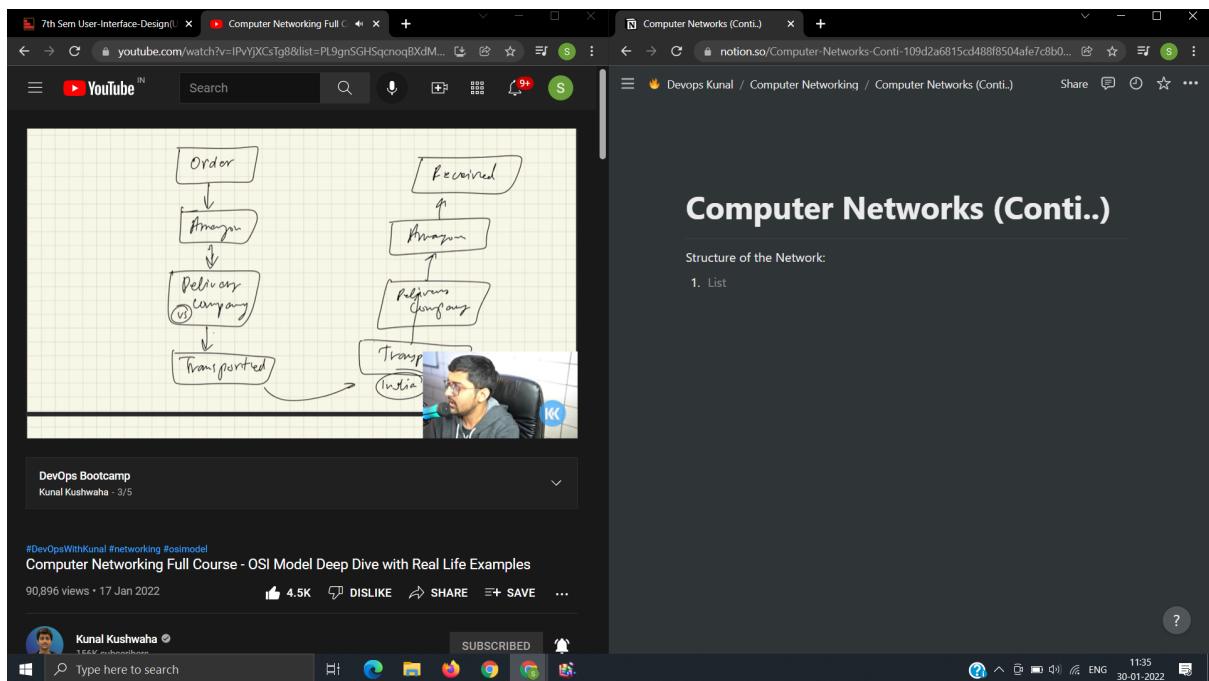




# Computer Networks (Conti..)

## Structure of the Network:



If we order something in Amazon, give it to Amazon will take care of it and Amazon will ship the order to local shipping agent and Transported from USA to India. This is how we can imagine the Internet. Order and Received part is the Application layer

## OSI model:

1. 7 layers in OSI model, Application, Presentation, Session, Transport, Network, Data link, Physical
2. Application layer: It's implemented in Software, send messages, order in Amazon, etc. Sent message to Presentation layer. Protocols: HTTP, FTP, etc
3. Presentation layer: Message in form in words, converts in binary format and all known as translation, encrypts, provides abstraction, also compressed. Protocol: SSL( secure socket layer )
4. Session layer: Helps in setting up and managing the connections, authentication and all, authorization( to access file permissions ). Example shopping in amazon

session created for payment after done, it logs you out.

5. Transport layer: information is segmented, every segment will contain port number, destination, source and all, and sequence number to order the packets. Flow control controls amount of data is transported, 40mbps and 20mbps, slow down at same speed. Checksum data received is good or not. TCP and UDP
6. Network layer: communicating with other computer, router comes here. Logical addressing (IP) assigns IP address sender's and receiver's end. Best path to take b/w 2 computers ( uses Dijkstra's algorithm), load balancing happens here
7. Data link layer: Allows to directly communicate with computers. Logical addressing and physical addressing happens here, MAC address of sender and receiver are assigned to a data packets. Computer's Wi-Fi, Bluetooth will have different MAC address in a frame. It adds MAC address in a frame and transport that frame
8. Physical layer: Wires, physical one's, cables and stuffs.

TCP/IP model:

1. Internet suit
2. OSI vs TCP/IP: 7 vs 5 layer, Application, Transport, Network, Data link and Physical layer. Presentation, session are merged in application layer

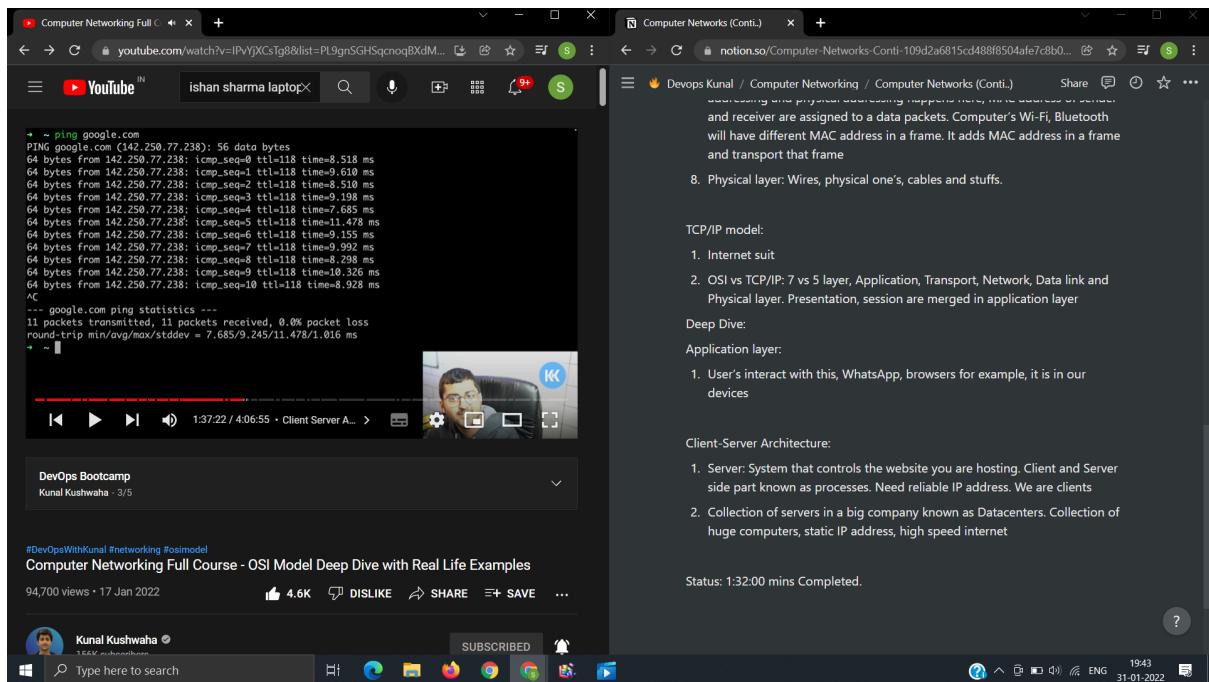
Deep Dive:

Application layer:

1. User's interact with this, WhatsApp, browsers for example, it is in our devices

Client-Server Architecture:

1. Server: System that controls the website you are hosting. Client and Server side part known as processes. Need reliable IP address. We are clients
2. Collection of servers in a big company known as Datacenters. Collection of huge computers, static IP address, high speed internet

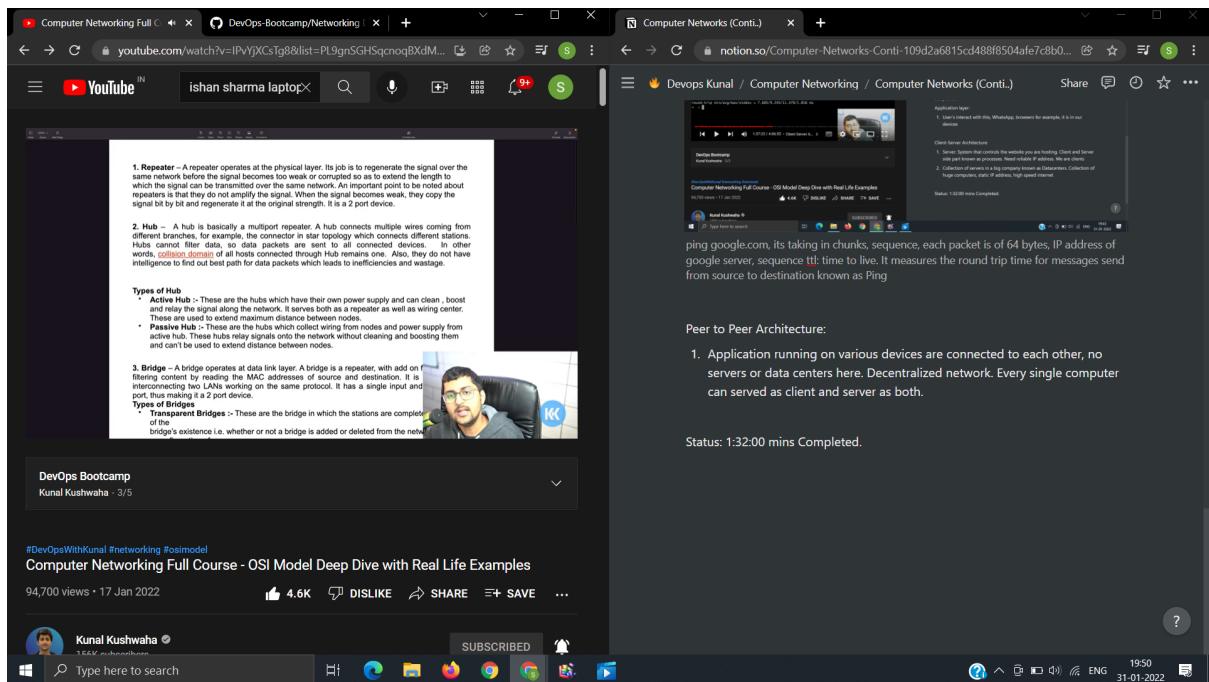


ping google.com, its taking in chunks, sequence, each packet is of 64 bytes, IP address of google server, sequence ttl: time to live. It measures the round trip time for messages send from source to destination known as Ping

## Peer to Peer Architecture:

1. Application running on various devices are connected to each other, no servers or data centers here. Decentralized network. Every single computer can served as client and server as both.

Networking pdf in Kunal's GitHub



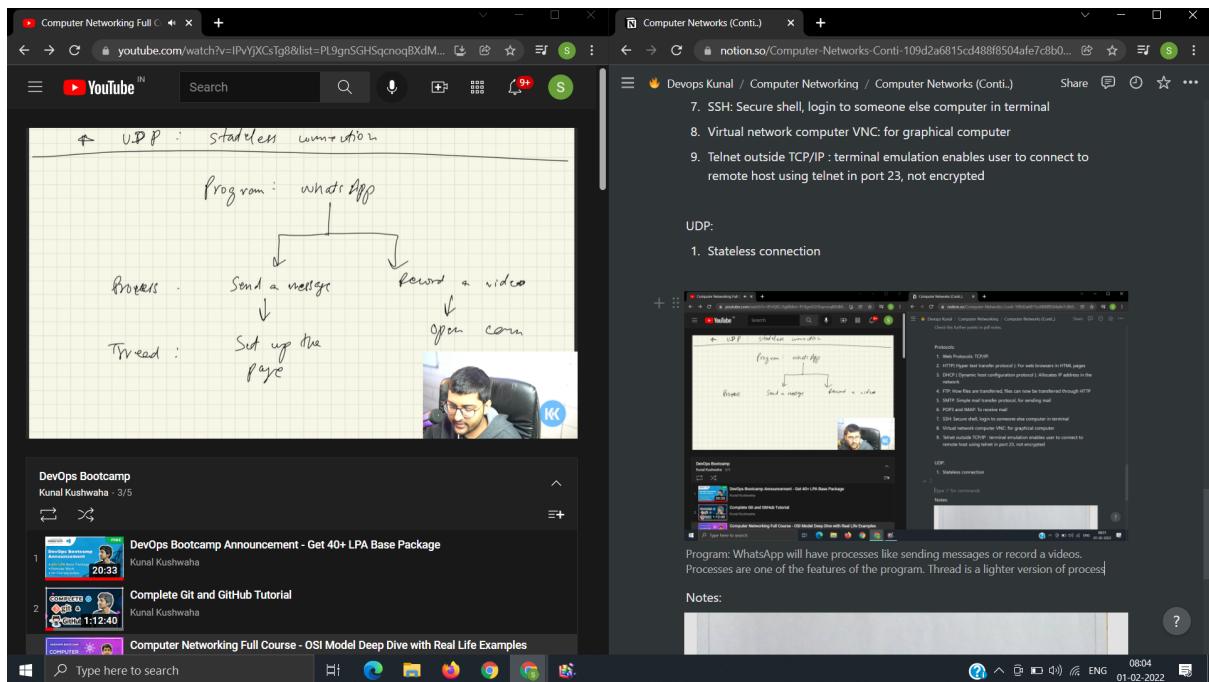
Check this further points in pdf notes.

## Protocols:

1. Web Protocols: TCP/IP:
2. HTTP( Hyper text transfer protocol ): For web browsers in HTML pages
3. DHCP ( Dynamic host configuration protocol ): Allocates IP address in the network
4. FTP: How files are transferred, files can now be transferred through HTTP
5. SMTP: Simple mail transfer protocol, for sending mail
6. POP3 and IMAP: To receive mail
7. SSH: Secure shell, login to someone else computer in terminal
8. Virtual network computer VNC: for graphical computer
9. Telnet outside TCP/IP : terminal emulation enables user to connect to remote host using telnet in port 23, not encrypted

## UDP:

1. Stateless connection



Program: WhatsApp will have processes like sending messages or record a videos. Processes are one of the features of the program. Thread is a lighter version of process. Thread sending message can be set up page, Record video is open camera. Thread is doing one single job.

Sockets: Send msgs from one system to another system. Interface b/w processes and internet

Ports: Which application we are working with

1. We might have many chrome tabs opened which tab1, 2 or 3 to determine this known EPHEMERAL PORTS, assign itself random ports, after used it will discard

HTTP:

1. Client server protocol, it tells us how you request data from server and it tells us how server will send back the request. Every Application layer protocols also require some transport layer protocol, has some methods like get, push. HTTP uses TCP. HTTP is stateless protocol, server will not store any info about client.
2. Whenever we get web pages response they might have links, texts, videos, images, docs all have specific URL known as WWW
3. google.com is url and link to the resource attached after that

HTTP Methods:

1. GET: requesting something

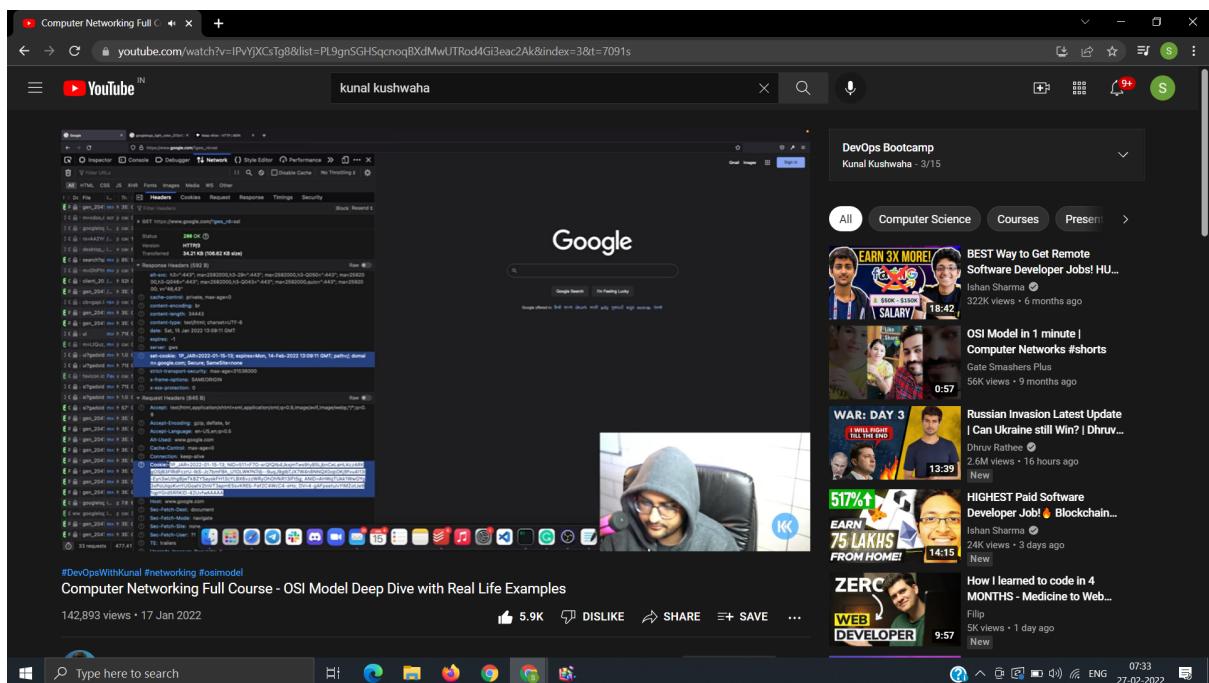
2. POST: Giving something to server credentials to login
3. PUT: Puts data in server
4. DELETE: delete something

Error/Status code:

1. 1xx range: information category
2. 2xx range: success
3. 3xx: redirecting
4. 4xx: client error
5. 5xx: server error

Cookies:

1. String which is unique stored on client's browser. When user visits a site, a cookie is saved for faster access

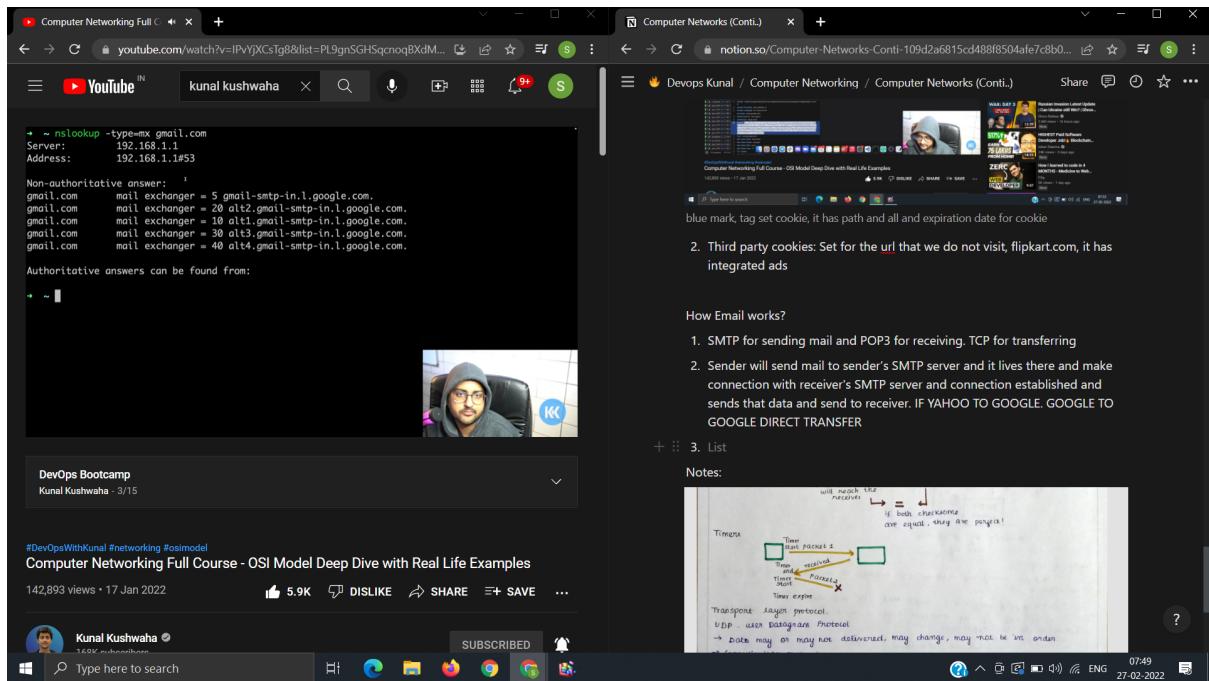


blue mark, tag set cookie, it has path and all and expiration date for cookie

2. Third party cookies: Set for the url that we do not visit, flipkart.com, it has integrated ads

How Email works?

1. SMTP for sending mail and POP3 for receiving. TCP for transferring
2. Sender will send mail to sender's SMTP server and it lives there and make connection with receiver's SMTP server and connection established and sends that data and send to receiver. IF YAHOO TO GOOGLE. GOOGLE TO GOOGLE DIRECT TRANSFER



3. POP: Post office protocol, port 110 does auth. Client —>POP server ( Auth and Transaction ). If download mail in your device, the it gets deleted in server
4. IMAP: get mail( Internet message access protocol ), doesn't get deleted in server

## DNS:

1. Phonebook list (Domain Name System)
2. How DNS is part of Application layer? Difficult to remember IP, HTTP takes domain name use it and convert URL to IP address and connect it to server.
3. HTTP asks friend you are DNS I have google.com domain can you give me its IP address? it will give it to you
4. Many URL's are there, many databases should be there in different classes.

DNS:

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## 5. Root DNS server: First point of contact where queried

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5. Root DNS server: First point of contact where queried

TLD top level domain, SLD second level domain. Database stored for TLD is by Internet Corp for assigned names and numbers. [icann.org](http://icann.org) who have registered for TLD

## Who is maintaining Root DNS servers

[root-servers.org](http://root-servers.org)

When we search google.com inside your computer it will check in its own pc, when we visit a website for first time it will store the value of its IP in its local cache. If its not there then it goes to Local DNS. ISP has all info which websites we visit even if its incognito mode also. even if not found ask with root server, if not found it asks with TLD and it gives it

6. we cannot buy a domain name can rent it. Rent it by Godaddy.com they pay it to icann.com and we pay to Godaddy.com. Some org have own TLD. Google, Amazon has it.

YouTube search results for "kunal kushwaha".

- Result 1:** "Computer Networking Full Course - OSI Model Deep Dive with Real Life Examples" by Kunal Kushwaha. Description: "When we search google.com inside your computer it will check in its own pc, when we visit a website for first time it will store the value of its IP in its local cache. If its not there then it goes to Local DNS. ISP has all info which websites we visit even if its incognito mode also. even if not found ask with root server, if not found it asks with TLD and it gives it".
- Result 2:** "Computer Networks (Conti..)" by Devops Ku... Share. Description: "6. we cannot buy a domain name can rent it. Rent it by Godaddy.com they pay it to icann.com and we pay to Godaddy.com. Some org have own TLD. Google, Amazon has it.
- Result 3:** "Computer Networks (Conti..)" by Computer Network... Share. Description: "7. List".
- Result 4:** "Computer Networks (Conti..)" by Computer Networks (Co... Share. Description: "Notes: Computer Networking @ Networking Notes".

messages received by DNS. man dig

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man dig

Notes:

<https://s3-us-west-2.amazonaws.com/secure.notion-static.com/dbd792d7-d592-4d96-9f28-46d8a4e5fb1b/Notes1.pdf>



Computer Networks 2 (Conti..)