SIWES
Work Report

By

Kayode Peter Temitope, 208077

Computer Science, 200 Level.

University of Ibadan.

CSC 299

At

Information Technology Network and Hardware Infrastructure, ITeMS, University of Ibadan.

10th January – 11th February, 2022.

Computer Science Department,

Faculty of Science,

University of Ibadan,

Ibadan.

The Director,

International Training Coordinating Centre,

University of Ibadan,

Ibadan.

Dear Sir,

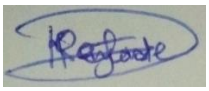
SUBMISSION LETTER FOR INDUSTRIAL TRAINING REPORT

I **KAYODE PETER TEMITOPE**, with Matriculation Number **208077**, of the **Department of Computer Science,** have successfully completed my five weeks Industrial Training for 2020/2021 academic session and hereby write to submit my Industrial Training Report.

The Industrial Training took place at Information Technology Network and Hardware Infrastructure (ITNH), ITeMS, University of Ibadan, which started on the 10th of January, 2022, and ended on the 11 March, 2022. I sincerely do appreciate the Director and ITCC for the opportunity given to me to apply my theoretical knowledge, and the exposure to the future world of work through the Industrial Training Program.

I will be grateful if this report is properly evaluated and given a satisfactory remark.

Yours Faithfully,



Kayode Peter Temitope.

ACKNOWLEDGEMENT

Words alone are not enough to say how grateful I am to God, who saw me through this period of my Industrial Training. I appreciate all those who have in one way or the other contributed to make my Industrial Training a success.

I specially acknowledge my parent whose effort and unconditional love made it possible. I had to stay out of home for this period of the Industrial Training, in which they didn't fail to carry out their responsibility as to providing and supplying my basic needs.

I also sincerely appreciate the Deputy Director of ITNH, ITeMS, Engr. Oluseyi Megbowon, for making it possible for me to intern in his unit. I also sincerely express my gratitude to my direct supervisor, Mr. Adekola Adewole, for your understanding and patience with me throughout my Industrial Training.

Finally, a big thank you to ITCC (Industrial Training Coordinating Center) for the opportunity given to us students to gain more knowledge through the Students' Industrial Work Experience Scheme.

TABLE OF CONTENT

ABSTRACT

This technical report contains the major activities carried out at Information Technology Network and Hardware Infrastructure (ITNH), ITeMS, and brief description of the experience gained during the training period and the materials used in writing the report.

This report consists of five (5) chapters ranging from Computer Networking, Overview of Computer Network devices in chapter one. Chapter two of this report carefully explains common practices and processes carried out in creating computer networks such as crimping of network cables, splicing of fiber cables and the use of Cisco Packet Tracer for simulation of networking pathway. Chapter three gives the details of the interconnection between the computer networking devices and how to create a small computer network in a house. Chapter four gives a brief summary of my Industrial Training experience in relation to my previous class works. Finally, chapter five gives a brief conclusion and recommendation on the Industrial Training.

INTRODUCTION

The Students' Industrial Work Experience Scheme (SIWES) is an integral part of the preparation of students for Bachelor of Science (B.Sc.) in the Faculty of Science of University of Ibadan, Ibadan. This programme is undertaken by every student in this level in partial fulfillment of the award of Bachelor of Science (B.Sc.) degree.

Among the numerous objectives are:

- To provide avenue for students in Nigerian Universities to acquire industrial skills and experience in their course of study
- It enables student to understanding more on what had been taught in class.
- It enables student to associate and meet with industrial workers.
- Familiarizes the students with typical environments in which they are likely to function after graduation.
- To enlist and strengthen employer's involvement in the entire process of preparing university graduates for employment in the industry

Therefore, the five weeks Industrial training I undertook at ITNH, ITeMS, U.I, has helped me in learning and knowing the skills and ability required to troubleshoot, resolve, and communicate networking issues to other employees and management. Also to maintain the computer networks including mainframes, routers, servers and other physical hardware. I also learnt to use the Cisco Packet Tracer simulation to distribute and create a network, learnt how to crimp a RJ45 network cable, splice a fiber cable using fusion method. Finally, I learnt to maintain the security and networking best practices to offer the best solutions and protection to the university system.

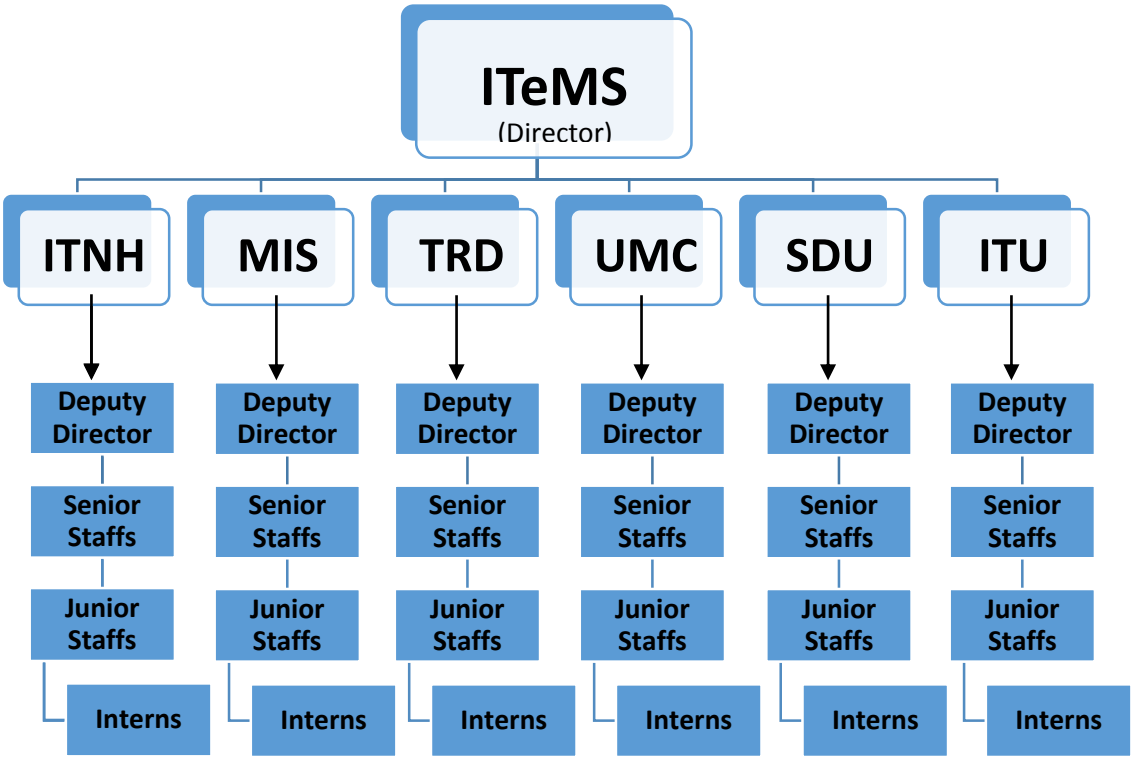
BRIEF OVERVIEW OF ITNH, ITeMS, U.I

ITNH (Information Technology Network and Hardware Infrastructure) is a section under the general information and media section of the University (ITeMS), responsible for the planning, analysis, design, implementation and operation of computer networking facilities and infrastructures around the University of Ibadan environs.

More specifically, their services includes but not limited to:

1. Creating of Network Infrastructures in each Departments and unit of the University.
2. Creating and management of the Network Portals of the whole University
3. Troubleshooting and resolving of communication and networking issues in the University.
4. Maintaining the University computer networks including mainframes, routers, servers and other physical hardware.
5. Maintaining the security and networking best practices to offer the best solutions and protection to the university system.

Other section of ITeMS includes MIS, TRD, UMC, SDU and ITU.



CHAPTER ONE

COMPUTER NETWORKING

Computer networking refers to connected computing devices (such as laptops, desktops, servers, smartphones, and tablets) and an ever-expanding array of IoT devices (such as cameras, door locks, doorbells, refrigerators, audio/visual systems, thermostats, and various sensors) that communicate with one another.

How does a computer network work?

Specialized devices such as switches, routers, and access points form the foundation of computer networks. Switches connect and help to internally secure computers, printers, servers, and other devices to networks in homes or organizations. Access points are switches that connect devices to networks without the use of cables.

Routers connect networks to other networks and act as dispatchers. They analyze data to be sent across a network, choose the best routes for it, and send it on its way. Routers connect your home and business to the world and help protect information from outside security threats.

While switches and routers differ in several ways, one key difference is how they identify end devices. A Layer 2 switch uniquely identifies a device by its "burned-in" MAC address. A Layer 3 router uniquely identifies a device's network connection with a network-assigned IP address. Today, most switches include some level of routing functionality.

Computer Network

A computer network is a system in which multiple computers are connected to each other to share information and resources. A computer network or data network is a telecommunications network which allows computers to exchange data. In computer networks, networked computing devices pass data to each other along network links (data connections). The connections between nodes are established using either cable media or wireless media. The best-known computer network is the Internet.

Characteristics of a Computer Network

- Share resources from one computer to another.
- Create files and store them in one computer, access those files from the other computer(s) connected over the network.
- Connect a printer, scanner, or a fax machine to one computer within the network and let other computers of the network use the machines available over the network.

Following is the list of hardware's required to set up a computer network.

- Network Cables
- Distributors
- Routers
- Internal Network Cards
- External Network Cards

Overview of the Devices Used in Computer Networking

Network computer devices that originate, route and terminate the data are called network nodes. Nodes can include hosts such as personal computers, phones, servers as well as networking hardware. Two such devices can be said to be networked together when one device is able to exchange information with the other device, whether or not they have a direct connection to each other.

Network Cables

Network cables are used to connect computers. The most commonly used cable is Category 5 cable RJ-45.

Types of Network Cables

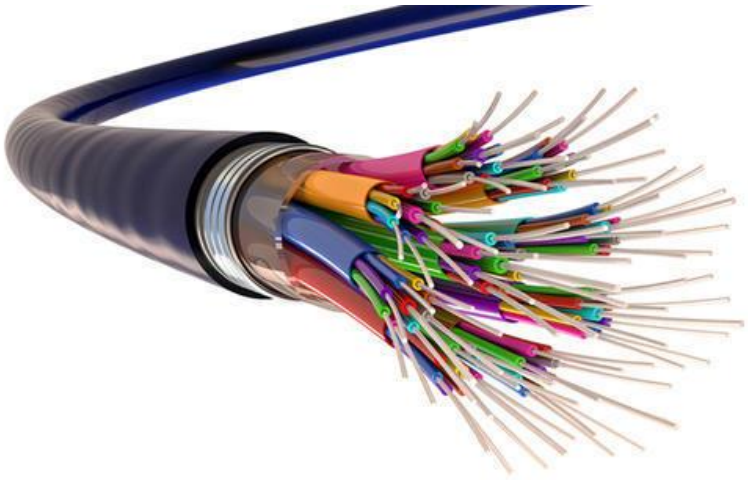
Coaxial Cable

Coaxial cables have a single copper conductor at the center, while a plastic layer provides insulation between the center conductor and braided metal shield. The metal shield blocks outside interference from fluorescent lights, motors, and other computers.

Coaxial cabling is highly resistant to signal obstruction, although it can be complex to install. It can handle greater cable lengths between network devices than twisted pair cables. The two types of coaxial cables are thick coaxial and thin coaxial.

Fiber Optic Cable

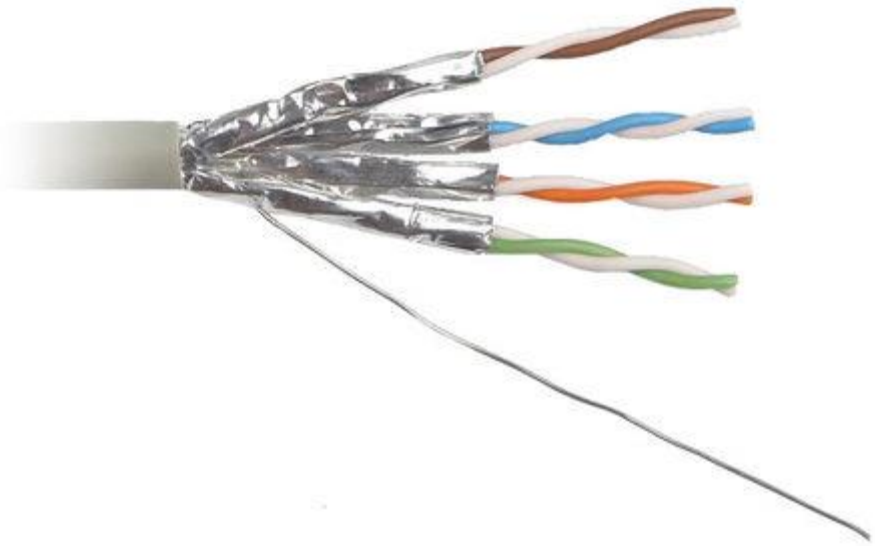
Fiber optic cables possess a center glass core surrounded by multiple layers of protective materials. They avoid electrical obstruction by transmitting light instead of electronic signals, making them perfect for environments with large amounts of electrical interference. Fiber optic cables have become the standard for connecting networks across buildings because of their resistance to moisture and lighting.



Shielded Twisted Pair (STP) Cable

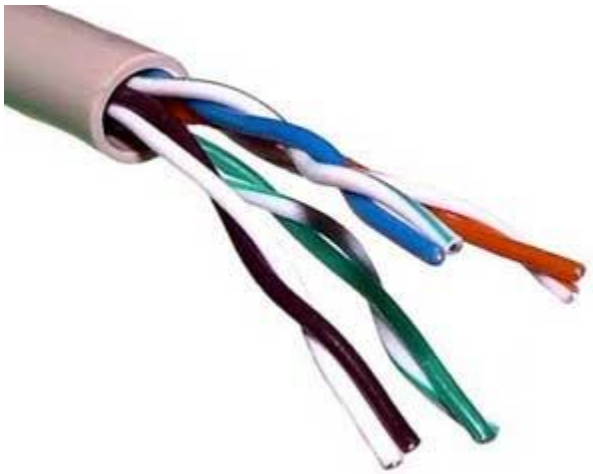
Often referred to colloquially as simply ethernet cables, STP cables employ a special type of copper telephone wiring used for business installations. An external shield functioning as a ground is added to the standard twisted pair of telephone wires.

Shielded twisted pair cables can be perfect if you want to set up cables in an area with potential interference and risks to an unshielded twisted pair cable's electrical current. Shielded twisted pair cables can also help to expand the distance between the cables.



Unshielded Twisted Pair (UTP) Cable

Unshielded twisted pair (UTP) cables are broadly used in the telecommunications and computer industries as ethernet cables and telephone wires. In a UTP cable, conductors forming a single circuit are twisted around one another to cancel out electromagnetic interference (EMI) from external sources.



Switch

A network switch connects devices within a network (often a local area network, or LAN) and forwards data packets to and from those devices. Unlike a router, a switch only sends data to the single device it is intended for (which may be another switch, a router, or a user's computer), not to networks of multiple devices.

Router

A router is a type of device which acts as the central point among computers and other devices that are a part of the network. It is equipped with holes called ports. Computers and other devices are connected to a router using network cables. Now-a-days router comes in wireless modes using which computers can be connected without any physical cable.

Network Card

Network card is a necessary component of a computer without which a computer cannot be connected over a network. It is also known as the network adapter or Network Interface Card (NIC). Most branded computers have network card pre-installed. Network cards are of two types: Internal and External Network Cards.

Internal Network Cards

Motherboard has a slot for internal network card where it is to be inserted. Internal network cards are of two types in which the first type uses Peripheral Component Interconnect (PCI) connection, while the second type uses Industry Standard Architecture (ISA). Network cables are required to provide network access.

External Network Cards

External network cards are of two types: Wireless and USB based. Wireless network card needs to be inserted into the motherboard, however no network cable is required to connect to the network.

Universal Serial Bus (USB)

USB card is easy to use and connects via USB port. Computers automatically detect USB card and can install the drivers required to support the USB network card automatically.

CHAPTER TWO

PROCESSES IN COMPUTER NETWORKING

1. SPLICING

Fiber Optic Cable is a form of modern network cable that has a far greater capacity than electrical communication connections. Optical fibers are made comprised of exceedingly tiny strands of glass or plastic and these cables transfer information between two sites using completely optical (light-based) technology.

Fiber Optic Cable Splicing is the method of joining two fiber optic cables together. Termination is the other, more frequent way of linking fibers. Fiber splicing is the preferred way when cable lines are too long for a single length of fiber or when combining two different types of cable.

Fusion splicing and Mechanical splicing are two methods of fiber optic splicing. Both techniques have much lower insertion loss than fiber connections.

Mechanical Splicing:

Mechanical splicing is a type of splicing that does not use a fusion splicer. A mechanical splice is an optical fiber connection that is adjusted and maintained in place by an assembly that employs an indexing fluid to keep the fibers aligned. Mechanical splicing permanently connects the two optical fibers with a short mechanical splice approx. 6 cm long and 1 cm in diameter. This will mechanically join two bare strands after they have been properly aligned. Mechanical splices are simple alignment devices that keep the two ends of the fiber completely aligned and allow light to travel from one fiber to the other.

The splice is securely attached with a snap cover, an adhesive cover, or both. The fibers are not permanently connected; they are only held together tightly enough to let light through. (0.5 dB insertion loss) The splice loss is typically around 0.3 dB. On the other hand, fiber mechanical splicing introduces more reflection than fusion splicing. Mechanical splices for fiber optics are small, simple to use, and appropriate for rapid repairs or long-term installations. They come in both permanent and re-enterable forms. Mechanical splices for single-mode and multimode fiber optic cables are available. Mechanical splicing is easier to perform but allows higher insertion loss. Therefore, mechanical splicing is best for a quick or temporary repair rather than a permanent splice.

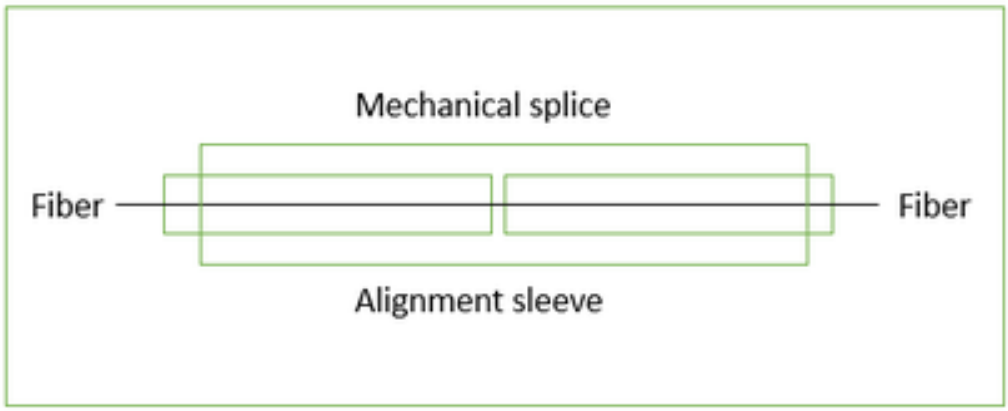
Steps to Perform Mechanical Splicing

Step 1 - Fiber Preparation: Protective coatings, jackets, tubes, strength members, and other materials should all be removed, leaving only the naked fiber visible. The most important consideration is hygiene.

Step 2 - Cleaving the fiber: The process is comparable to fusion splicing cleaving, however, the accuracy of the cleave is less crucial.

Step 3 - Joining fibers mechanically: This approach does not utilize any heat. Simply place the fiber ends in the mechanical splice device and splice them together. Light coupling from one fiber end to the other will be aided by the index matching gel in the mechanical splice equipment. Rather than an index matching gel, epoxy will be used to hold the cores of earlier equipment together.

Step 4 - Fiber protection: The final mechanical splice acts as its own splice protector.



Advantages of Mechanical Splicing:

- Mechanical splices do not require electricity.
- Other than a fiber stripper and a fiber splitter, many mechanical fiber splice designs require no additional equipment.
- Mechanical splicing is useful in cases where fusion splicing is not conceivable or practical. This makes them perfect for short-term connections.

Disadvantages of Mechanical Splicing

- The insertion loss is much higher. The normal insertion loss of a mechanical splice is about 0.2 dB, which is much greater than the 0.02 dB loss of a standard fusion splice. Multimode fibers are usually spliced mechanically.

- Mechanical splices struggle to meet the alignment tolerances of single-mode fibers.
- Mechanical splices are only used under relatively safe conditions, such as in an office building.

Fusion Splicing

Fusion splicing is more expensive than mechanical splicing, but it lasts longer. The fiber cores are fused together with reduced attenuation in the fusion process (insertion loss of less than 0.1 dB). Arc or another type of heat during fusion splicing. This leads to a clear, reflection-free, and continuous connection between the fibers, which enables very little light loss (average loss of 0.1 dB). Fusion splicing is a complex process that requires great care. Your fibers may not be connected properly and if not done correctly, your signal may degrade.

Steps to perform Fusion splicing

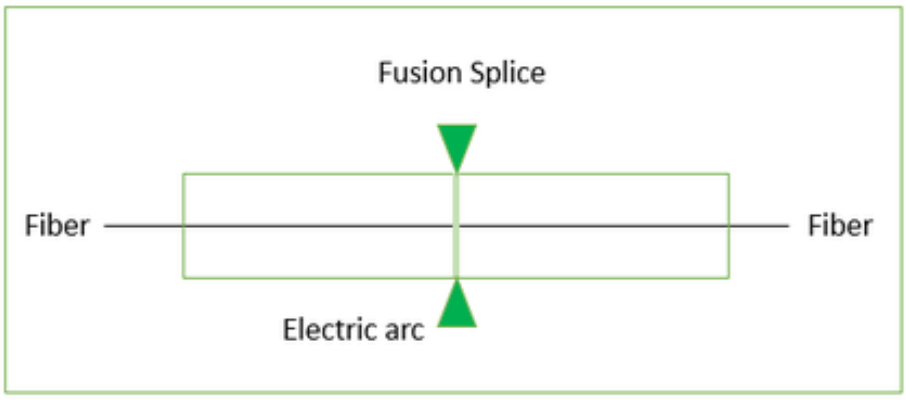
Step 1 - Fiber striping: You must first remove or peel off the protective polymer coating around the fiber optic cable before you can begin fusing it. A mechanical stripping device, similar to stripping pliers, is usually used for this purpose. Remember to clean the stripping equipment before starting the fusing process.

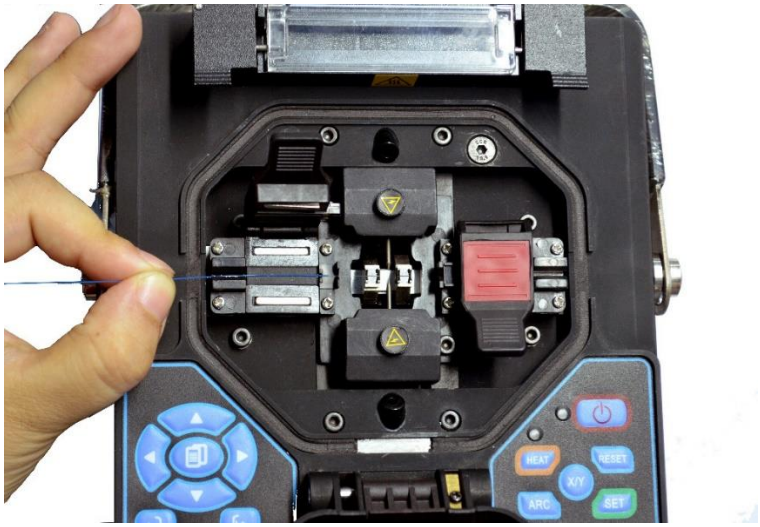
Step 2 - Fiber Cleaning: It's time to clean the raw fiber after it's removed from its shell. The glass can be kept clean by wiping it with 99.9% isopropyl alcohol (IPA) and lint-free wipes.

Step 3 - Fiber Cleaving: To make an effective fusion splice, you need a decent cleaver. Instead of cutting the fiber, the chopper knife cuts and pulls or bends it to cause a neat break, with the end face remaining flat and perpendicular to the fiber axis.

Step 4 - Fiber Fusion: After the fibers have been split, use a fusion splicer to join them together. The ends of the fiber must first be aligned within the splicer. Melt the fibers with an electric arc after they're correctly aligned, permanently fusing the ends together.

Step 5 - Fiber Protection: The splice will not break during typical handling if the fiber is protected from bending and tensile loads. Although a standard fusion splice has a tensile strength of 0.5 to 1.5 pounds and would not break with normal handling, it must be protected from extreme bending and tensile pressures. The splice is protected from the weather and breakage by using shrink tubing, silicone gel, and/or mechanical crimp protection.





Advantages of Fusion Splicing

- Fusion splicing is a compact process and has the lowest insertion loss and back reflection.
- Fusion splicing is permanent and has the highest mechanical strength.
- Fusion splicing can withstand a wide range of temperatures.
- Dust and other pollutants are kept away from the optical path by fusion splicing.

Disadvantages of Fusion Splicing:

- If too much heat is applied to melt the fiber optic cable for termination, the connection will become brittle and cannot be used for a long time.
- Fusion splicing causes significant up-front costs of continuous power supply as well as some special instruments.
- Fusion splicing cannot be used for temporary connections as it is a lengthy process

Because the fusion splices are virtually smooth, fusion splicing creates less loss and back reflection than mechanical splicing. Mechanical splices work with both single-mode and multimode fibers, while fusion splices are only used with single-mode fibers.

Fusion splicing is used by many telecommunications and cable television providers for long-haul single-mode networks, although mechanical splicing is used for shorter local cable lengths. Fusion splicing is also preferred for this application because analog video signals require little reflection for optimal performance. Signal loss and reflection are negligible problems for most LAN applications, so the LAN industry can use either approach.

2. CRIMPING

Cables can transmit information along their length. To actually get that information where it needs to go, you need to make the right connections to an RJ45 connector. Your cable run needs to terminate into a connector, and that connector needs a jack to plug into.

Registered Jack 45 (RJ45) is a standard type of physical connector for network cables. RJ45 connectors are commonly seen with Ethernet cables and networks.

Modern Ethernet cables feature a small plastic plug on each end of the cable. That plug is inserted into RJ45 jacks of Ethernet devices. The term “plug” refers to the cable or “male” end of the connection while the term “jack” refers to the port or “female” end.

RJ-45 Connector with Protective Cover InstalledRJ45 plugs feature eight (8) pins to which the wire strands of a cable interface electrically. Each plug has eight locations (positions), spaced about 1mm apart. Individual wires are inserted using special cable crimping tools. The industry calls this type of connector 8P8C (Eight Position, Eight Contact).

Ethernet cables and 8P8C connectors are crimped into the wiring pattern to function. 8P8C can be used with other types of connections besides Ethernet; it is also used with RS-232 serial cables, for example. Because RJ45 is by far the predominant usage of 8P8C. Industry professionals use those two terms interchangeably.

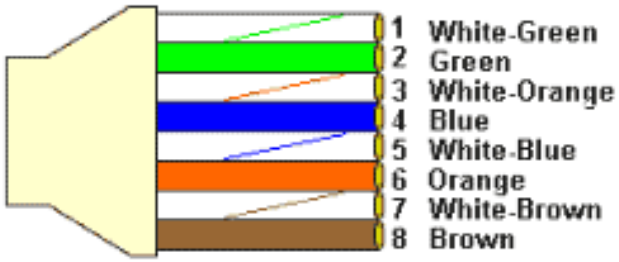
T568A or T568B Wiring Standard

RJ45 T568A Compared To T568B Wiring Standards

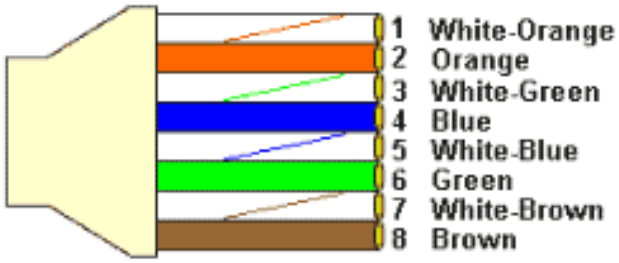
T568A and T568B are the two color codes used for wiring eight-position modular plugs. Both are allowed under the ANSI/TIA/EIA wiring standards. The only difference between the two color codes is that the orange and green pairs are interchanged.

There are no transmission differences between T568A and T568B cabling schemes. North America's preference is for T568B. Both ends must use the same standard. It makes no difference to the transmission characteristics of data.

T568B wiring pattern is recognized as the preferred wiring pattern.



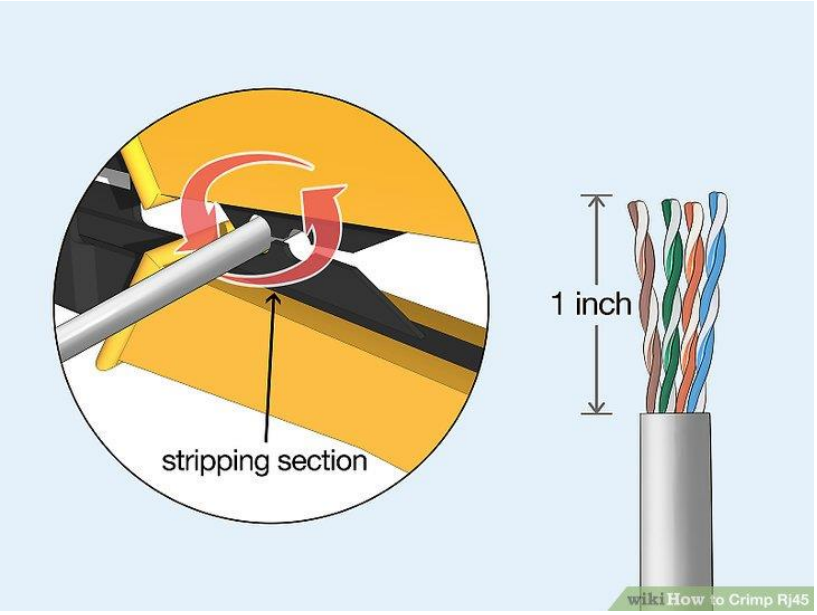
568A CABLE END



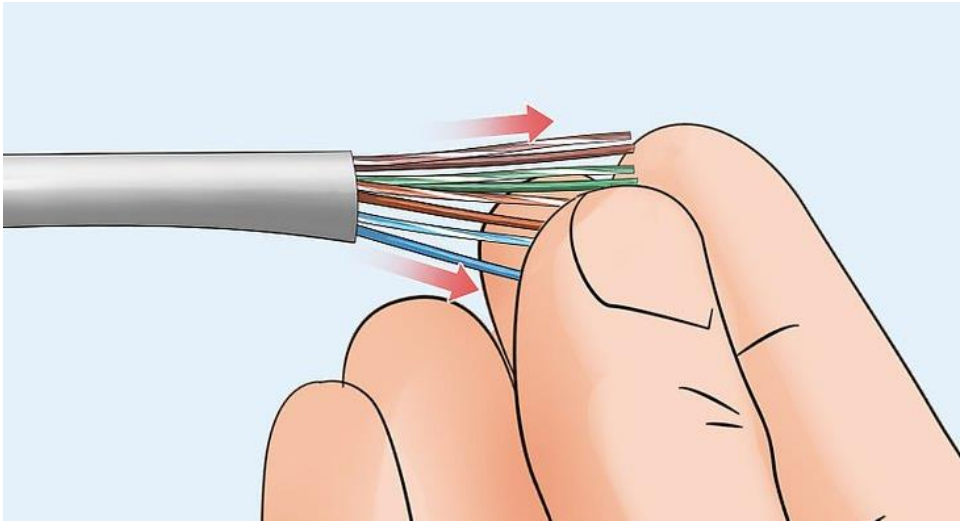
568B CABLE END

STEPS IN CRIMPING A NETWORK CABLE

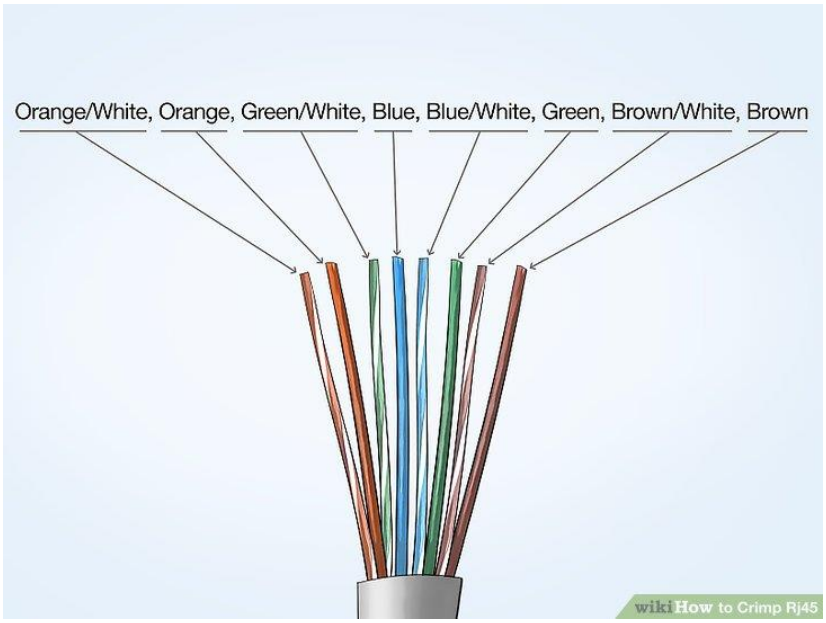
STEP 1: Strip the cable back 1 inch (25 mm) from the end. Insert the cable into the stripper section of the tool and squeeze it tight. Then, rotate the crimping tool around the cable in a smooth and even motion to create a clean cut. Keep the tool clamped and pull away towards the end of the wire to remove the sheathing. The stripping section is a round hole near the handle of the tool. The sheathing should come off cleanly, leaving the wires exposed.



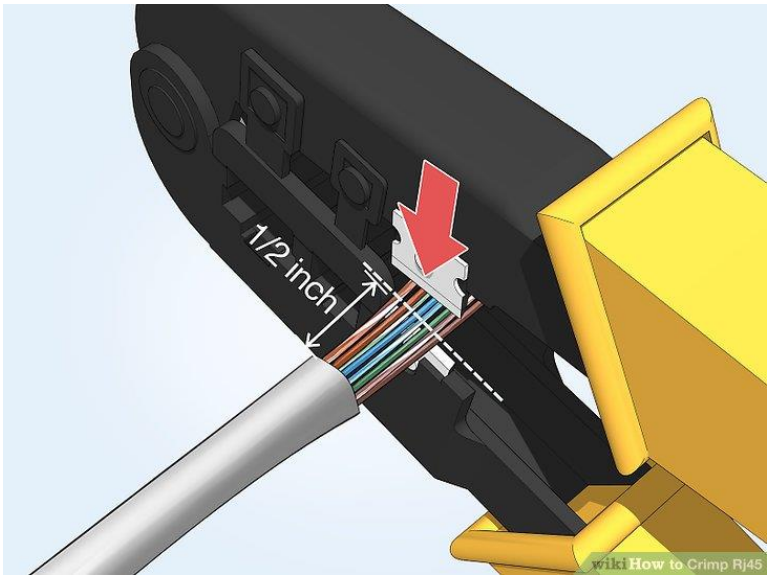
STEP 2: Untwist and straighten the wires inside of the cable. Inside of the cable you'll see a bunch of smaller wires twisted together. Separate the twisted wires and straighten them out so they're easier to sort into the right order. Cut off the small plastic wire separator or core so it's out of the way. Don't cut off or remove any of the wires or you won't be able to crimp them into the connector.



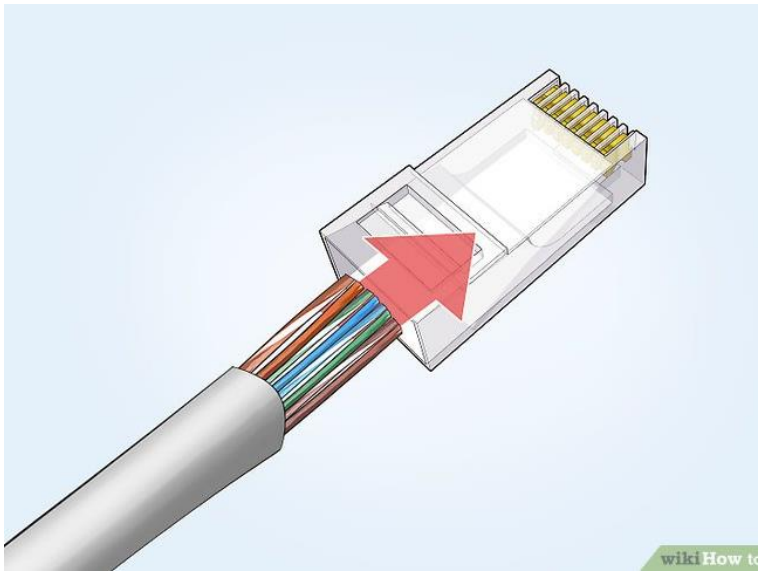
STEP 3: Arrange the wires into the right order. Use your fingers to put the wires in the correct order so they can be properly crimped. The proper sequence is as follows from left to right: Orange/White, Orange, Green/White, Blue, Blue/White, Green, Brown/White, and Brown. There are 8 wires in total that need to be arranged in the right sequence. Note that the wires labeled Orange/White or Brown/White indicate the small wires that have 2 colors.



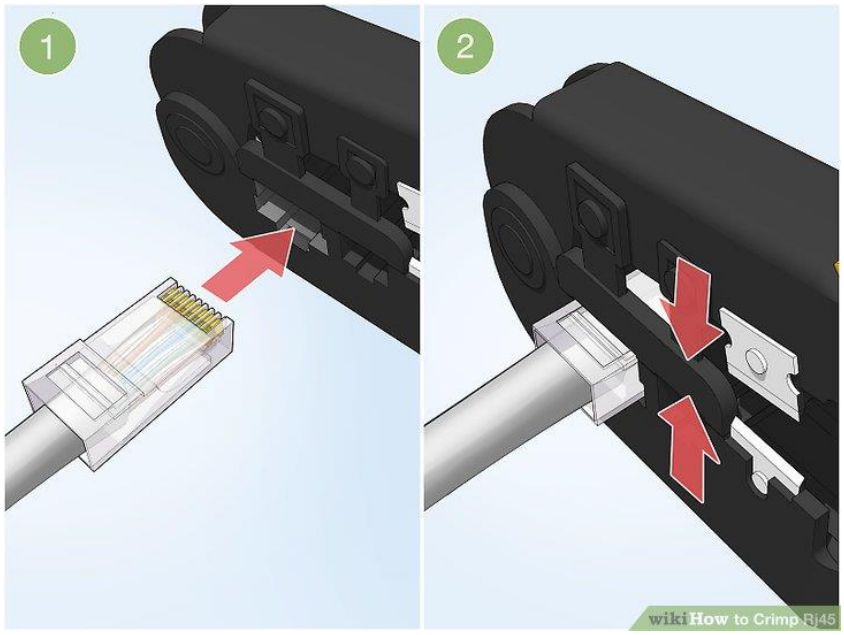
STEP 4: Cut the wires into an even line 1⁄2 inch (13 mm) from sheathing. Hold the wires with your thumb and index finger to keep them in order. Then, use the cutting section of the crimping tool to cut them into an even line. The cutting section of the tool will resemble wire cutters. The wires must be in an even line to be crimped into the RJ-45 connector properly. If you cut them in an uneven line, move further down the wires and cut them again.



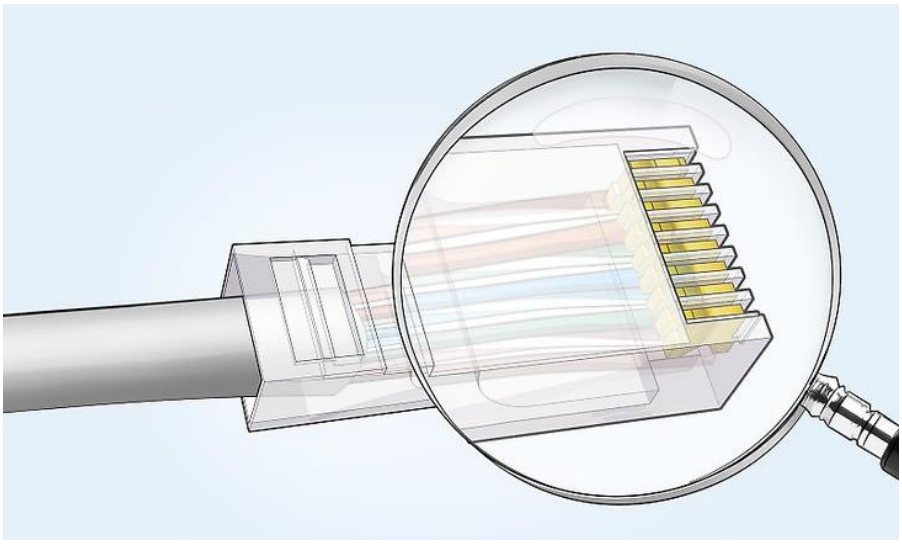
STEP 5: Insert the wires into the RJ-45 connector. Hold the RJ-45 connector so the clip is on the underside and the small metal pins are facing up. Insert the cable into the connector so that each of the small wires fits into the small grooves in the connector. The sheathing of the cable should fit just inside of the connector so it's past the base. If any of the small wires bend or don't fit into a groove correctly, take the cable out and straighten the wires with your fingers before trying again. The wires must be inserted in the correct order and each wire must fit into a groove before you crimp the connector.



STEP 6: Stick the connector into the crimping part of the tool and squeeze twice. Insert the connector in the crimping section of the tool until it can't fit any further. Squeeze the handles to crimp the connector and secure the wires. Release the handles, then squeeze the tool again to make sure all of the pins are pushed down. The crimping tool pushes small pins in the grooves down onto the wires to hold and connect them to the RJ-45 connector.

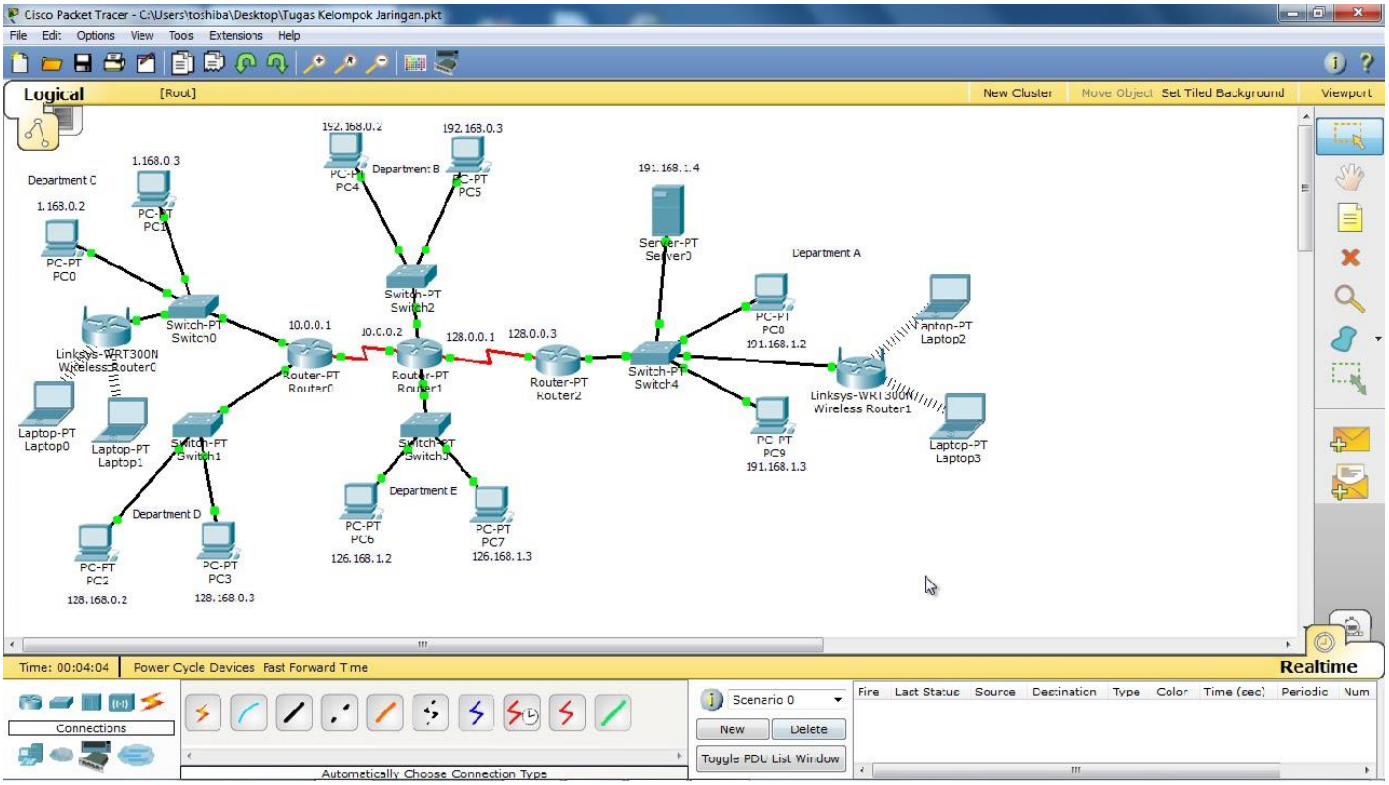


STEP 7: Remove the cable from the tool and check that all of the pins are down. Take the connector out of the tool and look at the pins to see that they're all pushed down in an even line. Lightly tug at the connector to make sure it's attached to the cable. If any of the pins aren't pushed down, put the wire back into the crimping tool and crimp it again.



3. CISCO PACKET TRACER

Packet Tracer offers an effective, interactive environment for learning networking concepts and protocols. Most importantly, Packet Tracer helps students and instructors create their own virtual “network worlds” for exploration, experimentation, and explanation of networking concepts and technologies.

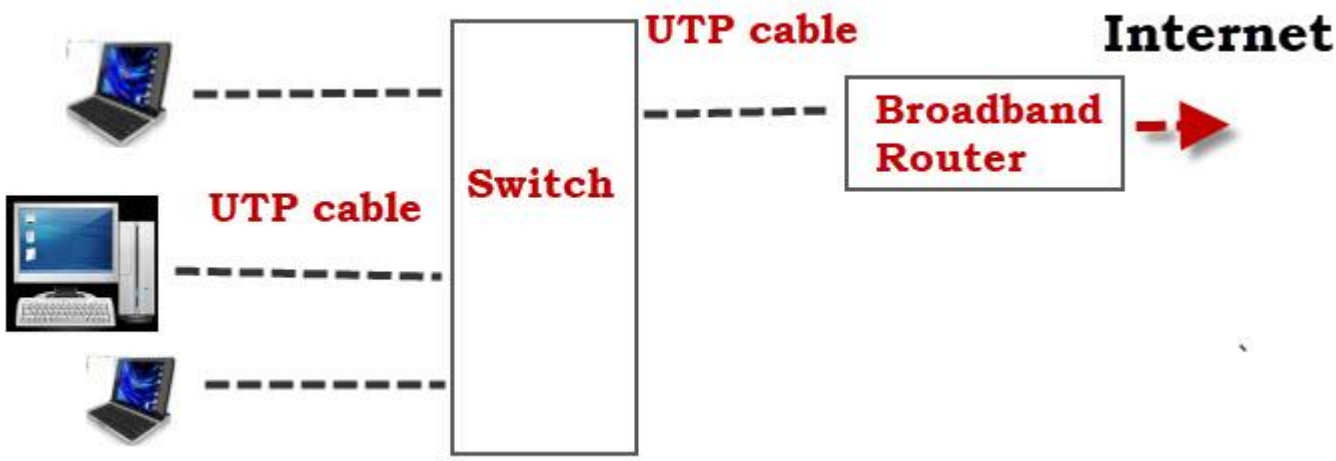


CHAPTER THREE

INTERCONNECTION OF THE NETWORKING DEVICES

STEP 1: Choosing a Wired or Wireless Network

Wired networks use Ethernet over UTP cable and tend to be faster than wireless networks, which is an important consideration if you are a gamer. The simple wired home network diagram below shows a minimum setup with a switch and broadband router.



Simple Wires Home Network Diagram

Wired Network Advantages

- Fast typically 100 Mbps to 10 Gbps
- Secure and reliable.

Wired Network Dis-Advantages

- Doesn't work with devices that don't have an Ethernet port e.g. tablets and smart phones.
- Not so easy and fast to setup as it requires running cables. However home plug or power line adapters can be used instead.
- Not so easy for visitors and mobile devices (laptops) to connect to.

Main Uses

It is best used for network backbone i.e. connecting between router, network switches and wireless access points on different levels (floors).

Home Wireless Networks

Today most home networks are Wi-Fi networks.

The installation of wireless networks using Wi-Fi is quick and easy, but wireless networks are generally slower than wired networks.

Wireless Network Advantages

- Easy installation and setup from an end user perspective.
- Allows easy access to smart phones, Tablets and mobile devices.
- No cables to run.

Wireless Network Disadvantages

- Not as Secure as wired networks without proper configuration, and easy to set up insecurely.
- Not as fast as wired networks.
- Not as reliable as wired networks.

Main Uses

Connecting peripheral devices like computers, smart phone, tablets etc.

Most home network installations will use a mixture of wired and wireless.

However small home and home office networks will generally be Wi-Fi only.

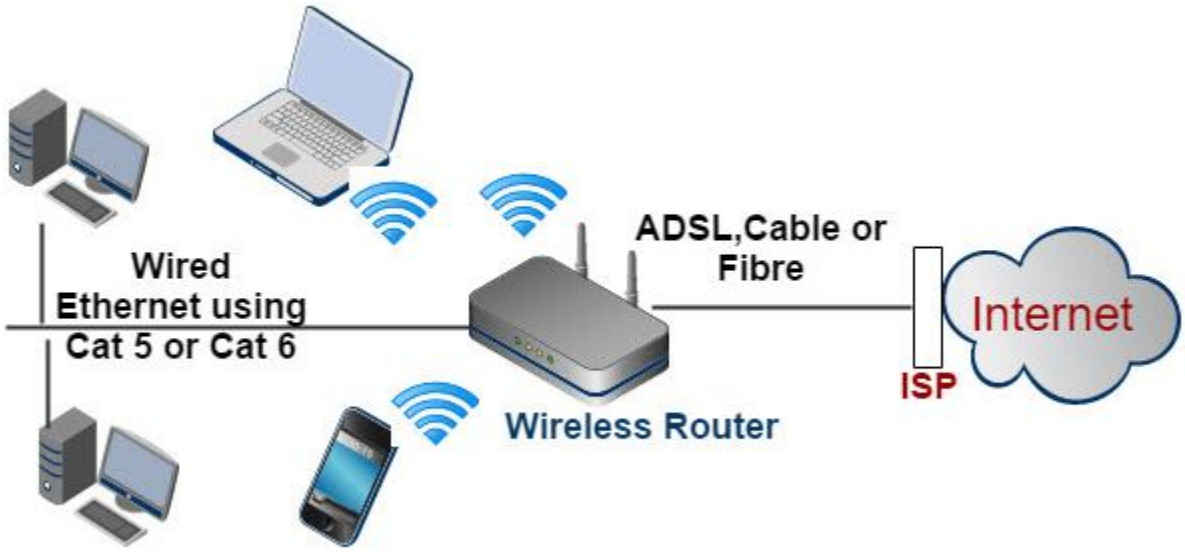
STEP 2: Setting up a Home Network - Components and Structure

Today however most home and small business office networks will use a wireless network or mixed network, as most people use Smart phones, and tablets which don't have Ethernet support.

The main components required to build a typical home/small business network are:

- Router or Wireless router – Connects the network to the Internet.
- Wireless Access Point – Used to Connect Wi-Fi equipped devices to the network.
- Ethernet HUB or Switch -Used to Connect Ethernet equipped devices.
- Cable CAT 5, CAT5E or cat 6 with RJ45 connectors.
- Telephone Cable with RJ 10 connectors.
- Broadband Filters.

The home network diagram below shows the structure of a typical small home network using a wireless router and connected to the Internet.



Network Diagram – Typical Simple Home Network

For most home networks the Wireless Router or Hub which connects the network to the Internet will be the main component of the home or small home office network, and in many cases it will be the only component.

The Wireless router usually incorporates a Wireless access point, Ethernet switch, DSL modem and Router in a single box.

DSL Modem– converts digital signals into analogue signals that are suitable for sending over a telephone line. It is usually built into the Internet/broadband router and is not normally purchased as a separate component.

DSL/Broadband Filter– Used to filter out DSL signals from telephone signals so that you can access the internet and use the telephone simultaneously. Often included as part of the connection socket.

STEP 3: Install Location of a Wireless Router

The Wireless router will need to connect to the telephone line, cable or fibre network access point in your home. Therefore most people locate the Wireless router near to the main telephone socket. However, you can usually change the location by using telephone extension cables or longer WAN cables. Because the Wireless Router provides the Wireless access point then you should install it in a central location, if possible, to get the best wireless reception. WAN cables use the same connectors (RJ45), and cables as Ethernet cables.

Don't

- Hide it in a cupboard
- Install it behind the sofa
- install next to motors, microwaves, cordless telephones

STEP 4: Testing Your Wireless Signal

The easiest way of testing you signal strength in various locations is to use the inSSIDer Wi-Fi checker which is an App that you can install on your Android Tablet or phone. The general idea is to install the Wireless router in its preferred location and then move around the house with the inSSIDer Wi-Fi checker, check the signal strength, and then adjust the location if necessary.

Extending Your Home Network

In large homes/offices it may not be possible to connect all devices directly to the Wireless router and so you will need to purchase additional networking components.

You can extend your home network by:

- Extending your Wi-Fi coverage by installing additional Wireless Access Points or a more powerful access point.
- Extending the Wired network by running cables into other rooms
- Using your power cables by installing home plug adapters. See How to extend a Home Network

STEP 5: Home Router Setup

To administer the home router you access it via a web browser, and login using a username and password. Before you allow devices to connect to your home network you should make some basic changes to the default setup parameters of your router.

The two important one are the SSID used to access the Router and the router admin password as the default username/passwords are well known, and published on the Internet.

Connecting Wi-Fi Devices

The standard way of connecting a Wi-Fi device to a Wi-Fi network is to connect to the network and enter the password when prompted. However most modern Wi-Fi routers/hubs support a feature called WPS (Wi-Fi protected setup). This usually involves pressing a button on the Wi-Fi router and a corresponding WPS connection button on the Device. The devices then connect without requiring you to enter a password.

Home Network IP Addresses

All of the devices will need an IP address. This is provided automatically by a service called DHCP which, by default, is provided by the home router. IP address provided by the DHCP server are known as dynamic addresses, as they can change. You can also assign addresses manually, and these are known as static addresses.

Static Addresses are not normally assigned but are often required when using Port forwarding. They can be assigned on the network settings of the device, but preferably on the DHCP server using reserved addresses.

Additionally the addresses used on the home network are known as internal addresses. When you connect to the Internet your device will use an external IP address. This address is the IP address of the router/hub.

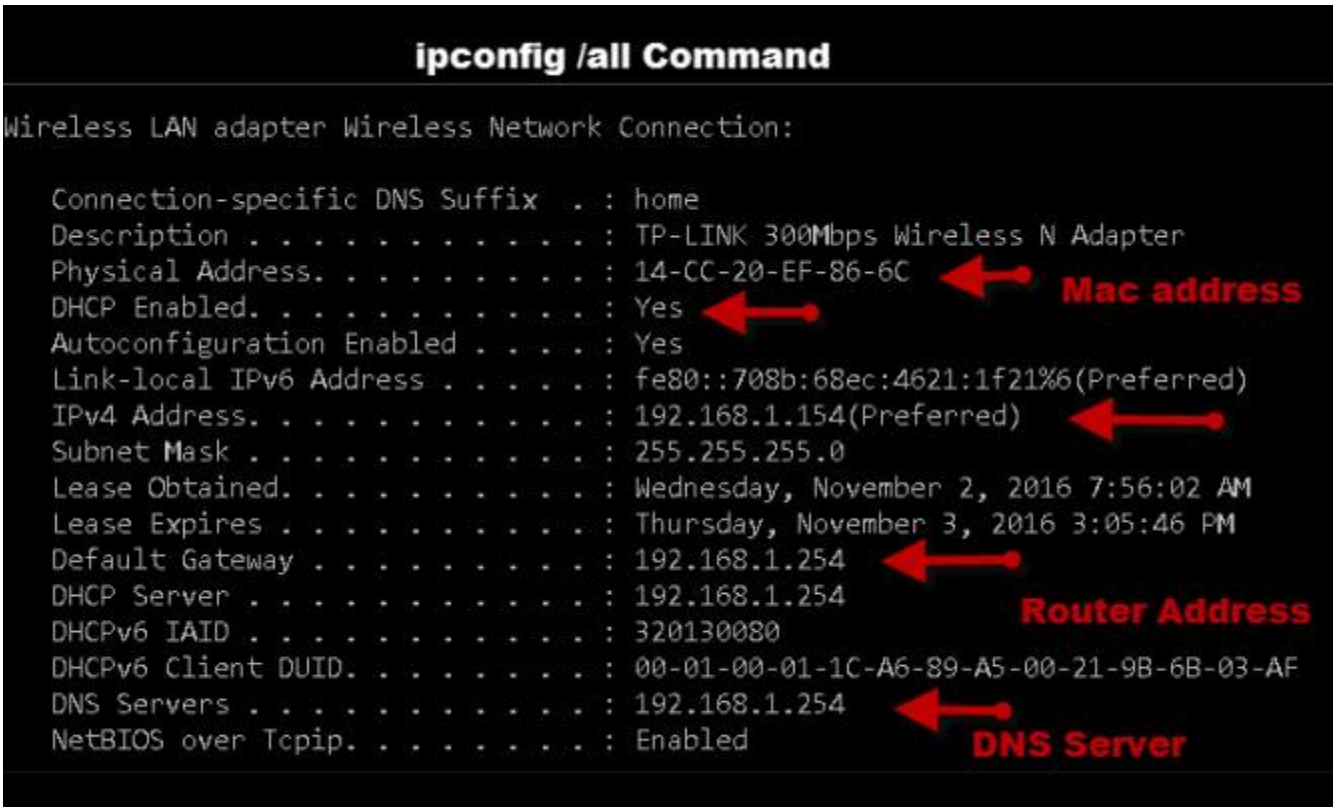
STEP 6: Finding Your DNS, IP, MAC Addresses and Router IP Address

You may need to find out what DNS servers you are using or the IP or MAC address of:

- Your Home Router
- Your own computer/tablet/phone

The main tool you use is the ipconfig (windows) or ifconfig (linux) tool.

The screen shot below shows the ipconfig command use with the /all switch. I.e. ipconfig/all



The home router is the gateway to the Internet. When viewing the configuration, some devices refer to it as the default router whereas other use the term default gateway.

In the screen shot above it is **192.168.1.254**

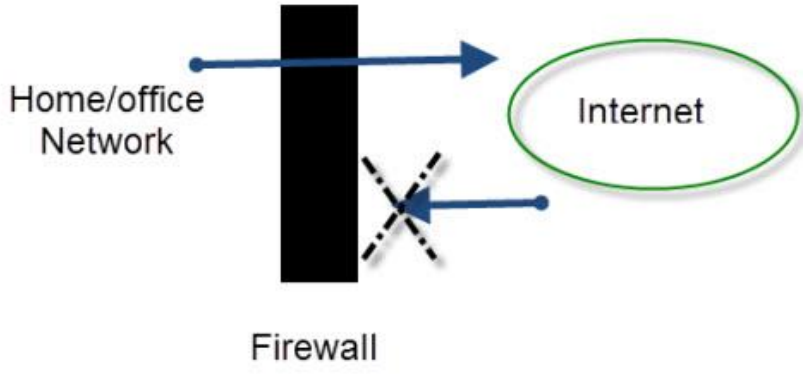
Splitting Your Home Network

For security reasons you may find the need to split your home network. This is especially true in small business networks like restaurants etc. where customers are also given access to the

network. Many modern routers will provide guest networks for this purpose, and is easy to setup. Another common method, but not as simple is to use VLANs.

STEP 7: Connecting to Internet

The home router connects to the internet and acts as a Firewall. A firewall protects your home or small business network computers and devices from intruders on the Internet. It effectively acts like a one way digital gate blocking access to your network from devices on the Internet, but at the same time allowing devices on your network to connect to devices on the Internet. (Schematic diagram below)



Generally there is no configuration required as the default behaviour is only to allow connections from the local network to the Internet, and not from the Internet to the home network. However if you do require devices on the Internet to connect into your network (often required by gamers) then you can configure port forwarding.

Checking Network and Internet Speeds

On any network the speed is restricted by the slowest component. A computer with a Gigabit network card talking to a computer with a 100Mbit/s network card is restricted to 100Mbit/s.

Shared devices like switches and Wireless access points are network choke points just like traffic lights and roundabouts on a road. LAN Speed test is a very useful tool for testing your local network speeds. For Internet speeds you can use online speed test sites.

Home Network and Internet Connection Problems

You will invariably have connection problems from time to time. In my experience most problems are easily diagnosed, and fixed with a little patience and perseverance.

Having a good understanding of how the network fits together, and works is essential for successful troubleshooting.

CHAPTER FOUR

EXPERIENCES RELEVANT TO CLASSWORK

The knowledge my lecturers impacted in me turned out to be my most invaluable asset during my industrial training. Thanks to the hours of lectures, tons of homework, practical classes and some personal research while in school, I was able to handle a handful of challenges at my workplace with relative ease. To start with, Departmental courses such as CSC 241 (Foundations of Computer Science) in which I learnt how to draw a flowchart, CSC 293 (Web Programming), CSC 222(Digital Communication), CSC 272 (Information Management Systems), CSC 213(Digital Logic Design) and others like GES101 (Use of English) all proved to be useful at various points in time during my SIWES Training.

My basic understanding of Digital Communication enabled me have a full grasp of the basis of the information communication architecture of the University of Ibadan.

In the same vein, CSC 222 which was taught by Dr. Adeniji David helped me get out of difficult situations at the Helpdesk. Thanks to our practical classes and lectures, I made mince meal of Microsoft tools such as MS-Excel and MS-Access and Cisco Packet Tracer whenever the need arose.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

Conclusion

Industrial training experience at Telemedicine Department gave me a glimpse and exposure to the reality of life after school. It sharpened my mind and spurred me into developing my digital communication skills, information management and interpersonal communication skills more. The training also afforded me the opportunity to see loopholes in the communication channels and pathways of the University system, thereby developing my analytical approach to solving various challenges with cutting-edge technology.

I was able to develop interpersonal relationship with colleagues at work as well and this boost my communication skills also.

Recommendations

The Industrial Training Coordinating Centre really did very well in this SIWES especially by ensuring that every student actually got IT placements that pertained to their fields of study and by organizing a seminar to intimate us students on what is required of us in the industry.

ITCC, after putting in a lot work, should not relent their efforts but go further to ensure that IT students' welfare are taken care of by employers.

The Department of Computer Science should place emphasis on more practical as regards database, digital communication and networking (Network Administration) as a course before students go for the SIWES training.

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