Cables and Connectors

Course Title: Computer Networks

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Lecture Outline

1. Different Types of Devices
2. Ethernet Cabling
3. Terminal Emulation Software
4. Remote Access

Cisco Switch

Fig. A 2960 series cisco switch

CLI Access Options

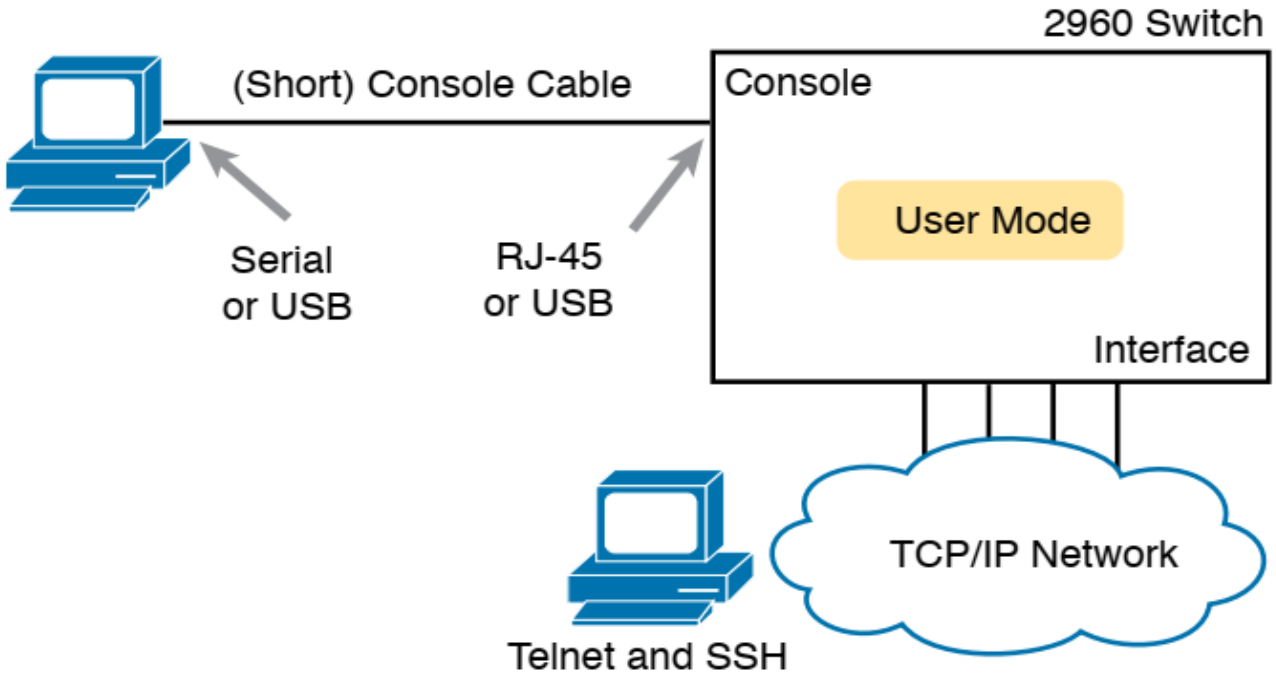


Fig. CLI access options

Console Connection to Switch

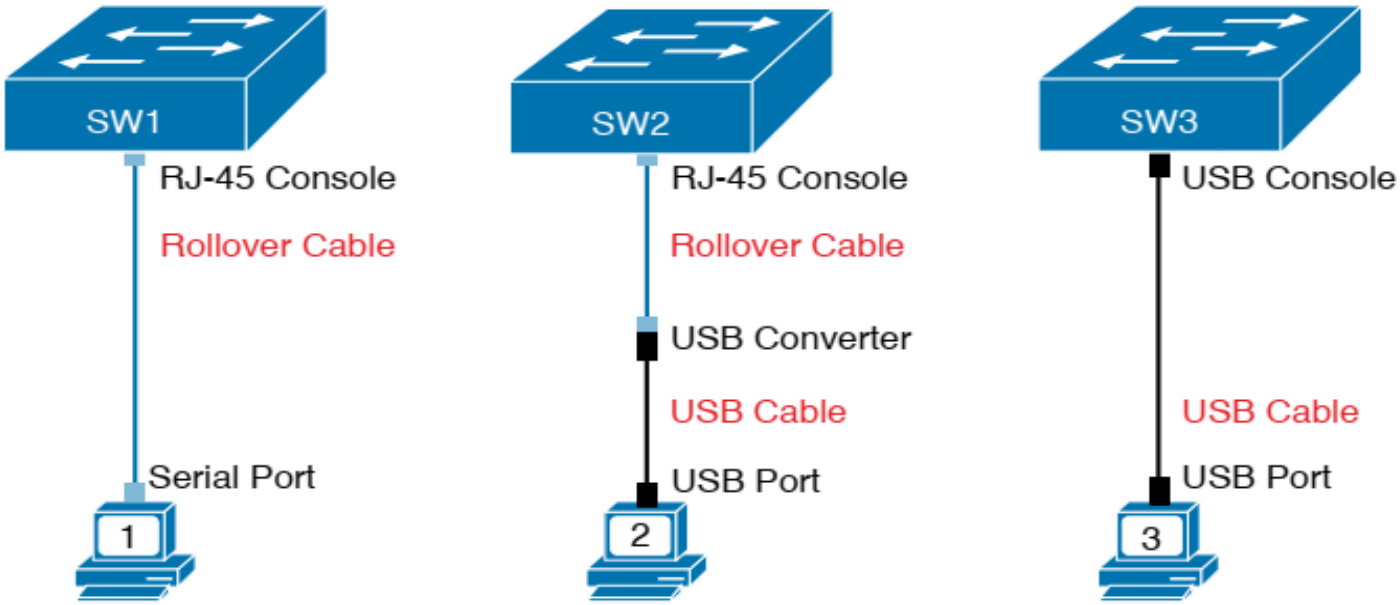
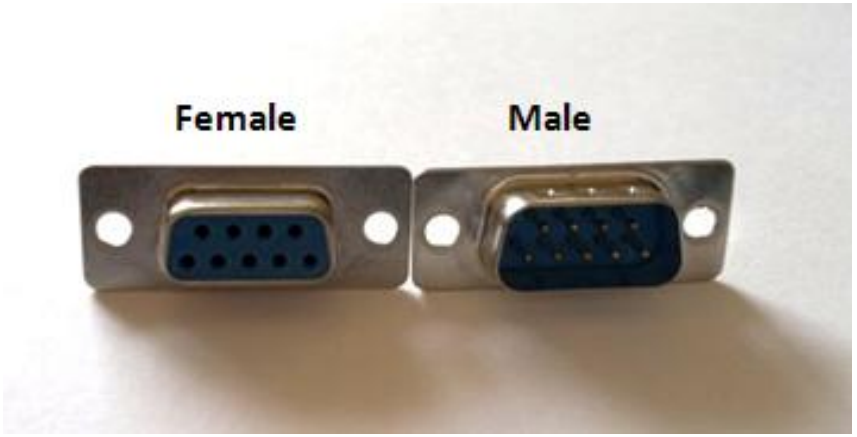


Fig. Console Connection to a Switch

2960-XR series supports both the older RJ-45 console port and a USB console port

USB console port is Not rectangular ,rather it is Mini-B port

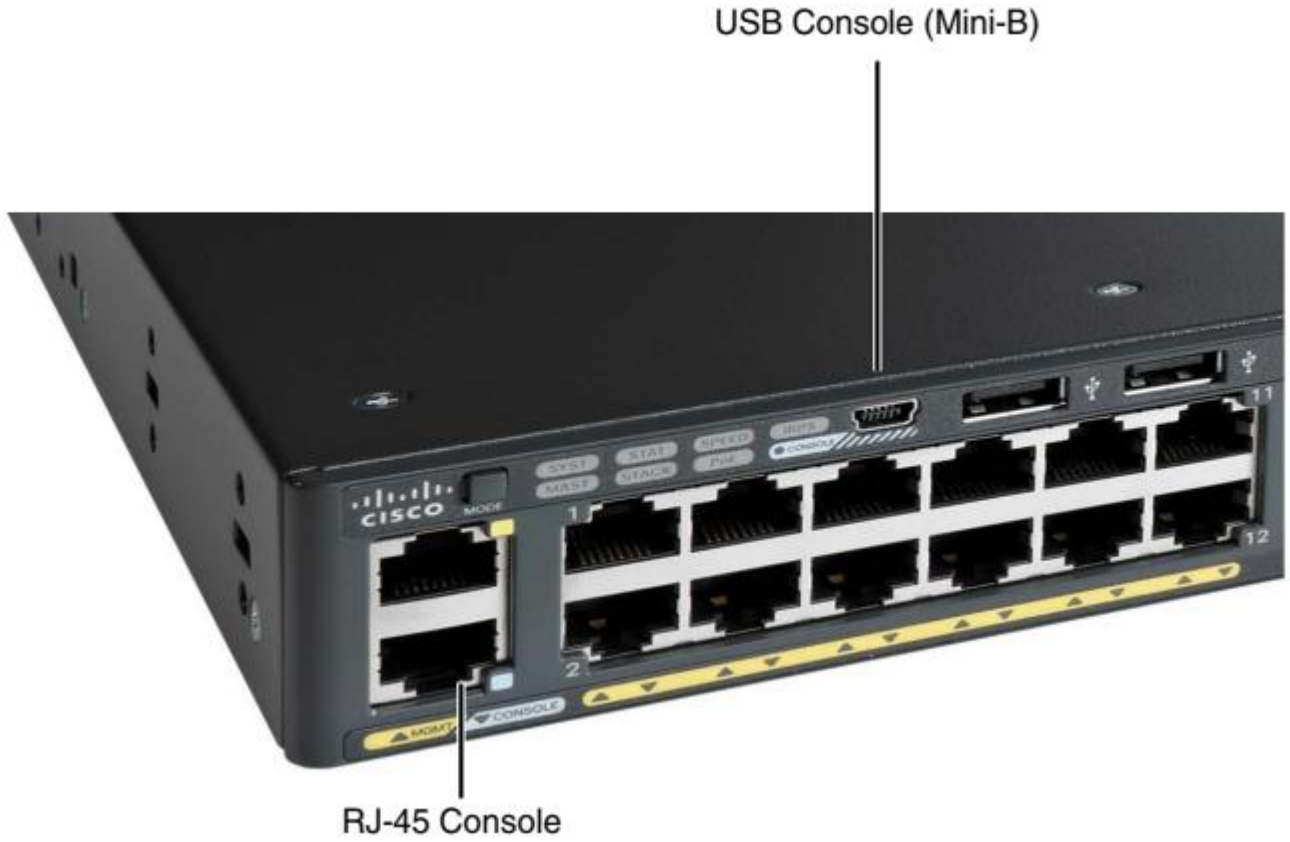
DB9 Connector



Almost obsolete
Replaced by USB

Fig. DB9 Connector (For serial port of PC)

USB and RJ-45 Console



Terminal Emulation Software

To interact with Switch/Routers

Examples

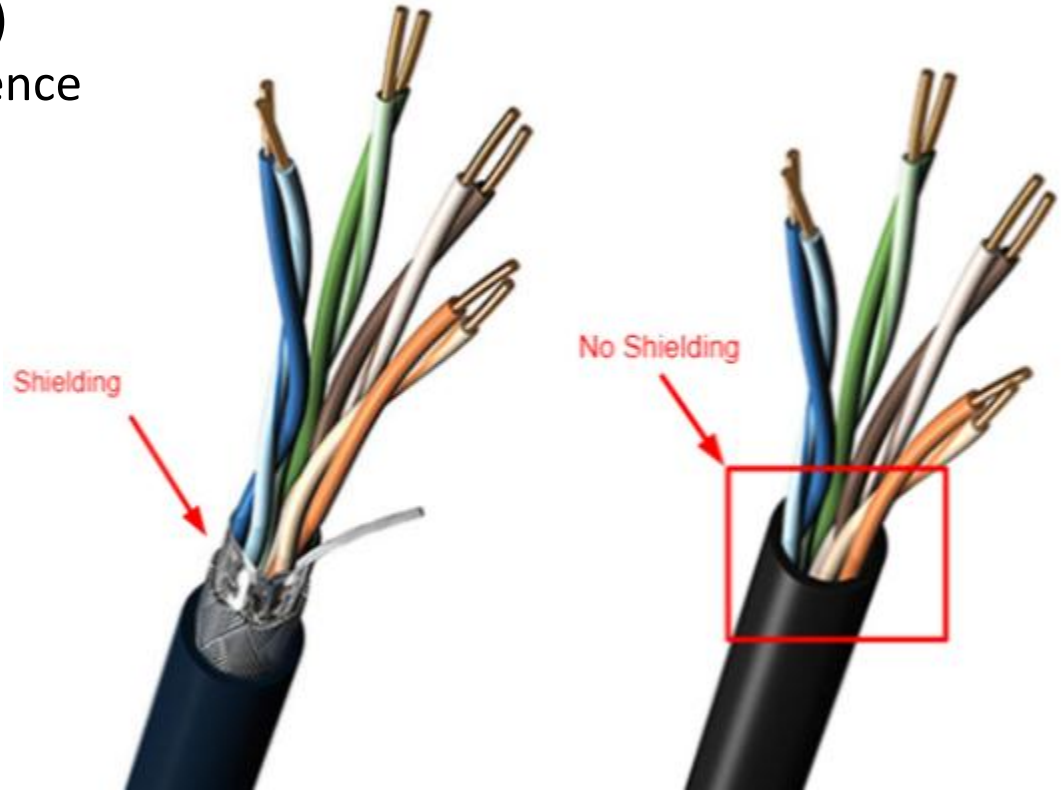
- SecureCRT: Supports serial, Telnet and SSH → Not free
- PuTTY: Supports serial, Telnet and SSH → free
- TeraTerm Pro: Supports serial, Telnet and SSH → free
- Windows Telnet (integrated to Windows OS) → Supports Telnet only
- Windows HyperTerminal → Supports Telnet and Serial, NOT SSH

Remote Access

- Telnet and SSH allows remote access to Switch/Router
- Must need password to access the device
- Telnet is not secure
  - No encryption
- SSH is secure
  - Encryption is used

Ethernet Cabling

- Unshielded Twisted Pair (UTP)
  - Electromagnetic interference
  - Less data rate
  - cheap
- Shielded Twisted Pair (STP)
  - Less interference
  - Higher data rate
  - costly

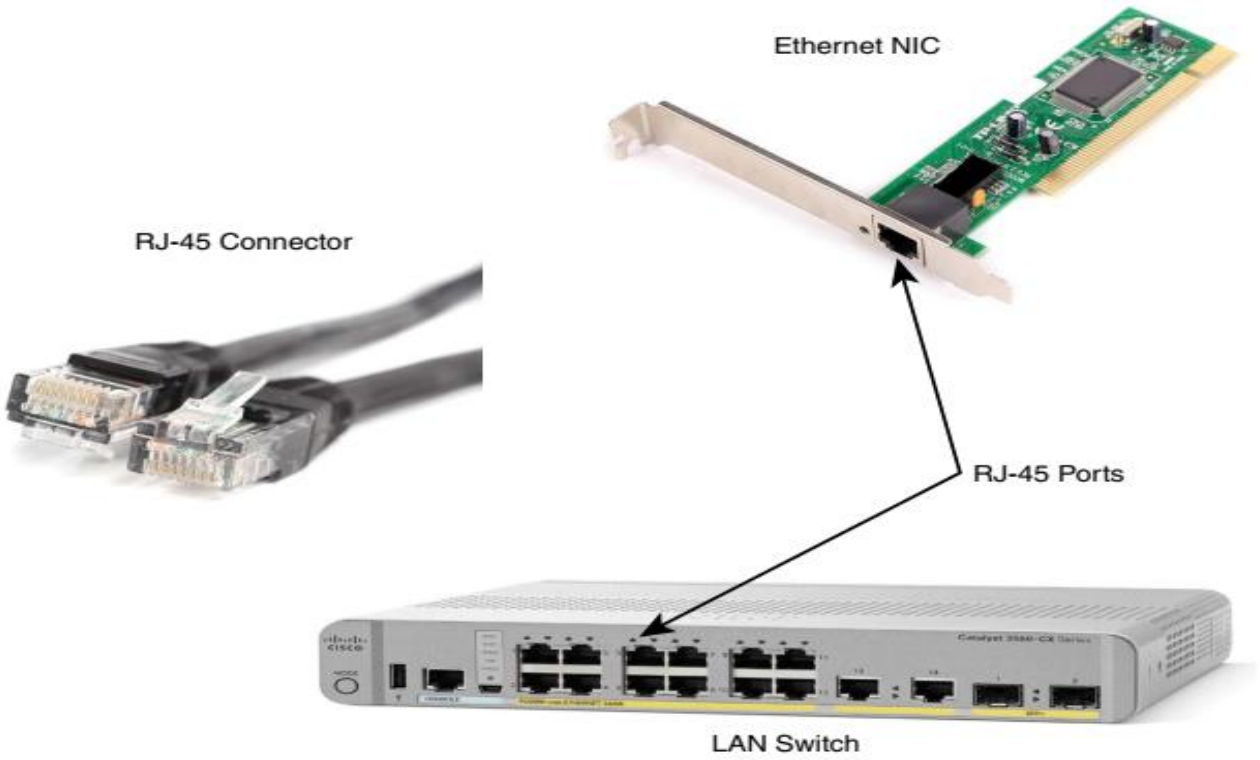


Ethernet Cabling

Table I Different categories of cable

Category	Speed (Mbps)	Common use
Cat 1	< 1	Analog voice
Cat 2	4	ARCNET
Cat 3	10	10baseT Ethernet
Cat 4	16	Token Ring
Cat 5	100	100baseT Ethernet
Cat 5e	1000	1000baseT Ethernet
Cat 6	1000	1000baseT Ethernet

Ethernet Cabling



Ethernet Cabling

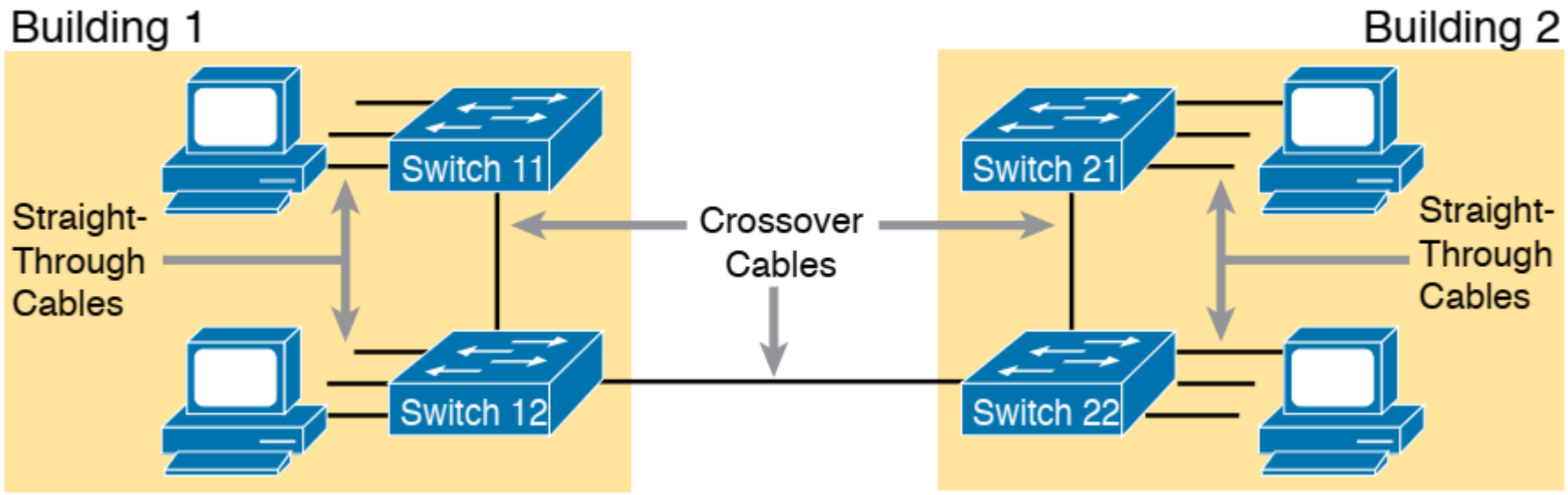
- Straight-Through cable
  - PC to Switch or Hub
  - Router to Switch or Hub
- Crossover cable
  - PC to PC
  - Switch to Switch
  - Hub to Hub
  - Switch to Hub
  - Router to Router
- Rollover
  - PC to Console

Crossover cable: If the endpoints transmit on the same pin pair

Straight-through cable: If the endpoints transmit on different pin pairs

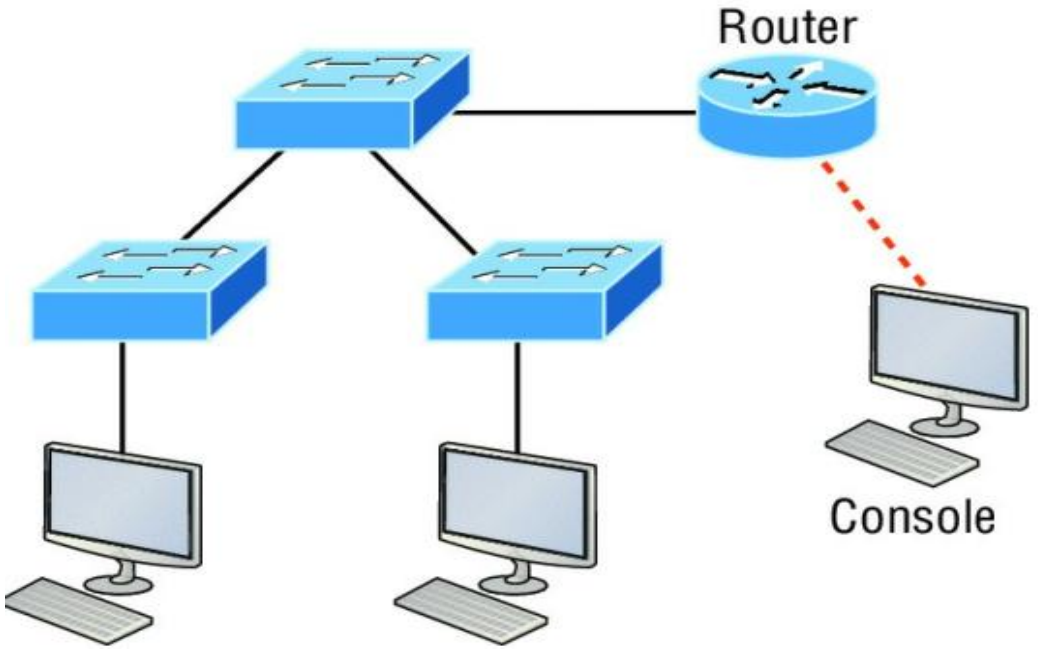
Transmits on Pins 1,2	Transmits on Pins 3,6
PC NICs	Hubs
Routers	Switches
Wireless access point (Ethernet interface)	—

Ethernet Cabling

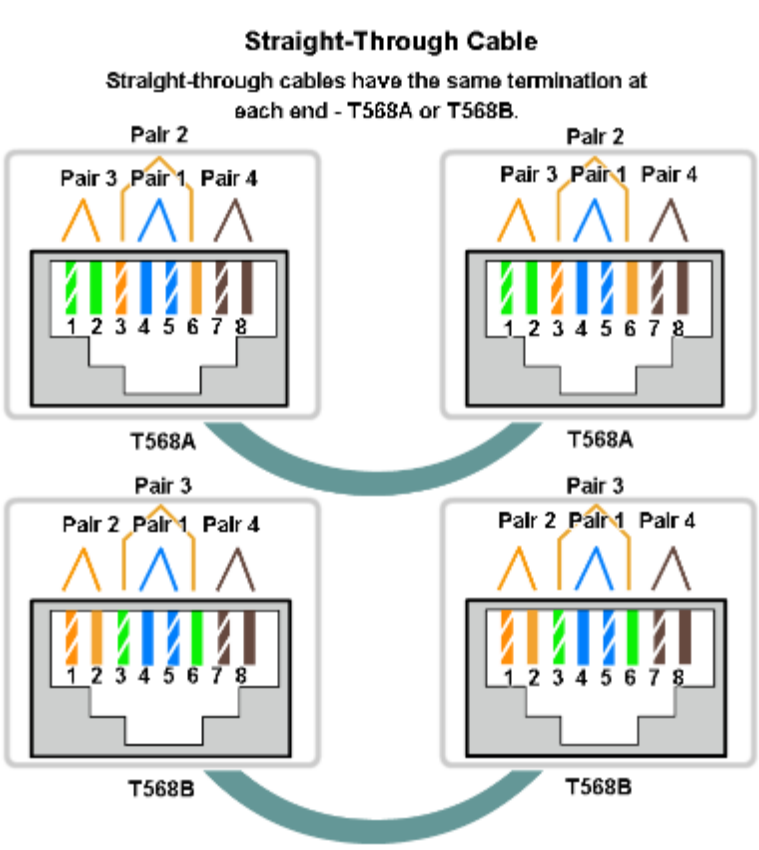


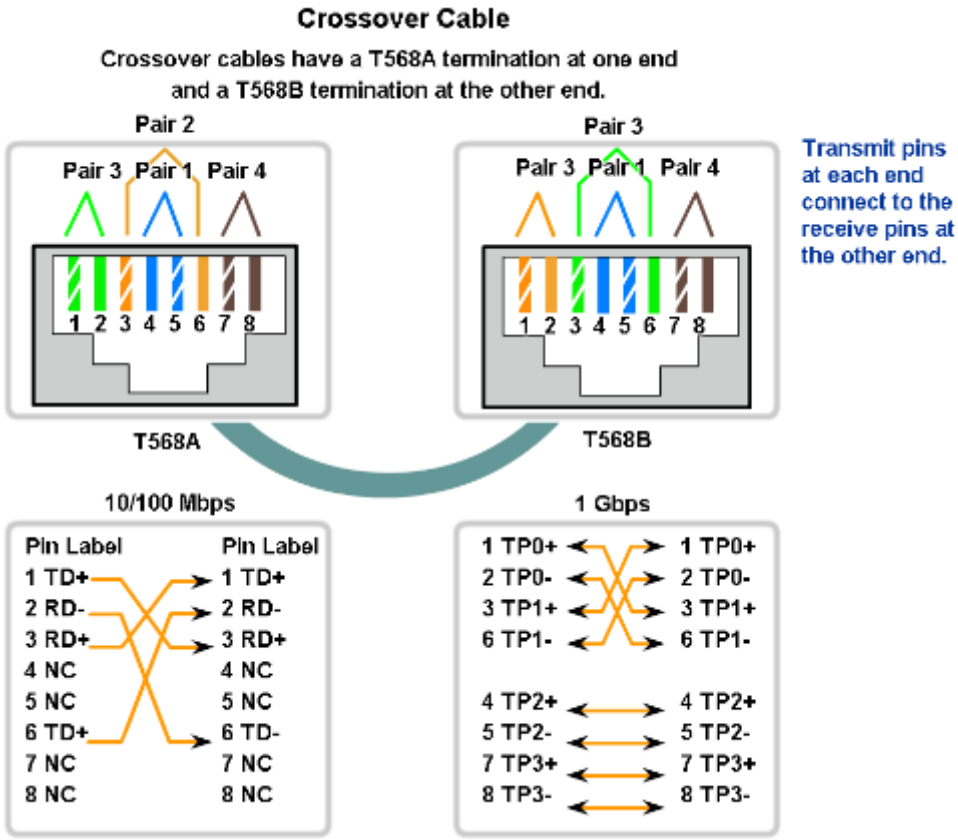
Ethernet Cabling

Identify cables



Ethernet Cabling





IMPORTANT

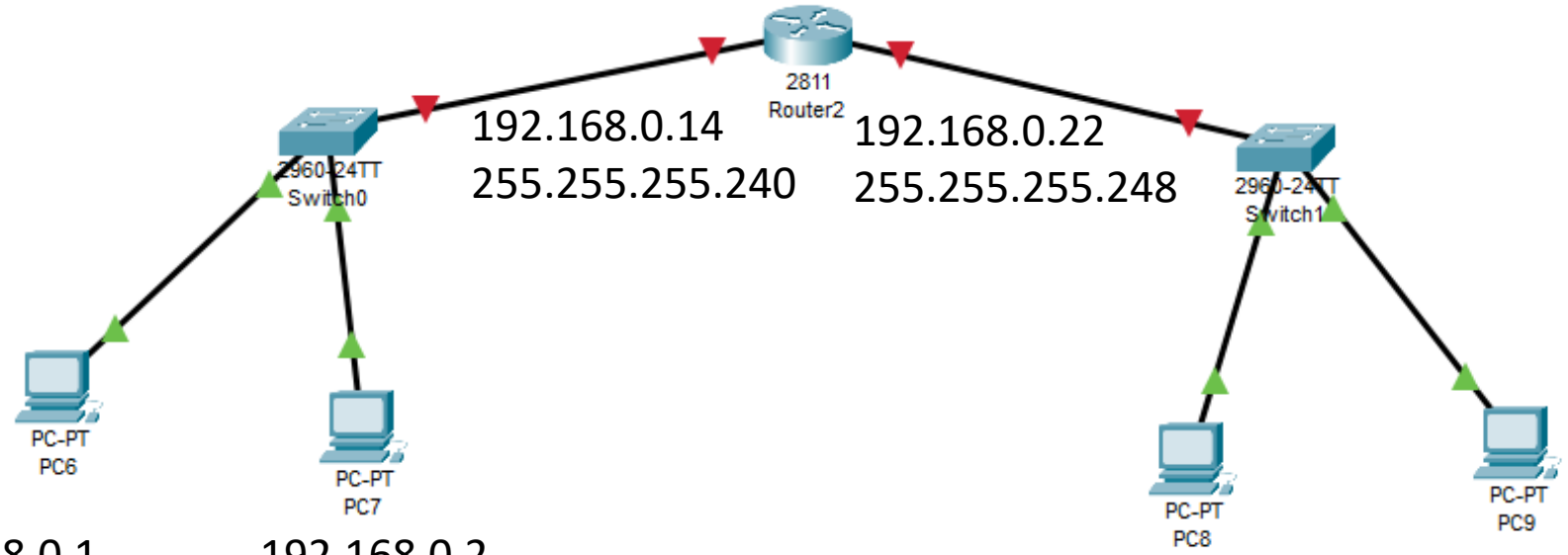
- Suppose that we have three networks BBA, CSE, and EEE with IP requirements of 100, 350 and 80. If You are given an IP block 10.10.0.0, allocate IPs performing VLSM subnetting.

- Suppose that we have five networks A, B, C, D, and E with IP requirements of 10, 30, 90, 200, and 80. If You are given an IP block 172.16.0.0, allocate IPs performing subnetting.

- Consider your ID: AB-CDEFG-H, Suppose that we have four networks N1, N2, N3, and N4 with IP requirements of 100*C, 10*D, 50*A, and 20*G. If You are given an IP block 192.168.0.0, allocate IPs performing subnetting.

IMPORTANT

- Suppose that we have two networks CSE and EEE with IP requirements of 10 and 8. If You are given an IP block 192.168.0.0, allocate IPs performing subnetting.



192.168.0.1
255.255.255.240
192.168.0.14

192.168.0.2
255.255.255.240
192.168.0.14

192.168.0.17
255.255.255.248
192.168.0.22

192.168.0.18
255.255.255.248
192.168.0.22

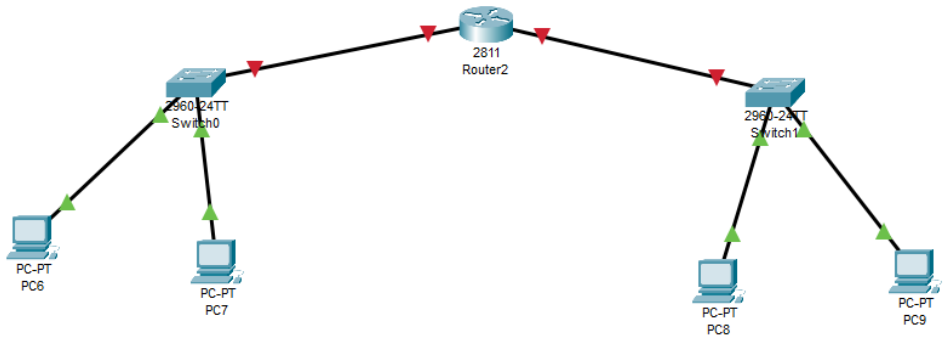
IMPORTANT

- Suppose that we have two networks CSE and EEE with IP requirements of 10 and 8. If You are given an IP block 192.168.0.0, allocate IPs performing subnetting.

192.168.0.0/16
CSE→ 10 host → 4bit →192.168.0.0-15/28 → 255.255.255.240
Net address: 192.168.0.0/28
BC address: 192.168.0.15/28
Gateway: 192.168.0.14/28

EEE→ 8 host →3bit→192.168.0.16-23/29 → 255.255.255.248
Net address: 192.168.0.16/29
BC address: 192.168.0.23/29
Gateway: 192.168.0.22/29

RN-> 4 IP -> 2bit ->
192.168.0.24~27/30
255.255.255.252



References

1. Official Cert Guide CCNA 200-301 , vol. 1, *W. Odom*, Cisco Press, First Edition, 2019, USA.

2. CCNA Routing and Switching, *T. Lammle*, John Wily & Sons, Second Edition, 2016, USA.

3. Cisco IOS Configuration Fundamentals Command Reference. http://www.cisco.com

Books

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2. CCNA Routing and Switching, *T. Lammle*, John Wily & Sons, Second Edition, 2016, USA.