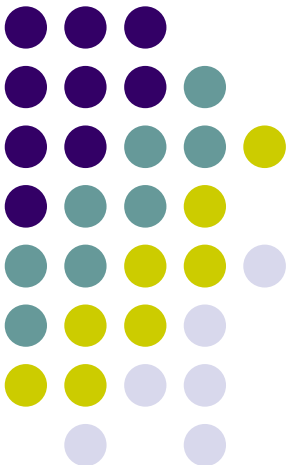
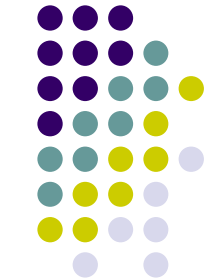
Υλοποίηση Δικτυακών Υποδομών και Υπηρεσιών: IOS Routing Configuration

Πανεπιστήμιο Πελοποννήσου
Τμήμα Επιστήμης & Τεχνολογίας Τηλεπικοινωνιών

Ευάγγελος Α. Κοσμάτος



Cisco routers direct connection

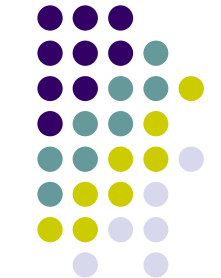


- Cisco routers are DTEs (Data Terminal Equipment). This poses a problem when we connect them directly, since one of the routers must serve as the DCE (Data Circuit-Terminating Equipment) in such a connection
- The DCE must send a clock rate to the DTE, so we've got to configure that as well.
- You can use one DTE/DCE cable or two separates DTE and DCE cables

DTE/DCE cables (1)

- The first thing to do is to ascertain which is the DTE and which is the DCE interface. This can be done by physically looking at the cable connector type.
  - The female connector is the DCE end.
  - The male connector is the DTE end.
- Current DTE/DCE cables have "DTE" and "DCE" physically stamped into the connector itself

DTE/DCE cables (2)

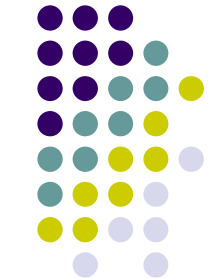


- The more professional way of achieving this is to issue a show controller command. This command displays the hardware (layer1) specifications including the cable types connected.

R1#show controller serial 1
HD unit 1, idb = 0x1DBFEC, driver structure at 0x1E35D0
buffer size 1524 HD unit 1, *V.35* *DTE cable*

R3#show controller serial 1
HD unit 1, idb = 0x1C44E8, driver structure at 0x1CBAC8
buffer size 1524 HD unit 1, *V.35* *DCE cable*

Set clock rate



- The DCE must supply a clock rate to the DTE. If this step is left out, the physical connection can be opened but the logical connection, the line protocol, will fail.

  R3#show int s1

  Serial1 is up, line protocol is down

- Once we have a clock rate configured on R3, the line protocol should come up. Let's configure a clock rate and find out!

  R3(config)#int s1
  R3(config-if)#clockrate 56000

Serial interface connection

- To connect serial interfaces, you need a DCE cable on one router and a DTE on another.
- The most common serial router cables are equipped with V.35 connectors
  - female for DCE
  - male for DTE.

- The routers themselves have one of two kinds of female jacks for serial interfaces
  - mini-DB60 on the new models and
  - larger DB50 jack on the older models

CSU/DSU (1)

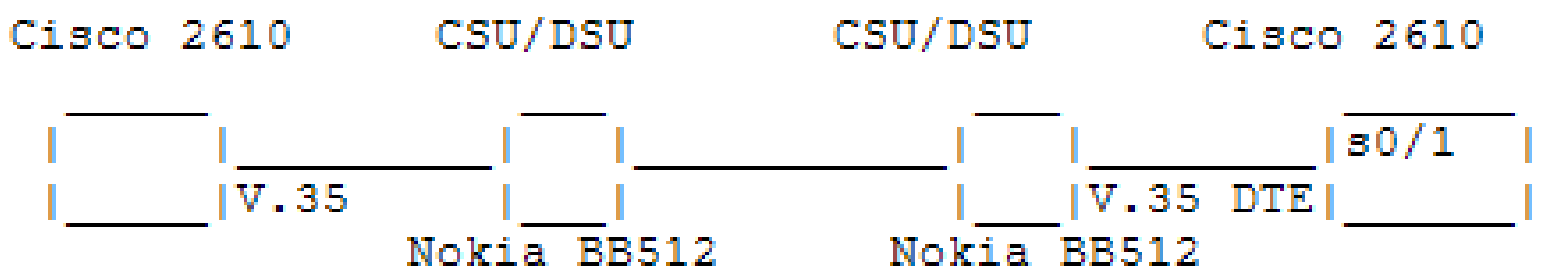
- A CSU/DSU (Channel Service Unit/Data Service Unit) is a hardware device about the size of an external modem that converts a digital data frame from the communications technology used on a local area network (LAN) into a frame appropriate to a wide-area network (WAN) and vice versa.
- For example, if you have a Web business from your own home and have leased a digital line (perhaps a T-1 or fractional T-1 line) to a phone company or a gateway at an Internet service provider, you have a CSU/DSU at your end and the phone company or gateway host has a CSU/DSU at its end.

CSU/DSU (2)

- The Channel Service Unit (CSU) receives and transmits signals from and to the WAN line and provides a barrier for electrical interference from either side of the unit.
- The CSU can also echo loopback signals from the phone company for testing purposes.
- The Data Service Unit (DSU) manages line control, and converts input and output between RS-232C, RS-449, or V.xx frames from the LAN and the time-division multiplexed (TDM) DSX frames on the T-1 line. The DSU manages timing errors and signal regeneration. The DSU provides a modem-like interface between the computer as Data Terminal Equipment (DTE) and the CSU.

CSU/DSU (3)

- BB512 Baseband Modem
  - provides efficient and cost-effective digital subscriber transport at up to 512 kbit/s data rate using standard unconditioned copper-wire local loop facilities.
  - is 64/128/192/256/320/448/512 kbit/s high-speed, 4-wire baseband modem using two twisted copper pairs.
  - it provides data rates fromc64 kbit/s to 512 kbit/s for full- and half-duplex applications.



RIP (1)

- Step 1: Enter privileged EXEC mode:

  Router>enable password

- Step 2: Enter the configure terminal command to enter global configuration mode.

  Router#config terminal

- Step 3: Enter the router rip command

  Router(config)#router rip

RIP (2)

- Step 4: Add the network number to use RIP and repeat this step for all the numbers.

  Router(config-router)#network network-number

  Example: Router(config-router)#network 192.168.10.0

- Note: To turn off RIP, use the no router rip command.

  Router(config)#no router rip

OSPF (1)

- Step 1: Enter privileged EXEC mode:

  Router>enable password

- Step 2: Enter the configure terminal command to enter global configuration mode.

  Router#config terminal

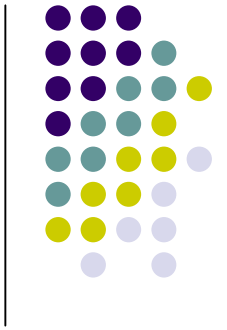
- Step 3: Enter the router ospf command and follow by the process-id.

  Router(config)#router ospf process-id

- Pick the process-id which is not being used. To determine what ids are being used, issue the show process command.

  Router(config)#show process

OSPF (2)



- Step 4: Add the network number, mask and area-id

  Router(config-router)#network network-number mask area area-id

- The network-number identifies the network using OSPF. The mask tells which bits to use from the network-number, and the area-id is used for determining areas in an OSPF configuration.

- Example:

  Router(config-router)#network 192.168.10.0 0.0.0.255 area 0

- Repeat this step for all the network numbers.
- To turn off OSPF, use the following command.

  Router(config)#no router ospf process-id

BGP (1)

- Enable BGP Routing Use the following commands in global configuration mode.

- Step1: Enable a BGP routing process, which places you in router configuration mode.

  router bgp autonomous-system

- Step2: Flag a network as local to this autonomous system and enter it to the BGP table.

  network network-number [mask network-mask] [route-map route-map-name]

BGP (2)

- Step3: Configure BGP Neighbors. BGP must completely understand the relationships it has with its neighbors. Specify a BGP neighbor:

  neighbor {ip-address | peer-group-name} remote-as number

- Reset BGP Connections
  - Reset a particular BGP connection.

    clear ip bgp address
  - Reset all BGP connections

    clear ip bgp *
- To turn off BGP:

  Router(config)#no router bgp autonomous-system