Networking basics course PDF which is very important for Ethical Hacking and Information Security !

• Network/Networking vaneko k ho ta?
➜ Dui wa dui bhanda badhi devices ek aapasma communicate garera data, file, information, anything sharing garera huney processlai networking vaninxa.

• Aba Networking vaneko bujisakeypaxi network ko components ko barema janam.

• Basic Components for Network Communication
➜ Network Interface Card (NIC)
- Eslai tinota nameley chininxa LAN Card, Ethernet Card & NIC
- Yo card hamro sabhai devicesma hunxa & yesko main function vaneko aafno device lai kunai arko devicema (network, computer) ma connect garney ho. Without NIC card we can't connect any device to the network.

NIC Card 2 typeko hunxa :
• Wired
• Wireless

➜ Hub
- It is a network device that splits a network connection into multiple computers.
- It is also known as network distributer, wireko through hamile computerlai hubma connect garera net use garna sakinxa. Note : Router & Hub different different hunxa

➜ Switches
- Switch is like hub & yesko kaam chahi jun device switchma connect hunxani ani connect vayepaxi switchma connectionko through switchma aauney message or data hunxani teslai portko throught right addressma transfer gardinxa.

➜ Cables and Connectors

➜ Router
- Routerko baremata tha vaihaleko xa hola, router yo chahi internet excess garnako lagi alag alag deviceslai connect garnako lagi use garinxa.

➜ Modem
- A modem is a hardware device that allows a computer to send and receive information over telephone lines. When sending a signal, the device converts ("modulates") digital data to an analog audio signal, and transmits it over a telephone line.

• Client/Server Model
➜ Aba eha kura aauxa client ra serverko :

• Client uh hunxa ki jasle internet ko through search garera server sanga kehi chaijko lagi

request garxa.
• Server hunxa jaha hamro sabhai online informations, data, files, records anything store gari rakhiyeko hunxa.

➜ Yesma esko process k vanxa vaneyni jo client hunxani usley kehi chij (eg. photo, video, article etc) paunako lagi kunai social sites (google, youtube etc) ma search garxan, tyo search gareko request hamro private ip jun ispleynai provide garya hunxa tyo ipbata isplai request garxa ani tyo hamile search gareko request ispma gayera ispley serverlai request garxa ani tespaxi serverle tyo search result ekai xinma khojera isplai response gardinxa ani ispley hamile response dinxa, matlab tyo hamile search gareko (photo, video etc) anything hamilai result dinxa. So ehi mani iniharu interrelated xan.

• Node/Host
Node/Host vaneko internet sanga connected raheko hamro devices such as laptop, mobile etc.

- note: file/packet transferring way:
through wired & wiresless network

- wired eg. sending files, folders anything through packets by one device to another device in any medium like sending video from laptop to mobile using usb cable.

- wireless eg. through wifi, bluetooth etc.

- note : esma hamile euta kura bujhnu parxa hai hamiley file share garda packetsko small piecesma transfer hunxa tyo tyo transfer gareko fileslai packet pani vanna sakxau hamile teslai burfsuite, wireshark tools use garera capture garna pani sakinxa.

• Types of Servers
➜ Web server
- Yesko main function vaneko internetma raheko websiteslai internetma publish gari server store garney. Webserver communicate garnako lagi http requestko use garxa. (http is network protocol)
- eg : Apache , IIS

➜ Application server
- Yo server chahi applicationko lagi use hunxa.

➜ Database server
- Yo server databasema use hunxa. Yesko main kaam vaneko database excess garney jun hamile query language (sql) use garera databasebata datas retrieve garna sakxau matlab databaseko information excess garna sakxau.

➜ Mail server
- Mail server mailsko send & receive garnalai use hunxa. Yesle smtp protocol use garera message ek aapasma send & receive garnalai help garxa.

➜ DNS server
- It is also known as internet central server. Yesko main function vaneko jun hami domain name

type gari search garxauni googlema ho teslai convert gardina ip addressma help hunxa

➜ FTP server
_ FTP Serverko use hunxa fileko transfer & store garnako lagi.

Aru pani xan but iniharu serverko popular types hun, so you need to learn it.

Can we use our computer as a server ?
➜ Yes

• Role of A Network Administrator
➜ The Network Administrator's role is to ensure the stable operation of the computer networks. This includes planning, developing, installing, configuring, maintaining, supporting, and optimizing all network hardware, software, and communication links.

• Network segmentation
➜ Network segmentation is a network security technique that divides a network into smaller, distinct sub-networks that enable network teams to compartmentalize the sub-networks and deliver unique security controls and services to each sub-network.

• Network congestion
➜ Network congestion refers to a reduction in quality of service (QOS) that causes packet loss, queueing delay, or the blocking of new connections. Typically, network congestion occurs in cases of traffic overloading when a link or network node is handling data in excess of its capacity.

• LAN traffic congestion
• Ethernet CSMA/CD

• Internetworking Basics
➜ It is a techniques of connecting computer devices with different operating systems and protocols of network to another different network.

➜ Different os (windows, mac, linux) install gareko hardware devices or laptoplai duita organization or network bich ek aapasma portko through connect garney processlai internetworking process vanna sakinxa.

➜ It supports 2 layered model :
- OSI Referenced Mode.
- TCP/IP Model.

• Broadcast domain
➜ Broadcastko matlab ho ki jaba kunai message ekko hami pathauxauni ho tyo sabhailai pathauney or deliver garney ho.
eg. radio officema ek janaley program conduct garxani ho teslai radioko madhyambata sabhailai tyo program sunna absar diney ho broadcastko help ley.

• Collision Domain

➜ So pahila collision vaneko bujham, collisin networkma packet ek aafasma takraunu or accident hunu matlab thokkinu ho & domain matlab networkko ek part or area.
➜ Collision Domain networkko yesto chijlai vanxa jaha ki ekai timema duitarfa bata aayeko packetslai ek aafasma takkar khanxa ra collision create garxa.

Boadcast ra Collision ko kaam Hubley garxa.

• Hub
➜ A network hub is a node that broadcasts data to every computer or Ethernet-based device connected to it.

➜ A hub is a physical layer networking device which is used to connect multiple devices in a network. They are generally used to connect computers in a LAN. A hub has many ports in it. A computer which intends to be connected to the network is plugged in to one of these ports.

• Switch
➜ A network switch is networking hardware that connects devices on a computer network by using packet switching to receive and forward data to the destination device. A network switch is a multiport network bridge that uses MAC addresses to forward data at the data link layer of the OSI model.

• Router
➜ A router is a device that connects two or more packet-switched networks or subnetworks. It serves two primary functions: managing traffic between these networks by forwarding data packets to their intended IP addresses, and allowing multiple devices to use the same Internet connection.

• Repeaters
➜ A repeater is implemented in computer networks to expand the coverage area of the network, repropagate a weak or broken signal and or service remote nodes. Repeaters amplify the received/input signal to a higher frequency domain so that it is reusable, scalable and available.

➜ Repeater vaneko network systemma networko signlai like wifi ko signallai ek thau bata arko ali tadako thauma kunai networking device such as adopter or network amplifier use garera signal boost garney device ho.

• 3 Ethernet Cabling: -
• Straight-Through Cable
➜ A straight-through cable is a type of twisted pair cable that is used in local area networks to connect a computer to a network hub such as a router.

• Crossover Cable
➜ It is a type of Ethernet cable that is used to connect computing devices directly together, such as computers or hubs.

• Rollover Cable
➜ Rollover cable is a type of null-modem cable that is used to connect a computer terminal to a

router's console port.

• Internet Protocols: - TCP/IP Model
➜ TCP/IP Model helps you to determine how a specific computer should be connected to the internet and how data should be transmitted between them. It helps you to create a virtual network when multiple computer networks are connected together. The purpose of TCP/IP model is to allow communication over large distances.

• OSI Reference Model
- https://youtu.be/vv4y_uOneC0

• Port
➜ A port in networking is a software-defined number associated to a network protocol that receives or transmits communication for a specific service. All network-connected devices come equipped with standardized ports that have an assigned number. These numbers are reserved for certain protocols and their associated function. Hypertext Transfer Protocol (HTTP) messages, for example, always go to port 80 -- one of the most commonly used ports.

- There are 65,535 port numbers, but not all are used every day.

- Ports 20 and 21. FTP is used to transfer files between a client and a server.

- Port 22. Secure Shell is one of several tunneling protocols used to build secure network connections.

- Port 25. Simple Mail Transfer Protocol (SMTP) is commonly used for email.

- Port 53. Domain name system (DNS) is a critical process that matches human-readable domain names to machine-readable IP addresses on the modern internet. It helps users load websites and applications without typing in a long list of IP addresses.

- Port 80. HTTP is the protocol that enables the World Wide Web.

- Port 123. Network Time Protocol helps computer clocks sync with each other. It's a vital process in encryption

- Port 179. Border Gateway Protocol (BGP) helps establish efficient routes between the large networks or autonomous systems that make up the internet. These large networks use BGP to broadcast which IP addresses they control.

- Port 443. HTTP Secure (HTTPS) is like HTTP but more secure. All HTTPS web traffic goes straight to port 443. Any network service that uses HTTPS for encryption, such as DNS over HTTPS, also connects directly to this port.

- Port 500. Internet Security Association and Key Management Protocol helps set up secure IP Security

- Port 3389. Remote Desktop Protocol enables users to connect to their desktop computers

from another device remotely.

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• What are common questions raised about port numbers ? Questions / Answers listef below :-

• What is the port number for localhost?
➜ Localhost is the default name used to establish a connection with a computer. The IP address is usually 127.0.0.1. This is done by using a loopback address network. Port 80 is the common standard port for HTTP.

• What is port number 8080 used for?
➜ Port number 8080 is usually used for web servers. When a port number is added to the end of the domain name, it drives traffic to the web server. However, users can not reserve port 8080 for secondary web servers.

• What is port number 3360 used for?
➜ TCP/IP networks use port 3360. The connection-oriented protocol TCP demands handshaking to set up end-to-end communications. Upon establishing the connection, user data is transferred bidirectionally over the connection.

• What is my IP address and port number?
➜ The easiest way to find a router's public IP address is to search "what is my IP?" on a search engine like Google. Identifying a port number will depend on the operating system.

• For Windows:

Go to the command prompt.
Type ipconfig.
Then, type netstat to populate a list of all the port numbers.
For macOS:

Go to System Preferences.
Next, go to Network > Advanced.
Click on the Port Scan tab, and enter the user's IP address.

• What is a proxy server address and port number?
➜A proxy server is, essentially, a computer on the internet with its own IP address. It sits between the client device and the remote server and acts as an intermediary to handle communication requests over the internet.

When a local computer sends a web request, it automatically goes through the proxy server. The proxy server uses its own IP address for the web request and not the user's. Proxy servers offer privacy benefits -- for example, the ability to change the client IP address, masking the user's location.

The proxy server address includes an IP address with the port number attached to the end of

the address. The port number 8080 is usually used for web servers, proxy and caching.

• What is the port number for Gmail?
➜ Gmail uses both Internet Message Access Protocol (IMAP) and SMTP. The IMAP port is 993, and the SMTP port is 25.

• MAC Address
➜ A MAC address is a unique physical address assigned to each network adapter in a computer, or mobile device. It is a 48 bit value, consisting of twelve hexadecimal characters. The most common format for displaying a MAC address is using six groupings of two characters separated by a hyphen or colon. mac address eg. 2C:54:91:88:C9:E3

MAC Address lai hamile change garna pani sakxau. Mobileko mac address change garnu xa vaney mobile root garnu parxa aba pcko change garnu xa vaney pc ma linux use garera garna sakxau. Yo garney processlai mac spoofing vaninxa. MAC Address change garera hami free internet acess garna pani sakxau. Yo jaba hami wifi use garda netko paisa sakera net chalna xodxani teti bela ispley internet sanga hamro mac address filter garera block gardinxn ani hamro devicema signal matra show garxa net chahi chaldaina.

To know more practically : https://youtu.be/Ydks0uXcNqo

• IP Addressing
➜ https://youtu.be/yP4yePOjJBg

>Topics for learning Network Cheatsheet<

>>>First Week
>>Networking
• What is Networking
• Benefits of Network
• Basic Components needed for Network Communication
• Client/Server Model
• Types of Servers
• Role of A Network Administrator
• Network segmentation
• LAN traffic congestion
• Ethernet CSMA/CD
• Internetworking Basics
• Broadcast domain
• Collision Domain Hub
• Switch & Router
• Repeaters
• Ethernet Cabling: - Straight-Through Cable, Crossover Cable, Rolled Cable
• Internet Protocols: - TCP/IP Model
• OSI Reference Model

• Port Numbers,TCP/IP, TCP/UDP, MAC Address,
• IP Addressing
• IP Terminology
• IP Addressing Scheme.

>>>Second Week
• Sub netting Basics
• How to Create Subnets, Subnet Masks, Classless Inter-Domain Routing (CIDR), Sub netting Class C Addresses, Sub netting Class B Addresses
• Physical Vs Logical Address
• Public & Private IP Addresses.

>>>3rd Week
• TCP/IP Troubleshooting utilities
• Troubleshooting IP Addressing, hostname, Arp, Ping, tracert / traceroute, Netstat, getmac, Nslookup.

• IANA, IANA Root Zone Database, IANA Number Resources, local Internet registry (LIR),National Internet Registry (NIR), AfriNIC, APNIC, ARIN, LACNIC, RIPE NCC, Regional Internet Registry (RIR)

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-AnonSploit