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TCSS 462/562: (Software Engineering for) Cloud Computing   School of Engineering and Technology
Fall 2024                                               University of Washington – Tacoma

## Class Activity 2 – Horizontal Scaling in the Cloud
## Cost Comparison
Tuesday October 29th, 2024

The table below provides the hypothetical average execution time for running a multi-threaded data processing task to process big data using various cloud computing resources.

| Resource Type | Run time (seconds) | Cost per hour |
|---|---|---|
| AWS Lambda @ 3GB<br>2 vCPUs | 236 | 18.0¢<br>costs for function calls can be ignored |
| AWS ec2 VM r5.large<br>2 vCPUs | 347 | 4.5¢ (spot) |
| AWS ec2 VM m5.xlarge<br>4 vCPUs | 212 | 6.9¢ (spot) |
| AWS ec2 VM m5.8xlarge<br>32 vCPUs | 123 | $0.66 (spot) |
| AWS ec2 VM c5.18xlarge<br>72 vCPUs | 129 | $1.18 (spot) |
| AWS ec2 VM m5.24xlarge<br>96 vCPUs | 120 | $2.07 (spot) |
| AWS ec2 VM z1d.12xlarge<br>48 vCPUs | 126 | $1.52 (spot) |

1. Determine which cloud computing resource above will complete the data processing task in the least amount of time based on the provided average execution times for a single iteration of the data processing task from the table.

2. Now determine how long the FASTEST computing resource will require to complete 2,500 iterations of the data processing task? (the task is repeated 2,500 times)
Assume infinite horizontal scalability in that you can create as many resources (VMs or Lambdas) as needed to complete all of the runs in parallel. VM(s) or Lambda function(s) will perform a total of 2,500 distinct executions of the processing task.
Assume that each VM requires 5-minutes (300 seconds, .0833 hours) to initialize before any processing can be performed. AWS Lambda has no initialization time or cost.
(list time in minutes:seconds)

3. What is the COST for the resource type above that offers the FASTEST total execution time for 2,500 iterations.

4. Which cloud computing resource above can complete 2,500 iterations of the data processing task for the LOWEST POSSIBLE COST?

5. What is the lowest possible cost for performing 2,500 iterations for #4?

6. How long will these iterations require using the LOWEST COST resource?
(list time in minutes:seconds)
Assume infinite horizontal scalability in that you can create as many VMs as needed to complete all of the iterations in parallel.
Assume that VMs require 5-minutes to initialize before any runs can be performed.
Note that initialization increases cost, and cost should be minimized.