Day 1:

Data point present in an image= w\*h\*3

= 1300\*768\*3

= 2,995,200

Data requirements-> Moore's law

* Exponential increase in data volume

Challenges faced:

1. Data requirements-> example: social media which has billions of users, sees huge load on its infra
2. Infra burden-> to accommodate the growing data needs, massive installation of hardware needs to be done
3. Setting up hardware and difficulties faced while maintaining it: maintaining business and associated resources
4. Customer stories: Netflix, Spotify, Amazon Prime, Twitter

What is cloud computing?

* It's a technology in which infra/resources hosted by CSP is used by us to dev, deploy, migrate applications
* Lot of services are available like compute, network, database, servers, etc.
* Cloud service models: IaaS, PaaS, SaaS

1. Infrastructure as a Service (IaaS):

* It's a virtual data center complete with servers, networks, VMs, storage, database, gateways, VPN, etc
* Management and security of infra like patching update, fixing bugs, upgrading-> responsibility of the CSP
* Using that infra to build app-> your responsibility
* Virtualization drives IaaS
* E.g: Amazon EC2, Google Compute Engine from GCP
* Suits well for financial use cases

1. Platform as a Service (PaaS):

* Comes with platforms that are preconfigured with infra like VMs, database, network, etc.
* Offers a wide variety of Prog lang support like Java, Python, PHP etc
* Reduces overhead involved with IaaS
* Khan academy uses PaaS
* E.g.: AWS Beanstalk, Google App Engine from GCP

1. Software as a Service (SaaS):
2. Reason 1: choosing readily available, cheaper products over building similar product, E.g.: Microsoft Teams
3. Reason 2: time constraint, budget constraint, skilled professional constraint

* E.g.: Google workspace (rival to O365)
* Prebuilt software given to you for your usage
* You do not have to worry about managing the infra, or the source code, or the feature update, etc

Shared responsibility model:

1. CSP responsibilities: security, maintenance, SLA, availability, scaling, updating/upgrading of resources
2. Customer responsibility: user data, maintaining user data, securing user data, app security, privacy, access permissions
3. Users: setting up secure password, secure credentials

1. Function as a Service (FaaS)

* If (cloud=interesting)

Go to session;

Else

Log off;

* FaaS paved way for serverless architecture designs
* Based on the principle: trigger and response
* E.g.: AWS Lambda, Cloud functions of GCP
* There's a cap on execution time-> a function can run for a max of 15 minutes in the case of Lambda
* Billed for execution time-> calculated for ms + resources used

Billing:

1. Pay upfront: e.g.: mobile data pack recharge, rent, internet, subscription (OTT), dth
2. Pay per use: e.g.: water bill, electricity bill, cloud, postpaid calls, uber, ola, credit card

Cloud deployment models:

* Deploying application + resources to your customers

1. Public cloud deployment model:

* Massive hardware installation is required as resources are publicly deployed to everyone
* E.g.: CSP- AWS, GCP, Azure
* Security, privacy, access control is tricky

1. Private cloud deployment model:

* Deploy resources/app to a set of people
* Very secure-> protected by firewall
* Build a private cloud that's safe and has high level of access control
* E.g.: Sparsh
* Expenses are high, costlier than public cloud

1. Hybrid cloud deployment model:

* Some parts of application are deployed in public cloud, sensitive user data/ application module is deployed in private cloud
* Cheaper than private, but costlier than public
* Private cloud is protected using firewalls
* Cloud bursting
* E.g.: e-banking website, online shopping, IRCTC

1. Community cloud deployment model:

* Variation of private cloud
* Healthcare, legal, educational institutions use community cloud to work on joint projects
* Partner businesses, cannot be rival businesses
* Data will be shared among the community members to further the project or endgoal