

Internship on Computer Networking & Security

BY

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This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Internship titled “**Internship on Computer Networking & Security**”, submitted by **SHAHED AHMED RONY, ID-173-15-10313** to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 08-10-2020.

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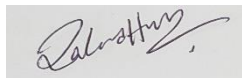
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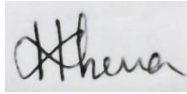
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I, hereby declare that, this internship has been done by me **SHAHED AHMED RONY, ID: 173-15-10313** under the supervision of **Refath Ara Hossain, Lecturer, Department of CSE** Daffodil International University. I also declare that neither this internship nor any part of this internship has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

This internship report is largely representing the offloading procedure based on Network Deployment and Network Security. The main purpose of this report is to get practical experience by observing Computer Networking, Network devices, Network Security, Server Connection access networks at Air Voice Global technology ltd and Deploying in different organizations. Working with different types of a vendor like CISCO, ARUBA, NETGEAR, etc Wireless have given me adequate knowledge about how to survey a site, what could be the proper solution for the deployment of new network server and Wi-Fi network and the way how to configure an access point, Switches, Router and how to up a Network. From these two months of internship at Air Voice Global technology ltd, I get to understand about the practical working environment in a vendor.

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CHAPTER 1

Introduction

1.1 Introduction

The internship is that kind of prospect to definite the huge endowment of one's identifiable. We should have got to wrinkle certain real-world things in every subject otherwise the education leftovers imperfect. An internship is really indispensable on behalf of those students who have to substantiate himself/herself and it is likewise an prospect to contribute a coincidental to substantiate by professors, supervisors for a perkier impending. With every subject, nearby is an internship tallied through varsity consultant as the final development. After implementation that, he/she will be a graduate. The situation also a very significant object to elect an organization aimed at an internship in which one is recovered than additional one. Consequently that you can acquire numerous effects form the organization. By way of a learner of computer science and engineering, I pass away to "Air Voice Global technology ltd" to comprehensive my BSC and encouraged the wish to acquire as much as myself can. what not acquire from books so faraway, the situation is not too different but then again it's too difficult to appreciate by provisional on books that how an ISP Company before Network run. The tongues of books are not so much life as the linguistic of intramural run-through. It is a impatient way to acquire essentially about the Networking, Configuration[1]. It similarly communicates how several societies are tortuous and worked together daytime and darkness for the Network support. Internship helps to organize the gears after construction the job. This familiarity helps myself to do the gears after joining on a job. It is understanding and lifetime realization. Here I proverb the development of Networking, communication, Client problem solving, site survey, Server control, and Configuration, etc. which I can't acquire by book. It is too far helpful for my imminent career in Network Admin and network administrator or Network analyst.

1.2 Motivation

A computer network is a fellowship of computer systems and other computing hardware devices. This is a telecommunications network that tolerates computers to interchange data. The data communications discuss to the broadcast of digital data amongst computers. if we are established a physical connection amongst network and computing devices is consuming, moreover cable media or wireless media. The best-known computer network is the Internet. Networking or the internet is the largest world-wide communication network of computers. The Internet is generally defined as a global network concerning millions of digital devices and computers. Corporate network IT systems are too complex. For this reason, In today's world, every corporate network sector has been adopted computer networking and information technology for the smooth functionalities around the world. Computer networks use a different type of protocol to secure their network and all of the protocols are performing different things. But the main problem is hacking. All of the hackers are not good and they want to earn money so they try to hack all the information. For this reason, security is the most important topic. Computer security is the fortification of computer systems and information from mischief, embezzlement, and Internet security is a subdivision of computer security that encompasses numerous security procedures drilled for safeguarding the security of trades done online. So that why cybercriminals are always trying to network security prevents attacks or targeted by cybercriminals at browsers, network operative systems, and additional applications. Nowadays most people are using the wireless network so Cybercriminals can crack WEP passwords in minutes using freely available software. The hacker hacks the network and enter the internal network from the outside network and collect all the information.

1.3 Scope of learning from this Internship

This report is based on Air Voice Global technologies Ltd networking system. Along with this, the report will also partially describe the whole air voice technologies

Network System. This report is mainly important for the Networking related organizations to understand the network system that includes network devices, physical and wireless communication, routing protocols, network monitoring tools, network security tools, and so on. VLAN is the virtual Local Area Network that can separate each of the departments from other departments like the Account department can make separate from the Marketing department using VLAN. If any of the departments want to communicate with other departments then apply inter VLAN. Using Inter VLAN if each of the departments wants to communicate with other departments then it will be possible. ACL is the Access Control List that acts as a white list & blacklist. If any of the networks want to block any specific network or any specific host then it possible using ACL. In the organization, the Account department and all the files of this organization are very secure things. It needs to hide from the outside network or hackers. So we apply ACL in the Account and File server to protect it. Another security is VPN. VPN is a virtual private network that makes network private or more secure. When one branch office sends any important file with another branch office that time it needs to be secure. If we use a VPN that it hide their network address when transferring the file to another office. So it will secure from the hacker. As an ISP company, all networking devices should be encrypted passwords, All the switch ports should be secure and if hackers try to hack the system using their pc add into the internal network it also should be blocked. So need to apply port security, MAC address binding, and Encrypted password. Also, all the devices should be managed from anywhere.

1.4 Report Objective

The main goals of this report are to accomplish the requirements of the BSC program and to present the acquaintance and information that has been achieved during the internship period under the organization.

The other important goals are as follows –

- To Configuration the internal network for office and also Outside Network.
- To transferring any secure information from one branch to another branch office using VPN.

- To secure the network apply switch port security, MAC address binding, Encrypted password.
- To Redesign the network structure of air voice for efficient connectivity and load balancing.

1.5 Report summary

In the first chapter of this report discuss computer network and security, the background of this report, and the scope of the study. This chapter also discusses the main objective of this project. What did in this report and project is overall discussed in chapter one. The second Chapter discusses an overview of Air Voice Global technology ltd. Discuss their employee description and all department responsibility. This chapter also discusses their services and how they give their services and manage their client, company location, and other information about the company. Chapter three showing the existing network structure of air voice Limited. This chapter also discusses the working procedure of the existing network structure and features of the existing system. Also, discuss the current equipment that they are used for giving their services and devices features. In chapter four discuss the proposed network and proposed a network structure diagram. It also discussed about which protocol suggested for the proposed network with its benefit. At last, discuss about benefit and features of the proposed network and difference between the existing network and proposed network. In Chapter five discuss about Performance, results, and discussion about this project. In Chapter six discuss about conclusion and bibliography.

Chapter 2

Organization

2.1 Introduction

Internet service provider or an ISP is a company that offers its clientele's entry to the internet and other services. It is the company of information communication and technology to afford the facilities like High-Speed Internet, Data Connectivity, Intranet (LAN), Camera Solution, Wi-Fi solutions, Software, Server, Co-Location, and Consultancy, etc. To sustain a undeviating line to the internet, the company frequently sustains their servers. Our company contributing necessary software, a password-protected user account, way to connect to the internet, ISP proposal their customers the proficiency to browse the web and exchange email with other people. ISP also proposals supplementary services. While others are large corporations, certain ISP are operated by one individual. They might likewise have in opportunity, certain only support users in a particular city, while others have regional or national capabilities. Air Voice Global technologies Ltd provides both home users and for corporate users in a particular city.

Air Voice Global technologies Ltd is a leading Nationwide Internet Service Provider and IT solution company in Bangladesh. They are a lineup with IT capability with brilliance in 'Customers' Need Impost and exertion to justify as well as. Air Voice Global technologies started its journey with aim of providing very high-level software and technical support. Air Voice Global technologies were reputable with the above aching independent of keeping the customers in the information superhighway with the fastest Internet connectivity by expending the most forward-thinking and reliable apparatus obtainable.

The main office in 56/1 Purana paltan, and Sub office which is in 87/1 Motijeel, Dhaka. In the beginning, the number of clients was 100 and corporate clients were 20. But in the present day, the number of clients is over 1500 and corporate clients are 300 including Government Offices, Hostels, Hotels, Restaurant, Buying Houses,

shops, EBL, etc. In the beginning, 12 people handle the total network. But now more than 50 plus persons handle the total network. The first time their bandwidth was 50Mbps. Now their bandwidth is 4Gbps.

Air Voice Global technologies have developed its Backbone with Undergrounded Optical Fiber in Paltan, Uttara, Baridhara, Basundhara, Gulshan, Banani, Dhanmondi, Motijeel, Mohammadpur, Sylhet. This Company has a very creative, forward-thinking, and talented force of IT experts in their approach. Air Voice Global technologies pricing is neither cheap nor high.

2.2 Service

Air Voice Global technologies Limited assures its well-founded assurance to deliver the customer with the best FACILITY in the Zone. Air Voice Global technologies Limited is now successively its 10 Years of journey, foremost within the best ISP in Paltan in terms of Network & Number of Customers but they are the best in terms of FACILITY. Some of the value-added services are Intranet, CCTV camer solution, web development, hosting, domain registration, SMS service, wifi solution, co-location, faithful server, and lot more.

2.2.1 High-Speed Internet

Air Voice Global technologies afford very established connectivity within a secure network. Our internet connection is super fast also relies on a faithful network. Our all internet connection is ascendable up to 1Gbps connectivity.

2.2.2 Data Connectivity

Air Voice Global technologies afford Point to Point and Point to Multi-Point Data connectivity. We afford data connectivity as per your necessary volume. Secure your business from outdoor attack using the Internet.

2.2.3 Intranet (LAN)

A common platform to a server share Local area network (LAN) is a group of devices. We connect any company's all-inclusive business computer, Server, Printer, Camera, and all interconnected devices using the best submissive product.

2.2.4 Camera Solution

Air Global technologie Camera solution countenances approved personnel to steadily monitor their competence anytime, anywhere. Air Global technologies give services with maintenance, which can ensure service guarantee.

2.2.5 Wifi Solutions

Air Voice Global technologies proposition full wifi hotspot solution as per customization and need. Expending wifi resolution, they can control user, data, and payment from a single server. They afford both a Enthusiastic server on the remot location and Local service on own premises with Local BDIX Connectivity, Power Backup, and direct access.

2.3 Connectivity of Air Global technologies Systems Limited:

For Home-based Users or Particular PC Connectivity:

1. Point to Point Steadfast Fiber Connectivity
2. FTTx Connectivity
3. Cable Modem Service

For Commercial Office Connectivity:

1. Local network
2. Data Connectivity

Air Global technologies Data Connectivity is established on both the L2 and L3 networks. It is a wide-ranging solution that reacts to the requirements of today's unique business. Air Global technologies data Connectivity is a decidedly ascendable up to 1Gbps Per Location and secure solution that truthfully allows you to interconnect all of the applications, end-users, and support groundwork onto a particular network. Air Global technologies offer a comprehensive assortment of dedicated Bandwidth options starting from 5Mbps as per customer requirements.

2.4 The Vision

We are providing internet services, software & systems integration services. We ensure that our customers are successful by understanding and being responsive to their needs, as well as working collaboratively with them to provide one-stop faster, cost-competitive and scalable services that create competitive advantages in the world of electronic communication[3]. Air Global technologies Limited to make a high-class Customer Care Department to response within a MINUTE against any complaint & it will close the day with Zero complaint. The company will reach to their customer beyond their expectations & they will proactively find out any issue regarding Service for extra care.

2.5 The Mission

The mission of Air Global technologies Limited is to ensure & provide high level of quality Service with the limited number of Customers. They do not believe in grabbing lots of customers rather they would like to make long time bondage with their existing customers with high level of satisfaction of unparalleled services. The

company can assure their Customers that no one can match their level of service & caring to their valued Customers. It is a Family with all the Customers & dedicated Personnel of Air Global technologies Limited. The company would like to make stronger the bondage with their Customers day by day. Each of our activities must benefit and add value to the common wealth of our society. We firmly believe that, in the final analysis we are accountable to each of the constituents with whom we interact; namely: our employees, our customers and our fellow citizens [4].

2.6 Values

We believe that how we do business is paramount to our success. Our commitment is exemplified by "The Air Way" a core value statement which highlights the importance of Customer and Market Focus, High Performance, Integrity and Respect, Spirit, Collaboration and People Development. Our employees are the key to living these values and we are committed to provide a work environment for our employees that foster The Air way. We are extremely proud of our employees, who take seriously their responsibility to embody these values in their relationships with each other, and with our customers, suppliers, and community[6]. We also are extremely proud of our commitment to the communities where our employees live and work.

2.7 Specialties of Air Global technologies Limited

There is lot's of specialties as like:

- They Are provide regarding the commitment of Bandwidth no compromise– to be provided at actual.
- They ensure customer DEDICATED Bandwidth (speed) on demand.
- 24 hours unlimited Net surfing– no transfer limitations.

- As rapid as customer support – comeback time less than one hour.
- 24/7 Help Desk – 9.00 am to 10.00 pm customer-end support.

Chapter 3

Tasks and Activities

3.1 Daily Task and Activities

As an intern of the Networking team, my significant accountability was to comprehend the systems of the association. They provided indispensable documents to get an impression of the system and team conferences. They assist me to appreciate all the terms and matters of the system.

My task was configuring Routers, switches, Site surveys in Clients' end. In the future portion of my internship, I was also tortuous in Research and Development with a individual topic.

My other responsibility was to monitor daily operational performance. I configured the Router in the organization. I installed of software such as, anti-virus, Microsoft Office, and many other effectiveness applications for clients. I Fix hardware issues such as, replacing wicked keyboards, exchanging broken screens, exchanging damaged hard drives, exchanging random access memory (RAM) and so lots of other hardware issues.

I'm always trying to be attended to internet problems such as, client support, distributing of patch cords, re-crimping of damaged (RJ45), emergency of internet support to clients systems, emergency of damaged switches.

3.2 Client Site Survey:

Paramount the physical appointment to the site to determine:

- Walkthrough of attention areas

- Authorize the truthfulness of received documentation
- Offer with venue also representative in these places, that cannot be rummage-sale for mounting situations and other probable productions[1].
- Take Together additional intelligence, where are the VIPs and what nature of events arrive nearby. What nature of events they are and would we need superior wireless services or to have the Wi-Fi turned off because of exhibitor's paraphernalia successively on the same frequencies[1].

3.3 Network Design

Do a simulation of the venue and all of the information previously gathered is used. This is also rummage-sale to create an preliminary scheme including:

- The wireless network needs a bill of materials (BOM).
- Supporting equipment for BOM (wired network build-out, conduit, wire hangers, etc.)
- Equipment for installation locations.
- Installation for hardware/workers required (cherry pickers, etc.)
- Predictable coverage and capability report.

The Following figure 3.3.1 shows the wifi network system diagram.



Fig 3.3.1: Wi-Fi network Diagram

3.4 DHCP SERVER

DHCP (Dynamic Host Configuration Protocol) is a network management protocol used to dynamically assign an Internet Protocol (IP) address to any device, or node, on a network so they can communicate using IP. DHCP automates and centrally manages these configurations rather than requiring network administrators to manually assign IP addresses to all network devices. DHCP can be implemented on small local networks as well as large enterprise networks.

DHCPv4 assigns IPv4 addresses and other network configuration information dynamically. Because desktop clients typically make up the bulk of network nodes, DHCPv4 is an extremely useful and timesaving tool for network administrators. The DHCPv4 server dynamically assigns, or leases, an IPv4 address from a pool of addresses for a limited period of time chosen by the server, or until the client no

longer needs the address. Clients lease the information from the server for an administratively defined period. Administrators configure DHCPv4 servers to set the leases to time out at different intervals.

3.5 VLAN

A virtual local area network (VLAN) is a logical group of workstations, servers and network that appear to be on the same LAN despite their geographical distribution. A VLAN allows network of computers and users to communicate in a simulated environment as if they exist in a single LAN and are sharing a single broadcast and multicast domain. VLANs are implemented to achieve scalability, security and ease of network management and can quickly adapt to change in network requirements and relocation of workstations and server nodes. Higher-end switches allow the functionality and implementation of VLANs. The purpose of implementing a VLAN is to improve the performance of a network or apply appropriate security.

3.5.1 Advantages of VLAN

There are few advantages of Vlan as like:

- Solve broadcast problem
- Reduce cost
- Better performance
- Improved IT staff efficiency
- Reduce the size of broadcast domains
- Allow us to add additional layer of security
- Make device management easier

- Allow us to implement the logical grouping of devices by function instead of location.

3.6 SECURITY OF THE NETWORK

Access Control List (ACL)

An access control list (ACL) is a table that tells a computer operating system which access rights each user has to a particular system object, such as a file directory or individual file. Each object has a security attribute that identifies its access control list. A network access control list (ACL) is an optional layer of security for your VPC that acts as a firewall for controlling traffic in and out of one or more subnets. ACLs are used to filter traffic based on the set of rules defined for the incoming or outgoing of the network. There are two main different types of Access-list[9].

1. Standard Access-list

These are the Access-list which are made using the source IP address only. These ACLs permit or deny the entire protocol suite. They don't distinguish between the IP traffic such as TCP, UDP and Https etc. By using numbers 1-99 or 1300- 1999, router will understand it as a standard ACL and the specified address as source IP address.

2. Extended Access-list

These are the ACL which uses both source and destination IP address. In this type of ACL, we can also mention which IP traffic should be allowed or denied.

3.6.1 ACL features

1. The set of rules defined are matched serial wise i.e. matching starts with the first line, then 2nd, then 3rd and so on.
2. The packets are matched only until it matches the rule. Once a rule is matched then no further comparison takes place and that rule will be performed[8].
3. There is an implicit deny at the end of every ACL, i.e., if no condition or rule matches then the packet will be discarded.

Advantages of ACL

- Improve network performance.
- Provides security as administrator can configure the access list according to the needs and deny the unwanted packets from entering the network.
- Provides control over the traffic as it can permit or deny according to the need of network[8].

3.6.2 VPN:

A virtual private network, or VPN, is an encrypted connection over the Internet from a device to a network. The encrypted connection helps ensure that sensitive data is safely transmitted. It prevents unauthorized people from eavesdropping on the traffic and allows the user to conduct work remotely. VPN technology is widely used in corporate environments.

A VPN extends a corporate network through encrypted connections made over the Internet. Because the traffic is encrypted between the device and the network,

traffic remains private as it travels. An employee can work outside the office and still securely connect to the corporate network. Even Smartphone's and tablets can connect through a VPN[9].

A site-to-site VPN connects the corporate office to branch offices over the internet. Site-to-site VPN are used when distance make it impractical to have direct network connections between these offices. Dedicated equipment is used to establish and maintain a connection.

A VPN works by using the shared public infrastructure while maintaining privacy through A remote access VPN securely connects a device outside the corporate office. These devices are known as endpoints and may be laptops, tablets, Smartphone's etc. Advantages in VPN technology have allowed security checks to be conducted on endpoints to make sure they meet a certain posture before connecting.

3.6.3 MAC Address Binding

In computer networking, MAC Filtering refers to a security access control method whereby the MAC address assigned to each network card is used to determine access to the network. MAC addresses are uniquely assigned to each card, so using MAC filtering on a network permits and denies network access to specific devices through the use of blacklists and whitelists. While the restriction of network access through the use of lists is straightforward, an individual person is not identified by a MAC address, rather a device only, so an authorized person will need to have a white list entry for each device that he or she would use to access the network[9].

Advantages of MAC Address Binding

- Prevent unwanted connections
- Not very hard to configure if you don't have a lot of devices
- Lightweight security feature
- Cost (No need to buy a a dedicate firewall to do MAC filter)

3.7 Device Configuration

This step is technical. In this step at first, all the devices (access points) are configured with the provided IP addresses by the Hotel's IT person. A computer needs a tube connection if we need to configure the Access point, the AP (access points)[7]. Then the IP address of the computer has tube changed and need to set one of the IP address of AP's IP series. Thereafter it is needed to open up a browser and log into the AP by hitting with the AP's IP address. We customize the network setting and have to save-it. The Figure 3.7.1 shows aruba Wifi device configuration.

The screenshot displays the Aruba Mobility Controller configuration interface for a VLAN Pool. The top navigation bar includes tabs for Monitoring, Configuration (selected), Diagnostics, Maintenance, Plan, Events, Reports, and a Save Configuration button. A Logout_admin link is also present. The left sidebar contains a menu with categories: Wizards (AP Wizard, Controller Wizard, WLAN Wizard, License Wizard), Network (Controller), VLANs (selected), Ports, Cellular Profile, IP, Security (Authentication, Access Control), Wireless (AP Configuration, AP Installation), and Management (General, Administration, Certificates, SNMP, Logging, Clock). The main content area is titled 'Network > VLAN Pool' and has two tabs: 'VLAN ID' and 'VLAN Pool'. Below the tabs is a table with the following data:

| VLAN Name | Pool Status | VLAN IDs | Action | |
|-------------|-------------|----------|--------|--------|
| I-user | Disabled | 32 | Modify | Delete |
| I-user-pool | Enabled | 201-204 | Modify | Delete |

Below the table is a section for 'Add new VLAN name' with input fields for 'VLAN Name' and 'List of VLAN IDs', and buttons for 'Add' and 'Cancel'. An 'Apply' button is located at the bottom right of this section. At the bottom of the main content area, there is a 'Commands' section with a 'View Commands' link.

Fig 3.7.1: Aruba Wifi device configuration

- **Gateway:Aruba-** 192.168.1.1
- **Primary DNS Server:** 208.68.232.232
- **Secondary DNS Server:** 208.67.230.230
- **NTP Server: Aruba-** (<http://instant.arubanetworks.com>)
- Netgear-(192.168.1.1)
- **Connection Status:** Up
- **Connection Type:** dhcp
- **MAC Address:** 00:24:82:26:43:a0
- **IP Address:** 192.168.2. 103
- **Mask:** 255.255.255.0
- **DHCP Actions: Renew DHCP Release DHCP**

3.8 RF Survey

When the paraphernalia is installed, then the strategy model is confirmed against the arranged in the atmosphere. This stage is comprises of a follow-up appointment to the site to comportment genuine RF testing and preliminary strategy endorsement.

3.9 Final Step to setup

In front, a connection from the Core router is taken to the Core Switch, where a server and the Zone Director are connected. The server was Linux Based DNS, WEB, Mail, proxy server. The core connection from the switch will go to the aggregation which switches from where the connections for the PoE(Power over Ethernet) switch will be served and from there for every connection the Access points are supplied.

3.10 WiFi Speed test and analysis

Each and every day we are check in different areas wifi device internet speed and wifi analysis. The Figure 3.10.1 shows Wifi Speed test and the figure 3.10.2 shows wifi analysis.

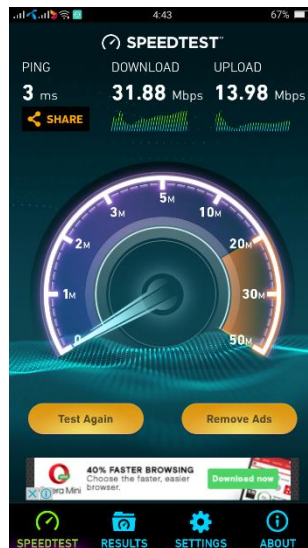


Fig 3.10.1: WiFi Speed Test

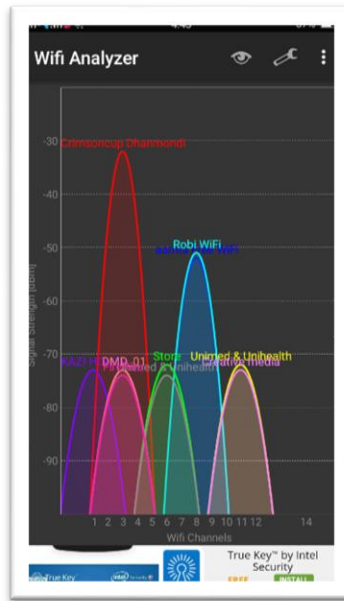


Fig 3.10.2: Wifi Analysis

3.11 Challenges

A better internship involvement I couldn't have asked aimed. When I'm working in Air Voice Global technology facilitated me discover the real job life and how a offshore company operates. This has been by distant the most stimulating and treasures the well-intentioned capability of my life. Yet there were some productions and problems encountered and well-known while the internship program.

3.12 Skills

3.12.1 Technical Skills

This internship program I learn some unconventional familiarity on Computer Networks and Security. Working on an organization aided to used router, switch, and other networking devices. I was not familiar with these physical devices before.

Working on the organization and using these devices aided to improvement real-world experience, how to network is monitored at the corporate level.

The internship program likewise aided me to improve my technical skills through the penetrating usage of MS Excel. I know excel has countless applications and can be castoff for countless purposes but never got the prospect to acquire the real-life use of it. So this internship also aided me out and get uncovered to the real-life use of excel at the corporate level. Now I am mindful that excel can be castoff to comfort that our works by using spool the table to exemplify data in a expressive way, by using filter and sort for discovery also organizing the data rapidly, and by using formulas for doing long-lasting calculations in a wink of an eye.

3.12.2 Interactive Skills

My communication skills were equipped while I got the chance to work with people from different people's backgrounds. Concluded my collaborations with my supervisor and other senior employees, my interactive skills were boosted. I well-educated to communicate with supervisors and seniors managers during my internship period.

Chapter 4

Air Voice Global technology ltd Network Structure

4.1 Existing System of Air Voice Global technology ltd

Air voice Global Limited existing network follows the two Tier layers network model that comprises of two layers: the Access layer and the Core layer. Two Tier-Layer network model is the desired method to network strategy. Figure 4.1 shows the existing network. In the figure, Fiber@Home and Earth communication are providing the bandwidth to the organization. Fiber@Home communication works as the mainline and Earth communication works as a backup line. If the main connection line is down then the other line will be used to running the whole network. The mainline speed is 3Gbps and the backup line is 1Gbps. These both are considered as the outbound connection. These lines are connected to the Mikrotik cloud core router with an optical fiber line. The Figure 4.1 shows two-tier Architecture Model of Air voice Global Limited

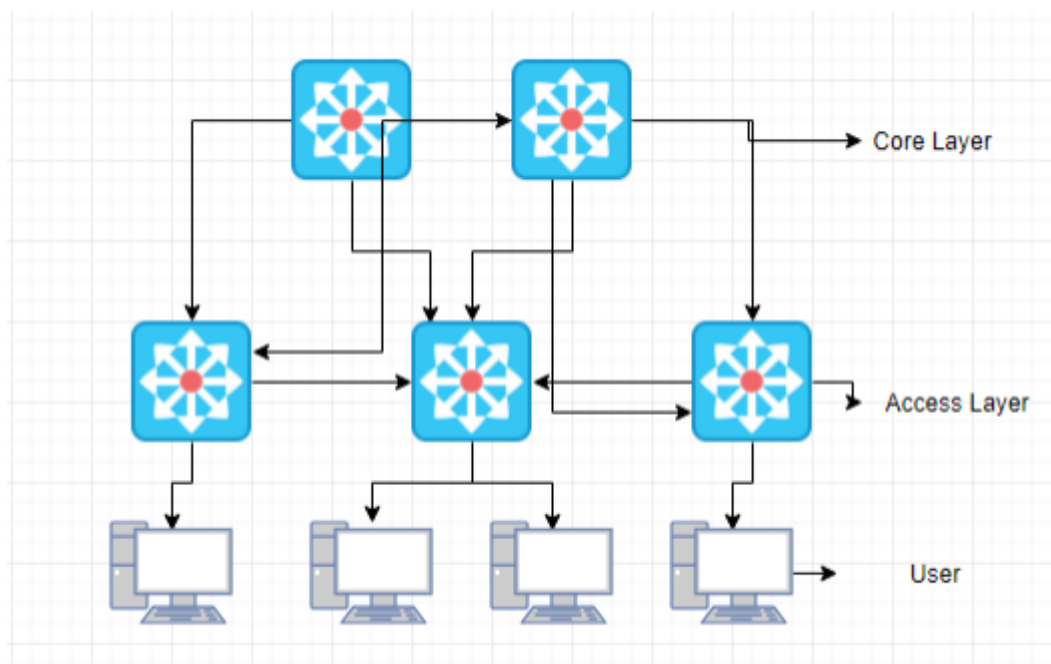


Fig 4.1: Two-tier Architecture Model of Air voice Global Limited

4.2 Core Layer

The core layer involves of the most expensive routers, largest, fastest routers with the uppermost model numbers and Core Layer is painstaking as the mainstay of networks[10]. The Core Layer routers are castoff to combine that geographically divided networks. The Core Layer routers move that information on the network as wild as possible can. The switches operating at the core layer are switches packets as wild as possible can. The core should be extremely obtainable and redundant. The core is accumulating that traffic from all the delivery layer to devices, so it must be proficient of furthering bulky quantities of data rapidly.

Contemplations at the core layer include

- Providing high-speed switching (fast transport)
- Providing consistency and liability broadmindedness
- This scrambling use by faster, not additional, equipment.
- The Evading CPU-intensive likewise can packet handling caused by inspection, security, qualit of service (QoS) classification, or other processes.

4.3 Access layer

The Access layer includes access switches that are connected to the end devices that (Computers, Printers, and Servers, etc.). Access layer switches also certify that packets are delivered to the end devices. The access layer serves can numerous functions, including

- Layer 2 switching
- Giant accessibility

- Port security
- QoS cataloging and pattern and trust limitations
- The address Resolution aslo Protocol (ARP) inspection
- Virtual admittance control lists (VACLs)

4.4 Features of Existing Network

They have features of networking with branches.

- Advance recourse sharing among all departments inside each branch office.
- Limited Professional Manpower.
- No recourse sharing option with other Branches with security.
- No advance security feature
- Transfer the data using the same VLAN each branch office
- Costly in terms of maintenance
- Needs more manpower to share recourses in other branches
- Time consuming to communicate with other branches
- Network fall possibility is very high.

4.5 Current equipment's of Air voice Global Limited

Equipment list and using devices list in air voice global:

- **Router**

1. Mikrotik CCR1036-8G-2S+



Fig 4.5.1: Mikrotik CCR1036-8G-2S+ Wifi router

2. Mikrotik CCR1036-12G
3. Mikrotik RB1100AH
4. Aruba 205
5. Aruba 225
6. Aruba 275

The Figure 4.5.2 shows the Aruba 275 Wifi router



Fig 4.5.2: Aruba 275 Wifi router

• OLT

1. BDCOM P3310B

The Figure 4.5.3 shows the Optical line termination



Fig 4.5.3: BDCOM P3310B

2. GLCOM

3. VSOL

• **Switch**

1. Cisco Catalyst 2970G

2. BDCOM S2928C

3. Cisco Catalyst 2950



Fig 4.5.2: Cisco Catalyst 2950

4. Cisco Catalyst 3560

5. Cisco Catalyst 3550

6. Cisco Catalyst 2950G

7. Cisco Small Business Also other types of equipment are seven RI7 Rack, Media Converter, UTP Cable (CAT 6, CAT6e), Connector RJ-45, Wireless router, IP camera, Optical Fiber, Patch cot & Onu

Chapter 5: Conclusion and Future Career

5.1 Conclusion

This Internship at Air voice Global Limited provides the opportunity to trial attention in a individual career before permanent commitments are made. That also gave me the proper scope to gain this experience and knowledge which is co-relate with the theoretical background and that we learned in university courses. In Fongda Bangladesh, working with the vendor like Aruba, Netgear Wireless gave me the practical as well as technical knowledge of Wi-Fi technology. In Air voice Global Limited I have learned how to survey a site, to provide the appropriate solution about Wi-Fi, and how to deploy a new Wi-Fi network. This internship experience will help me to make a better carrier in the telecommunication field and also learned lots of new concepts and a new way of working. I have learned how to work in a team, and I often needed to meet an skillful person to resolution some problems. This whole experience such as network monitoring, survey, and field operation has been very helpful for the future life that surprises me.

5.2 Future of Network Engineering Technology

Networking is a excessive way to start a career in Network Engineer, and several routine networking as a stepping-stone into other Network Engineer fields such as Network administrator, Cloud networking. However, networking it self is a excessive career, highly skilled and experienced network engineers are among the highest paid position^[11].

5.2 Limitation of this report

To formulate the report on the accomplished real-world experience in a short duration only three months is not an easy task. Especially the IT field of the corporate network sector is a huge area of knowledge and technology. So, this is a very short time to achieve all the relevant information and knowledge about corporate network information technology. I'm preparing and this report has some problems and boundaries have encountered which are as follows:

In this report some difficulties and boundaries have encountered which are as follows:

- The central restriction of the education is insufficient for current information, applicable to the study.
- All mandatory information was not allowed to utilize the company and there is also restricted prospect to visit more than one branch.
- The time restriction is numerous of the features could not be deliberated in present reports.
- A narrow data range for analysis in this suffers.
- Lack of experience in practicum report writing. Another limitation was to implement the proposal for a large company.

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