Cloud Service Models

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What is a Cloud?

A cloud is a type of parallel and distributed system consisting of a collection of interconnected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on service-level agreements established through negotiation between the service provider and consumers.

It is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Benefits of Cloud Computing

1. Large enterprises can offload some of their activities to Cloud-based systems.
2. Small enterprises and start-ups can afford to translate their ideas into business results more quickly without excessive upfront costs.
3. System developers can concentrate on the business logic rather than dealing with the complexity of infrastructure management and scalability.
4. End users can have their files accessible from everywhere and any device.
5. No upfront commitments.
6. On demand access.
7. Competitive pricing.
8. Simplified application acceleration and scalability.
9. Efficient resource allocation & energy efficiency.

Cloud Service Models

Each layer provides a different service to users.

IaaS solutions are sought by users that want to leverage Cloud computing from building dynamically scalable computing systems requiring a specific software stack. IaaS services are therefore used to develop scalable websites or for background processing.

IaaS solutions target mostly end users, who want to benefit from the elastic scalability of the Cloud without doing any software development, installation, configuration, and maintainence. SaaS service providers often utilise this.

PaaS solutions provide scalable programming platforms for developing applications, and are useful when new systems have to be developed.

1. **Infrastructure as a Service (IaaS)**
   - Consists of Virtualised Servers, Storage and Networking.
   - IaaS solutions deliver infrastructure on demand in the form of virtual hardware, storage and networking.

- Virtual hardware is utilized to provide compute on demand in the form of virtual machine instances.
- These are created on user's request on the provider's infrastructure, and users are given tools and interfaces to configure the software stack installed in the VM.
- Pricing model is usually defined in terms of dollars per hours.
- Virtual storage is delivered in the form of raw disk space or object store.
- Raw disk space is a virtual hardware that has persistent storage.
- Object storage is a high level abstraction for storing entities rather than files. It is a data storage architecture for storing unstructured data, which sections data into units object and stores them in a structurally flat data environment.
- Vitual networking identifies the collection of services that manage the networking among virtual instances and their

connectivity towards the internet or private networks.

- Ex - Amazon(EC2, S3), Rightscale, vCloud etc.

2. **Platform as a Service (PaaS)**

- Consists of Runtime Environment for Applications, Development and Data Processing Platforms.

- PaaS deliver scalable and elastic runtime environments on demand that host the execution of applications.

- These services are backed by a core middleware platform that is responsible for creating the abstract environment where applications are deployed and executed.

- The service provider takes care of scalability and managing fault-tolerance, while Users focus on logic of the application developed by leveraging the provider's APIs and libraries.

- This approach increases the level of abstraction but also constrains the user in a more controlled environment.

- Ex - Windows Azure, Hadoop, Google AppEngine, Aneka etc.

3. **Software as a Service (SaaS)**
   - Consists of End-user applications like social networking, photo editing, CRM etc.
   - Provides applications and services on demand.
   - Most common desktop applications are replicated on the provider's infrastructure, made more scalable, and accessible through a browser on demand.
   - These applications are shared across multiple users, whose interaction is isolated from other users.
   - The SaaS Layer is the one that includes Social Networking websites, which leverage cloud based infrastructures to sustain the load generated by their popularity.
   - Ex - Shopify, Adobe, Twiiter, Zoom, Salesforce etc.
4. **Function as a Service (FaaS)**
   - FaaS is also known as Serverless Computing.

- It is a cloud computing model in which cloud providers manage the infrastructure and automatically allocate resources as needed for executing individual functions or pieces of code.
- In FaaS architecture, you write and deploy small, self-contained functions or microservices, and the cloud provider takes care of scaling, managing, and maintaining the underlying infrastructure, allowing developers to focus solely on writing code.
- FaaS is an excellent choice for applications that have variable workloads and need to respond quickly to events.
- It's commonly used for web applications, microservices, data processing, and IoT (Internet of Things) applications.
- Ex - AWS Lambda, Azure Functions, Google Cloud Functions, IBM Cloud Functions, Alibaba Cloud Function Compute etc.

Thanks For Reading! 💙

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