ITA6009 - Cloud Computing

Winter Semester 2022-23

Assignment - I

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Question

Q 1) Construct a cloud infrastructure with the following requirements:

* Cloud Governance
* Security Policies
* Services offered by cloud with its deployment models.
* Cloud Orchestrations
* Roles and their responsibilities

Ans → Designing a cloud infrastructure is a complex process. Here are the requirements for a cloud infrastructure in detail:-

i) Cloud Governance - It refers to the policies, procedures and frameworks that ensure effective management and control of cloud services. It includes the following components:-

a) Cloud Management Platform - It is a tool that enables organizations to manage their cloud infrastructure efficiently.

b) Compliance and Regulation - It refers to the adherence to legal, regulatory and industry standards.

c) Cost Optimization — It refers to the effective use of resources to reduce cost.

ii) Security Policies — These are a set of guidelines and procedures that ensure the security of cloud infrastructure. The following are some of the essential security policies:

a) Identity and Access Management — It is the process of maintaining and managing user identities and their access to cloud resources.

b) Data Encryption — It is the process of converting data into secure format to prevent unauthorized access.

c) Network Security — It include measures to protect the cloud infrastructure from network based attacks.

iii) Services offered by cloud with its Deployment Model

There are different types of services offered by cloud.

a) Infrastructure as a Service (IaaS) — It provides access to virtualized computing resources.

b) Platform as a Service (PaaS) — It provides a platform for developing, testing and deploying applications.

c) Software as a Service (SaaS) — It provides access to software application that are hosted on cloud.

Deployment Models

a) Public Cloud – A cloud infrastructure that is accessible to the public over the internet.

b) Private Cloud – A cloud infrastructure that is used exclusively by a single organization.

c) Community Cloud – A cloud infrastructure that is used by multiple organizations.

d) Hybrid Cloud – A cloud infrastructure that combines public and private clouds.

iv) Cloud Orchestration

It is the process of automating the deployment, management and monitoring of cloud resources.

a) Provisioning – It is the process of creating and deploying cloud resources.

b) Configuration Management – It is the process of managing configuration of cloud resources.

c) Monitoring and Scaling – The process of monitoring the performance of cloud resources.

v) Roles and Responsibilities

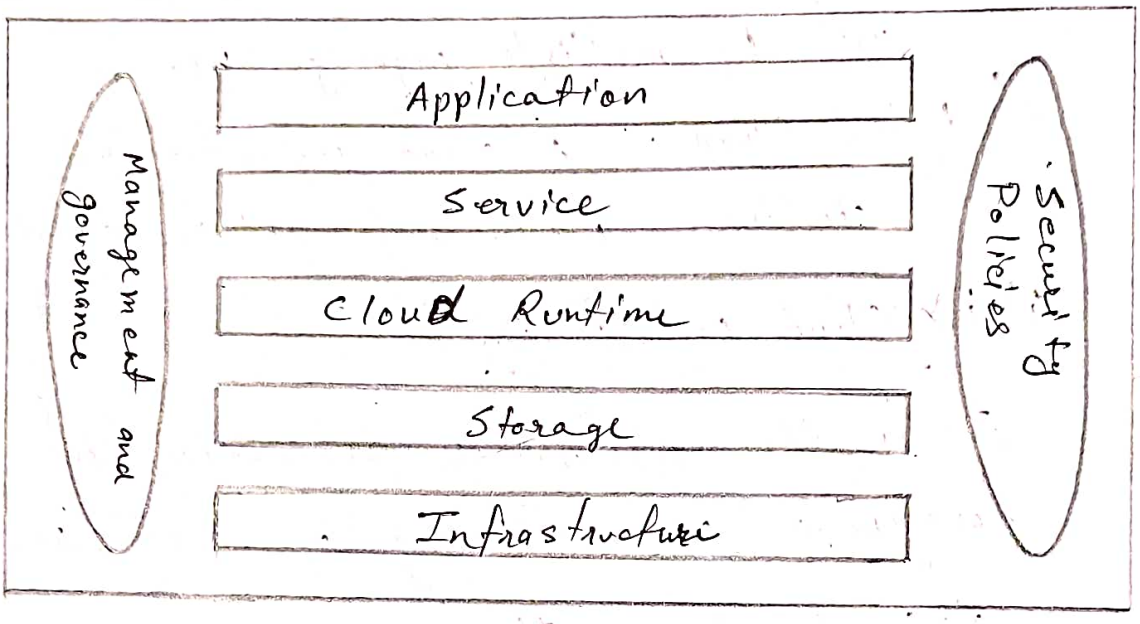
a) Cloud Architect – Person responsible for designing and implementing the cloud infrastructure.

b) Cloud Engineering – Person responsible for deploying, configuring and maintaining the cloud infrastructure.

c) Cloud Administrator – ~~A cloud security~~ Person responsible for managing and monitoring the cloud infrastructure.

d) Cloud security Engineer — Person responsible for ensuring the security of the cloud infrastructure.

e) Cloud Developer — Person responsible for developing and deploying applications on cloud infrastructure.



Diagram

Q2) Choose an application of your own and give detailed description on the following :-

a) Cloud Infrastructure

b) Description of Infrastructure components and activities.

c) Assumptions Made

d) SLA

Ans> We are chosing a cloud application for Online Retail Store. We are chosing this scenario to provide the detailed description about the ~~topics~~ given topics.

a) Cloud Infrastructure - The cloud infrastructure for an online retail store typically consists of the following components.

* Compute - includes virtual machines and serverless computing resources to host application and run business Logic.
* Storage - includes objects and files storage to store product images, customer data, sale and purchase data, etc.
* Network - includes virtual private clouds, load balancers to provide secure and high-performance connectivity.
* Database - includes relational and non-relational databases to store transaction data, product information and customer reviews.
* Security - includes identity and access management, encryption and firewall service to secure the application and data.
* Monitoring - includes logging, monitoring and analytics services that provide visibility into the application and infrastructure.

b) Description of Infrastructure Components and Activities

The first and most important activity ~~of~~ is computing of resources host the application and run the basic business logic.

The second is to store images, customer records and other important files using the storage feature. Then comes the network resources. The network resources provides secure and high performace ~~security~~ connectivity for application. The database resource stores the transaction data, product informations and customer reviews, etc. It is an important resource is it is very necessary to ~~st~~ record the above mentioned data.

The most important activity is to secure the cloud resources and data. The security ~~res~~ resources ensures the security of the application and customer data.

Monitoring is also important in terms of activities. The monitoring resources provides visibility into the application and infrastructure.

C) Assumptions Made

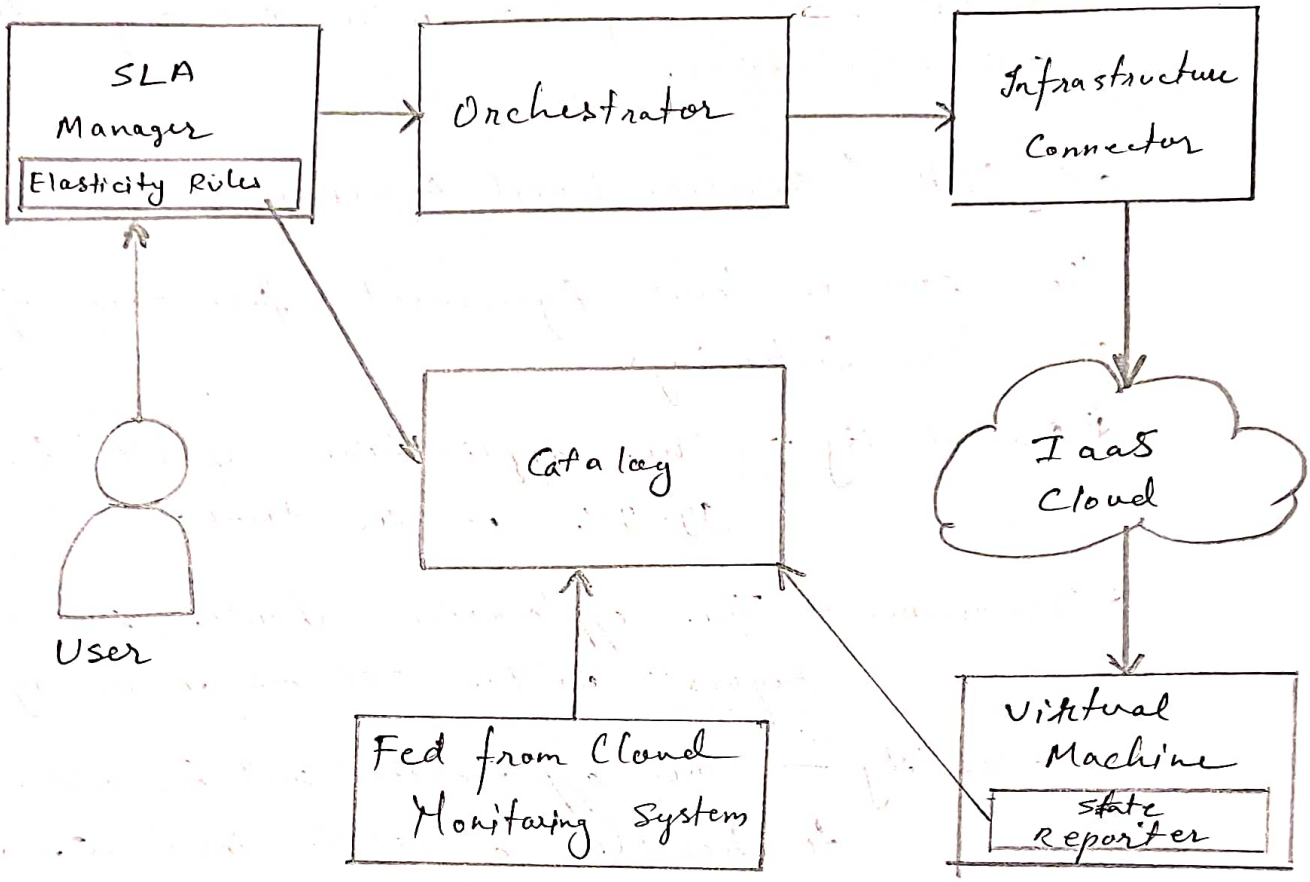
* The Online Retail Store is designed to handle a moderate amount of traffic.
* The application is designed to be highly available and fault-tolerant.
* The application is designed to be scalable to handle peak traffic loads.

* The application is designed to be ~~secure~~ secure and compliant with industry standards and regulations.

d) SLA (Service Level Agreement)

The service level Agreement for the application are the followings

* Availability - The application should be available 99.9% of the time.
* Performance - The application should respond to request within 500 ms on average.
* Scalability - The application will be able to scale to handle a 100% increase in traffic within 5 minutes.
* Security - The application should be secure and compliant with industry standards and regulations.
* Support - The application will be supported 24/7 by a team of experts who can provide timely and effective support in case of issues.


SLA
Manager
Elasticity Rules
Orchestrator
Infrastructure
Connector
Catalog
IaaS
Cloud
User
Fed from Cloud
Monitoring System
Virtual
Machine
state
reporter

Diagram