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I Cloud Architecture computing

it refers to the components & sub components required for cloud computing.

→ Front end Platform: they include client devices like computers & user interfaces like windows & web browsers that allow access to cloud application & services.

→ Back end Platform: it includes the servers to process & manage requests alongwith appropriate storage for storage & retrieval of client data. Also network access security for communication b/w cloud components.

→ Cloud Based Delivery:

SAAS: software as a service

PaaS: Platform " " "

IaaS: infrastructure " " "

II Infrastructure as a Service: (IaaS) its a form of cloud computing that provides virtualized computer resources over the internet

Key aspects:

→ virtual machines: users can create, configure & manage virtual machines that emulate physical computers.

→ storage: they have scalable storage solutions for data with options to block, file or object storage.

→ Networking: virtual networks, load balances & IP addresses to manage configurations & traffic.

→ Benefits:

- cost efficiency: Pay as you go models reduce expenses.
- Flexibility: choose & configure resources to meet specific requirements.
- scalability: we can scale resources up or down based on requirements.

III Amazon web services (AWS)

its a cloud computing platform offered by amazon. it provides a large range of cloud resources, including computing power, storage & databases. key components:

- Elastic compute cloud: EC2: it supports virtual computers/ servers to run applications

- storage: S3 :(simple storage service)
  : scalable object storage.

  : EBS: (Elastic block store)
  : BLOCK storage to be used with EC2

- database: RDS: (Relational database service)
  : managed relational databases.

  : DynamoDB: NoSQL database service.

- networking: VPC: virtual private cloud:
  : isolated networks within the cloud

  : Route 53: scalable DNS & domain registeration.

- security: IAM: (identity & access management).
  : manage access to AWS resources.

  : KMS: (Key management service)
  : manage encryption keys

IV Amazon EC2 : [Elastic compute cloud]

its a core AWS service that provides scalable computing capacity in the cloud.

Key features:

- instance : types : general purpose : balanced resources for various workloads (t2, t3)
  - : compute optimised : high performance processors for compute intensive tasks (c5).
  - : memory optimised : large memory for memory intensive applications. (r5).
  - : storage optimised : high speed storage for data intensive tasks (i3).
- Elasticity : auto scaling : automatically adjust the no. of instances based on demand
  - : elastic load balance (ELB) : distribute incoming traffic across multiple instances.
- Security : security grps : virtual firewalls to control inbound & outbound traffic.
  - : key pairs : secure access using SSH keys

- Pricing models: On demand: pay for compute capacity by hr.

: Reserved instances: commit to 1-3 yr term

: Spot instances: bid for unused EC2 capacity for cost savings.

- Storage options: EBS : Elastic block store.
: Persistent block storage for EC2

: instance store: temporary storage.

→ Amazon EC2 enable users to launch & manage virtual servers, providing flexibility to scale computing resources up or down as needed, making it a fundamental tool for cloud based DS project.