Cloud Computing

Numerical Questions

Question 1. Consider a scenario where XYZ Inc. wants to use a cloud service from Amazon. The service level agreement guarantees negotiated between XYZ Inc. and Amazon prior to initiating business are as follows.

❖ Availability guarantee: 99.5% time over the service period

❖Service period: 30 days

❖Maximum service hours per day: 15 hours

❖Cost: INR 2500 per day

Service credits are awarded to customers if availability guarantees are not satisfied.

❖Monthly connectivity uptime service level are given as follows.

❖Monthly uptime percentage < 99.5%, Service credit: 15%

❖Monthly uptime percentage < 99%, Service credit: 25%

❖Monthly uptime percentage < 90%, Service credit: 35%.

However, in reality, it was found that over the service period, the cloud service suffered five outages of durations: 1 hour 30 mins, 30 mins, 5 mins, 20 mins and 10 mins, each on different days, due to which normal service guarantees were violated. If SLA negotiations are honored, compute the effective cost payable towards buying the cloud service

a) INR 63750

b) INR 56250

c) INR 18750

d) INR 11250

SLA (Service level agreement)

b/w CSP, customer

Total service time = 15 X 30 X 60

450 hour

27000 min

down time = 1 hour 30 min + 30 min +

5 min + 20 min + 10 min

= 155 min

Actual service time = 27000 - 155

= 26845 min

$$= \frac{26845}{27000} \times 100 = 99.425\%$$

= SLA - ⑩ 15%

9500 X 30 = 75000

15% of 75000 = 11250

Actual payable cost = 75000 - 11250

= 63750 Rs Ans

Question 2. Consider a scenario where XYZ Inc. wants to use a cloud service from Amazon. The service level agreement guarantees negotiated between XYZ Inc. and Amazon prior to initiating business are as follows.

❖ Availability guarantee: 99.5% time over the service period

❖Service period: 30 days

❖Maximum service hours per day: 20 hours

❖Cost: INR 2000 per day

Service credits are awarded to customers if availability guarantees are not satisfied.

❖Monthly connectivity uptime service level are given as follows.

❖Monthly uptime percentage < 99.5%, Service credit: 15%

❖Monthly uptime percentage < 99%, Service credit: 25%

❖Monthly uptime percentage < 90%, Service credit: 35%.

However, in reality, it was found that over the service period, the cloud service suffered six outages of durations: 45 mins, 1 hour 30 mins, 30 mins, 15 mins, 20 mins and 10 mins, each on different days, due to which normal service guarantees were violated. If SLA negotiations are honored, compute the effective cost payable towards buying the cloud service.

Question 3. Assume that the following cloud service providers (CSPs) provide storage as a service.

- ❖CSP A stores data in its primary data center in Mumbai and stores the replica in its backup data center in Mumbai.
- ❖CSP B stores data in its primary data center in Mumbai and stores the replica in its backup data center in New Delhi.
- ❖CSP C stores data in its primary data center in Mumbai and does not store the replica.
- ❖CSP D stores data in its primary data center in Mumbai and stores the replica in the same data center for faster access.

Which CSP is likely to provide the highest availability?

a) CSP A
b) CSP B
c) CSP C
d) CSP D

CSP – Cloud service provider

SLA – Service level agreement

M/C – machine

VM – virtual machine

OS – operating system

AWS – Amazon web service

Question 4. XYZ Inc. has two options to satisfy the requirements, which are given as follows.

Expenditure	In-House Server (INR)	Cloud
❖Servers (INR)Purchase Cost	70,000	
❖Cost/Hour	-	7
(Over three year span)		
❖Efficiency	40%	80%
❖Power and Cooling (Cost/Hour)	3	-
❖Management Cost (Cost/Hour)	2	1

Calculate the total cost for both options, i.e., in-house server and cloud server

a) INR 201400 and INR 210240
b) INR 131400 and INR 70080
c) INR 70000 and INR 183960
d) INR 201400 and INR 183960

in house

70,000 +

1 year hours
24 x 365

3 → 3 x 24 x 365
= 26280
hour in
3 years

Cooling = 3 x 26280 = 78840

Management = 2 x 26280 = 52560

70,000 + 78840 x 52560

= 201400 Rs

Cloud

compute = 7 × 26280 = 183960

management = 1 × 26280 = 26280

+

210240 kg

option A

Question 5. XYZ Inc. has two options to satisfy the requirements, which are given as follows.

Expenditure	In-House Server (INR)	Cloud
❖Servers (INR)Purchase Cost	75,000	
❖Cost/Hour	-	6
(Over three year span)		
❖Efficiency	40%	80%
❖Power and Cooling (Cost/Hour)	4	-
❖Management Cost (Cost/Hour)	3	2

Calculate the total cost for both options, i.e., in-house server and cloud server.

Question 6. XYZ Inc. is an IaaS cloud service provider, who is planning to construct a new generation data center in Hyderabad. They use shipping containers for consolidating the data center that is pre-packaged unit of management. You are given the following information for a viability study. Each shipping container has self-contained networking, servers, air conditioning units and UPS. A container has 27 server racks, each with 13 servers. Each server has 32 CPU cores. It costs INR 625L to purchase and deploy one container (1L = INR 1,00,000). For each server, the electricity load consumed by the computing-related activities is 100W per hour. This load is constant and does not change based on usage level of the servers. This load does not include non-computing related power usage, such as for AC, lighting, etc. Its costs INR 10L/month to rent a warehouse that can store up to 5 containers. Electricity board charges you INR 10 per KWh of power. A system administrator's salary is Rs. 1.2L per month and one system administrator can manage up to 5 containers. Assume that there are no additional charges for network bandwidth, taxes, security guard, etc. Say you plan to initially purchase 10 containers for the data center. Calculate the total cost spent in the first month, including infrastructure cost.

a) 6297.672L

b) 661.472L

c) 6296.472L

d) 31544.4L

server Racks = 27

1 Rack → server = 13

1 server → CPU = 32

1 container = 625 X 10

Rent = 10L X 2 = 20L

Ad. salary 1.92L X 2 = 2.4L

100 w per hour

1 → 27 X 13 = 351

10 — 3510 = ω

cost = 3510 X 24 X 30 X 60

25·27 20 Rs

20 L

2·4 L

6·25 L × 10 L

6297.672 L.

option A

Question 7. XYZ Inc. is an IaaS cloud service provider, who is planning to construct a new generation data center in Hyderabad. They use shipping containers for consolidating the data center that is pre-packaged unit of management. You are given the following information for a viability study. Each shipping container has self-contained networking, servers, air conditioning units and UPS. A container has 25 server racks, each with 15 servers. Each server has 32 CPU cores. It costs INR 650L to purchase and deploy one container (1L = INR 1,00,000). For each server, the electricity load consumed by the computing-related activities is 110W per hour. This load is constant and does not change based on usage level of the servers. This load does not include non-computing related power usage, such as for AC, lighting, etc. Its costs INR 10L/month to rent a warehouse that can store up to 5 containers. Electricity board charges you INR 10 per KWh of power. A system administrator's salary is Rs. 1.2L per month and one system administrator can manage up to 5 containers. Assume that there are no additional charges for network bandwidth, taxes, security guard, etc. Say you plan to initially purchase 10 containers for the data center. Calculate the total cost spent in the first month, including infrastructure cost.

Question 8. Consider a scenario where XYZ Inc. wants to use a cloud service from Amazon. The service level agreement guarantees negotiated between XYZ Inc. and Amazon prior to initiating business are as follows.

❖ Availability guarantee: 99.5% time over the service period

❖Service period: 31 days

❖Maximum service hours per day: 15 hours

❖Cost: INR 1700 per day

Service credits are awarded to customers if availability guarantees are not satisfied.

❖Monthly connectivity uptime service level are given as follows.

❖Monthly uptime percentage < 99.5%, Service credit: 15%

❖Monthly uptime percentage < 99%, Service credit: 25%

❖Monthly uptime percentage < 90%, Service credit: 35%.

However, in reality, it was found that over the service period, the cloud service suffered six outages of durations: 55 mins, 1 hour 40 mins, 30 mins, 25 mins, 20 mins and 10 mins, each on different days, due to which normal service guarantees were violated. If SLA negotiations are honored, compute the effective cost payable towards buying the cloud service.

Thanks