

**INTERNSHIP REPORT**

**ON**

**CREATION OF A SECURE LOCAL AREA NETWORK**

**SUBMITTED TO**

**THE DEPARTMENT OF COMPUTER SCIENCE**

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## TABLE OF CONTENT

INTRODUCTION.....	3
WHERE I WORKED.....	3
DUTIES PERFORMED.....	4
CREATIN A SECURE LOCAL AREA NETWORK.....	4
WHAT IS A COMPUTER NETWORK.....	5
NETWORK ANALYSIS AND DESIGN.....	5
NETWORK TOPOLOGY.....	5
NETWORK DEVICES.....	6
NETWORK DIAGRAM.....	7
SECURITY OF THE NETWORK.....	7
CONCLUSION.....	9
RECOMMENDATION.....	9
REFERENCES.....	10

## **INTRODUCTION**

This report describes the activities carried out during a 12 week, final, fulltime internship program at the Babcock University Information and Communication Technology Unit/Centre (ICT-Unit/Centre).

The document contains information about the organization and the responsibilities performed throughout the period between August and October 2014. More than a plain account of tasks, the objective of this text is to reflect upon the experiences collected during the internship from the perspective of a BSc student.

The first part of the report offers an overview of the organization, followed by an outline of all the duties carried out during this time. Following, it proceeds to describe in some detail the most relevant projects carried out and their respective analysis. Finally, the report wraps-up with a few closing remarks and conclusions from the experience.

## **WHERE I WORKED: BABCOCK UNIVERSITY ICT CENTER**

Babcock University is a Seventh - day Adventist institution of higher learning, located in Ilisan-Remo, Ogun state.

The BU ICT Centre is the department of the Babcock University under the division of Development and Strategy, concerned with conceiving, designing and implementing ICT strategies for the university by providing the necessary infrastructure and network services.

The unit carries out the following duties;

- Managing the university network as well as provide support for the network users.
- Helping with the online security of the campus network.
- Providing technical support to system users by helping with trainings and giving advices on best practices for the usage of personal computers

These duties are achieved majorly due to the co-operation of diverse professionals. The unit is made up of; computer engineers, software engineers, network administrators, system administrators.

## **DUTIES PRFORMED WHILE ON THE PROGRAM**

Majorly, my duties were that of an assistant to the senior systems administrator, who was directly the supervisor for all the interns at the BU ICT.

These duties include;

- Installation of software such as, anti-virus, Microsoft office, Corel draw and many other utility applications for clients.
- Fixing hardware issues such as, replacing bad keyboards, replacing broken screens, replacing damaged hard drives, replacing random access memory (RAM) and so many other numerous hardware issues.
- Attending to minor internet issues such as, distributing of patch cords, re-crimping of damaged cable terminators (RJ-45), replacement of internet cards on clients systems, replacement of damaged switches.

In addition to working as an assistant in the office alongside other interns, I participated in 3 major projects that took place outside the office, at three other locations on the university main campus (field duties) that had to do with networking;

- The Babcock University Teaching Hospital (BUTH) 140-bed complex
- The third floor of the Babcock Business School (BBS) complex
- The Laz Otti Memorial e-Library

I learnt a great deal when it comes to networking. My knowledge of crimping, color codes, punching down, working with network hard ware devices has improved tremendously.

I chose the subject “creating a secure Local Area Network” this is because; the majority of my experience at the centre was spent creating a LAN. It was not my first internship: between August and October 2013, I worked twelve weeks in another ICT unit at Obat Oil and Petroleum in Lagos. The previous one was rather centred on enterprise resource planning software design and development.

### **CREATING A SECURE LOCAL AREA NETWORK (LAN)**

As stated earlier, the majority of my time at BU ICT was spent creating a secure LAN for the faculties, offices, libraries, etc. this drew my attention majorly because the security and integrity of the data of any organisation, if compromised can cause serious damage(s) to such

organisation. As such the following pages would describe the processes involved in creating a secure LAN.

## WHAT IS A COMPUTER NETWORK?

A computer network is the connection of computer systems (hardware and software) and accessories for the purpose of resource sharing and ease of communication. A computer network can be large enough to accommodate millions of computers and accessories (Internet) it can also be as small as 2 computers.

Meanwhile, a local area network is a type of computer network that is confined to a limited geographical area like Adeleke university campus, homes, cyber cafes, coffee shops etc. the number of computers in a LAN can be just 2 and can also be as much as a few hundreds (sometimes thousands).

Basically, creating a connection (with a cable, Bluetooth, Wi-Fi) between two computer devices defines a computer network.

## NETWORK ANALYSIS AND DESIGN

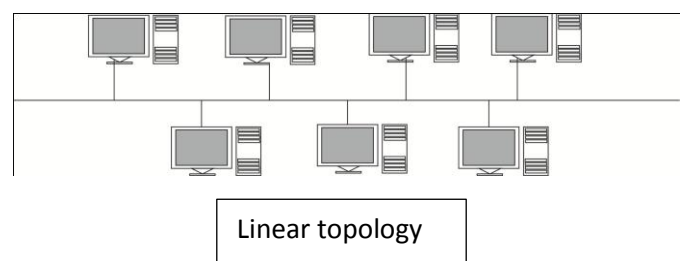
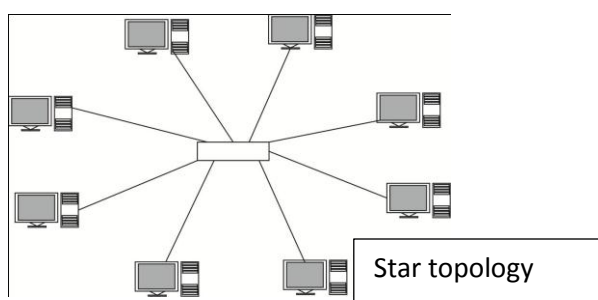
Before creating anything (in this case a network of computers) it is necessary to design a logical representation of the project to make sure it is workable. Then next, consider its feasibility. To do this, you want to consider the financial implications of creating a network, the manpower, the importance and necessity, the cost of maintenance and so on.

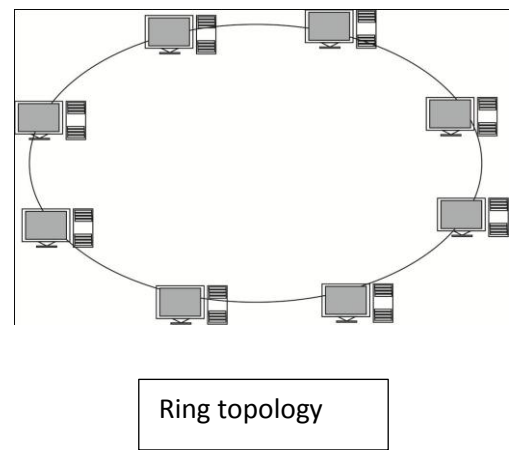
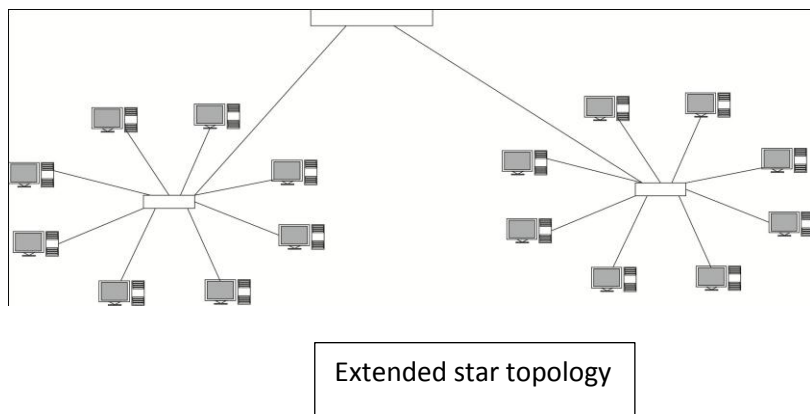
In the design phase; deciding what topology you want to use is necessary as well as, what kind of cables you would need and what network devices you need to purchase. These would be discussed in details hereafter.

Bear in mind that, we are trying to simulate a network where the staff can share network resources and communicate efficiently but most importantly safely, we would also attempt to make provisions for guests to connect to the network but in a limited capacity to avoid security compromise with the application of clients' authentication system.

## NETWORK TOPOLOGY

Topologies in computer networks refer to the physical arrangement of computers and the network devices. There are various topology types. Viz; bus topology (linear), star topology, ring topology, hierarchical star topology (extended star topology).





For the purpose of this project, the extended star topology would be implemented for the following reasons;

- Security
- Ease of expansion
- Cheaper to maintain even though it costs more to set up due to purchase of so many hardware devices.

## NETWORK DEVICES

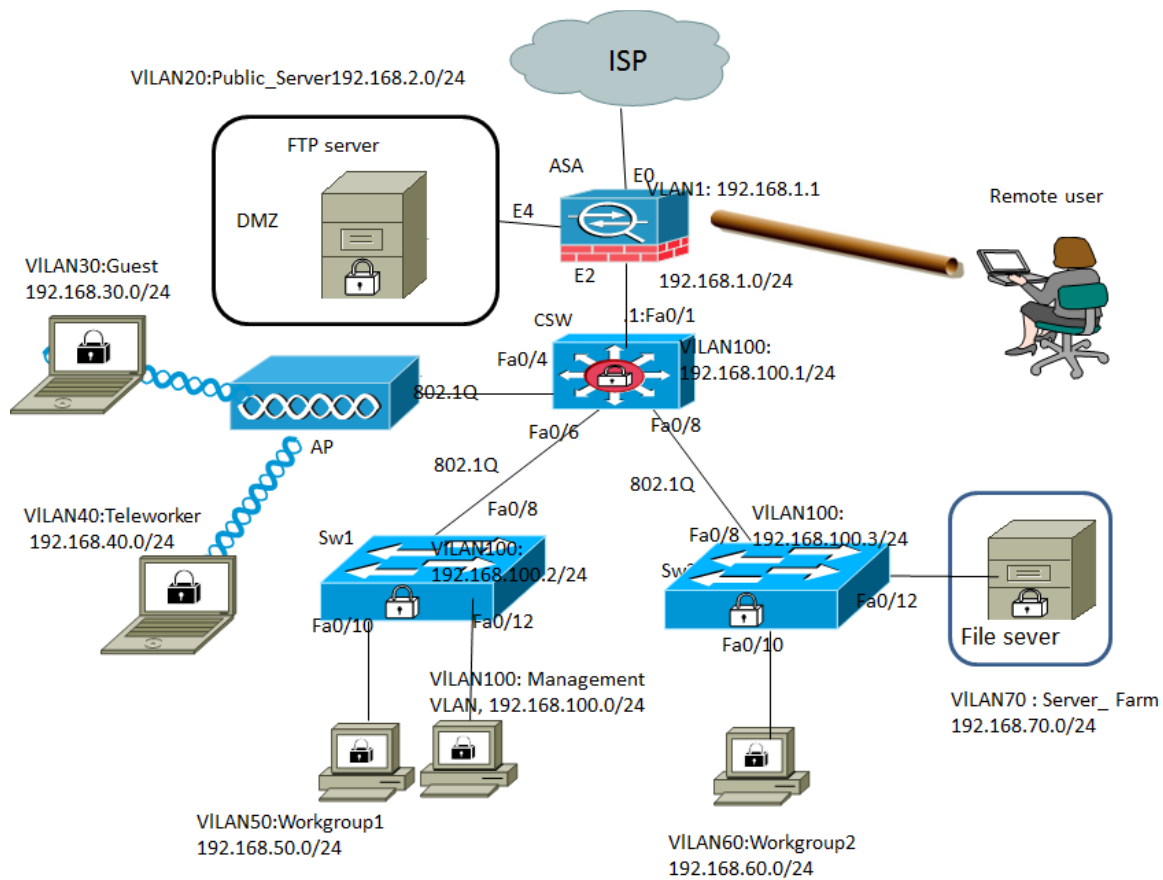
**ROUTER:** a router traditionally translates network packets from one network to another. In other words it receives information from the internet, and transfers it to the right recipient on the LAN. Here the router used has the capability of implementing the adaptive security appliances (ASA) capabilities and other security policies.

**SWITCH:** A switch does almost the same job the router. It distributes packets to peripherals. But most importantly it serves as a central connection point for cables from workstations, other switches etc.

**WIRELESS ACCESS POINT:** The wireless access point serves as an extension of the LAN to devices that cannot connect to the network by the use of cables. The WAP becomes the part of the network that visitors are allowed to connect to with limited security but with some security too.

**CABLES:** The cables to be used here would be majorly, the unshielded twisted pair CAT5 (CAT5 UTP) because of its speed, and relatively low cost as well as reliability. If there would be a need for running cables externally (exposed) then the shielded CAT5 twisted pair cables would be employed. The RJ45 would be used in terminating the cables.

## NETWORK DIAGRAM



From the network diagram above we see that the local area network is linked with the internet (the external) through the Internet Service Provider (ISP) (examples of ISPs; MTN GLO) the connection comes into the local network through the cisco router that has ASA (Adaptive security Appliance) enabled. The ASA would be discussed later. The connection flows through to the core switch which serves as a central connection point for other workstation switches. Obviously there are three departments in this simulated network and one public wireless access point.

## SECURITY OF THE NETWORK

For the sake of growth and well-being, owners as well as managers of a company need to pay special attention to the security system of their computer network. Network security is concerned with the protection of network resources and services from natural and human caused disasters. To do so, the security designer has to look carefully at the vulnerability of the network system and design security measures to protect disaster on the company.

All network devices used in the simulated network have been configured with a basic configuration. The basic configuration includes the names of the devices, the IP addresses, user names and their encrypted passwords, VTY and console ports passwords, default routes, access and trunk ports

As described earlier the simulated network would make use of CISCO Adaptive security appliance router 5505. ASA 5505 is a full-featured security appliance capable of offering a high-performance firewall, SSL and IPsec VPN, and many other network services for small and medium-sized company networks. ASA 5505 has a flexible eight-port 10/100 Fast Ethernet switch.

Furthermore, it is important to note that switch ports are gateways to a network. Therefore it is necessary to keep them secure. Unused ports must be monitored regularly if need be, they must be shut down. For the purpose of this network, the unused ports are shut down. Security must be configured on open ports to avoid spoofing, sniffing and MAC address flooding.



## **CONCLUSION**

In this world of today where so the internet has gotten so many users and we are just like pebbles in an ocean of information. Majority of the users of the internet do not understand how exactly it works some others don't care, the few who understands the background working system of internet either exploits the vulnerability of other users or help to protect others or just don't care about others. Therefore, it is necessary to ensure that security is air tight before deploying the network. Otherwise the organization's information is vulnerable and attacks would easy.

It is necessary for the network administrator to understand the nitty-gritty of the best security practice.

More so, I learnt how to work with experts in different fields of computing.

## **RECOMENDATION**

SIWES with its numerous challenges has proven to be the link between pages and reality. I personally got exposed to the running around of the real world, the rowdiness within which you have to make calm decisions, the world of opportunities that are lying fallow, the willingness to crave for logical creativity. Every student should be allowed a chance to get this experience.

## **REFERENCES**

Tamirat Atsemegeorgis. Building a Secure Local Area Network, Helsinki Metropolia University of applied sciences. May 2013.