

Cloud as a Service

Q1 List and explain the attributes of cloud infrastructure. How cloud infrastructure can deliver 'IT-as-a-Service' to the end-users.

Attributes

Learn 4-5 points only

- **On-demand self-service:** The Cloud computing services do not require any human administrators, users themselves are able to provision, monitor, and manage computing resources as needed.
- **Broad network access:** The Computing services are generally provided over standard networks and heterogeneous devices.
- Clouds implement a 'pay-as-you-go' billing model.
- No lock-in of resources and no upfront investment in procuring resources.
- **Resource pooling:** Resources are shared across multiple applications and occupants in an uncommitted manner. Multiple clients are provided service from the same physical resource.
- **Rapid elasticity:** The Computing services should have IT resources that are able to scale out and quickly and on a needed basis. Whenever the user requires services it is provided to him and it is scale-out as soon as its requirement gets over.
- **Measured service:** The resource utilization is tracked for each application and occupant, it will provide both the user and the resource provider with an account of what has been used. This is done for various reasons like monitoring billing and effective use of resources.

IT-as-a-Service

IT as a service (ITaaS) is an operational model where the information technology (IT) service provider delivers an information technology service to a business. The

information technology is typically delivered as a managed service with a clear IT services catalog and pricing associated with each of the catalog items. Under an ITaaS model, the IT service provider will place great emphasis on the needs and the outcomes required by the business to improve employee productivity and improving the top line (revenue) and bottom line (profitability). Such services will have a deep industry focus to fully enable industry specific use cases. The benefits to the business sought by using the ITaaS model include the standardization and simplification of products delivered by IT, improved financial transparency and more direct association of costs to consumption.

Q2 Explain the gamut of cloud solutions.

Software as a Service (SaaS)

Software as a Service provides you with a completed product that is run and managed by the service provider. In most cases, people referring to Software as a Service are referring to end-user applications. With a SaaS offering you do not have to think about how the service is maintained or how the underlying infrastructure is managed; you only need to think about how you will use that particular piece of software. A common example of a SaaS application is web-based email where you can send and receive email without having to manage feature additions to the email product or maintaining the servers and operating systems that the email program is running on.

Platform as a Service (PaaS)

Platforms as a service remove the need for organizations to manage the underlying infrastructure (usually hardware and operating systems) and allow you to focus on the deployment and management of your applications. This helps you be more efficient as you don't need to worry about resource procurement, capacity planning, software maintenance, patching, or any of the other undifferentiated heavy lifting involved in running your application.

Infrastructure as a Service (IaaS)

Infrastructure as a Service, sometimes abbreviated as IaaS, contains the basic building blocks for cloud IT and typically provide access to networking features, computers (virtual or on dedicated hardware), and data storage space. Infrastructure as a Service provides you with the highest level of flexibility and management control over your IT resources. Services offered by this delivery model include: server

hosting, web servers, storage, computing hardware, operating systems, virtual instances, load balancing, Internet access, and bandwidth provisioning.

Storage as a Service (STaaS)

Storage as a Service or STaaS is cloud storage that you rent from a Cloud Service Provider (CSP) and that provides basic ways to access that storage. Enterprises, small and medium businesses, home offices, and individuals can use the cloud for multimedia storage, data repositories, data backup and recovery, and disaster recovery. The key benefit to STaaS is that you are offloading the cost and effort to manage data storage infrastructure and technology to a third-party CSP.

Desktop as a Service (DaaS)

Desktop as a Service (DaaS) is a cloud computing offering where a service provider delivers virtual desktops to end users over the Internet, licensed with a per-user subscription. The provider takes care of backend management for small businesses that find creating their own virtual desktop infrastructure to be too expensive or resource-consuming. This management typically includes maintenance, back-up, updates, and data storage. Cloud service providers may also handle security and applications for the desktop

Q3 Discuss the principal technologies used for cloud computing

- The key to provide a dynamic cloud infrastructure is the virtualization layer that sits between the cloud instances and the physical hardware it runs on. The platform virtualization software — the hypervisor — allows multiple operating system instances to run as guest on the same server.
- The main drivers for cloud computing are cost, agility, and time to market. By building cloud infrastructures using a cloud orchestrator and provisioning engine, one can realise cost savings and improve time to market. The cloud orchestrator and the provisioning engine sits on top of the virtualization layer working on the network, server, and storage. It is a layer of software that
 - Interacts with multiple servers,
 - Enables IT departments to pool resources together across service, and
 - Define standardized tiers of services called virtual compute centres.

- This helps in sharing of infrastructure.
- Cloud orchestrator and provisioning engine helps IT departments to define organisation's and users in a secure multi tenant environment. It creates standardized collection of virtual machines and set policies on how users can use this VMs.
- It allows writing workflows to automate the creation of the cloud infrastructure.

Q4 Explain the cloud implementation planning phase with key steps.

- Cloud strategy provides high-level guidance to define the cloud strategy and the artefacts that describe the architecture of a cloud-enabled application.
- These artefacts are meant for the implementation planning phase of the cloud for enabling an application. Only high-level architecture of the system is captured in these artefacts.
- This phase also takes care of linking the business strategy that is defined for a business to adopt a cloud based strategy and the IT requirements for the application on the cloud that are needed to support this strategy.
- The key steps in cloud implementation planning are as follows:
 - Understand the cloud strategy
 - Define the cloud application requirements
 - Assess the cloud readiness
 - Define high-level cloud architecture
 - Identify changes in management requirements
 - Develop a roadmap and implementation plan.

5. How SOA architecture is useful for implementing applications in the cloud.

- SOA is a very useful architectural style for implementing applications in the cloud. Adoption of SOA is the best way to leverage and consume the application services provided by the cloud.

- A cloud based application consists of many granular services offered on the cloud. These cloud offerings may in turn integrate and leverage services and systems from different environments.
- Standardization across different IT environments is not possible, and consists of heterogeneous environment.
- SOA removes barriers for cloud clients, it employs mechanism that allows IT systems to work together cohesively within one enterprise. These services also comprise consumable interfaces which may be user interfaces, web service interfaces, feeds, or widgets.
- SOMA (Service Oriented Modelling and architecture) is applied with a meet-in-middle approach. Business processes, business strategy along with business goals stated are used to arrive at the service portfolio using SOMA.

6. With a block diagram explain the conceptual cloud model.

7. List and explain the various “Service Definitions” defined for cloud computing environment.