CC Week 7

topics to study:

- mobile cloud computing : key requirements
- dynamic runtime offloading

QUESTION 1:

Which of the following is/are key requirement(s) of Mobile Cloud Computing?

A) Simple APIs offering access to mobile services
B) Internet access to remotely stored applications in the cloud
C) Sophisticated APIs requiring knowledge of underlying network technologies
D) Web interface

Correct Answer: A, B, D
Detailed Solution: Refer slide 12 of Mobile Cloud Computing - I.

Mobile Cloud Computing (MCC) is a paradigm that combines the computational power of cloud computing with the ubiquity and mobility of mobile devices. It allows mobile devices such as smartphones and tablets to offload their computation, storage, and other resource-intensive tasks to remote cloud servers via wireless networks.

This enables mobile devices with limited processing power, memory, and battery life to perform complex tasks and access large amounts of data with greater efficiency and scalability.

- **Synchronizer Module**: The synchronizer module is a crucial component in Mobile Cloud Computing. Its primary function is to coordinate and manage the communication between the mobile device and the cloud infrastructure during split execution.

QUESTION 2:

In Mobile Cloud Computing, the synchronizer module collects results of split execution and combines them, and makes the execution details transparent to the user.

A) TRUE
B) FALSE

Correct Answer: A
Detailed Solution: Task of synchronizer modules is to collect results of split execution and combine, and make the execution details transparent to the user. So, the correct option is A.

QUESTION 3:

Geographical distribution of server nodes is _____ in Fog Computing and _____ in Cloud Computing.

A) Distributed, Centralized
B) Distributed, Distributed
C) Centralized, Distributed
D) Centralized, Centralized

Correct Answer: A

Detailed Solution: Geographical distribution of server nodes is Distributed in Fog Computing, and Centralized in Cloud Computing. So, the correct option is A.

When to Offload??

The amount of energy saved is :

$$P_c \times \frac{C}{M} - P_i \times \frac{C}{S} - P_{tr} \times \frac{D}{B}$$

S: the speed of cloud to compute C instructions
M: the speed of mobile to compute C instructions
D: the data need to transmit
B: the bandwidth of the wireless Internet
P_c: the energy cost per second when the mobile phone is doing computing
P_i: the energy cost per second when the mobile phone is idle.
P_{tr}: the energy cost per second when the mobile is transmission the data.

Suppose the server is F times faster—that is, S= F × M.

We can rewrite the formula as

$$\frac{C}{M} \times (Pc - \frac{P_i}{F}) - P_{tr} \times \frac{D}{B}$$

QUESTION 4:

Formulate the amount of energy saved (E) during offloading for the given dat
Energy cost/second while when mobile phone is doing computation = C1 P_c
Energy cost/second while when mobile phone is idle = C2 P_i

Energy cost/second while when mobile phone is transmitting the data = C3 P_{tr}
Speed of cloud to compute **k** instructions = Sc S
Speed of mobile to compute **k** instructions = Sm m
Data need to transmit = D
Bandwidth of the wireless Internet = B

A) E = C2*(k/Sm) - C1*(k/Sc) - C3*(D/B)
B) E = C1*(k/Sm) - C2*(k/Sc) - C3*(D/B)
C) E = C3*(k/Sm) - C2*(k/Sc) - C1*(D/B)
D) E = C1*(k/Sc) - C2*(k/Sm) - C3*(D/B)

QUESTION 6:

Population of a city/town is a static geographic information.

A)TRUE

B)FALSE

Correct Answer: B

Detailed Solution: Population of a city is a dynamic geographic information.

QUESTION 7:

Which of the following statement(s) is/are FALSE about Fog Computing?

A) Intelligence is brought to the cloud from the end users.
B) Fog computing is used for real-time applications
C) Fog nodes' response time is higher than cloud server
D) Network routers, WiFi Gateways will be capable of running applications

Correct Answer: A, C

QUESTION 8:

Fog Computing has _____ number of server nodes and has _____ delay jitter compared to Cloud Computing.

A) small, higher
B) large, higher
C) small, lower
D) large, lower

Correct Answer: D

Detailed Solution: Fog Computing has a very large number of server nodes and has lower delay jitter compared to Cloud Computing. Hence, the correct answer is D.

Geospatial Cloud Models: These are systems that combine geospatial (location-based) data with cloud computing, allowing users to access and work with maps, satellite imagery, and other location-related information over the internet.

Interoperability: This is the ability of different systems or components to work together smoothly.

QUESTION 9:

In Geospatial Cloud Models, which level of interoperability ensures the ability to "consume" the information?

A) Service Level Interoperability
B) Security Level Interoperability
C) Data Level Interoperability
D) None of the above

Correct Answer: C
Detailed Solution: Data Level Interoperability ensures the ability to "consume" the information. So the correct option is C. Refer to interoperability in Challenges in Geospatial Cloud.

- Service Level Interoperability (Option A) is about systems being able to communicate and exchange services. It's important, but it's not directly about consuming data.
- Security Level Interoperability (Option B) is about maintaining security while exchanging data.
- Data Level Interoperability (Option C) is all about making sure different systems can understand and use the same data.

QUESTION 10:

Consider the statements and select the correct answer:
Statement I: In Geospatial cloud, data services in cloud can be run through IaaS service model.
Statement II: Web service is the key technology to provide Geospatial services.

A) Statement 1 is correct but Statement 2 is incorrect
B) Statement 2 is correct but Statement 1 is incorrect
C) Both the statements are correct
D) Both the statements are incorrect.

Correct Answer: B
Detailed Solution: In Geospatial cloud, data services in cloud can be run through PaaS service model. Web service is the key technology to provide Geospatial services. Hence, B is the correct answer.

Geospatial cloud services typically utilize the PaaS (Platform as a Service) model rather than the IaaS (Infrastructure as a Service) model for running data services. PaaS provides a platform for developing, deploying, and managing applications, which is more suitable for geospatial data services as it abstracts away the underlying infrastructure concerns.

QUESTION 5:

Which of the following is/are not a benefit of Fog computing?

A) Location awareness

B) Higher latency as compared to cloud computing

C) Improved QoS

D) Man-in-the-middle-attack

Correct Answer: B, D

Detailed Solution: Fog results in low latency, which is one of its major benefits. As the computing data is over dispersed edge devices, there may occur issues like Man-in-the-middle-attack. So, the correct answers are B and D.

QUESTION 1:

Which of the following options is correct about geographic information?

Statement 1: Geographic information could be static or dynamic.

Statement 2: Geographic information varies in scale

Statement 3: Population of a city/town is a static geographic information

a. Statement 1 & 2 are True, but Statement 3 is False.
b. Statement 2 & 3 are True, but Statement 1 is False.
c. Statement 1& 3 are True, but Statement 2 is False.
d. All the statements are True.

Correct Answer: a

Detailed Solution: Population of a city is a dynamic geographic information.

QUESTION 2:

Which of the following is true about geographical information system? Choose the most appropriate option.

a) Variable load of the GIS server needs dynamic scaling of resources.

b) GIS uses network intensive web services.

c) GIS requires a high level of reliability.

d) All of these.

Correct Answer: d

QUESTION 8:

Fog Computing has _____ number of server nodes and has _____ delay jitter compared to Cloud Computing.

A) small, higher
B) large, higher
C) small, lower
D) large, lower

Correct Answer: D

Detailed Solution: Fog Computing has a very large number of server nodes and has lower delay jitter compared to Cloud Computing. Hence, the correct answer is D.

QUESTION 4:

Which of the following statements is false about Code offloading using cloudlet?

Statement 1: The architecture reduces latency by using multi-hop network.

Statement 2: It potentially lowers battery consumption by using short range radio.

a. Statement 1 is correct but Statement 2 is incorrect
b. Statement 2 is correct but Statement 1 is incorrect
c. Both the statements are correct
d. Both the statements are incorrect.

Correct Answer: b

Detailed Solution: The architecture reduces latency by using a single-hop network and potentially lowers battery consumption by using Wi-Fi or short range radio. So, the correct option is (b).

Latency = delay or the amount of time it takes for data to travel from its source to its destination in a network.

Code offloading is a strategy used in mobile computing where certain tasks or computations are shifted from a mobile device, like a smartphone or tablet, to a more powerful computing resource, typically a remote server or cloud infrastructure.

A cloudlet is a small-scale cloud data center or server located at the edge of a network, typically in close proximity to mobile users.

QUESTION 5:

Which of the following are some of the key components of Mobile cloud computing ? Choose the most appropriate option.

a. Solver
b. Synchronizer
c. Profiler
d. All of the above

Correct Answer: d

Detailed Solution: Profiler, Solver and Synchronizer are some of the key components of mobile cloud computing. So, the correct option is (d).

Profiler analyzes the mobile environment, Solver optimizes task distribution and execution in the cloud, and Synchronizer coordinates data and task synchronization between mobile devices and the cloud.

QUESTION 7:

Fog computing enablers are

a. Virtualization
b. Big data
c. Service oriented architecture
d. None of these

Correct Answer: a, c

Detailed Solution: Fog computing enablers are Virtualization, Service oriented architecture.

Correct options are (a), (c).

QUESTION 8:

Which of the following is/are feature(s) of Mobile Cloud Computing?

a) Use less mobile device resources because applications are cloud-supported
b) Reduce reliability with information backed up and stored in the cloud
c) Mobile devices connect to services delivered through an API architecture
d) Facilitates slower development, delivery and management of mobile apps

Correct Answer: a, c

Which of the following is/are the challenge(s) of Geospatial Cloud?

a) Scaling of Spatial Databases
b) Policy management among the tenants
c) Implementation of Spatial Databases
d) None of the above

Correct Answer: a, b, c

Detailed Solution: Challenges of Geospatial Cloud are as follows-
1. Implementation of Spatial Databases
2. Scaling of Spatial Databases
3. Policy management among the tenants

So, the correct options are (a), (b), (c).

QUESTION 1:

Fog Computing is applicable in

a) Smart Grid
b) Smart Traffic Light
c) Connected Vehicles
d) None of the above

Correct Answer: a, b, c

Detailed Solution: Fog computing is implemented in Smart Grid, Start Traffic light, Connected Vehicles. So, the correct options are (a), (b), and (c).

QUESTION 2:

Fog Computing has _____ probability to attack on data enrouter and required _____ number of server nodes than Cloud Computing.

a) lower , less
b) lower, large
c) higher, less
d) higher, large

Correct Answer: b

Detailed Solution: Fog Computing has a lower probability to attack on data enrouter and required a large number of server nodes than Cloud Computing. Refer to Lecture 34.

QUESTION 3:

Consider the following statements:

Statement 1: In Geospatial Cloud, it is needed to integrate data from heterogeneous back-end data service.

Statement 2: Data services can be inside and/or outside of the cloud environment in Geospatial Cloud.

a. Statement 1 is Correct, but Statement 2 is Incorrect.

b. Statement 2 is Correct, but Statement 1 is Incorrect.

c. Both statements are Correct.

d. Both statements are Incorrect

Correct Answer: c

Detailed Solution: Both statements are correct regarding Geospatial Cloud concept. So, the correct option is (c). Refer to Lecture 35.

QUESTION 6:

Which of the following statement(s) is/are FALSE about Fog Computing?

a) Fog nodes present near to the end-user

b) Fog computing enables real-time applications

c) Fog nodes' response time is much higher than Cloud's

d) Network routers, WiFi Gateways will not be capable of running applications

Correct Answer: c, d

Detailed Solution: Fog nodes present near to the end-user, Fog computing use for real-time applications, Fog nodes' response time is much lower than cloud server, network routers, WiFi Gateways will be capable of running applications. So, the correct options are (c), (d).

QUESTION 8:

Benefits of Fog Computing is/are:

a. Immobility
b. Low latency and location-aware.
c. Homogeneity
d. Widespread geographical distribution.

Correct Answer: b, d
Detailed Solution: Benefits of Fog Computing are (i) Very large number of nodes are involved, (ii) Low latency and location-aware, (iii) Heterogeneity and (iv) Widespread geographical distribution. So, correct option is (b) and (d).

QUESTION 9:

Distance between the client and server in Cloud Computing is of _____ and Fog computing is _____.

a) One Hop, Multiple Hop
b) One Hop, One Hop
c) Multiple Hop, One Hop
d) Multiple Hop , Multiple Hop

Correct Answer: c
Detailed Solution: Distance between the client and server in Cloud Computing is of multiple hop and Fog computing is one hop. Refer Lecture 34.

a "hop" refers to a single point of traversal along a path between two network devices.
In cloud computing, data typically travels through multiple network hops to reach the remote server in the cloud, while in fog computing, the server or computing resource is located closer to the client, often within a single hop.

QUESTION 10:

Match the following tables related to Mobile Cloud Computing key components:

Table – I Table – II

Table – I	Table – II
1. Profiler 2. Solver 3. Synchronizer	i. Collects results of split execution and combine, and make the execution details transparent to the user

	ii. Monitors application execution to collect data about execution time, power consumption, network traffic iii. The task of selecting which parts of an app runs on mobile and cloud

a. 1. -> (ii), 2. -> (iii), 3. -> (i)

b. 1. -> (iii), 2. -> (i), 3. -> (ii)

c. 1. -> (i), 2. -> (ii), 3. -> (iii)

d. 1. -> (ii), 2. -> (i), 3. -> (iii)

Correct Answer: a

Detailed Solution:

Profiler monitors application execution to collect data about the time to execute, power consumption, network traffic. Solver has the task of selecting which parts of an app runs on mobile and cloud. Task of synchronizer modules is to collect results of split execution and combine, and make the execution details transparent to the user. So, the correct option is (a).