

Lab 1

Title: To Construct Network Cables and Setup a LAN

Objective:

- a) To familiarize with different types of ethernet cables and connectors
- b) To make straight through and cross-over cables
- c) To construct a LAN using those cables

Components and Equipment Used

SN	Component Equipment Name	Specification	Quantity
1	Ethernet Cables (Cat5e or Cat6)	1 – 2 meter in length	3
2	RJ45 Connectors		20 (Approx.)
3	Ethernet Cable Tester		1 or 2
4	Clamper		1 or 2
5	Switch	Any kind of switch	1

Related theory

Ethernet cables can be wired as straight through or crossover. The straight through is the most common type and is used to connect computers to hubs or switches. They are most likely what you will find when you go to your local computer store and buy a patch cable. Crossover Ethernet cable is more commonly used to connect a computer to a computer and may be a little harder to find since they aren't used nearly as much as straight through Ethernet cable.

A RJ45 connector is a modular 8 position, 8 pin connector used for terminating Cat5e patch cable or Cat6 cable. A pinout is a specific arrangement of wires that dictate how the connector is terminated.

Whether installing new cable, or troubleshooting existing cable, ethernet network cable testing plays an important role in the process. Network cable testing provides a level of assurance that the installed cabling links provide the desired transmission capability to support the data communication desired by the users. For testing if the cable we created is as per the standard, we need a network cable tester.

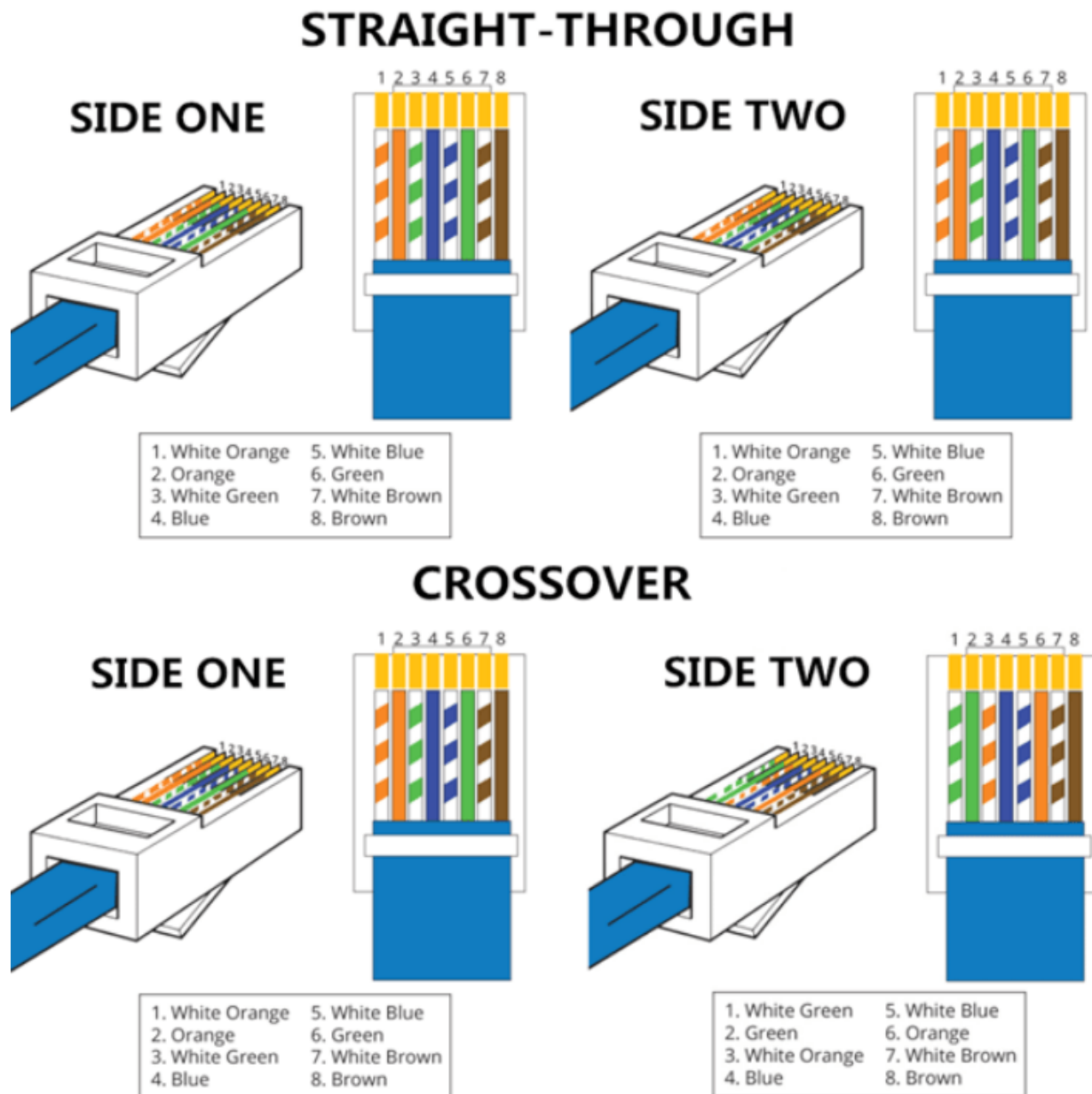


Fig: Straight Through and Cross-Over cable Overview

LAN setup:

A star topology is a topology for a Local Area Network (LAN) in which all nodes are individually connected to a central connection point, like a hub or a switch. A star takes more cable than e.g. a bus, but the benefit is that if a cable fails, only one node will be brought down.

All traffic emanates from the hub of the star. The central site is in control of all the nodes attached to it. The central hub is usually a fast, self contained computer and is responsible for routing all traffic to other nodes. The main advantage of a star network is that one malfunctioning node does not affect the rest of the network. However this type of network can be prone to bottleneck and failure problems at the central site.

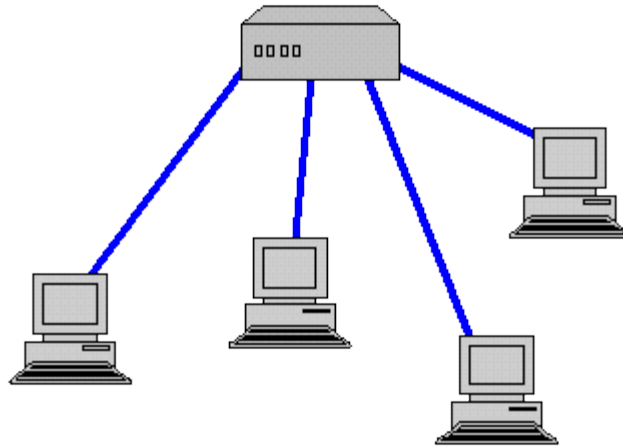


Fig: Star LAN topology Architecture

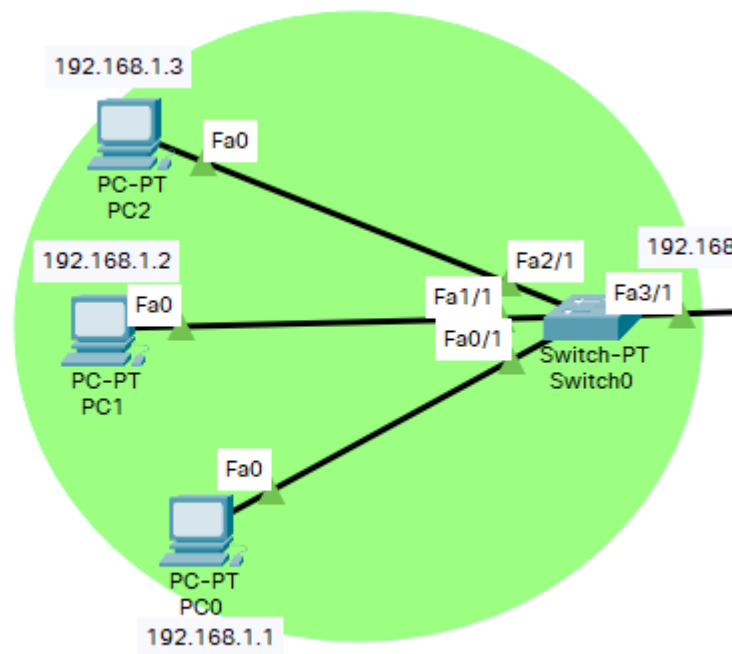
Procedure For creating Ethernet Cable:

1. Strip the **cable** jacket about 1.5 inch down from the end using Clamper's rolling blade.
2. Spread the four pairs of twisted wire apart. For cat6 you also need to cut the middle spine made up of plastic.
3. Untwist the wire pairs and neatly align them as per the standard as shown in above figure.
4. Cut the wires as straight as possible, about 0.5 inch above the end of the jacket.
5. Carefully insert the wires all the way into the modular connector, making sure that each wire passes through the appropriate guides inside the connector.
6. Push the connector inside the crimping tool and squeeze the crimper all the way down.
7. Repeat steps 1-6 for the other end of the cable.
8. To make sure you've successfully terminated each end of the cable, use a cable tester to test each pin.

Procedure For creating LAN:

1. Plug the straight through cables with the switch and each personal computers.
2. Go to each computer's network setting and select networking sharing center.
3. Inside network sharing center, select the Ethernet cable and go to properties.
4. Select IPv4 and use the static ip for all the computers.
5. To check if they are connected, open cmd and type ping <ip address of another host>. If there are reply, connection is successful.

Observation:



We can simply choose switches and PCs and then connect them through Fast Ethernet ports which allows transmission of data. We can set IP address of PC through Desktop>IP Configuration in Desktop where we can put the necessary IP address of the PC. When further expanding the LAN, Gateway of the router can also be set here. In Desktop tab, we can access that PC using terminal and many other features like wireless, etc.

Conclusion:

Hence, a simple LAN was designed where data can be transferred from one node to another.