

Cloud Deployment Models

Q1 Characteristics of Cloud Computing

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.

Q2 How does cloud computing help reduce costs for business?

- **Reduce the burden on IT support:**
 - Desktop support, and the infrastructure it takes to provide desktop support, are areas that cloud computing helps companies reduce costs. By using cloud computing, companies, such as engineering firms, can:
 - Scale down their internal IT workforce.
 - Shift their IT personnel to other company roles

- IT personnel continue to utilize their skills and provide value to the company
- Shifting IT personnel's roles allows the engineering firm to stay focused on engineering analysis while still providing high-quality IT service to their analysts.
- **Reduce fixed cost for infrastructure:**
 - For an engineering firm, a cloud partner can maintain all the hardware and infrastructure needed to stay competitive in the increasingly demanding high-tech area.
 - Computer clusters and data centers require dedicated space and resources to operate.
 - A cloud partner will provide and optimize computing resources for the engineering firm at a lower overhead cost than if having to continuously invest in up-to-date hardware.
- **Remote workforce and collaboration:**
 - Using cloud computing, simulation experts can optimize the output of a distributed team.
 - Cloud computing allows many engineers to collaborate in real-time from anywhere in the world which improves resource efficiency while maintaining a relatively low-cost operation model.
- **Less demanding labor and maintenance:**
 - Cloud solutions can also lead to a dramatic decrease in labor and maintenance costs. As a result of the hardware being owned by vendors and stored in off-site locations, there is less demand for in-house IT staff.

Q3 What are the four benefits of adopting cloud computing?



Write advantages from the Introduction chapter.

Q4 Cloud computing deployment models

Public

In this, the business rents the services that are required and pays for what is utilized on-demand. The resources are owned, maintained & operated by a third-party cloud service provider, and delivered over the internet. Eg: AWS, GCP, Microsoft Azure, etc.

Private

Private cloud refers to a cloud deployment model operated exclusively to a single organization. It provides computing services to a private internal network and selected users, instead of the public in general. Eg: HP Data Centers, Elastra-private cloud, Ubuntu, etc.

Hybrid

A hybrid cloud is a heterogeneous distributed system formed by combining facilities of the public cloud and private cloud. For this reason, they are also called **heterogeneous clouds**.

A major drawback of private deployments is the inability to scale on-demand and efficiently address peak loads. Here public clouds are needed. Hence, a hybrid cloud takes advantage of both public and private clouds.

Ex: Implementing database using on-premise private servers and using third-party cloud service providers like AWS as load balancing or computing solutions.

Q5 List 8 workloads suitable for public clouds and 6 workloads that are not suitable for public clouds.

Suitable on Public Cloud

- Web Pages
- Public Wikis and Blogs
- Online storage solutions
- Online backup & restore solutions
- Jobs with lower security constraints

Not suitable on Public Cloud

- Workloads which are composed of other services
- Workloads needing high-level accountability
- Requiring high output online transaction processing
- Workloads that depend on sensitive data

Q6 Describe the following in 2 or 3 sentences

a) Community cloud b) Shared private cloud

c) Dedicated private cloud

d) Dynamic private cloud

Community Cloud

Community clouds are distributed systems created by integrating the services of different clouds to address the specific needs of an industry, a community, or a business sector.

In the community cloud, the infrastructure is shared between organizations that have shared concerns or tasks. The cloud may be managed by an organization or a third party.

Ex: Our government organization within India may share computing infrastructure in the cloud to manage data.

Shared Private Cloud

It is a shared computing capacity with variable usage based pricing to business units that depend on service offering, accounts, datacentres, etc. It requires internal profit centres to take over or to buy infrastructure made available through account consolidation.

Dedicated Private Cloud

Dedicated Private Cloud (DPC) is defined as physically isolated, single-tenant collection of compute, network and sometimes storage resources exclusively

provisioned to just one organization or application. DPCs are scalable, isolated computing environments that are tailored to fit unique requirements and rightsized for any of workload or application.

Dynamic Private Cloud

Dynamic designs, implements and manages a Private Cloud end-to-end, complete with firewalls, VPN's, server instances for your applications, database servers, security layers and backup strategy. Your private Cloud is segregated from other customers and built under a separate account – fully managed, monitored and managed by the service provider.

Q7. List and explain 9 cloud computing security concerns.

Clouds are affected by malicious attacks and failures of the infrastructure. Such events can affect Internet domain name servers and prevent access to a cloud or can directly affect the clouds.

- **Misconfigured Cloud Storage:** Cloud storage is a rich source of stolen data for cybercriminals. Despite the high stakes, organizations continue to make the mistake of misconfiguration of cloud storage which has cost many companies greatly. According to a report, nearly 70 million records were stolen or leaked in 2018 due to misconfigured cloud storage buckets.
- **Insecure APIs:** Application user interfaces (APIs) are intended to streamline cloud computing processes. However, if left insecure, APIs can open lines of communications for attackers to exploit cloud resources.
- **Poor Access Management:** Improper access management is perhaps the most common cloud computing security risk. When companies are not aware of how their employees are using cloud computing services, they could lose control of their data assets and ultimately become vulnerable to breaches and insider security threats.

Such events can affect the Internet domain name servers and prevent access to a cloud or can directly affect the clouds:

- In 2009, Google was the target of a denial of service attack which took down Google News and Gmail for several days.
- In 2012 lightning caused a prolonged downtime at Amazon.

