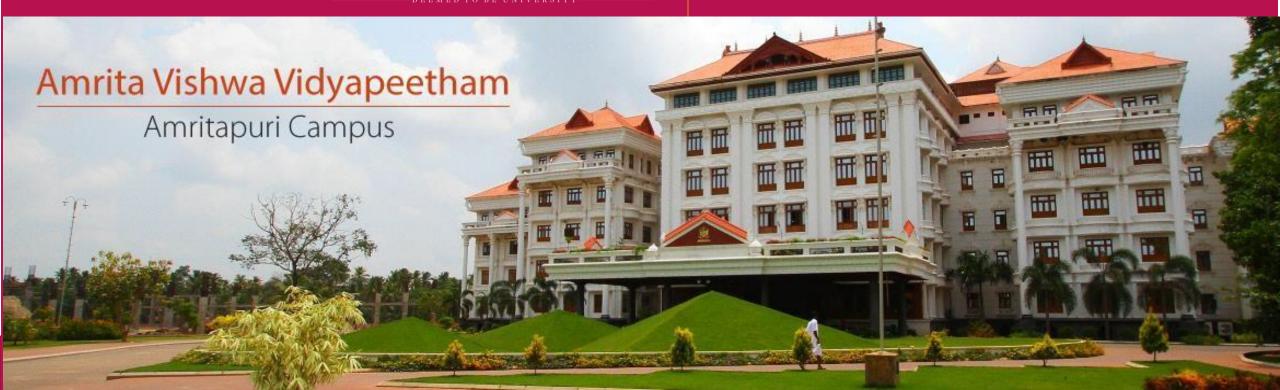




# 22AIE305 Introduction to Cloud computing 2-0-3-3

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#### **Problem 1**

Consider a scenario where company X wants to use a cloud service from provider P. The service level agreement (SLA) guarantee negotiated between the two parties prior to initiating business are as follows:

• Availability guarantee: 99.95% time over the service period

• Service period: 30 days

• Maximum service hours per day: 12 hours

• Cost: \$ 50 per day

Service credits are awarded to customers if availability guarantees are not satisfied. Monthly connectivity uptime service levels are given as:

Monthly Uptime Percentage	Service Credit
<99.95%	10%
<99%	25%

However, in reality, it was found that over the service period, the cloud service suffered five outages of durations: 5 hours, 30 minutes, 1 hour 30 minutes, 15 minutes, and 2 hours25 minutes, 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.



#### Problem 1 - answer

Service period duration = 30 days

Service duration/day = 12 hours

Total service uptime = (12\*30) hours

= 360 hours

Cost = \$ 50 per day

Total cost (at the time-of-service negotiation) = \$(50\*30) = \$1500

Total downtime = (5 hours+30 minutes+1 hour 30 minutes+15 minutes+2 hours 25 minutes) = 9 hours 40 minutes

Service availability = 
$$\left(1 - \frac{Downtime}{Uptime}\right)$$

Service availability

$$= \left(1 - \frac{9 \text{ hours } 40 \text{ minutes}}{(360 - 9 \text{hours } 40 \text{ minutes})}\right)$$

Service Availability % = 97.4%

Monthly uptime % = 97.4 < 99%

Service credits available = 25% of total credit

= 25/100 \*\$1500 = \$375

Effective cost payable towards buying the cloud service = (\$1500 - \$375)

= \$ 1125

### Problem 2

An organization ABC needs to support a spike in demand when it becomes popular followed potentially by a reduction once some of the visitors turn away. The company has two options to satisfy the requirements which are given in the following table:

Expenditure	In-house server	Cloud server
	(INR)	(INR)
Purchase cost	600000	-
Number of CPU cores	12	8
Cost/hour (over a three-year span)	-	42
Efficiency	40%	80%
Power and cooling (cost/hour)	22	-
Management cost (cost/hour)	6	1



- a) Calculate the price of a core hour on the In-house server and Cloud server over three years span.
- b) Calculate the total cost/effective hour for both options.
- c) Calculate the ratio of the total cost/effective hour for in-house to cloud deployment.
- d) If the efficiency of the in-house server is increased to 70%, which deployment will now better total cost/effective hour?



## Problem 2 - answer

a) Core hour on the In-house server = 22.83/12 = 1.9 INR

Core hour on the Cloud server = 42/8= 5.25 INR

b) Cost/effective hour for in-house server = 22.83/40 \* 100 = 57.075 INR Cost/effective hour for cloud server = 42/80 \* 100

= 52.5 INR

c) Total cost/effective hour for in-house = 
$$57.075 + 22 + 6$$
  
=  $85.075$  INR

Total cost/effective hour for cloud server = 
$$52.5 + 1$$
  
=  $53.5$  INR

Total cost/effective hour for in-house = 
$$32.61 + 22 + 6$$
  
=  $60.61$  INR

# Namah Shiyaya

