištenja usluga mreže, prvo moramo povezati uređaje



Planning & Cabling a Network

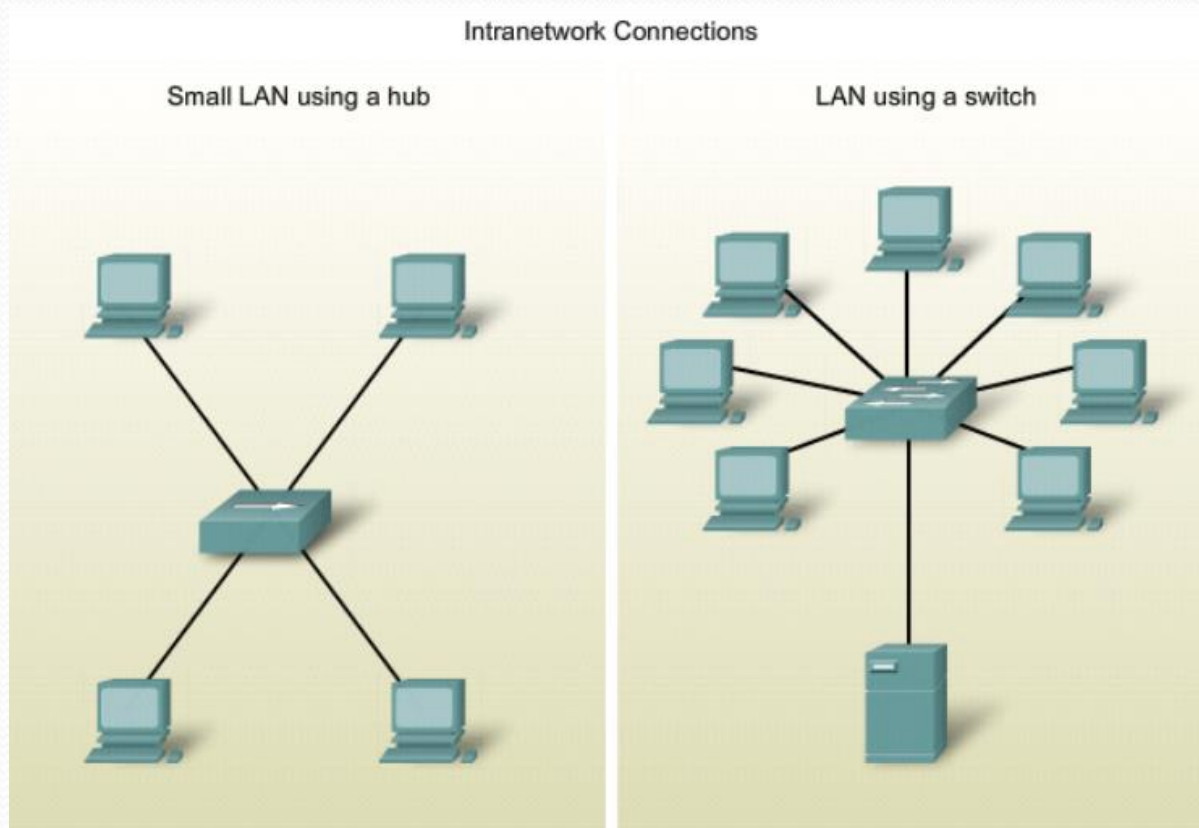
Odabir odgovarajućeg LAN uređaja

- Međumrežna (eng. *internetwork*) konekcija – ruteri, značaj i u LAN-u
- Svaki port predstavlja zasebnu mrežu, razbijaju i kolizione i *broadcast* domene
- Povezuju različite tehnologije (mogu imati i LAN i WAN interfejsse)



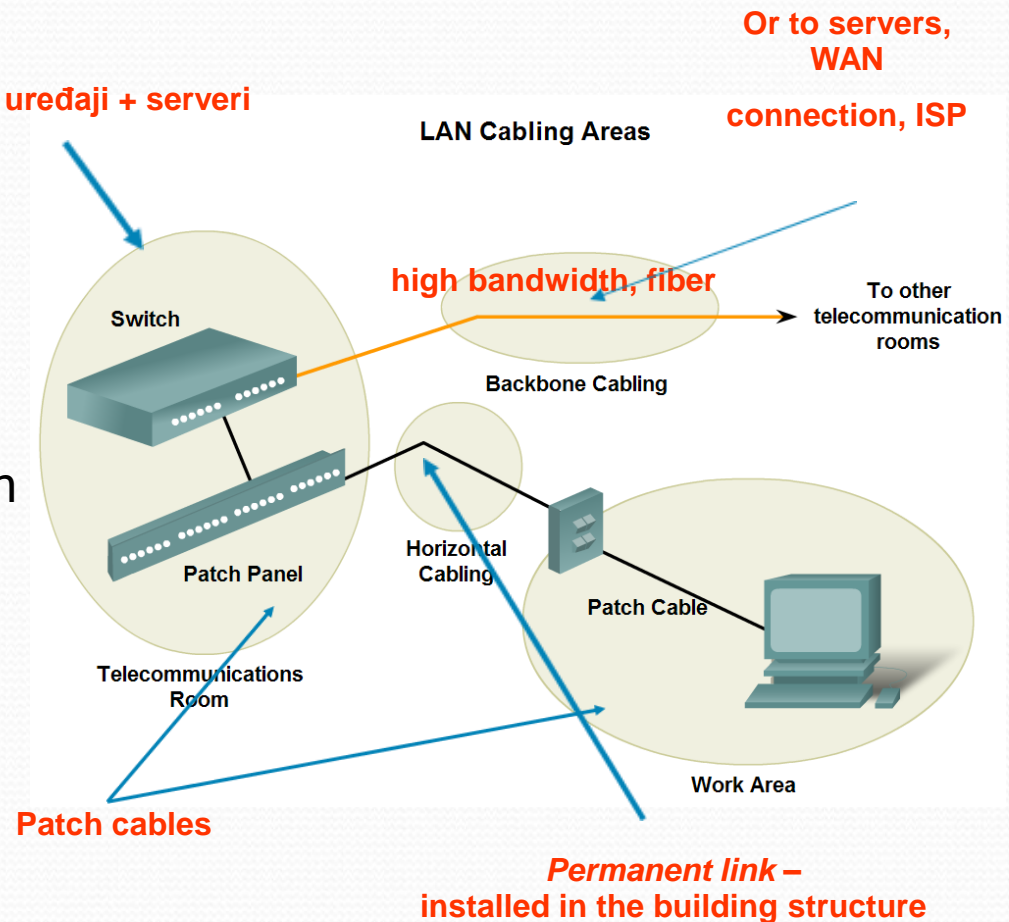
Odabir odgovarajućeg LAN uređaja(2)

- Mrežna (eng. *intranetwork*) konekcija – hub i switch
- Kolizioni domeni, BW, cijena



LAN povezivanje

- 4 fizičke oblasti:
 1. Radna
 2. Distribuciona
 3. *backbone* (vertikalno) kabliranje
 4. distribuciono (horizontalno) kabliranje
- UTP standardi dozvoljavaju maksimalnu dužinu od 100m (5+5+90) kad se saberu oblasti 1, 2 i 4 (bez vertikalnog kabliranja)
- Standardi vertikalnog kabliranja dozvoljavaju maksimalnu dužinu od 90m (UTP) do 3000m (optika)



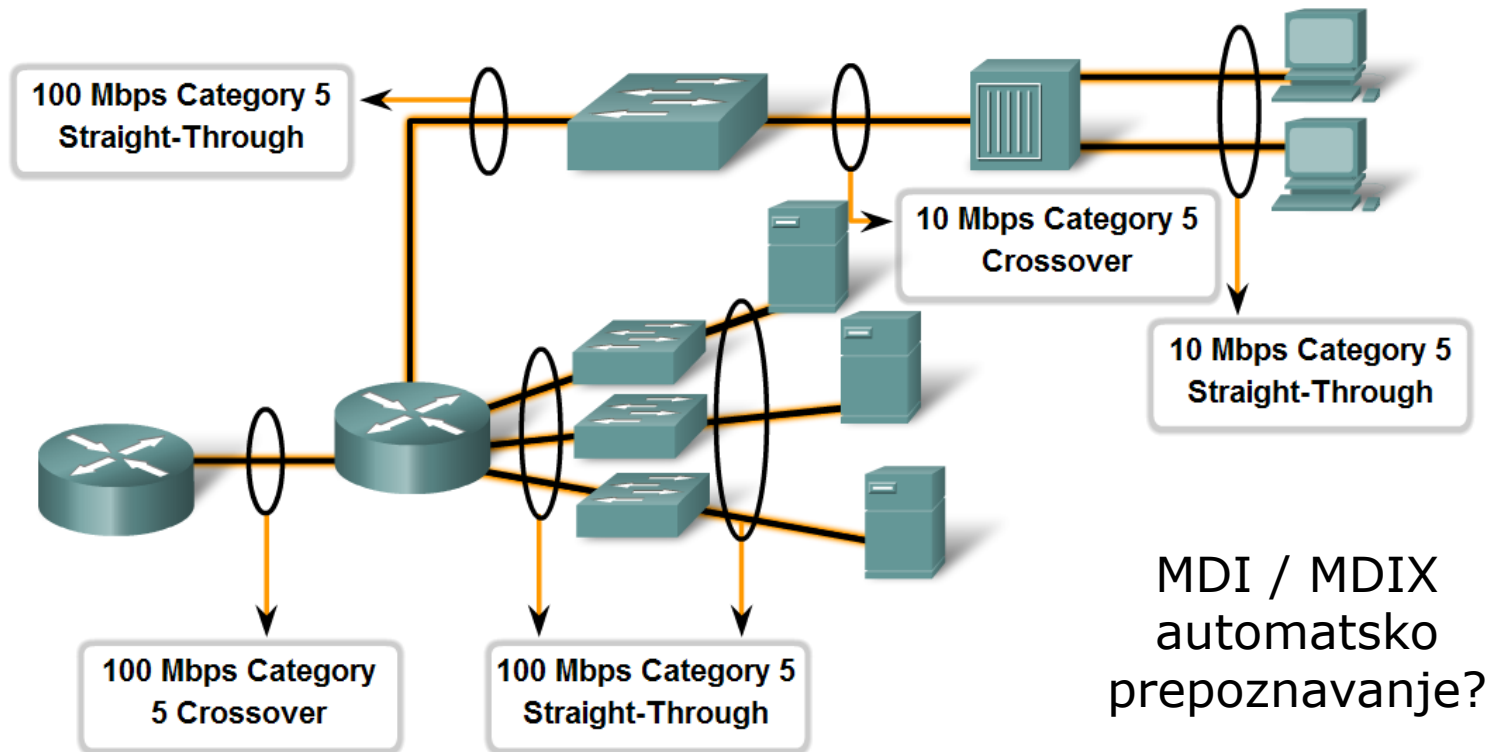
Tipovi medijuma

- UTP (Cat5, 5e, 6, 7), optika, *wireless*
- Svaki medijum ima svoje prednosti i nedostatke
- Faktori pri izboru odgovarajućeg medijuma:
 - dužina kablova (*attenuation*)
 - cijena
 - *bandwidth*
 - lakoća instalacije (fleksibilnost)
 - EMI/RFI smetnje (*wireless?*)

Kabliranje - primjer

Making LAN Connections

Identify the correct UTP cable type and likely category to connect different intermediate and end devices in a LAN.



Koliko hostova ima u mreži?

- odrediti broj (danas i kasnije), jedna mreža ili više podmreža?

Determining the Number of Hosts in the Network

Include these devices in the count:

LAN, WAN Interfaces

End devices



Router Interfaces

Count the number of interfaces,
and not the number of routers



Printers



IP Phones

Count other specialty IP
devices as well



**Switch Management
Addresses**



Administration Users



General Users

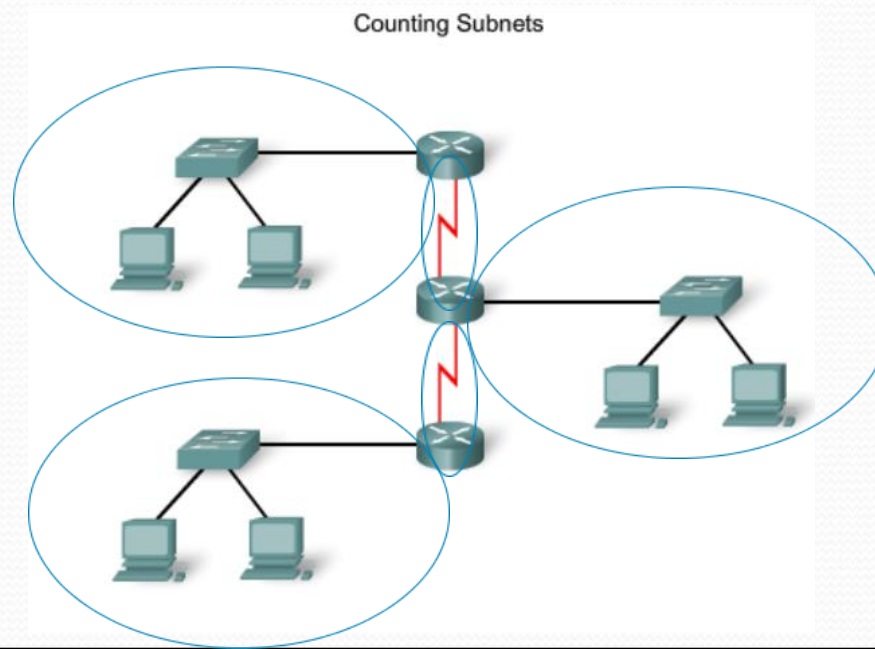


Servers

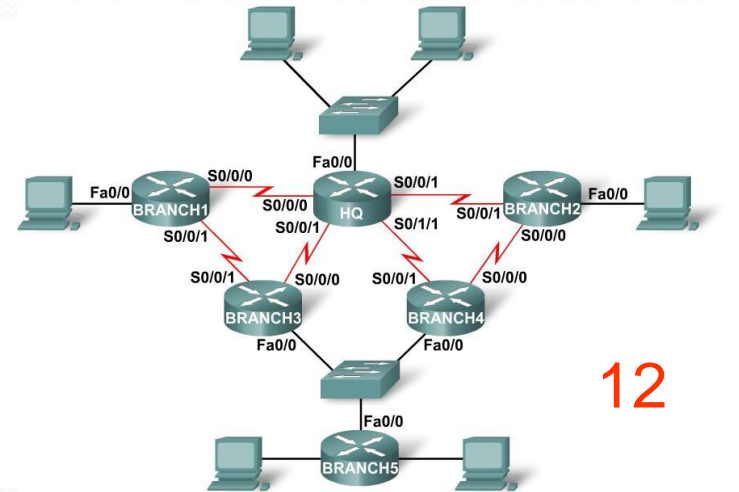
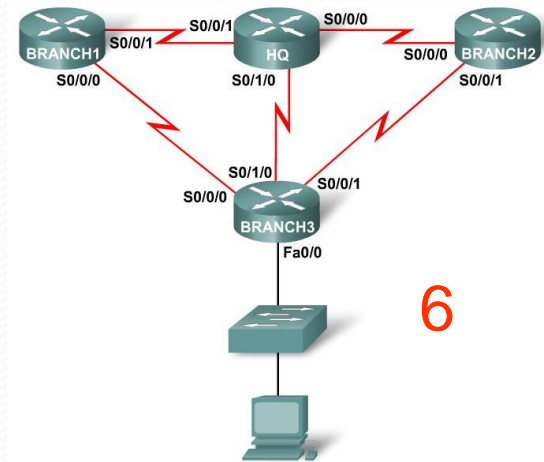
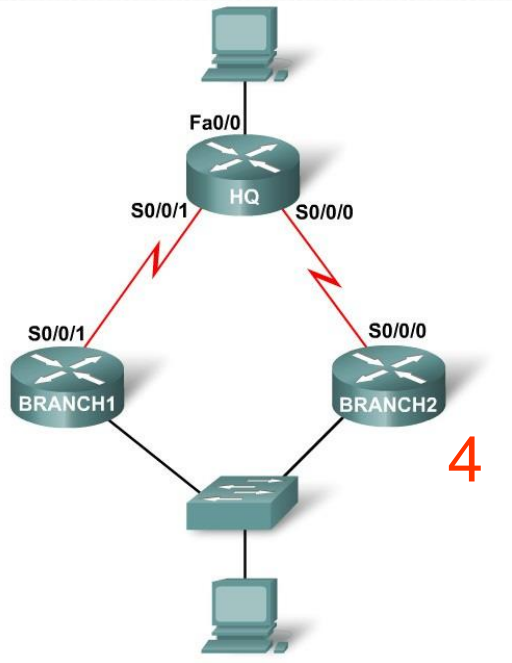
Plus WAP

Koliko podmreža?

- Prednosti podjela u podmreže: razbijanje *broadcast* domena, različiti mrežni zahtjevi različitih uređaja, sigurnost
- Svaka podmreža zahtijeva interfejs *router*-a kao *gateway*, a i svaka veza između dva *router*-a je podmreža!
- Ako se posudi n bita i ostane m host bita, broj podmreža postaje 2^n , a broj hostova po podmreži $2^m - 2$



Koliko podmreža? (2)

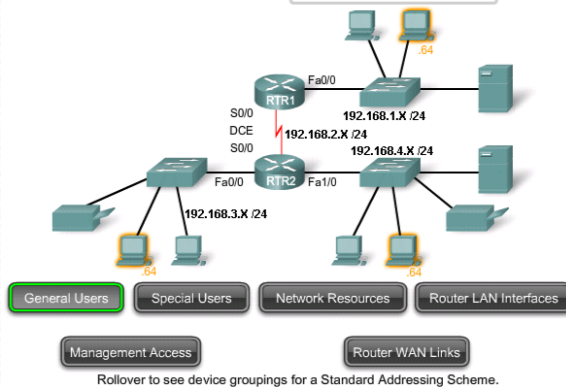


Dizajniranje standarda za našu mrežu

- konzistentnost, dokumentacija

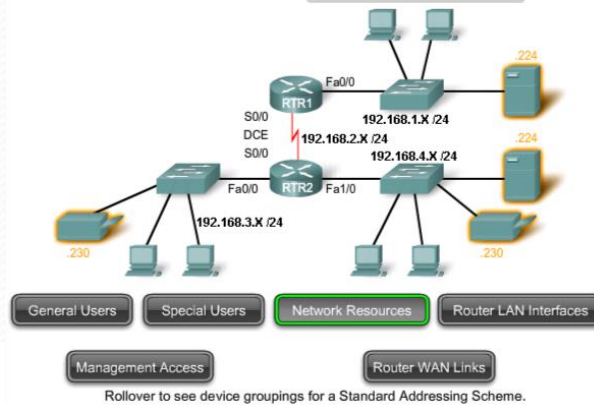
Designing an Internetwork Address Standard

General Users = .64 - .127



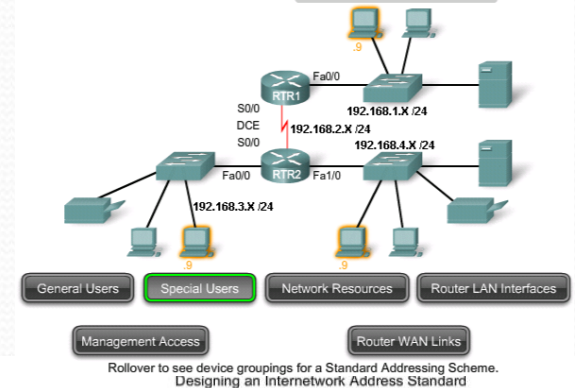
Designing an Internetwork Address Standard

Network resources = .224 - .239



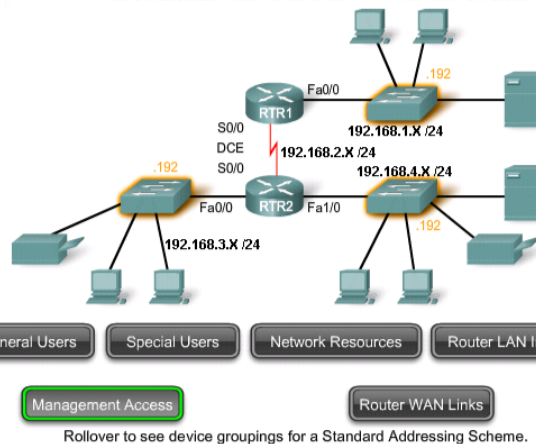
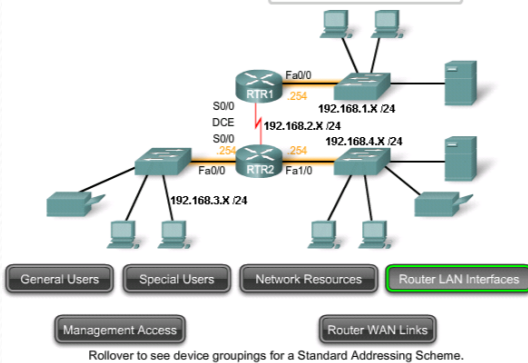
Designing an Internetwork Address Standard

Network Administrator = .8 - .15

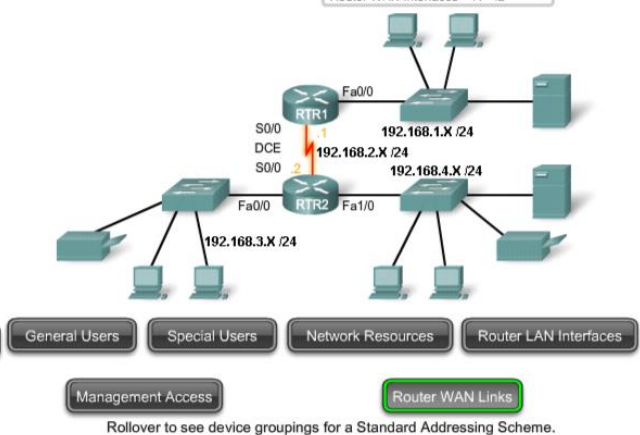


Designing an Internetwork Address Standard

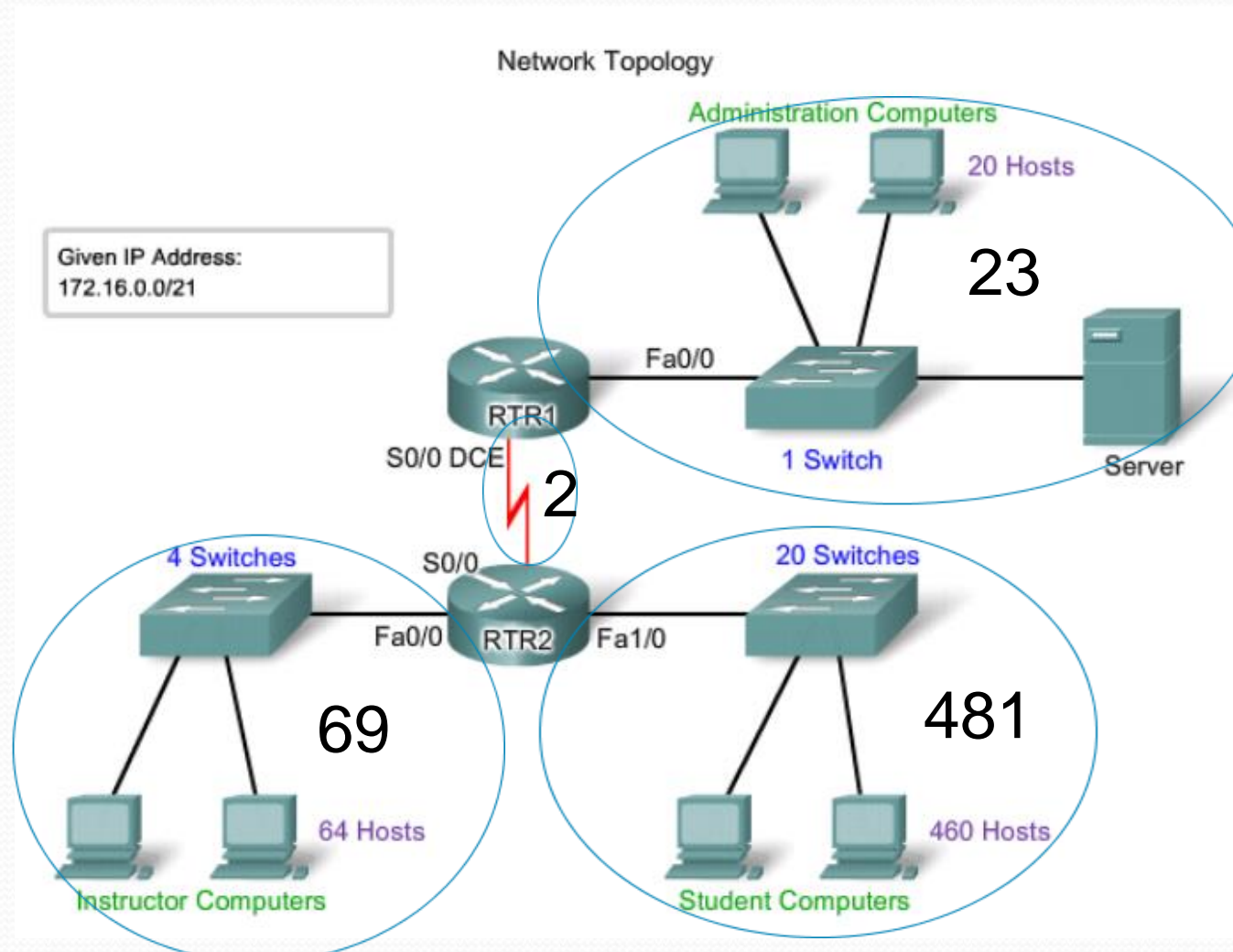
Router LAN Interfaces = .250 - .254



Router WAN Interfaces = .1 - .2



Adresiranje – primjer 1 (1)



Adresiranje – primjer 1 (2)

- bez VLSM-a

Calculating Addresses **without** VLSM Address Ranges for Subnets

Case 1

Network	Subnet Address	Host Address Range		Broadcast Address
Student	172.16.0.0/23	172.16.0.1	172.16.1.254	172.16.1.255
Instructor	172.16.2.0/23	172.16.2.1	172.16.3.254	172.16.3.255
Administration	172.16.4.0/23	172.16.4.1	172.16.5.254	172.16.5.255
WAN	172.16.6.0/23	172.16.6.1	172.16.7.254	172.16.7.255

172.16.0.0 - 172.16.1.255

481 Addresses used

510 host addresses available in each subnet

172.16.2.0 - 172.16.3.255

69 Addresses used

172.16.4.0 - 172.16.5.255

23 Addresses used

172.16.6.0 - 172.16.7.255

2 Addresses used

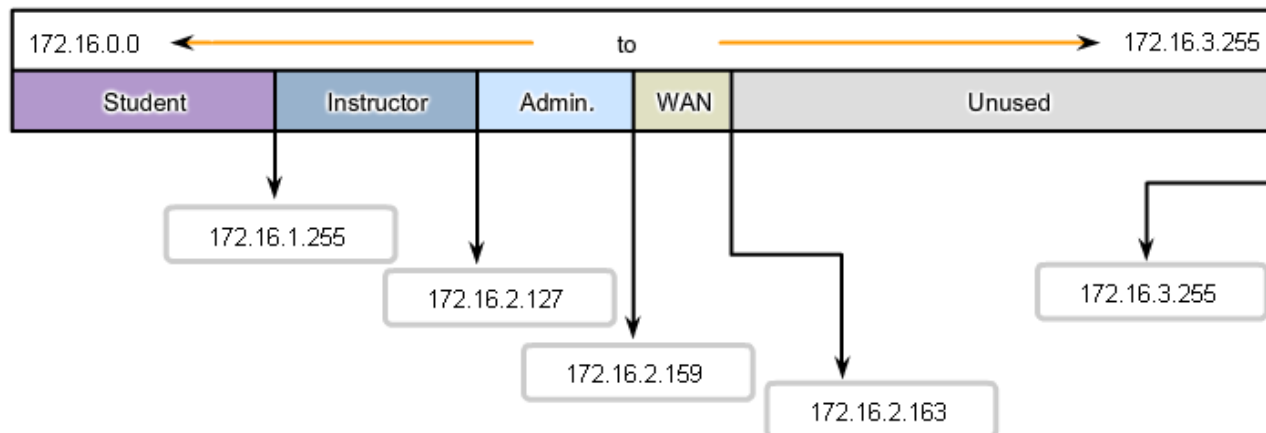
Adresiranje – primjer 1 (3)

- VLASM

Calculating Addresses **with** VLASM Address Ranges for Subnets

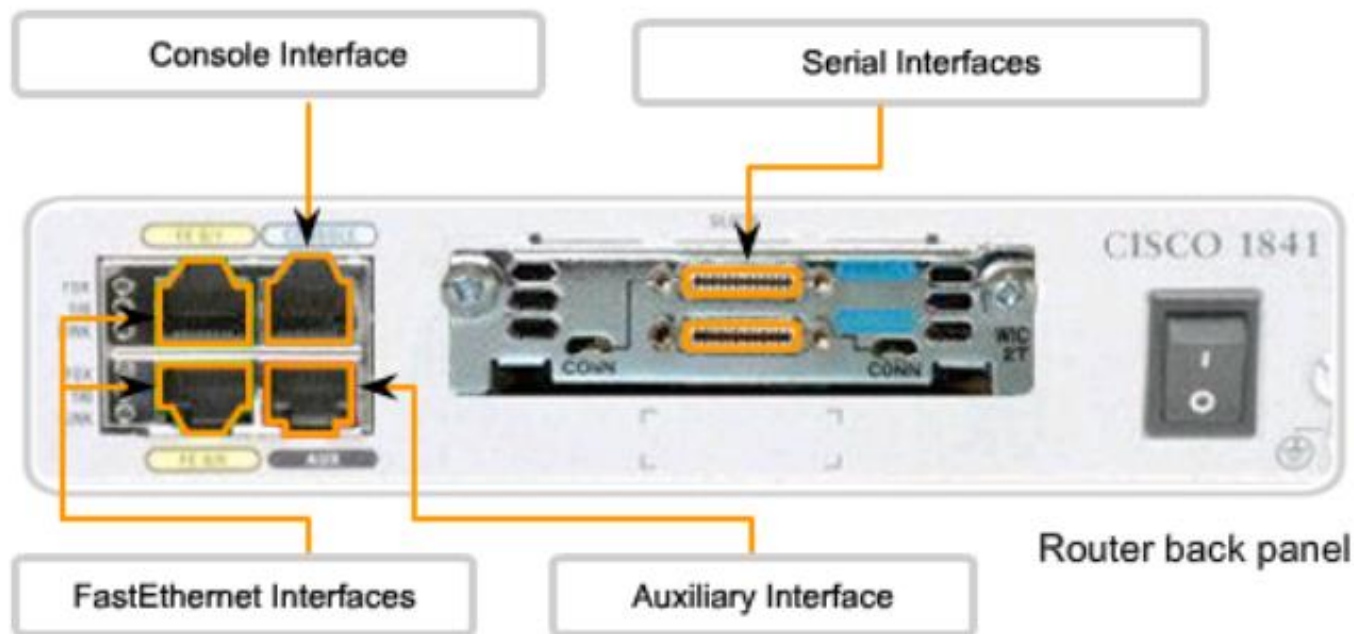
Case 1

Network	Subnet Address	Host Address Range		Broadcast Address
Student	172.16.0.0/23	172.16.0.1	172.16.1.254	172.16.1.255
Instructor	172.16.2.0/25	172.16.2.1	172.16.2.126	172.16.2.127
Administration	172.16.2.128/27	172.16.2.129	172.16.2.158	172.16.2.159
WAN	172.16.2.160/30	172.16.2.161	172.16.2.162	172.16.2.163
Unused	na	172.16.2.164	172.16.2.254	na



Interfejsi uređaja

- LAN interfejs
- WAN interfejs
- konzolni interfejs – konfigurisanje uređaja
- AUX interfejs – *remote* konfigurisanje pre modema



Povezivanje na uređaj

- Mrežni uređaji tipično nemaju monitor, tastaturu i miš
- Povezivanje na njih preko računara i programa terminal emulator
- Koraci:
 - RJ-45 kraj kabla spojiti na konzolni port routera, a DB-9 kraj u serijski port računara
 - Pokrenuti *HyperTerminal*
 - Kliknuti *Enter*

