

Unit 1:

Cloud Computing Fundamental

Motivation for Cloud Computing

Innovation in hardware technology continues to increase the processing capabilities of mobile devices. The latest smart tiny communicating devices include up to eight processing cores and often have fairly powerful GPUs as well. In spite of this it may make sense to offload computation to the cloud or cloudlet. Describe two circumstances under which it might be beneficial to offload application functionality from such a powerful smart tiny communicating device. **5**

Defining Cloud Computing

a) Define Cloud computing with respect to NIST. Explain 5 Essential Characteristics. of Cloud computing with a neat diagram. **08**

a. Provide the NIST definition of cloud computing. Distinguish between the definitions of cloud computing is a service and cloud computing is a platform. **5**

a) Define Cloud computing with respect to NIST. Enlist and explain deployment models of cloud computing. **6**

a) Define Cloud computing with respect to NIST. Explain cloud computing architecture with a neat diagram. **8**

5-4-3 Principles of Cloudcomputing

a. In the 5-4-3 principles of cloud computing what does 5 represent. Explain in detail. **5**

a) Explain in detail the 5-4-3 principles of Cloud Computing. **10**

a) In the 5-4-3 principle of cloud computing, what does 3 represent? Explain in detail. **6**

Cloud Ecosystem

a) Explain with neat diagram Cloud computing actors and their roles in a typical Cloud Ecosystem? 06

b. With the help of a suitable diagram explain the role of different actors in a cloud ecosystem. 5

a) Explain with the help of a diagram cloud ecosystem. 6

Requirements for Cloud Services

c) Enlist and Explain the requirements that need to be considered for cloud services 06

c) Enlist and explain the requirements that need to be considered for cloud services 8

b. Enlist and explain any five requirements that need to be considered for cloud services. 5

Cloud Application

Benefits and Drawbacks

a) Give a brief note on the merits and demerits of cloud computing. 06

b. Name any two applications that benefits a lot by adopting cloud computing technology? Describe significant benefits (only two) that application achieves through cloud adoption? 5

a. Give a brief note on the merits and demerits of cloud computing. 5

b) What are the benefits and challenges of cloud computing? 4

b) What are the benefits and challenges of cloud computing? 6

Cloud Computing Architecture and Management

Introduction

a) Explain with the help of a diagram in detail essential characteristics of cloud computing. 6

a) Compare Traditional network and Cloud computing. 8

a) Compare Traditional network and Cloud computing. 08

a) With the help of a diagram explain in detail essential characteristics of cloud computing. 6

Cloud Architecture

c. Compare and contrast SOA and cloud computing. 5

a. At which layer of cloud computing architecture does server consolidation and storage workload consolidation helps in optimization of the resources. How does this optimization technique contribute to performance of the cloud. 5

b. How is Cloud Anatomy different from Cloud Architecture? 5

c) With a neat diagram explain Service architectural model of SOA. 6

Network Connectivity in Cloud Computing

With the help of diagrams explain how networking is managed in an on-premise and outsourced community cloud. 5

Anatomy of the Cloud

c) What do you mean by Cloud anatomy? Explain with the help of a diagram. 06

a) Write a note on the anatomy of the cloud. 5

a) What do you mean by Cloud Anatomy? Explain with the help of a diagram. 6

a) What do you mean by Cloud anatomy? Explain with the help of a diagram. 6

Applications on the Cloud

Managing the Cloud

Migrating Application to Cloud

- d. You are being appointed as a service manager for an enterprise which conducts recruitments for a government agency. Explain the steps how you will analyse to move the existing enterprise application and IT environments to any of the deployments of cloud. **5**
- a. Explain different approaches for cloud migration adopted by vendors. **5**
- b) Explain the different phases of cloud migration. **5**
- c) With the help of a neat diagram explain the cloud architecture. **5**
- a. Why there is a need to migrate from web application to cloud application? **5**
Justify your answer by providing minimum 4 disadvantages of web application.
- a) Enlist and explain Phases of Cloud Migration. **6**
- c) Explain the different Phases of Cloud Migration. **6**

Unit 2:

Cloud Deployment Models

Introduction

- c. Tim's organization is planning the future of their data center infrastructure and has decided that they would like to move to a cloud service model. They have already embraced virtualization but would like to gain the management benefits of a cloud offering. They are working with a service provider who will provision hardware for their exclusive use. That equipment will reside in a data center that serves many customers. What type of cloud deployment model is Tim's organization considering? What are the different issues which may occur with the adoption of this cloud? **5**
- d. Based on the following characteristics compare all four cloud deployment models. **5**
(Provide your answers in a form of a table)
- i. Demand for in-house infrastructure
 - ii. Ease of use
 - iii. Cost
 - iv. Ownership

Private Cloud

- d. Compare and contrast public and private clouds based on the following properties (Provide your answers in a form of a table) **5**
- i. SLA ii. Security and data privacy iii. Cloud management
- b) Compare and contrast public and private clouds **6**
- b) Compare and contrast public and private clouds. **6**
- b) What is SLA? Are SLA's different for each type of cloud deployment? **6**

- b. Discuss how are the SLA's governed at each layer in the cloud architecture? **5**

Public Cloud

- b) Explain Characteristics, suitability and non-suitability conditions of Public Cloud. **06**
- b) Explain in detail the various characteristics, suitability, issues, advantages & disadvantages of public cloud. **10**
- b) Compare and contrast Public Cloud and Private Cloud. **06**
- c. How do laws of different countries affect the public cloud model. Is public cloud less secure. Justify. **5**

Community Cloud

- a. Discuss on suitability of deployment of a community cloud? **5**

Hybrid Cloud.

- c. How do laws of different countries affect the community and hybrid cloud model. **5**
- b. How can a hybrid cloud be implemented in an enterprise environment? **5**
- c) List few advantages of using Hybrid cloud. **2**
- b. Why do you think more companies have begun adopting hybrid clouds instead of other types of cloud architectures? **5**

Cloud Service Models

Introduction

- c. Write short notes on the deployment and delivery of cloud service models with a neat diagram. **5**

Infrastructure as a Service

- c. Write short notes on end user and service provider responsibilities of cloud service models (IaaS and PaaS) with a suitable diagram. **5**
- d) Write a short note on IaaS. **4**
- b) Write a short note on characteristics of IaaS, PaaS and SaaS. **6**

Platform as a Service

- d. Discuss on the characteristics of PaaS. **5**
- a) Explain in detail the different characteristics, suitability, unsuitability, advantages & disadvantages of PaaS **10**
- b) Write advantages and disadvantages of PaaS. **6**
- b) Write advantages and disadvantages of PaaS. **6**

Software as a Service

- b) Explain Services provided by IaaS, PaaS and SaaS Providers with suitable diagram. **06**
- b) Write advantages and disadvantages of SaaS. **06**
- c) Write a note on Software as a Service. **5**

Other Cloud Service Models.

Virtualization

Introduction

- c) What is virtualization? List its benefits and drawbacks. **6**

Virtualization Opportunities

- c) Explain with neat diagram the following resources that can be virtualized **08**
- i. Data Virtualization
 - ii. Application Virtualization
- b. Differentiate application virtualization, network virtualization and storage virtualization techniques. **5**
- b) Explain the following: **9**
- i. Processor Virtualization
 - ii. Memory Virtualization
 - iii. Storage Virtualization

Approaches to Virtualization

- a) Explain the different approaches to Virtualization. **9**
- b. Differentiate full virtualization, paravirtualization, and hardware- assisted virtualization techniques. **5**
- b) Describe types of virtualization with the help of a diagram. **8**

Hypervisors

Types of Hypervisors

- a. Differentiate between type-1 and type 2 hypervisors with help of diagrams. **5**
- b) List & explain the different types of Hypervisors. **10**

Security Issues and Recommendations

- a) Explain the different attacks targeted on hypervisors with a neat diagram. **08**
- d. Explain the different attacks targeted on hypervisors with a neat diagram. **5**
- c. What are protection rings? Explain how it is used in virtualization. **5**
- c) Explain the different attacks targeted on hypervisors with a neat diagram. **8**
- c) Explain the different attacks targeted on hypervisors with a neat diagram. **8**

b) What are protection rings? Explain how it is used in virtualization.

6

From Virtualization to Cloud Computing

b) Explain how cloud computing is different from virtualization.

06

c) Elaborate on virtualization with respect to cloud computing. Enlist and explain some of common pitfalls that come with virtualization.

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