

National University of Computer and Emerging Sciences

Computer Networks Lab – Spring 2023

Assignment 1

During the classes and labs, we have discussed that physical media is an important part of Computer Networks. The media can be wired as well as wireless. In this assignment will be working with the wired media.

In the wired media, there are total of three types of cables

- Coaxial Cable
- Twisted – Pair Cable
- Fiber Optic Cable

Twisted Pair Cable

A twisted pair cable is a type of cable made by putting two separate insulated wires together in a twisted pattern and running them parallel to each other for the purpose of improving electromagnetic compatibility. By twisting the wires, some part of the noise signals goes in one direction (sending) while the other part goes in the opposite direction (receiving). This twisting helps dampen the magnetic effect

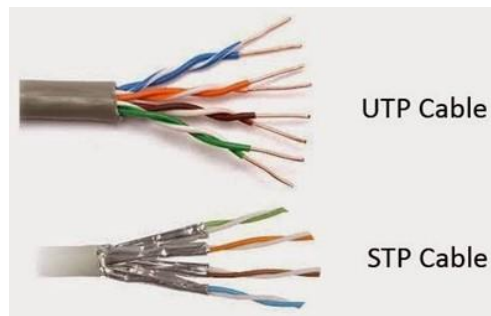
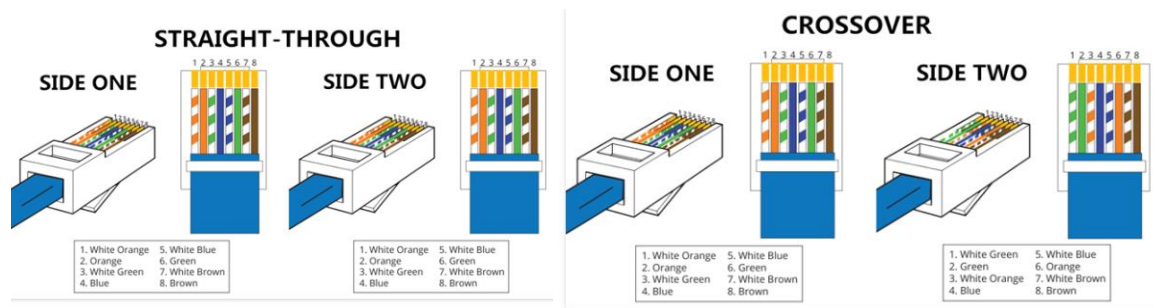


Figure 1 UTP vs. STP

on the wires, and the external waves cancel out due to the different twists. In simple words, compared to a single conductor or an untwisted balanced pair, a twisted pair reduces electromagnetic radiation from the pair and crosstalk between neighboring pairs and improves rejection of external electromagnetic interference. According to EIA/TIA-568 standard, twisted pair cables are classified into different categories such as Cat5e, Cat6, Cat7, Cat8 cables based on their electrical characteristics. For additional noise immunity, twisted pair cabling may be shielded. Cable with shielding is known as shielded twisted pair (or STP cable) and without as unshielded twisted pair (or UTP cable).

What Is Straight Through Cable?

A straight through cable is a type of twisted pair cable that is used in local area networks to connect a computer to a network hub such as a router. This type of cable is also sometimes called a patch cable and is an alternative to wireless connections where one or more computers access a router through a wireless signal. On a straight through cable, the wired pins match.



Straight Cable vs. Crossover Cable

Straight through vs. crossover cable, which one should I choose? Usually, straight through cables are primarily used for connecting unlike devices. And crossover cables are used for connecting alike devices. Use straight through Ethernet cable for the following cabling:

- Switch to router
- Switch to PC or server
- Hub to PC or server

Use crossover cables for the following cabling:

- Switch to switch
- Switch to hub
- Hub to hub
- Router to router
- Router Ethernet port to PC NIC
- PC to PC

Tasks

In this assignment, you are given a single meter long twisted pair (UTP) cables (a meter long each), 4 RJ-45 connectors.

- You will create a 1 Straight through Cable, 1 Crossover Cable.
- Connect two computers/laptops using your cable and verify the connectivity using ping command.
- Share a folder from one PC and access that shared folder on second PC over the connected wired network.

Deliverables

- A detailed report about the completion of above three tasks with screenshots.

References

- https://medium.com/@bilby_yang/comparison-between-utp-and-stp-27f7ac1d61aa
- <https://www.cables-solutions.com/difference-between-straight-through-and-crossover-cable.html>