**SE-441 Continuous Delivery and DevOps**

**Winter 2018-2019**

**Homework 6**

**Due On: Feburary 28, 2019**

**25 points**

1. [10 points] Assume our service has a predictable daily demand where the peak requires 250

servers but the trough requires only 50 servers. Assume that, on average, we require 150

servers per day. Assume further that each server hour costs us $5.00 per hour in a data center

or $4.20 per hour with a cloud provider. ***Hint:*** *The example on p.10 of the supplemental*

*AboveTheClouds.pdf will help you with this problem.*

a. How many server hours per day do we actually need?

150 servers X 24 hours = 3600

**Hours needed** = 3600

b. How many server hours per day must we actually provision?

250 servers X 24 hours = 6,000

**Actual Hours Provisioned** = 6,000

c. What is the potential cost difference per year between hosting the application in our own

data center versus hosting it with the cloud provider?

6000 hours X $5 data center hourly cost X 365 days = $10,950,000 data center yearly cost

6000 hours X $4.20 cloud provider hourly cost X 365 days = $9,198,000 cloud provider yearly cost

$10,950,000 - $9,198,000 = $1,752,000

**Difference per year** = $1,752,000

2. [15 points] Suppose we create 250 GB of new data each week that needs to be analyzed and

we have 8 local servers for that processing. A computer the speed of one EC2 instance takes

2 hours per GB to process the new data. ***Hint:*** *The example on p.13 of the supplemental*

*AboveTheClouds.pdf will help you with this problem. Also, assume that 1 GB =* 103 *MB.*

1. How long will it take us to process each week’s data locally?

250 GB X 2 hours per GB / 8 local servers = 62.5 hours

**Local Process Time** = 62.5 hours

1. How much would it cost to process the data locally assuming each server hour costs $4.50.

62.5 hours X $4.50 = $281.25

**Local Process Cost** = $281.25

(I am assuming that by “server hour” you mean the hourly cost for running all 8 local servers together, otherwise the answer would be $281.25 X 8 = $2,250)

c. How many cloud compute instances would we need to complete the analysis in one hour?

250 GB X 2 hours per GB / Y = 1 hour

500 / Y = 1

Y = 500

**Instances needed** = 500

d. How much does the computation cost to process the data with our cloud provider assuming

that each server hour of compute time costs $0.075?

500 instances X $0.075 = $37.5

**Cloud Processing Cost** = $37.5

e. How much does the transfer fees cost to move the data to the cloud provider assuming

that each GB will cost $0.10 to transfer?

250 GB X $0.10 = $25

**Transfer fees** = $25

f. How long will it take to transfer the full 250 GB of data to the cloud provider assuming

that they can sustain an average of 20 Mbits/second?

(250 GB x 1000 MB/GB x 8 bits/Byte) / 20 Mbits/sec = 2,000,000/20 = 100,000 sec

100,000 sec / 60 secs/min = 1,666.666 min

166,666.666 min / 60 mins/hour = 27.78 hours

**Transfer Duration** = 27.78 hours

g. How much will it cost to process each week’s data in the cloud?

$37.5 computation cost + $25 transfer cost = $62.5

**Cloud Cost** = $62.5

h. Compare the processing time and overall cost and make a recommendation as to whether

or not this process should be moved to the cloud provider.

Cloud Time = 27.78 + 1 = 28.78 hours Local Time = 62.5 hours

Cloud Cost = $62.5 Local Cost = $281.25

I would highly recommend moving this process to the cloud provider, since the local process takes more than twice the time and costs four times more than the cloud alternative.