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Applied Computing

Wales Institute

VISA)

Networks and Cybersecurity Essentials (ACCA4024)

Home Work 3: Straight Through and Crossover Cables

Submission Deadline: **On or before 06/11/2020 23.59 Hrs.**

Submission Via Moodle Link.

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Objectives

- Understand cabling standards for use in LAN cabling environments.

Background/ Scenario

The TIA/EIA has specified unshielded twisted pair (UTP) cabling standards for use in LAN cabling environments. TIA/EIA 568-A and 568-B stipulates the commercial cabling standards for LAN installations; these are the standards most commonly used in LAN cabling for organizations and they determine which color wire is used on each pin.

With a crossover cable, the second and third pairs on the RJ-45 connector at one end of the cable are reversed at the other end, which reverses the send and receive pairs. The cable pinouts are the 568-A standard on one end and the 568-B standard on the other end. Crossover cables are normally used to connect hubs to hubs or switches to switches, but they can also be used to directly connect two hosts to create a simple network.

Note: With modern networking devices, a straight-through cable can often be used even when connecting like devices because of their autosensing feature. With autosensing, the interfaces detect whether the send and receive circuit pairs are correctly connected. If they are not, the interfaces reverse one end of the connection. Autosensing also alters the speed of the interfaces to match the slowest one. For example, if connecting a Gigabit Ethernet (1000 Mb/s) router interface to a Fast Ethernet (100 Mb/s) switch interface, the connection uses Fast Ethernet.

The Cisco 2960 switch has autosensing turned on, by default; therefore, connecting two 2960 switches together works with either a crossover or a straight-through cable. With some older switches, this is not the case and a crossover cable must be used.

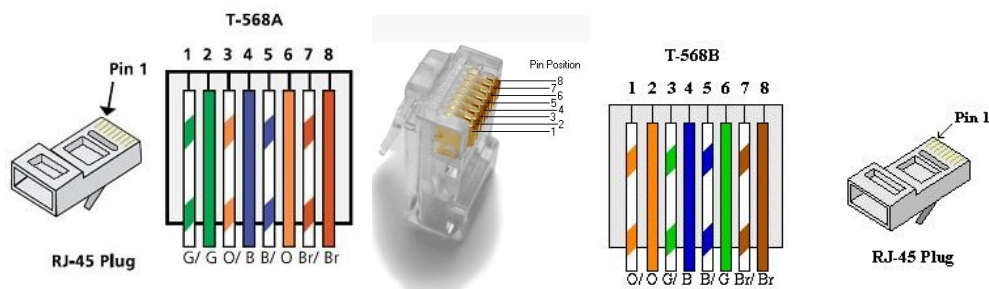
In addition, the Cisco 1941 router Gigabit Ethernet interfaces are autosensing and a straightthrough cable may be used to connect a PC directly to the router interface (bypassing the switch). With some older routers, this is not the case and a crossover cable must be used.

When directly connecting two hosts, it is generally advisable to use a crossover cable.

Task 1: Analyze diagrams and tables for the TIA/EIA 568-A and TIA/EIA 568-B standard Ethernet cable.

The following table and diagrams display the color scheme and pinouts, as well as the function of the four pairs of wires used for the 568-A standard.

Note: In LAN installations using 100Base-T (100 Mb/s), only two pairs out of the four are used.



Record your reflection

1. What are these TIA/EIA Standards? How do 568 A differs from 568 B? Are there any other standards? (100 – 300 Words)

The two wiring standards only differ in their assignments of the green and orange pair wires. They are the same in terms of speeds and reliability. 568A is preferred for US Federal Contracts as it allows for compatibility with USOC wiring, but 568B is the most commonly found in the wild. These are the only two standards for ethernet cabling.

2. What is a Straight through Cable and Cross over Cable? Which cable should be selected during a simple network installation (Topology includes Routers, Switches and End Devices)? (100 – 300 Words). You shall use Tables, Diagrams to clarify.

Straight through cabling is most commonly used to connect devices together when linked by a switch or hub. In a straight-through cable the colours match on both ends of the cable, these could be following either of the two standards 568a or 568b.

T568A Color Code	T568B Color Code
RJ45 Pin---Pair Color	RJ45 Pin---Pair Color
1-----White/Green	1-----White/Orange
2-----Green	2-----Orange
3-----White/Orange	3-----White/Green
4-----Blue	4-----Blue
5-----White/Blue	5-----White/Blue
6-----Orange	6-----Green
7-----White/Brown	7-----White/Brown
8-----Brown	8-----Brown

A cross-over cable will start on one side with the 568a standard and the opposite end will have the connections in the 568b standard. Effectively creating the “cross-over”.

The cross-over cable is switching over the send and receive pairs.

A cross-over cable is typically used to connect multiple hubs or switches together. They can also be used to connect two PC's directly together to form a basic two-device network.

So, in the case of this question a number of straight-through cables would be used to connect the various routers, switches and end-user PC devices.

