**1) What is cloud computing and their advantages? explain the types of cloud?**

Cloud computing: It refers to manipulating, configuring, and accessing the hardware and software resources remotely. It offers online data storage, infrastructure, and application. Cloud computing offers platform independency, as the software is not required to be installed locally on the PC.

Advantages: 1) Back-up and restore data

Once the data is stored in the cloud, it is easier to get back-up and restore that data using the cloud.

2) Improved collaboration

Cloud applications improve collaboration by allowing groups of people to quickly and easily share information in the cloud via shared storage.

3) Excellent accessibility

Cloud allows us to quickly and easily access store information anywhere, anytime in the whole world, using an internet connection.

4) Low maintenance cost

Cloud computing reduces both hardware and software maintenance costs for organizations.

5) Mobility

Cloud computing allows us to easily access all cloud data via mobile.

6) Unlimited storage capacity

Cloud offers us a huge amount of storing capacity for storing our important data such as documents, images, audio, video, etc. in one place.

There are four types of cloud:

1. Public cloud

2. Private cloud

3. Hybrid cloud

4. Community cloud

1.Public cloud:

Public cloud are managed by third parties which provide cloud services over the internet to public, these services are available as pay-as-you-go billing mode.

2.Private cloud :

Private clouds are distributed systems that work on a private infrastructure and providing the users with dynamic provisioning of computing resources.

3.Hybrid cloud:

Hybrid cloud is a heterogeneous distributed system resulted by combining facilities of public cloud and private cloud. For this reason they are also called heterogeneous clouds.

4.Community cloud:

Community cloud is a multi-tenant platform which allows several companies work on the same platform, given that they have similar needs and concerns.

**2)What amazon has?what are the types of security threats? Explain the key principles?**

Amazon has AWS. Amazon Web Services (AWS) offers a broad set of global cloud-based products including compute, storage, databases, analytics, networking, mobile, developer tools, management tools, IoT, security and enterprise applications. These services help organizations move faster, lower IT costs, and scale.

Types of security threads:

1. Phishing

Research shows that 30 percent of phishing emails are opened and that 91 percent of breaches begin with a phishing attack. In particular, the AWS root account is especially important to protect with MFA, as it holds access to anything and everything.

2. Password Management

Breaches of third-party websites are another common method of AWS credential exposure. Along with breaches, bad or guessable passwords are a risk factor.

3. Credential Leaks

Another source of reported AWS compromises is credentials being leaked via public source code or documentation. It’s important to treat your AWS Access Keys as securely as passwords. Never hardcode them into source code or documentation. Never email them or let them escape outside of the organization.

4. Network Security

The cloud environment is no different from your on-premises environment in network regards.Develop strong allow or block listing rules to apply to your firewalls to limit service access and exposure.

5. Security Incident Recovery Planning

DoS attacks can be mitigated using the AWS Shield managed denial of service protection.This should be investigated, so that you are prepared to react in the case of an expensive denial of service attack.

**Key Principles:**

Understand the fundamentals of pricing

There are three fundamental drivers of cost with AWS: compute, storage, and outbound data transfer. These characteristics vary somewhat, depending on the AWS product and pricing model you choose.

Start early with cost optimization

The cloud allows you to trade fixed expenses (such as data centers and physical servers) for variable expenses, and only pay for IT as you consume it.

Maximize the power of flexibility

AWS services are priced independently, transparently, and available on-demand, so you can choose and pay for exactly what you need. You may also choose to save money through a reservation model.

**3)What are the cloud platform model? explain?**

This cloud platform model is ideal for large accounts, enterprises, or organizations capable of building and managing their own IT platforms. However, they want the flexibility to amend their infrastructure according to their needs.

Infrastructure as a Service (IAAS):

IAAS is a form of cloud computing that provides virtualized computing resources over the internet.

In an IAAS model, a third party provider hosts hardware, software, servers, storage and other infrastructure components on the behalf of its users. IAAS providers also host users’ applications and handle tasks including system maintenance backup and resiliency planning.support the cloud infrastructure. Mature open-source cloud management frameworks like OpenStack are available to everyone and provide strong a software foundation for companies that want to build their private cloud or become a public cloud provider.

Platform as a Service (PAAS):

Platform as a Service (PAAS) is a cloud computing model that delivers applications over the internet. In a PAAS model, a cloud provider delivers hardware and software tools, usually those needed for application development, to its users as a service. A PAAS provider hosts the hardware and software on its own infrastructure. As a result, PAAS frees users from having to install in-house hardware and software to develop or run a new application.

Software as a Service (SAAS):

Software as a Service(SAAS) is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet.SAAS is closely related to the ASP (Application service provider) and on-demand computing software delivery models. IDC identifies two slightly different delivery models for SAAS namely the hosted application model and the software development model.

**4)write the URL for s3 pricing, EC2 pricing, Simple Monthly Calculator, TCO Calculator?**

S3 Pricing url: https://aws.amazon.com/s3/pricing/

EC2 Pricing url: https://aws.amazon.com/ec2/pricing/

Simple Monthly Calculator: https://calculator.s3.amazonaws.com/index.html

TCO Calculator: https://calculator.aws/#/del and the software development model.

**5)What is server virtualization? Explain with diagram?**

Server virtualization is the process of dividing a physical server into multiple unique and isolated virtual servers by means of a software application. Each virtual server can run its own operating systems independently.

*Key Benefits of Server Virtualization:* Higher server ability; Cheaper operating costs

|  |  |  |
| --- | --- | --- |
| **Virtual MACHINE** | **Virtual MACHINE** | **Virtual MACHINE** |
| Application | Application | Application |
| OS | OS | OS |
| Hypervisor | Hypervisor | Hypervisor |
| Virtual file system(VFS) | Virtual file system(VFS) | Virtual file system(VFS) |

**6)what is EC2 instance? Explain the types of storage?**

Amazon EC2 instances are the most important elements for the computing experience on the AWS Cloud platform for most users. They are a core component of any customer infrastructure, and being so, Amazon Web Services offers a variety of instance types, each with its own unique combination of CPU, memory, storage and networking capabilities.This provides users with the freedom to select the appropriate mix of resources for the cloud needs.They can select their instance type and size based on their requirements, and AWS provisions them on the fly, allowing these users the incredible ability to boot up hundreds of servers if they so desire within just minutes.

Types of storage:

1)Amazon EBS

Amazon EBS provides durable, block-level storage volumes that you can attach to a running instance. You can use Amazon EBS as a primary storage device for data that requires frequent and granular updates. For example, Amazon EBS is the recommended storage option when you run a database on an instance.

An EBS volume behaves like a raw, unformatted, external block device that you can attach to a single instance. The volume persists independently from the running life of an instance. After an EBS volume is attached to an instance, you can use it like any other physical hard drive. As illustrated in the previous figure, multiple volumes can be attached to an instance. You can also detach an EBS volume from one instance and attach it to another instance. You can dynamically change the configuration of a volume attached to an instance.

EBS volumes can also be created as encrypted volumes using the Amazon EBS encryption feature.

2)Amazon EC2 instance store

Many instances can access storage from disks that are physically attached to the host computer.

This disk storage is referred to as instance store. Instance store provides temporary block-level storage for instances. The data on an instance store volume persists only during the life of the associated instance; if you stop, hibernate, or terminate an instance, any data on instance store volumes is lost. For more information, see Amazon EC2 instance store.

3)Amazon EFS file system

Amazon EFS provides scalable file storage for use with Amazon EC2. You can create an EFS file system and configure your instances to mount the file system.

You can use an EFS file system as a common data source for workloads and applications running on multiple instances.

4)Amazon S3

Amazon S3 provides access to reliable and inexpensive data storage infrastructure.

It is designed to make web-scale computing easier by enabling you to store and retrieve any amount of data, at any time, from within Amazon EC2 or anywhere on the web. For example, you can use Amazon S3 to store backup copies of your data and applications. Amazon EC2 uses Amazon S3 to store EBS snapshots and instance store-backed AMIs.