

NCC Level-4 Diploma in Computing

Computer Networks

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Expected candidate time allocation: 35 to 40 hours

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Assignment Title : Asbestos Removal Contractors

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I confirm that this is my own and that I have not plagiarized any part of it. I have also noted the assessment criteria and pass mark for assignments.

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Student Signature: Fatema Akter

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Table of Contents

Task-1.....	6
Networking Infrastructure and Protocols:	6
(a) Structured Cabling:	6
(d) Wi-Fi standards and discuss Advantage and disadvantage of wireless:.....	11
Task-2.....	14
Addressing:	14
(a) Why network need addresses:.....	14
(b) Explain the teams MAC address and IP address and Distinguish between these teams and between IPv4 and IPv6:	14
(d) Explain how devices get their MAC or IP address:.....	16
(f) Explain how a packet gets from one network to another network:.....	18
Security:	19
(a) Explain three terms. Including this:	19
Confidentiality:	19
(b) Identify two missing issues:	21
(c) Identify seven measures:	22
(d) The biggest threat for this system:	23
Task-4.....	24
Diagram and Explanation:	24
(a) Show on logical diagram with main components in the network:.....	24
(b) Use the office layout show on physical cable layout and the location of components:....	25
(c) IP addresses and adds them in this diagram:.....	26
(d) Why I have chosen the particular hardware components and why I have connected them together in that way:	27
(e) Local prices and specification of suitable hardware/software recommend:	28
Remote Access	31
(a) Explain how you could incorporate remote access into the system and identify components you would need and action:	31
(b) How does this impact the network secured:	32
Bibliography	34

Introduction:

In this assignment I am required to produce a substantial document. This assignment will enable me to demonstrate my knowledge and understanding of computer network. I am also required to research the available component in market place. This assignment is divided into different tasks: Task-1: Networking Infrastructure and protocols, Task-2: Addressing, Task-3: Security, Task-4: Diagram and explanation and Task-5: Remote access.

Task-1

Networking Infrastructure and Protocols:

(a) Structured Cabling:

Structured Cabling is a set of standards that determine how to wire an office, building and data center, for data or voice interactions, using Category 5 or Category 6 cable as well as RJ45 sockets. These standards identify how to lay the cabling in a star structure, such that all outlets terminate at a central patch panel since where it can be determined exactly how these connections will be use.

(Elliot, (2002).)

Existing and Differences in topology, data rate and the type of cable required:

There are main three categorized in network topology. Including this:

- Bus
- Ring
- Star

Now Described about three Type of topology .including this table:

Type of Topology Name	Discuss Topology
Bus Topology	Bus is a series of computer connected along a single cable segment.
	Electrical pulse trek beside the span of the cable in all path
	At the finish of cable the signal bounce back except there is a terminator.
	Devise linked beside a single cable
Ring Topology	Ring has computer linked to form a loop
	every computer connected in a ring
	The ring have no start and no end
	Signal trek in particular path
	present ring topologies make use of smart hubs to make out a computer failure
Star Topology	Star is a group of computers connected though a central point hub or switch
	Each workstation is connected directly to hub
	Easy to add new devise
	Ease of changing configuration
	Ease of administration

Figure No: 1.1- Table of Topology

(Networking, (2003))

Here I have described about some Topology and there cable and data rate. Including this table:

Topology	Cable	Protocol	Minimum Data Rate	Maximum Data Rate
Star	Fiber	Fast Ethernet	1mbps	10mbps
Star	Twisted pair	Fast Ethernet	10mbps	100 Mbps
Ring	Twisted pair	Token Ring	4Mbps	16 mbps
Star-wired	Twisted pair	Token Ring	4Mbps	16 mbps
Liner Bus, Star	Twisted pair	ATM	155Mbps	2488 Mbps

Figure No: 1.2- Table of Topology cable and data rate

Type of cabling required:

Here for this network purpose Ethernet “Twisted-pair UTP cable” is required.

Here I have prefers “Ethernet Twisted-pair UTP” cable. There are many twisted pair cable are available. Such as

- Cat6
- Cat5

I have prefers start topology for this network And I have also used UTP cat6 cable for this network. This topology is better rather than other topology.

For that reason I have choose this cable. Including this:

- Office layout
- Need for redundancy
- Cost
- Faster data transferee from other cable
- Data rate available from other cable

(Telecom, (2004))

(b) Identify and briefly four protocols:

Name of Layer	Name of protocol	Purpose of protocol
Application Layer Protocol	SMTP (Simple Mail Transfer Protocol)	<ul style="list-style-type: none"> • Uses TCP/IP to transmit
		<ul style="list-style-type: none"> • Does not provide a use for sending and receiving messages
		<ul style="list-style-type: none"> • Many internet email applications do provide interfaces
		<ul style="list-style-type: none"> • Commonly used for sending email
		<ul style="list-style-type: none"> • Most email clients use POP3 or IMAP for incoming mail
Application Layer Protocol	HTTP (Hyper Text Transfer protocol)	<ul style="list-style-type: none"> • Used throughout the World Wide Web for sending messages and getting
		<ul style="list-style-type: none"> • responses from servers
		<ul style="list-style-type: none"> • Most common method is the GET method to Request and Receive web page
		<ul style="list-style-type: none"> • Takes care of braking data into packets and reassembling at the destination host
		<ul style="list-style-type: none"> • Takes care of braking data into packets and reassembling at the destination host
Transport Layer Protocol	TCP(Transmission Control protocol)	<ul style="list-style-type: none"> • Designed to provide reliable for IP
		<ul style="list-style-type: none"> • Takes care of Breaking data into packets and reassembling at the destination host
		<ul style="list-style-type: none"> • Checks if packet is corrupted and requests a resend if it is
		<ul style="list-style-type: none"> • Each endpoint is defined by an IP

Network Layer Protocols	IP (Internet protocol)	address and a TCP port number
		<ul style="list-style-type: none"> Used with WWW, email and file transfer
		Define the rules that determine how packets are transferred from one host to another
		<ul style="list-style-type: none"> It is not reliable protocol: <ul style="list-style-type: none"> ➤ Packets may not be delivered ➤ Packets may be delivered out of sequence Every host must have a unique IP address that identifies it

Figure No: 1.3- Table of Protocols

(Tanenbaum, (2010))

(C) Network using Wi-Fi and state the components required:

- Wi-Fi access point/Wi-Fi router
- Wireless LAN Media Access control and Physical Layer specification
- Contains a number of revisions and interpretations
- 802.11a,b,g,etc
- Products that implement 802.11 standards must pass tests and are referred to as “Wi-Fi certified”

Components required:

Wi-Fi access point:

- Wi-Fi access points are seats somewhere we can use our laptop to access the internet, also for free, or for a fee off of a network router. The router is the devices which agree to others to access our network.

Wi-Fi card:

- Wireless Internet cards too known as Local Area Network or LAN, cards, are one of the various types of adapter cards that add capabilities to our computer
- Wireless Internet cards approach in some forms
- Different cards live for desktops, laptops and PDAs.

How Wi-Fi fits:

I do not use Wireless network in this system. Because wireless network is low data transfer rate. And wireless network does not manage our required. But I have used something wireless network in this system. Such as: tablets, laptops and mobile phones.

(d) Wi-Fi standards and discuss Advantage and disadvantage of wireless:

Wi-Fi standards:

- IEEE 802.11 series-Wireless LAN (Local Area Networks)three are a number of important standards, including:
 - 802.11, Wireless LANs
- Bluetooth/IEEE 802.15- Wireless Personal Area Network
- IEEE 802.16-Wireless Metropolitan Area Networks
- IEEE 802.20-Mobile Broadband Wireless

Advantage of Wireless:

- **Convenience:**
 - Users to access network resources from nearly any suitable location in their primary networking background office.
- **Mobility:**
 - Users can access the internet even outside their normal work location.
- **Productivity:**
 - Users connected to a wireless network can maintain a nearly constant link with their most wanted network as they move from place to place
- **Deployment:**
 - Wired networks on the other hand, have the extra cost and complexity of real physical cables being run to frequent locations
- **Expandability:**
 - In a wired network, additional clients would require additional wiring.
- **Cost:**
 - Wireless networking hardware is at most horrible a modest increase from wired counterparts.
- Increased flexibility
- Opportunities to provide new services

Disadvantage of Wireless:

- **Security:**

Wireless networks may well choose to utilize some of the different encryption technologies available
- **Range:**
 - The typical range of a common 802.11g network with standard equipment is on the order of tens of meters.

- **Reliability:**

- Wireless networking signals are subject to a wide mixture of interference, as well as complex propagation special effects that are further than the control of the network administrator.

- **Speed:**

- The speed on most wireless networks typically 1-54 Mbps is distant slower than yet the slowest common wired networks 100Mbps up to several Gaps.

Recommends Standard:

This network has old structure cabling .That cable was right but some modify is necessary. Including this:

- I think The IEEE 802.11 of higher speed network should use 802.11n
- This standard is best for this system

Task-2

Addressing:

(a) Why network need addresses:

A Defined Network uses TCP/IP to communicate on a LAN, yet if he LAN isn't routed anyplace, for the reason that all applications and operating systems as well as devices can use one method of communicating, versus designing the similar program to use MAC addresses as well on the weird chance to somebody would have a non-routed LAN without TCP/IP configured.

(b) Explain the teams MAC address and IP address and Distinguish between these teams and between IPv4 and IPv6:

MAC Address:

- The Media Access Control (MAC)
- The IEEE MAC specification defines MAC addresses
- Which allocate multiple devices to be uniquely identified at the data link layer.

IP address:

- Defines the system verify how packets are transferred from one host to another
- It is not a dependable protocol
- Packets may be delivered out of sequence

Distinguish between MAC Address and IP Address:

IP Address	MAC Address
<ul style="list-style-type: none">The IP address assigned by the network card. it consist 32 bit	<ul style="list-style-type: none">The MAC address is the assigned number to the Network card. it consist 48 bit
<ul style="list-style-type: none">the IP address which assigned will change depending on the network	<ul style="list-style-type: none">The MAC is used to identify the network card on the computer system

Figure No: 2.1- Table of IP address and MAC address**Distinguish between IPv4 and IPv6:**

IPv4	IPv6
<ul style="list-style-type: none">Internet Protocol version 4	<ul style="list-style-type: none">IP version 6
<ul style="list-style-type: none">Each address is 32 bit length	<ul style="list-style-type: none">Each address is 128 bit length
<ul style="list-style-type: none">IPv4 address are binary number represent in decimals	<ul style="list-style-type: none">IPv6 address are binary number represent in hexadecimals
<ul style="list-style-type: none">Each address is a dotted quad in the form 101.4.233.1	<ul style="list-style-type: none">About 3.403×10^{38}, unique addresses

Figure No: 2.2- Table of IPv4 and IPv6

(c) IPv4 private address and why it might be used and is it applicable in this case:

- The majority common use of private addresses is in housing networks
- Private addresses are also commonly used in corporate networks which for security reasons
- Private addresses are often seen as attractive network security for the internal network

Yes it might be used in this case because it is

- Reliability
- Ordering
- Less cost
- Security

(d) Explain how devices get their MAC or IP address:**MAC Address:**

- Media Access Control
- MAC address always will be connected with Land card or
- Wired network card

IP Address:**DHCP:**

- Dynamic Host Configuration Protocol (DHCP)
- Client-server networks often allow for devices to be added and removed

Static:

- In difference a static IP address can become a security risk, for the reason that the address is all the time the same.
- Static IPs are easier to pathway for data mining companies

(e) Briefly explain subnet:

- A subnet is a logical subdivision of an IP network
- Internal routers can use this to route packets to the relevant subnet work
- By organizing hosts into logical groups, sub netting can improve network security and performance
- Subnets are meaningless to any router outside the business

How to used subnet network:

- When input IPv4 IP address then subnet will be fill up automatically
- For example:
 - Subnet address: 255.255.255.0

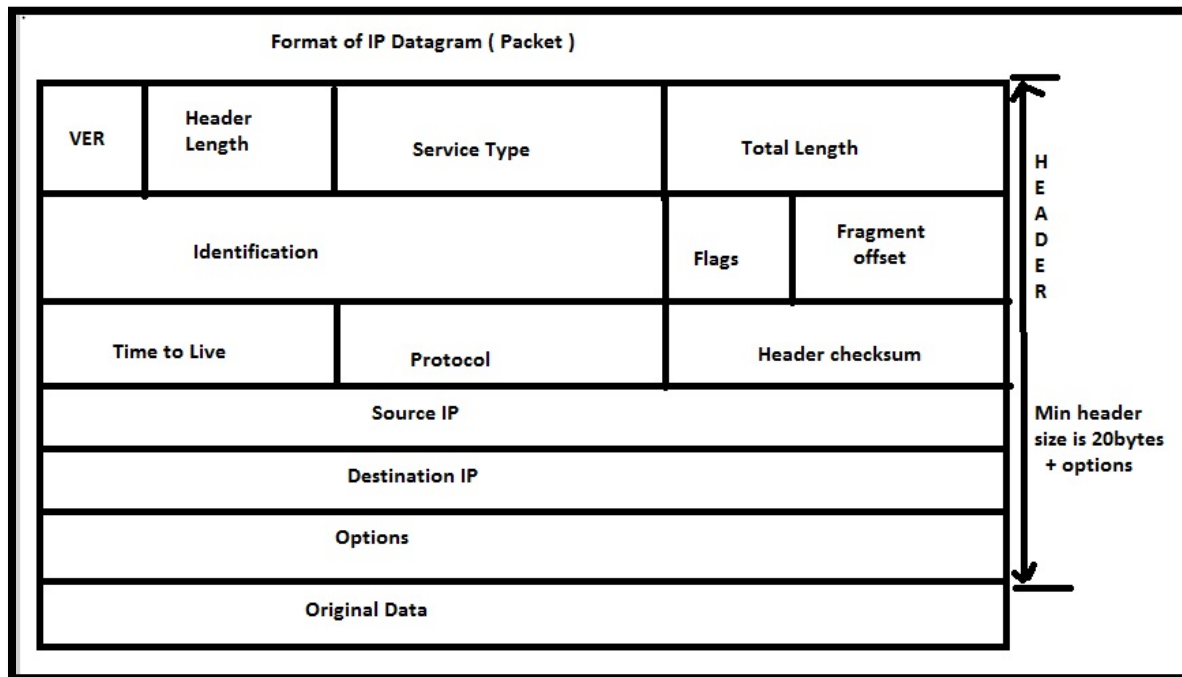
Recommend:

Yes I recommend using sub netting network in this network case. Including this:

- Traffic control
- Security
- Manageability easy

(f) Explain how a packet gets from one network to another network:

- A packet gets from one network to another network by the router.
- Router connected two or more network
- The message is stored until completed
- Routing algorithms are used to determine the next destination
- The message is forwarded
- A packet is an independent, self-contained message sent over the network
- Includes:
 - Addressing information
 - The data
 - A header

IP Address Format:**Figure No: 2.3- Interface of IP address format**

(Tanenbaum, (2010))

Task-3

Security:

(a) Explain three terms. Including this:

Confidentiality:

- Confidentiality is generally equivalent to privacy.
- Such training would typically include security risks that could threaten this information
- Training can help familiarize authorized people with risk factors and how to guard against them
- Further aspects of training can include strong passwords and password-related best practices

Example:

- Our documents can't access anybody without me.

Integrity:

- Data transmitted on the network is not modified
- Data transmitted on the network is not corrupted
- Data transmitted on the network is not lost
- Integrity involve maintain the accuracy, consistency, and trustworthiness of data over its complete life cycle.
- Data must not be changed in transit

Example:

- If we transfer data one computer to another computer then anybody can't modify data in the way.

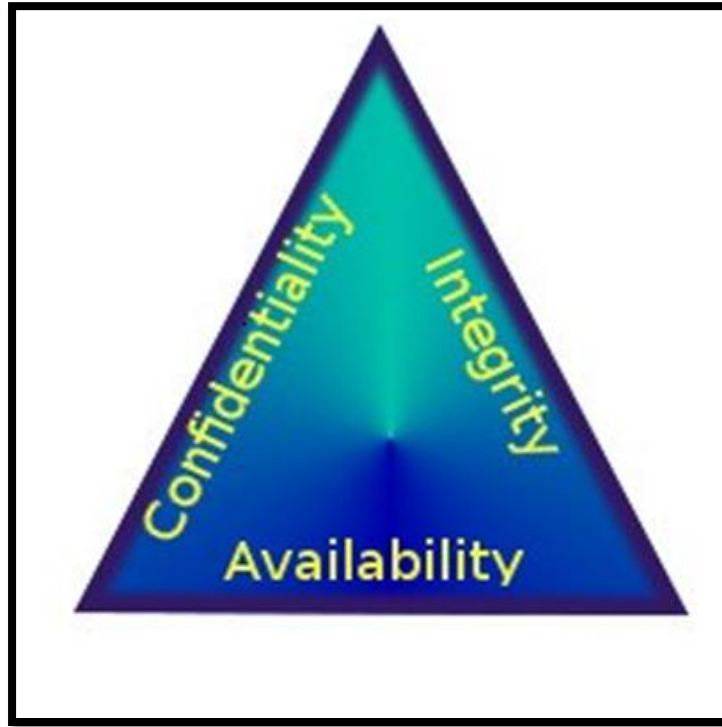


Figure No: 3.1- Interface of confidentiality, Availability and Integrity

Availability:

- And providing the required services at that time
- Ensuring that the network is available when needed
- Availability is best ensure by thoroughly maintain all hardware, performing hardware repairs immediately
- while needed and maintain a properly functioning operating system location that is free of software conflicts
- It's also vital to keep current with all needed system upgrades

Example:

- When we want anything for the requirement then we get those things. That means this thing is available.

(b) Identify two missing issues:

Authentication:

- Identifies the person or system attempting to connect to the network
- The user supplies a response to each challenge
- Determines whether they are allowed to access the network
- Usually involves a challenge or challenges to the user
- if correct, they are authenticated

Accountability:

- Accountability is an important information security concept
- The expression resources to every person who workings with an information system must have definite responsibilities for information declaration
- The tasks for which an individual is responsible are part of the generally information security plan with are readily quantifiable by a person who has decision-making responsibility for information guarantee.

(c) Identify seven measures:

Here I have described about seven measures that should be taken to keep the network secure. Including this:

Seven Measures Name	Describe Seven Measures
Man-in-the-Middle	Can modify information before transmission
	A third party pretends to be one of the parties in a two-way conversation
	Message that use a “store and software” transmission method are particularly vulnerable
Replay Attack	Can includes username and password combinations Attacker stores a set of message for later use
	Can be an attack on, like: availability ,Privacy, integrity
Virus	A hateful program that attacks a single compute or network
	Often attached to other files. such as: Embedded in image files, Attachment to emails, also on mobile phones
Trojan	Often a program that appears harmless
	Used to gain unauthorized access. like: Username and passwords, Networks, Files, Data
Worm	A worm is a program that can: Reproduce, Execute independently, Travel across network connections,
	A virus is reliant winning the transfer of files between computers to spread
Physical attack	May be deliberate or accidental -Theft -Deliberate damage
	Accidental -Power failure -Equipment failure

Wi-Fi	Data interception
	Endpoint Attacks

Figure No: 3.2- Table of seven measures

(d) The biggest threat for this system:

Worm:

I think worm is the biggest threat for this system. Files resides in achieve memory and duplicates. It automatically and generally invisible .it is a harmful program.

((ed)P, (2003))

Task-4

Diagram and Explanation:

(a) Show on logical diagram with main components in the network:

Here shown on logical diagram with components. Including diagram:

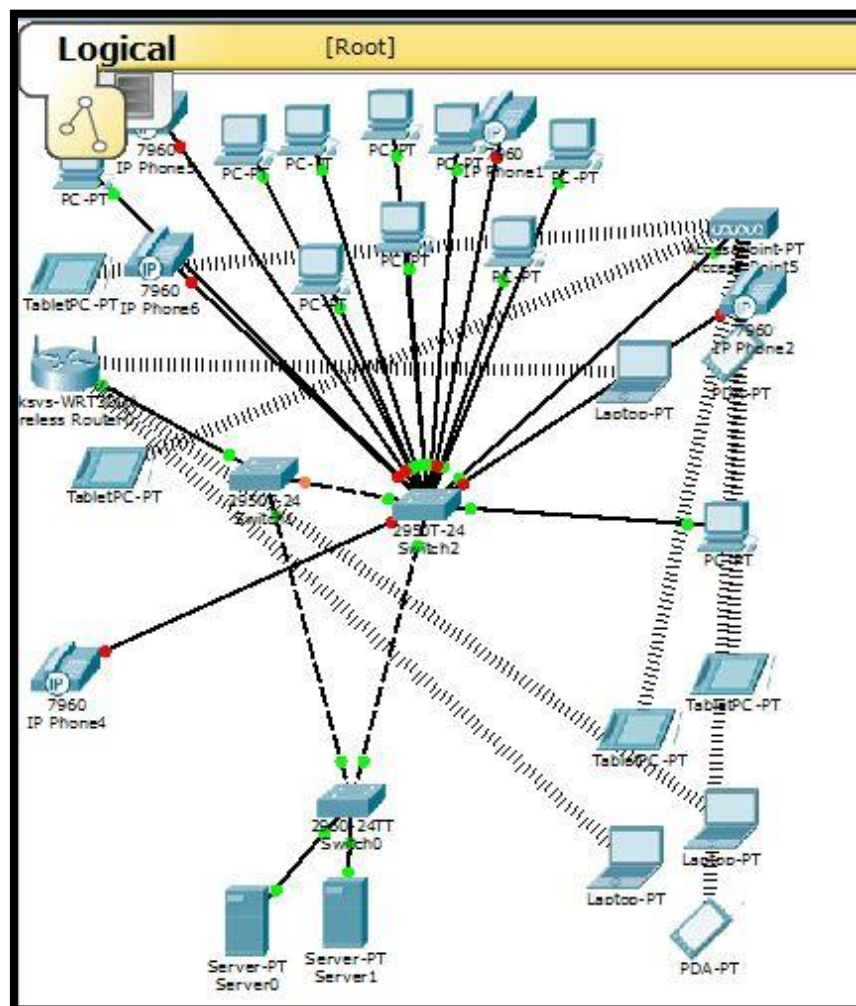


Figure No: 4.1- Interface of logical network diagram

(b) Use the office layout show on physical cable layout and the location of components:

Here show on physical cable layout in use the office layout. Including diagram:

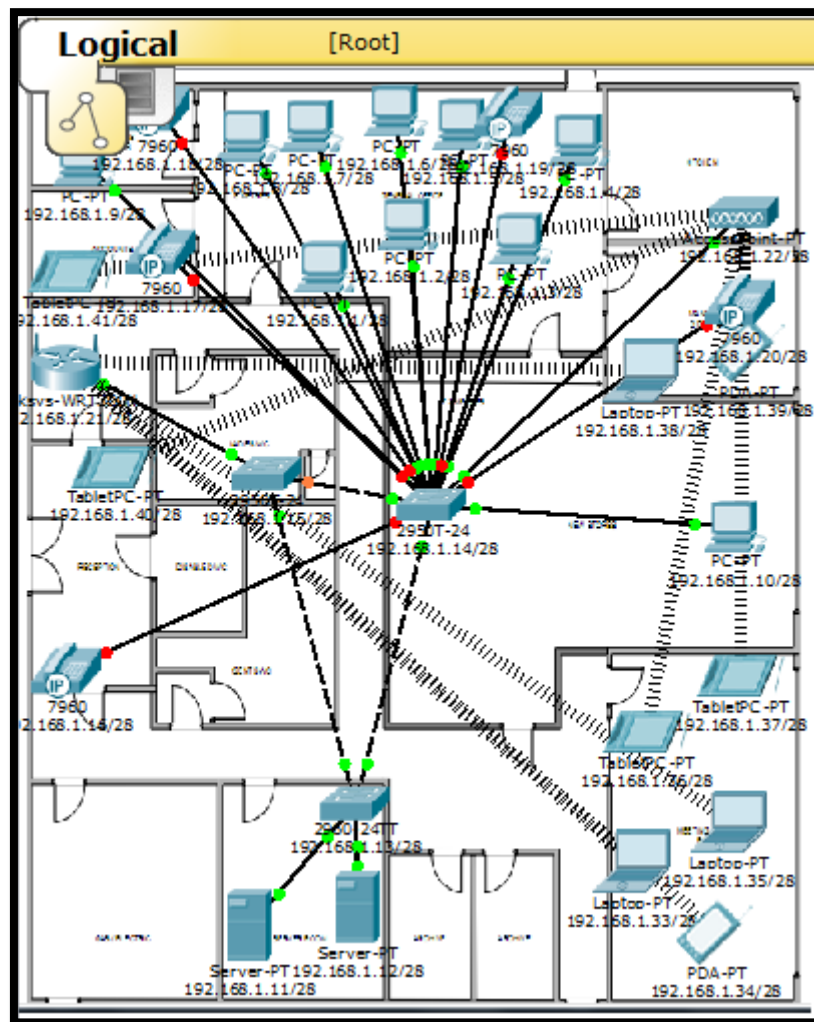


Figure No: 4.2- Interface of office layout and physical layout diagram

(c) IP addresses and adds them in this diagram:

Here shown on diagram with IP address. Including diagram:

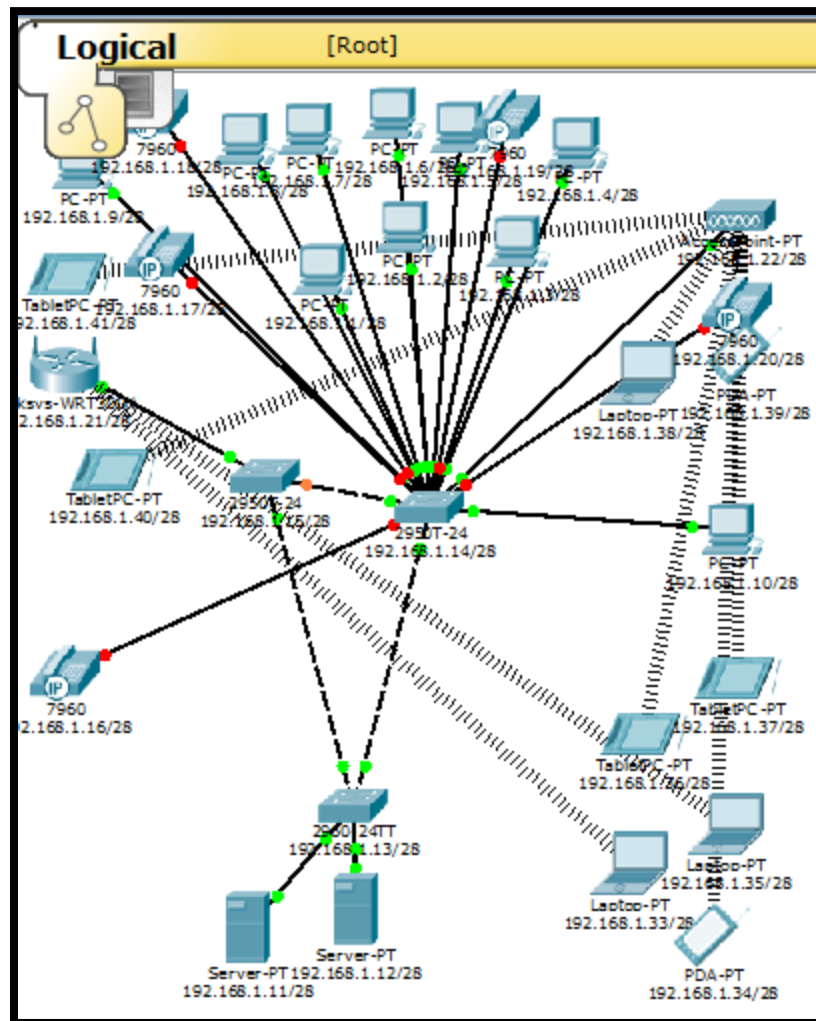


Figure No: 4.3- Interface of logical network diagram with IP address

(d) Why I have chosen the particular hardware components and why I have connected them together in that way:

Now I have described about why I have chose particular hardware components. I have chosen many hardware components because this network is required those hardware components. Including this hardware:





- Laptops
- Computers
- Tablets
- Mobile phones
- PDAs
- Server
- Switch
- Wireless router
- Wireless Access points

At first two servers is connected with one switch because if one server is damage then another server for backup. From switch (IP192.168.1.13/28) connect with other two switches. Then from switch (IP192.168.1.14/28) are connected with all Computers and connected with wireless access points as well as other side connected with wireless router. Wireless access points and wireless router are connected with all laptops, tablets and PADs. Then switch2 are connected with all IP phone4.

(e) Local prices and specification of suitable hardware/software recommend:

Here I have completed all requirement hardware. Including this:

Device Name	Quantity	Individual Device Price	Specification	Device Picture
Laptops	3	£1849.00	Dell Alien ware M17x Laptops	
Computers	10	£819.00	Apple iMac 21.5 inch (Intel 1.4GHz, 8GB RAM, 500GB HDD, Intel HD GBR, Mac OS X Yosemite)	
Tablets	4	£249.99	SAMSUNG Galaxy Tab A 9.7" 4G Tablet - 16 GB, White	
IP Phones	5	£79.99	Cisco 4 Line IP Phone With Display, PoE and PC Port	

PADs	2	£287.86	Apple I Pad Air, MD788LL/A 16GB, Wi-Fi, 9.7 in LCD (White with Silver)	
Server	2	£462.55	Thecus W5000 5 Bay Network Attached Storage with Windows Storage Server	
Switch	2	£66.76	TP-LINK TL- SG1024D 24-Port Gigabit Desktop/ Rack mount Switch	
Switch	1	£130.80	TP-Link TL- SG1008PE 8-Port Gigabit Desktop/ Rack mount Switch with 8-Port PoE	


Wireless Router	1	£59.00	TP-LINK TL-WDR4300 Wireless N750 Dual Band Router, Gigabit, 2.4GHz 300Mbps+5Ghz 450Mbps, 2 USB port, Wireless On/Off Switch	
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Figure No: 4.4- Table of Hardware Price

(Anon., n.d.)

Task-5

Remote Access

(a) Explain how you could incorporate remote access into the system and identify components you would need and action:

- Dial-up Connection
- Broadband Connection
- **Authentication**

Authentication take consist at two levels. Such as:

- Computer-level authentication:
 - while time Internet Protocol security is use for a Layer Two Tunneling Protocol
 - L2TP over IPSec (L2TP/IPSec) VPN connection computer-level authentication is perform during the replace of computer certificate
- User-level authentication:
 - The remote access client to requests the VPN link should be authenticated
 - User-level authentication occurs during the apple of a Point-to-Point Protocol authentication method.
- **Authorization**
 - The VPN client create a PPTP tunnel by the VPN server
 - The server sends a test to the client
 - The client sends an encrypted answer to the server
 - The server checks the response next to the client accounts database.
- **Integrity**
 - I can connect to the site of a PC however when I click to watch I cannot see the program that I want
 - I cannot access The Economist with additional worldwide big media

(b) How does this impact the network secured:

- No need Third party software
- Data does not hacking
- Secure remote wireless networks
- Use the strongest possible encryption method for VPN access
- Use the strongest potential authentication method for VPN access
- give access to chosen records throughout intranets or extranets rather than VPNs
- allow e-mail access without requiring VPN access
- execute and enforce a strong password policy
- Provide strong antivirus, antis am and personal firewall protection to our remote users, and require to they use it
- Quarantine users starting the time to them attach to the VPN pending their computer has been verified as safe

(Anon., n.d.)

Conclusion:

At the end of this assignment I had a best working experience. I got to gained knowledge of networking. Confidently my experience will help me complete better achievement in the near future where network problems will come out.

Bibliography

(ed)P, r.B., ed., (2003). *Networking Complete*. 3rd ed. Sybex.

Anon., n.d. /en-us/library/cc739294{WS.10}.aspx. [Online] Available at: <http://technet.microsoft.com> [Accessed 16 oct 2015].

Anon., n.d. uk/voip-skype-phones/b?ie=UTF8&node=356492011. [Online] Available at: <http://www.amazon.co>. [Accessed 15 oct 2015].

Elliot, B., ed., (2002).. *Designing a Structured Cabling System to ISO 11801*. 2nd ed. Woodhead Publishing Ltd.

Networking, ed., (2003). *Complete*. 3rd ed. Sybex: Price, B. (ed).

Rysavy, P., ed., (2002). *Networking Standards and Wireless Networks*. Netmotion Wireless.

Tanenbaum, A.S.&W.D.J., ed., (2010). *Computer Networks*. 5th ed. Pearson Education.

Tanenbaum, A.S.&W.D.J., ed., (2010). *Computer Networks*. 5th ed. Pearson Education.

Telecom, B., ed., (2004). *BT Structured Cabling*. British Telecom.