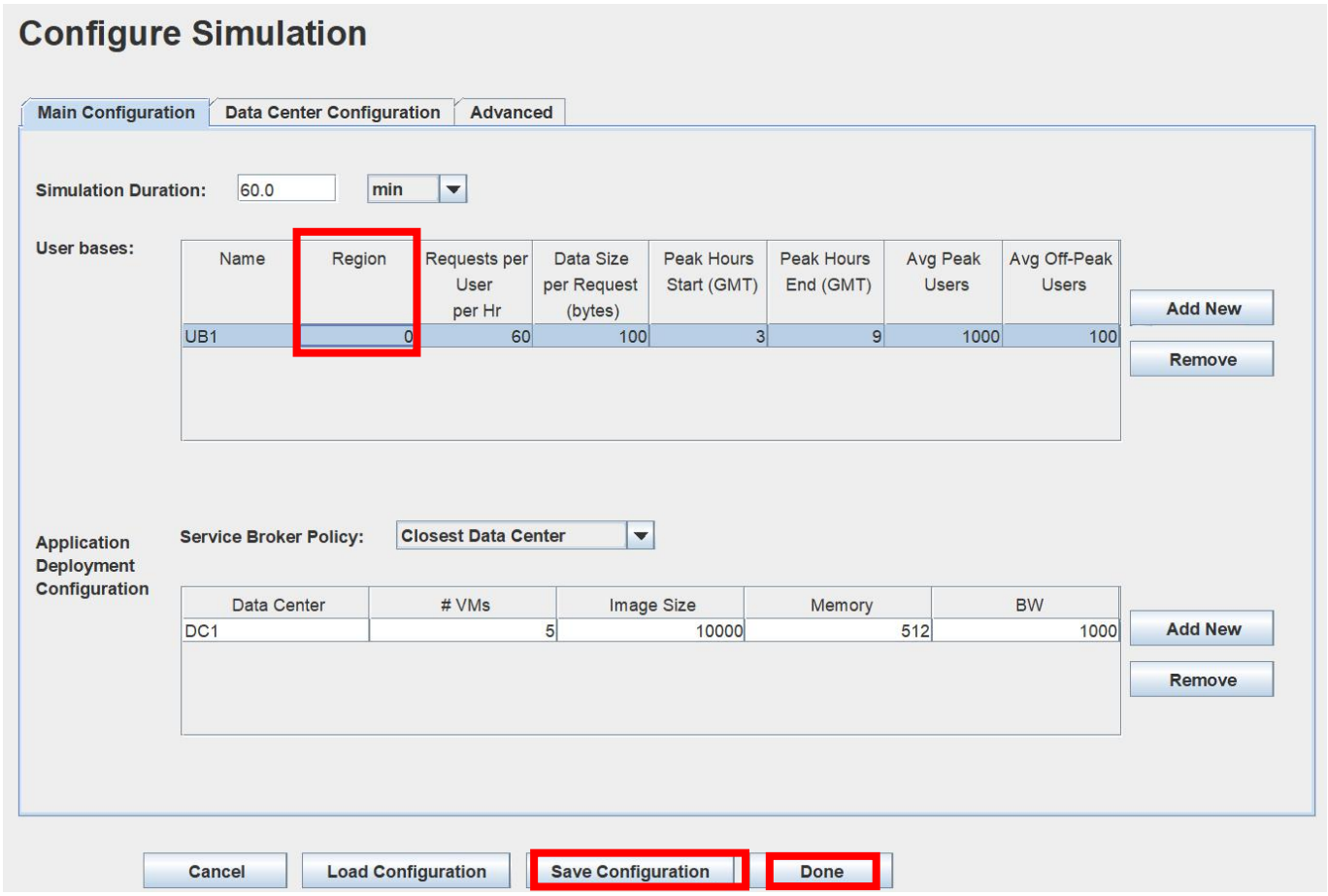
# CLOUD COMPUTING LAB -05
**Name: Drishti.**
**Roll No.: 1928228**
**Date: 02/02/2022**

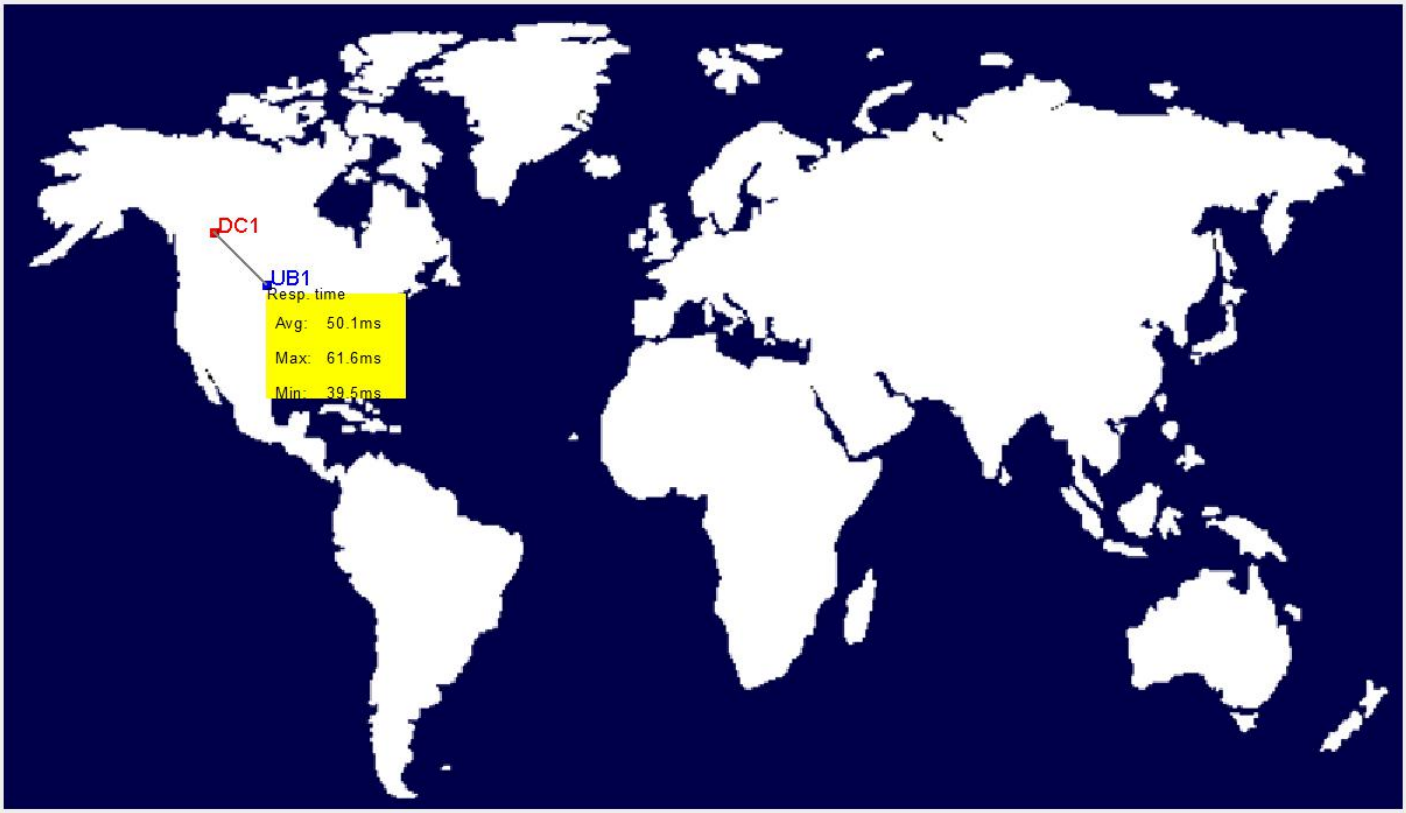
## Task01:
Change user bases each time and compare their average response time by retaining one datacenter in only one area (e.g., North America).
In this software, there are a total of 6 regions (continents) ( North America-0, South America-1, Europe-2, Asia-3, Africa -4, Australia-5)




Following are the screenshots and the export from the cloud simulator.

Here the there is one datacentre and 1 user base. Data centre is in region 0 as well as userbase (North America)
The average response time is: 50.1 millisecond
The minimum response time is: 39.5 millisecond
The maximum response time is: 61.6 millisecond

**Simulation Complete**



Results of the Simulation Completed at: 02/02/2022 10:08:23

## Overall Response Time Summary

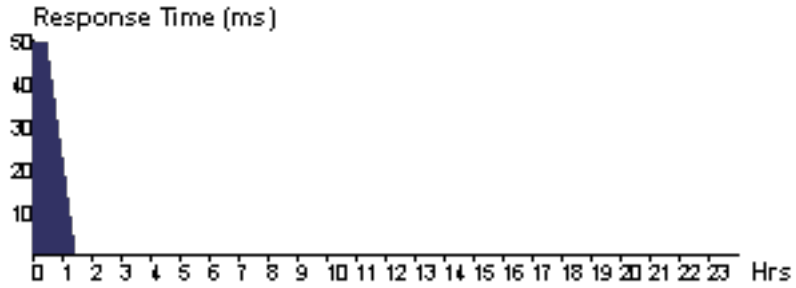
| | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| Overall response time: | 50.09 | 39.55 | 61.61 |
| Data Center processing time: | 0.48 | 0.01 | 0.86 |

## Response Time by Region

| Userbase | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| UB1 | 50.09 | 39.55 | 61.61 |

## User Base Hourly Response Times

### UB1




## Data Center Request Servicing Times

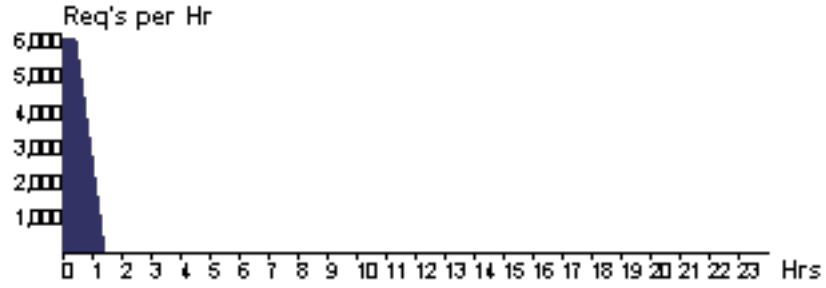
| Data Center | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| DC1 | 0.48 | 0.01 | 0.86 |

## Data Center Hourly Average Processing Times

### DC1

Data Center Hourly Loading

DC1



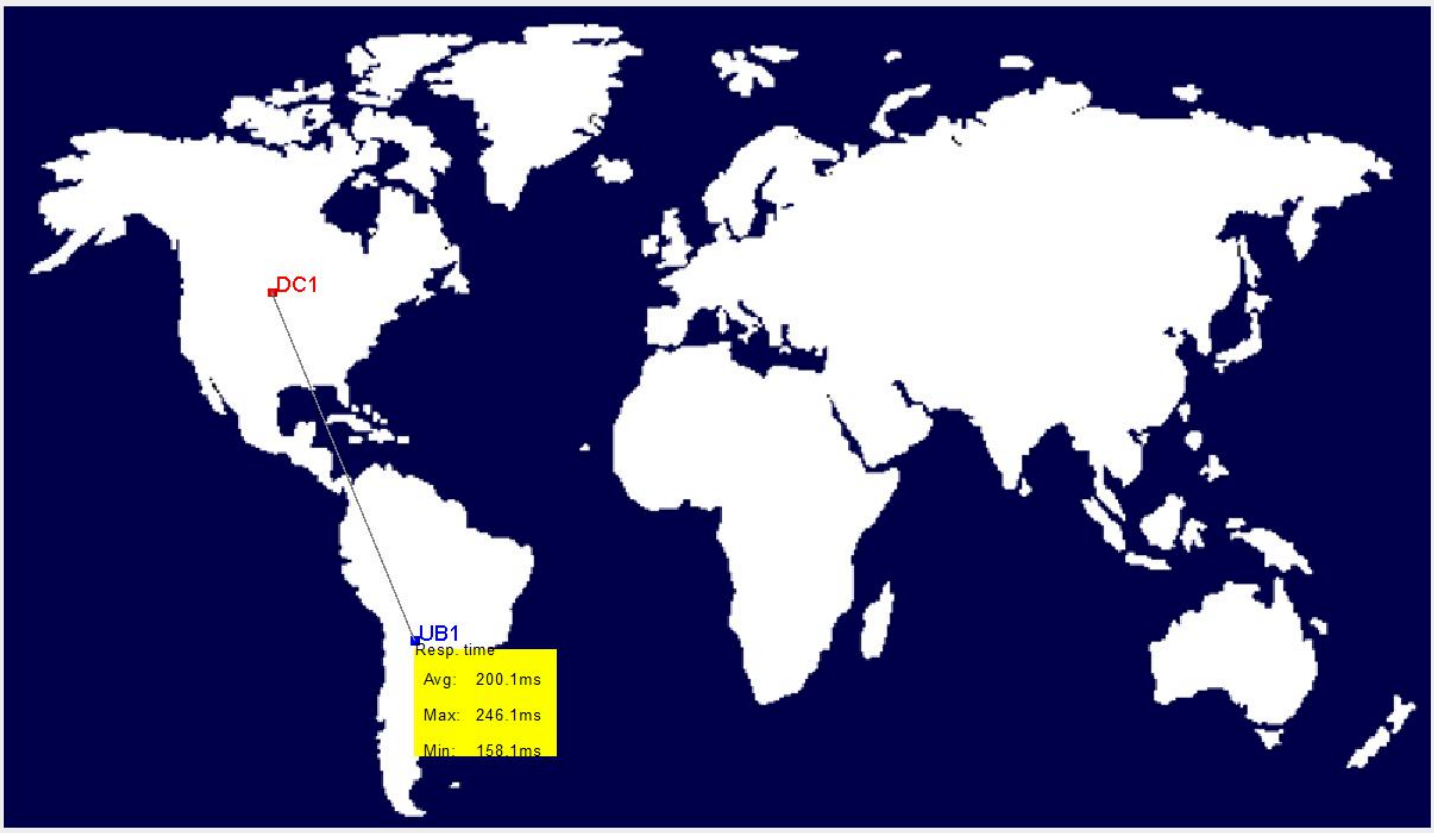

Cost

| | |
|---|---|
| Total Virtual Machine Cost ($): | 0.51 |
| Total Data Transfer Cost ($): | 0.06 |
| Grand Total: ($) | 0.57 |

| Data Center | **VM Cost $** | **Data Transfer Cost $** | **Total $** |
|---|---|---|---|
| DC1 | 0.51 | 0.06 | 0.57 |

Here the there is one datacentre and 1 user base. Data centre is in region 0(North America) and userbase in region 1 (South America)
The average response time is: 200.1 millisecond
The minimum response time is: 158.1 millisecond
The maximum response time is: 246.1 millisecond

Simulation Complete



Results of the Simulation Completed at: 02/02/2022 10:09:28

## Overall Response Time Summary

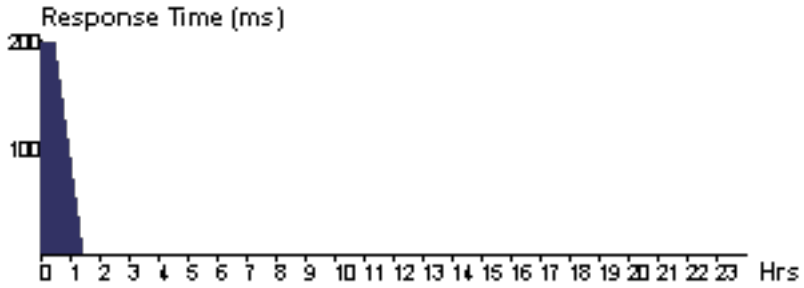
| | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| Overall response time: | 200.07 | 158.06 | 246.12 |
| Data Center processing time: | 0.10 | 0.02 | 0.11 |

## Response Time by Region

| Userbase | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| UB1 | 200.07 | 158.06 | 246.12 |

## User Base Hourly Response Times

### UB1




## Data Center Request Servicing Times

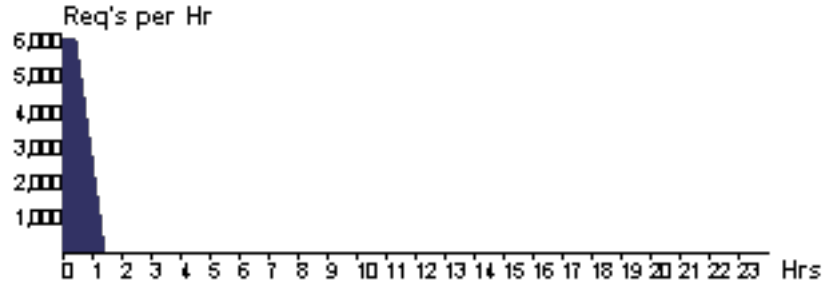
| Data Center | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| DC1 | 0.10 | 0.02 | 0.11 |

## Data Center Hourly Average Processing Times

### DC1

Data Center Hourly Loading

DC1



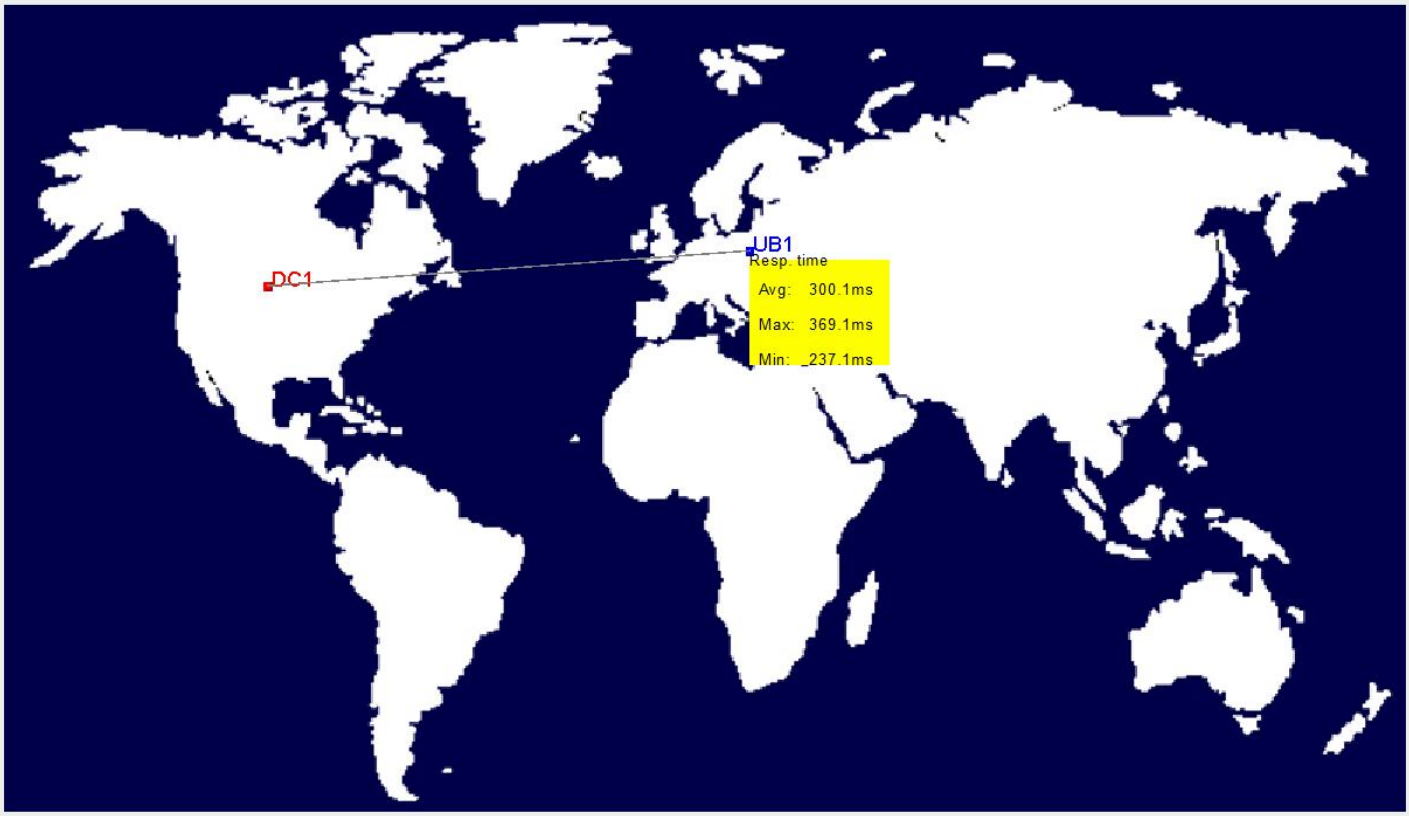

Cost

| | |
|---|---|
| Total Virtual Machine Cost ($): | 0.51 |
| Total Data Transfer Cost ($): | 0.06 |
| Grand Total: ($) | 0.57 |

| Data Center | **VM Cost $** | **Data Transfer Cost $** | **Total $** |
|---|---|---|---|
| DC1 | 0.51 | 0.06 | 0.57 |

Here the there is one datacentre and 1 user base. Data centre is in region 0(North America) and userbase in region 2 (Europe)
The average response time is: 300.1 millisecond
The minimum response time is: 237.1 millisecond
The maximum response time is: 369.1 millisecond

**Simulation Complete**



Results of the Simulation Completed at: 02/02/2022 10:10:27

## Overall Response Time Summary

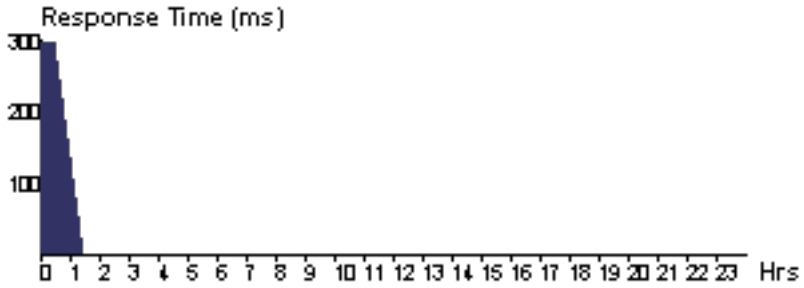
| | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| Overall response time: | 300.06 | 237.06 | 369.12 |
| Data Center processing time: | 0.34 | 0.02 | 0.61 |

## Response Time by Region

| Userbase | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| UB1 | 300.06 | 237.06 | 369.12 |

## User Base Hourly Response Times

### UB1




## Data Center Request Servicing Times

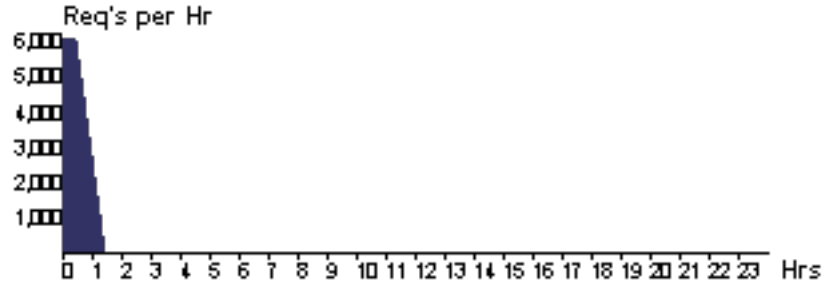
| Data Center | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| DC1 | 0.34 | 0.02 | 0.61 |

## Data Center Hourly Average Processing Times

### DC1

Data Center Hourly Loading

DC1

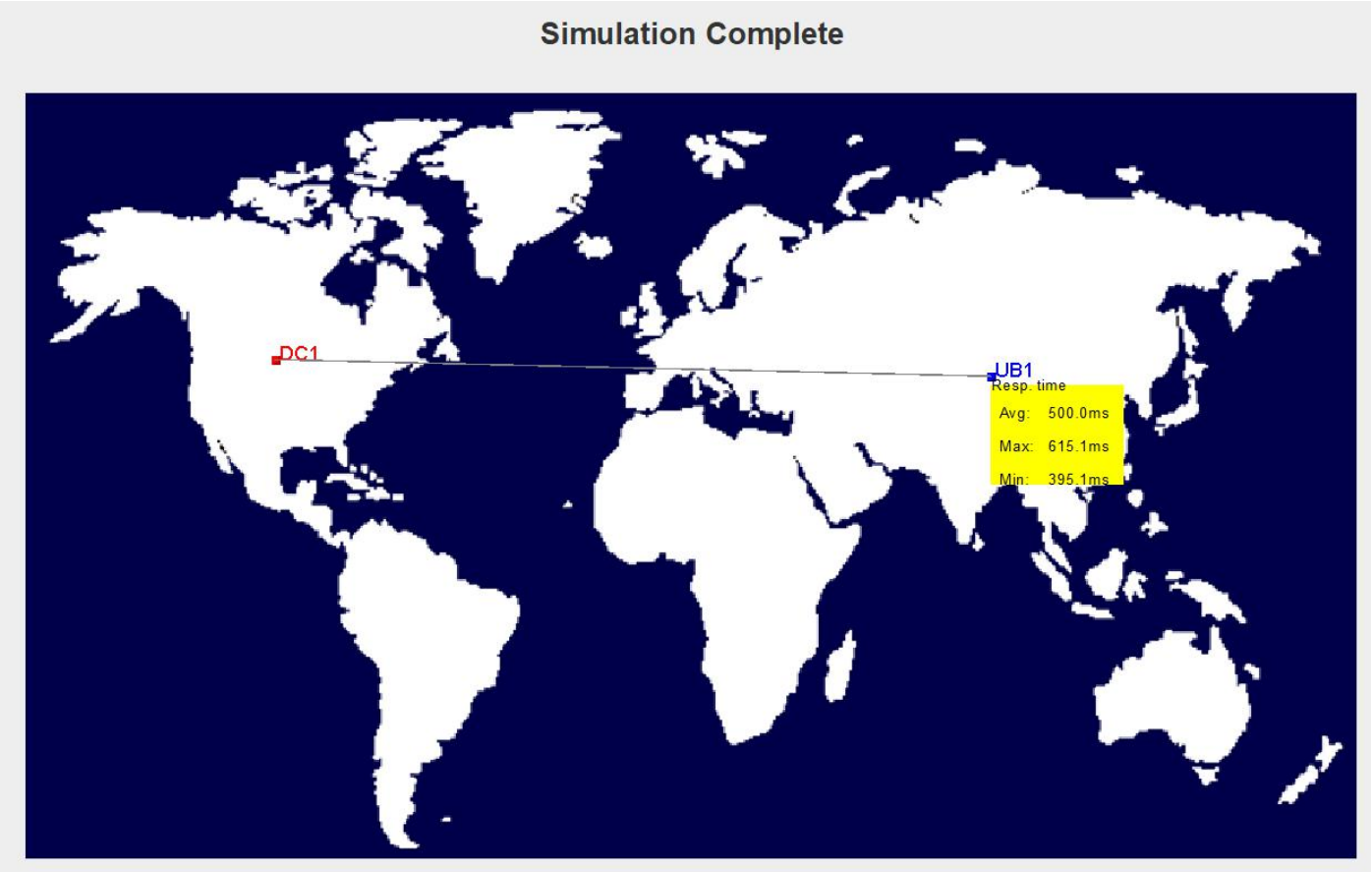



Cost

| | |
|---|---|
| Total Virtual Machine Cost ($): | 0.51 |
| Total Data Transfer Cost ($): | 0.06 |
| Grand Total: ($) | 0.57 |

| Data Center | **VM Cost $** | **Data Transfer Cost $** | **Total $** |
|---|---|---|---|
| DC1 | 0.51 | 0.06 | 0.57 |

Here the there is one datacentre and 1 user base.  Data centre is in region 0(North America) and userbase in region 3 (Asia)
The average response time is: 500.0 millisecond
The minimum response time is: 395.1 millisecond
The maximum response time is: 615.1 millisecond



Results of the Simulation Completed at: 02/02/2022 10:12:00

## Overall Response Time Summary

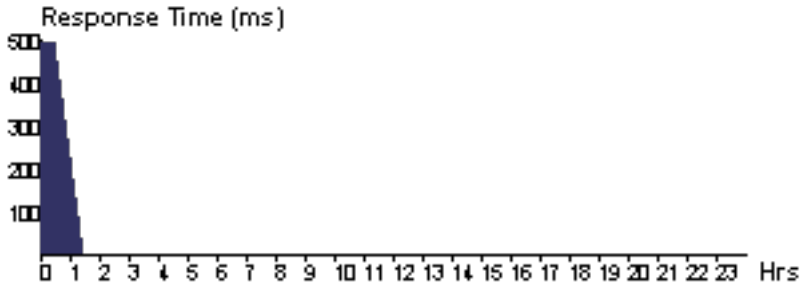
| | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| Overall response time: | 500.02 | 395.06 | 615.12 |
| Data Center processing time: | 0.34 | 0.02 | 0.61 |

## Response Time by Region

| Userbase | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| UB1 | 500.02 | 395.06 | 615.12 |

## User Base Hourly Response Times

### UB1




## Data Center Request Servicing Times

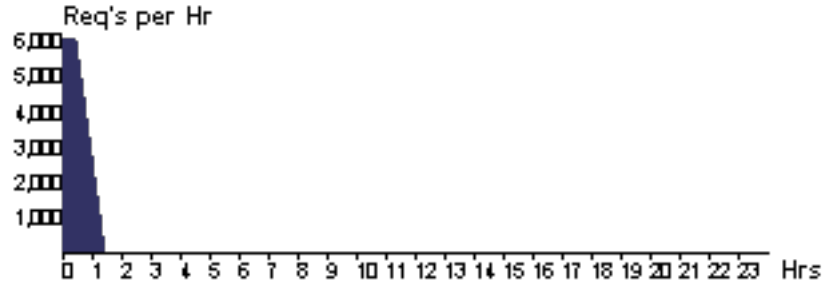
| Data Center | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| DC1 | 0.34 | 0.02 | 0.61 |

## Data Center Hourly Average Processing Times

### DC1

Data Center Hourly Loading

DC1

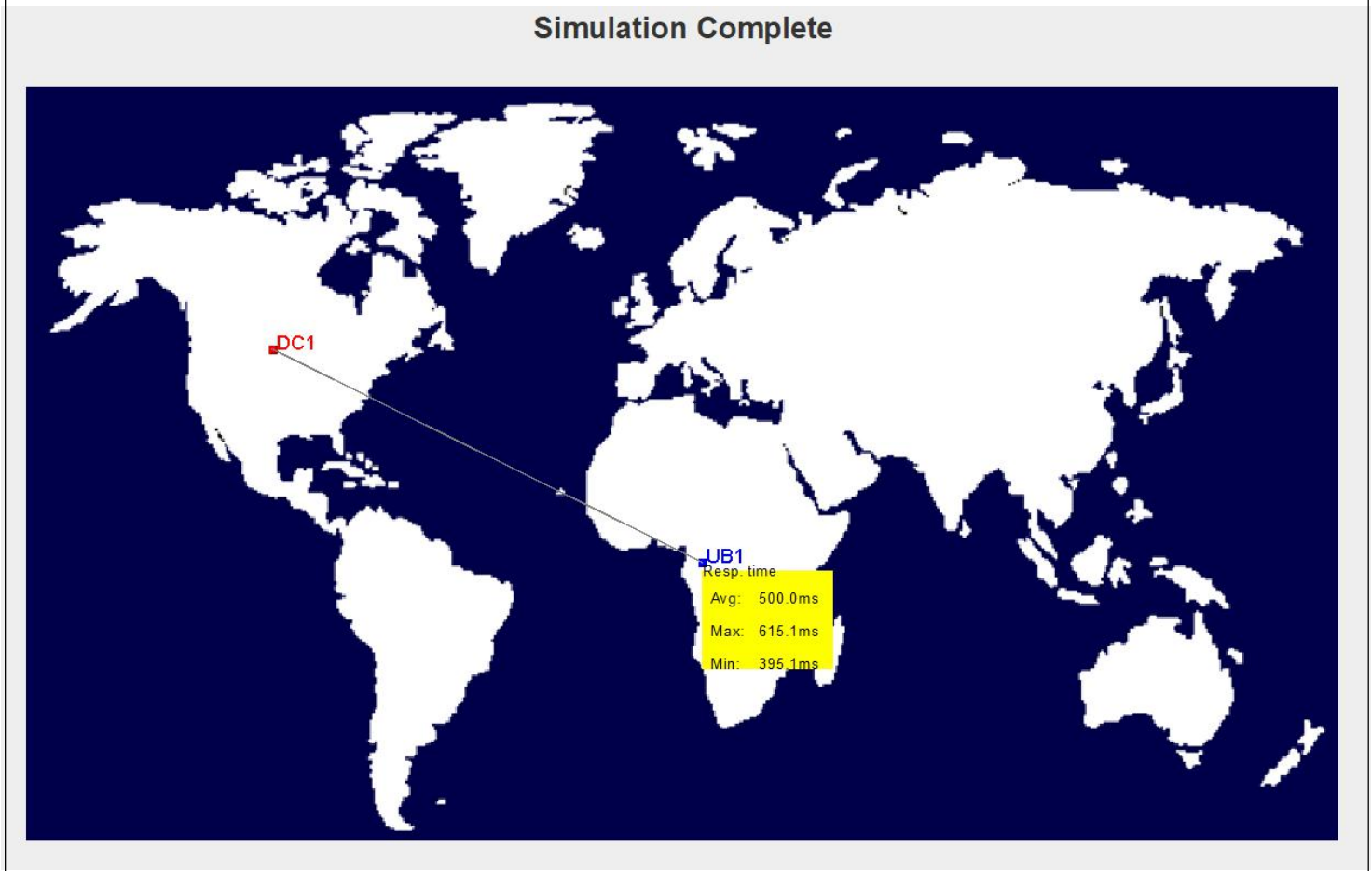



Cost

| | |
|---|---|
| Total Virtual Machine Cost ($): | 0.51 |
| Total Data Transfer Cost ($): | 0.06 |
| Grand Total: ($) | 0.57 |

| Data Center | **VM Cost $** | **Data Transfer Cost $** | **Total $** |
|---|---|---|---|
| DC1 | 0.51 | 0.06 | 0.57 |

Here the there is one datacentre and 1 user base. Data centre is in region 0(North America) and userbase in region 4 (Africa)
The average response time is: 500.0  millisecond
The minimum response time is: 395.1 millisecond
The maximum response time is: 615.1 millisecond



Results of the Simulation Completed at: 02/02/2022 10:12:58

## Overall Response Time Summary

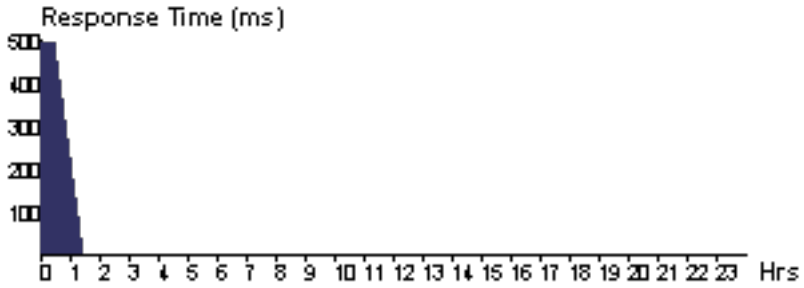
| | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| Overall response time: | 500.02 | 395.06 | 615.12 |
| Data Center processing time: | 0.34 | 0.02 | 0.61 |

## Response Time by Region

| Userbase | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| UB1 | 500.02 | 395.06 | 615.12 |

## User Base Hourly Response Times

### UB1




## Data Center Request Servicing Times

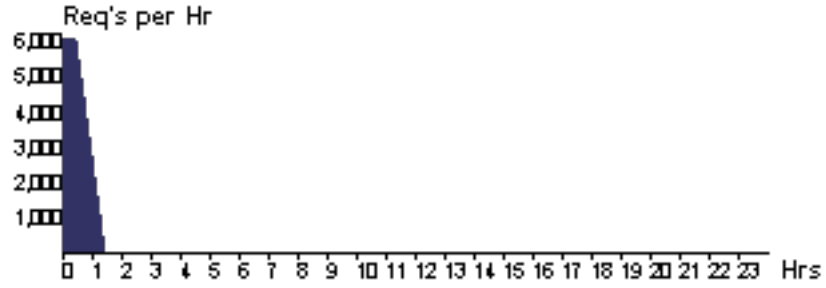
| Data Center | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| DC1 | 0.34 | 0.02 | 0.61 |

## Data Center Hourly Average Processing Times

### DC1

Data Center Hourly Loading

DC1

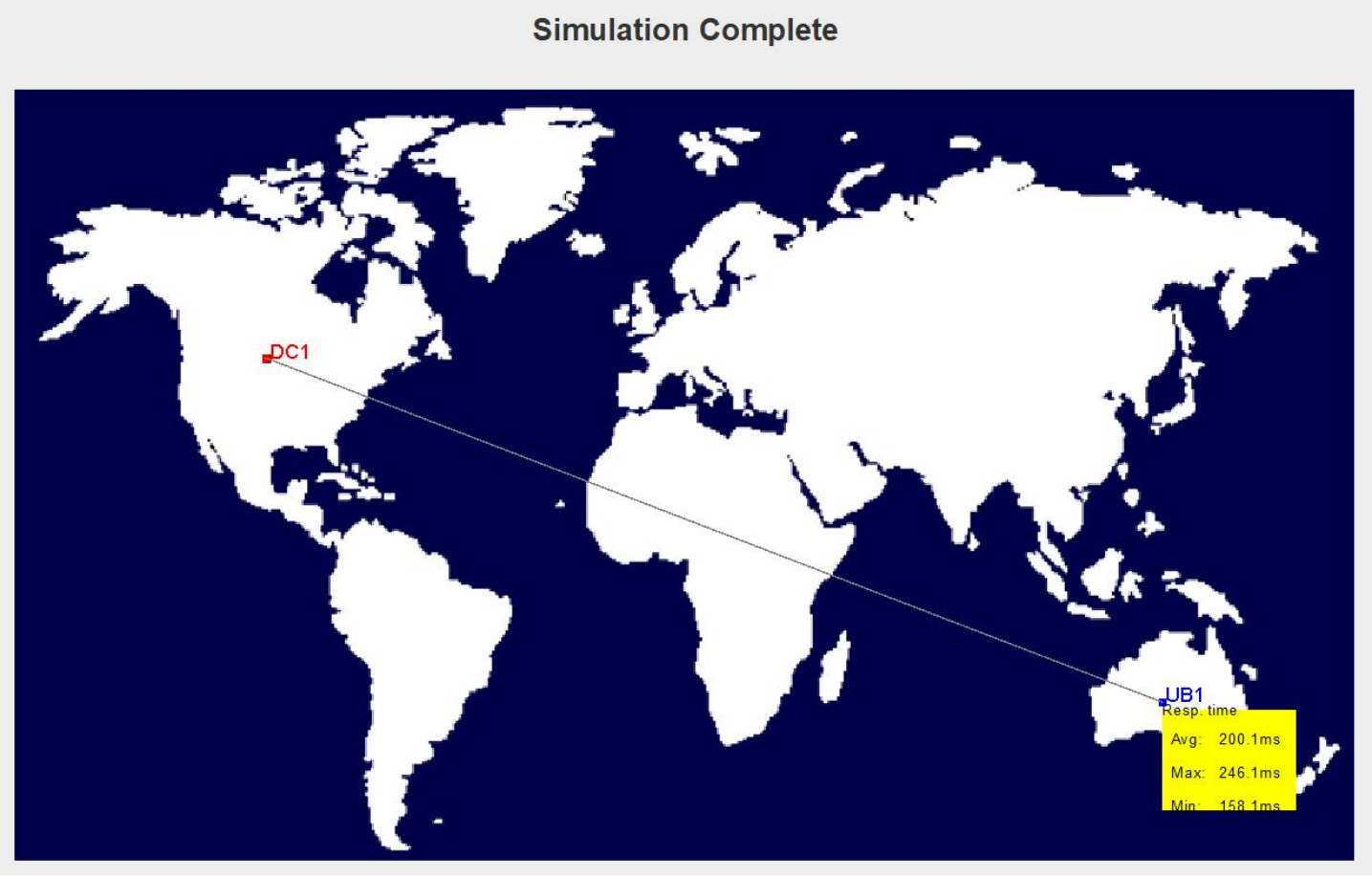



Cost

| | |
|---|---|
| Total Virtual Machine Cost ($): | 0.51 |
| Total Data Transfer Cost ($): | 0.06 |
| Grand Total: ($) | 0.57 |

| Data Center | **VM Cost $** | **Data Transfer Cost $** | **Total $** |
|---|---|---|---|
| DC1 | 0.51 | 0.06 | 0.57 |

Here the there is one datacentre and 1 user base. Data centre is in region 0(North America) and userbase in region 5 (Australia)
The average response time is: 200.1 millisecond
The minimum response time is: 158.1 millisecond
The maximum response time is: 246.1 millisecond



Results of the Simulation Completed at: 02/02/2022 10:13:53

## Overall Response Time Summary

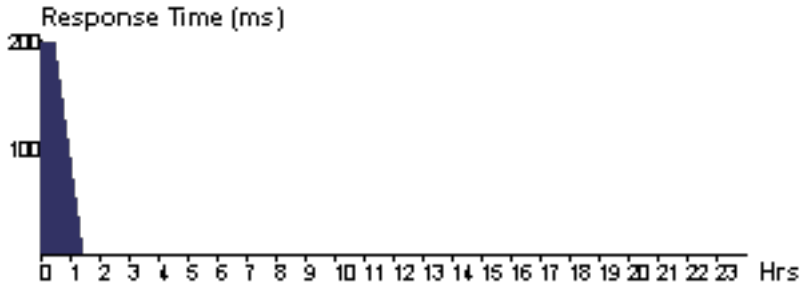
| | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| Overall response time: | 200.07 | 158.06 | 246.12 |
| Data Center processing time: | 0.10 | 0.02 | 0.11 |

## Response Time by Region

| Userbase | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| UB1 | 200.07 | 158.06 | 246.12 |

## User Base Hourly Response Times

### UB1




## Data Center Request Servicing Times

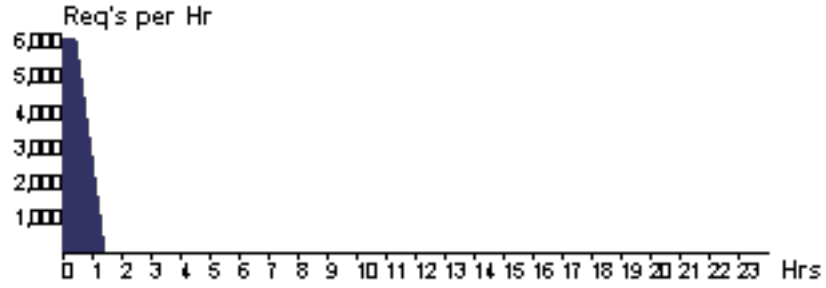
| Data Center | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| DC1 | 0.10 | 0.02 | 0.11 |

## Data Center Hourly Average Processing Times

### DC1

Data Center Hourly Loading

DC1

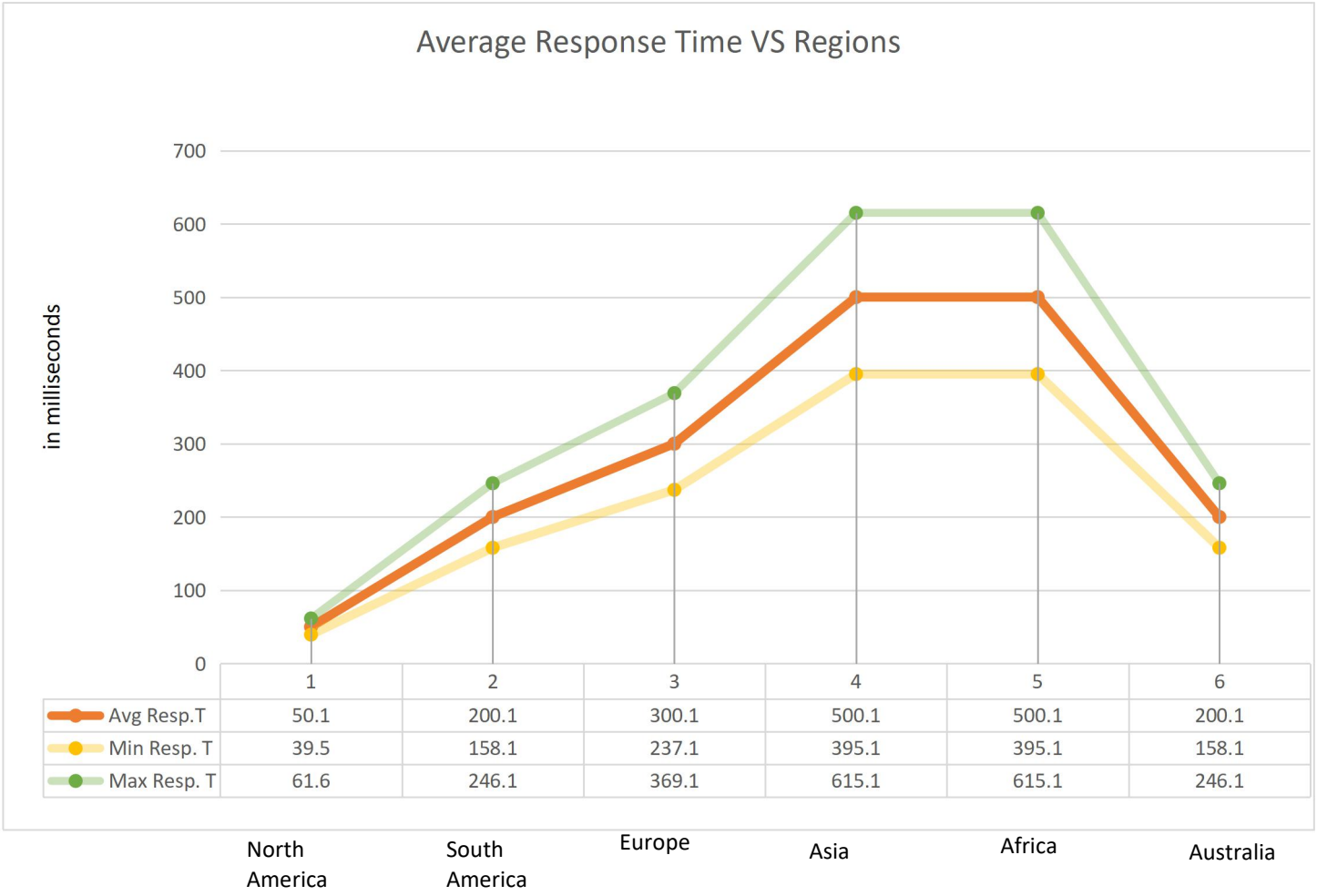



Cost

| | |
|---|---|
| Total Virtual Machine Cost ($): | 0.51 |
| Total Data Transfer Cost ($): | 0.06 |
| Grand Total: ($) | 0.57 |

| Data Center | **VM Cost $** | **Data Transfer Cost $** | **Total $** |
|---|---|---|---|
| DC1 | 0.51 | 0.06 | 0.57 |

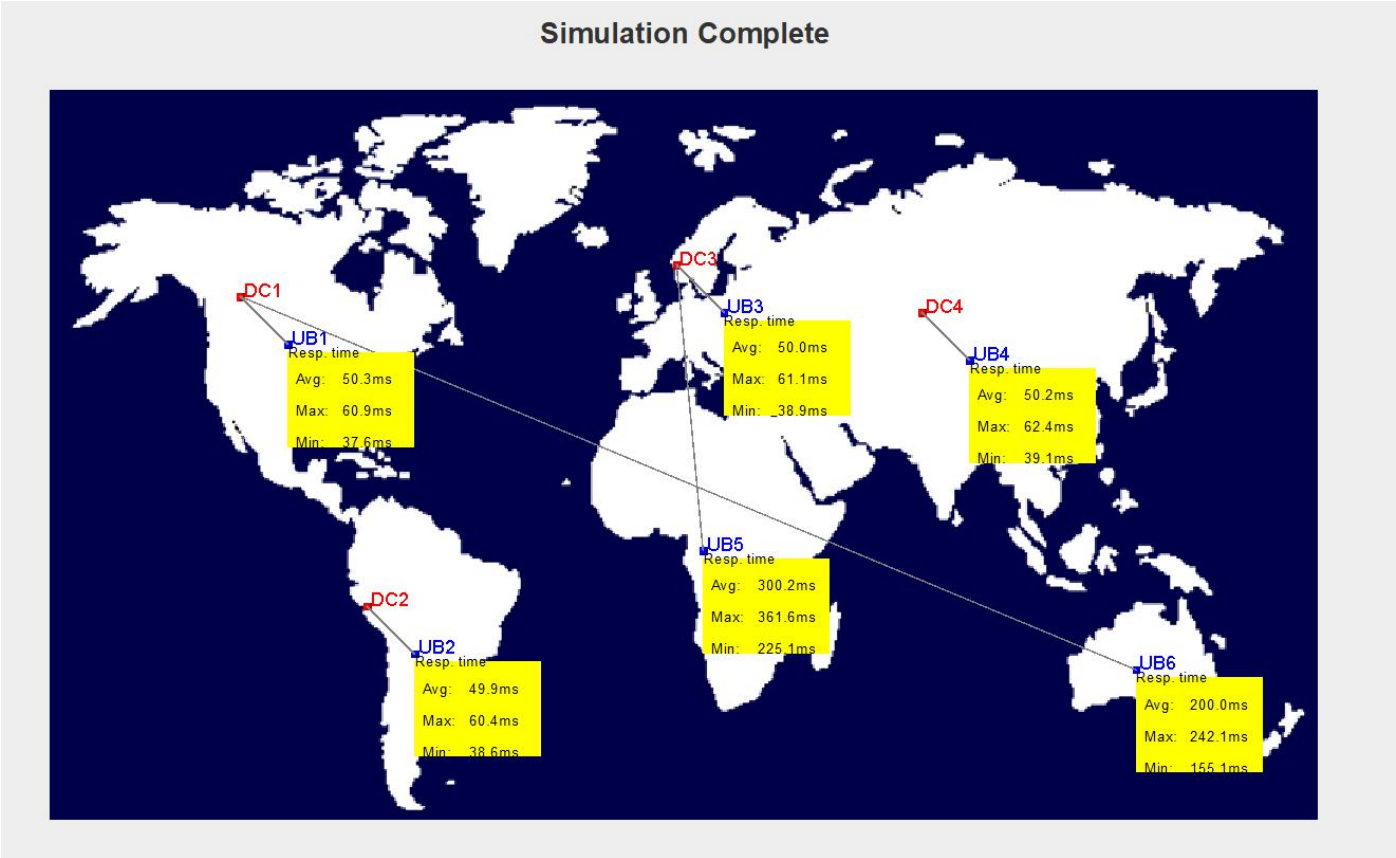
Graph comparing average response time, maximum response time and minimum response time of all the user base in different regions with respect to the data center in region-0 (North America)



**Task02:**

In this case, we're looking at six user bases, each of which is located in a different region ranging from 0,1,2,3,4,5, and four data centres in 0,1,2,3 regions. We'll examine how long it takes for all of the connections to respond, based on the service broker's policies for efficient data centre use.

1) Closest Datacentre First:



Results of the Simulation Completed at: 02/02/2022 10:44:57

## Overall Response Time Summary

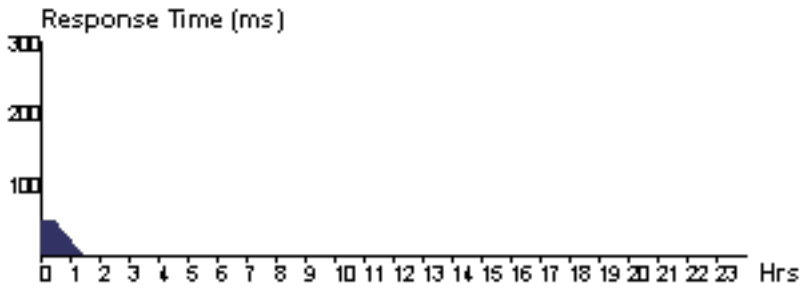
| | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| Overall response time: | 117.80 | 37.63 | 361.64 |
| Data Center processing time: | 0.41 | 0.02 | 0.89 |

## Response Time by Region

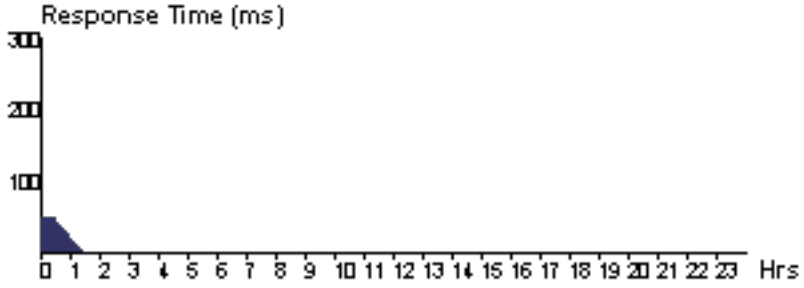
| Userbase | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| UB1 | 50.25 | 37.63 | 60.88 |
| UB2 | 49.93 | 38.64 | 60.39 |
| UB3 | 50.01 | 38.88 | 61.06 |
| UB4 | 50.23 | 39.14 | 62.38 |
| UB5 | 300.24 | 225.14 | 361.64 |
| UB6 | 200.01 | 155.14 | 242.14 |

## User Base Hourly Response Times

### UB1

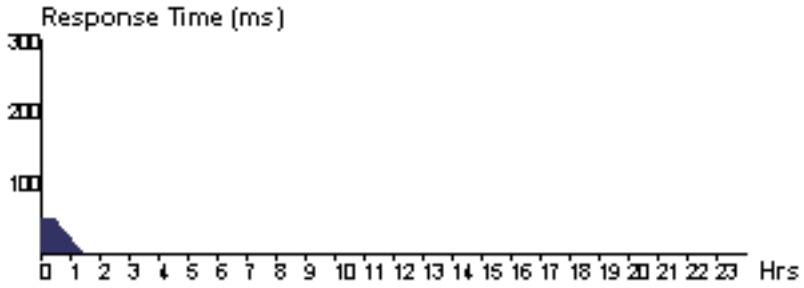


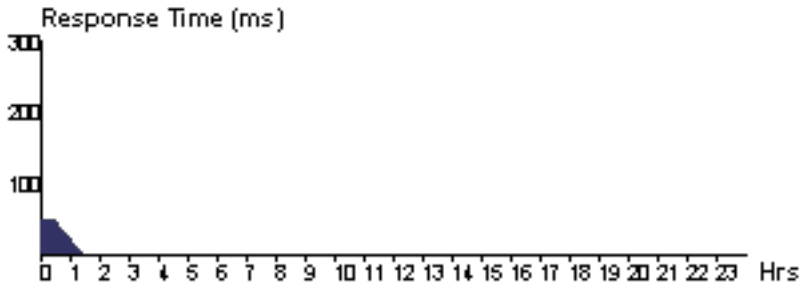

### UB2



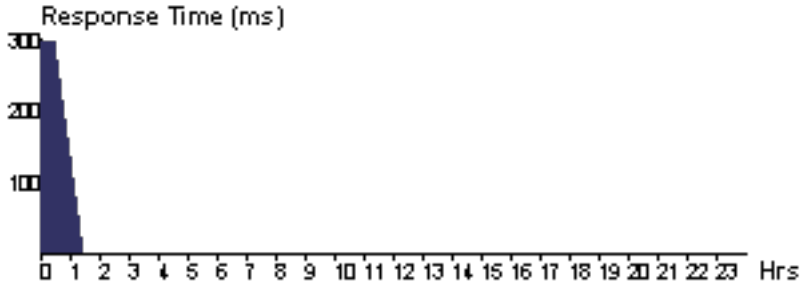

### UB3

### UB4

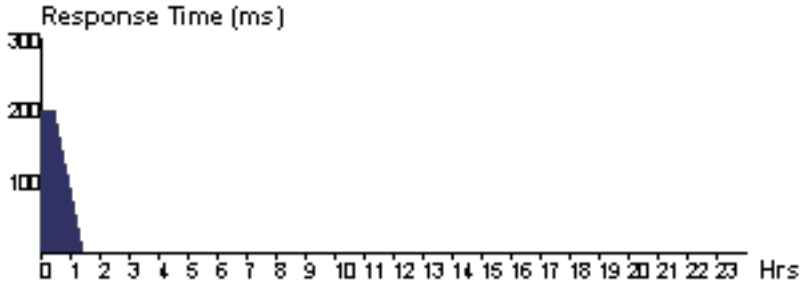



UB5




UB6




Data Center Request Servicing Times

| Data Center | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| DC1 | 0.30 | 0.02 | 0.88 |
| DC2 | 0.51 | 0.03 | 0.89 |
| DC3 | 0.43 | 0.02 | 0.88 |
| DC4 | 0.50 | 0.02 | 0.88 |

Data Center Hourly Average Processing Times

DC1

DC2

DC3

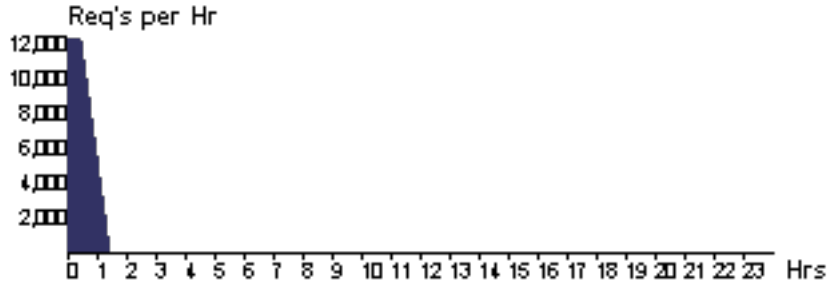
DC4

Data Center Hourly Loading

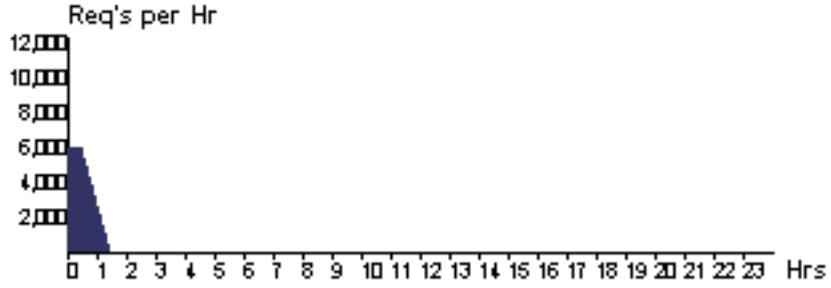
DC1

DC2

DC3




DC4

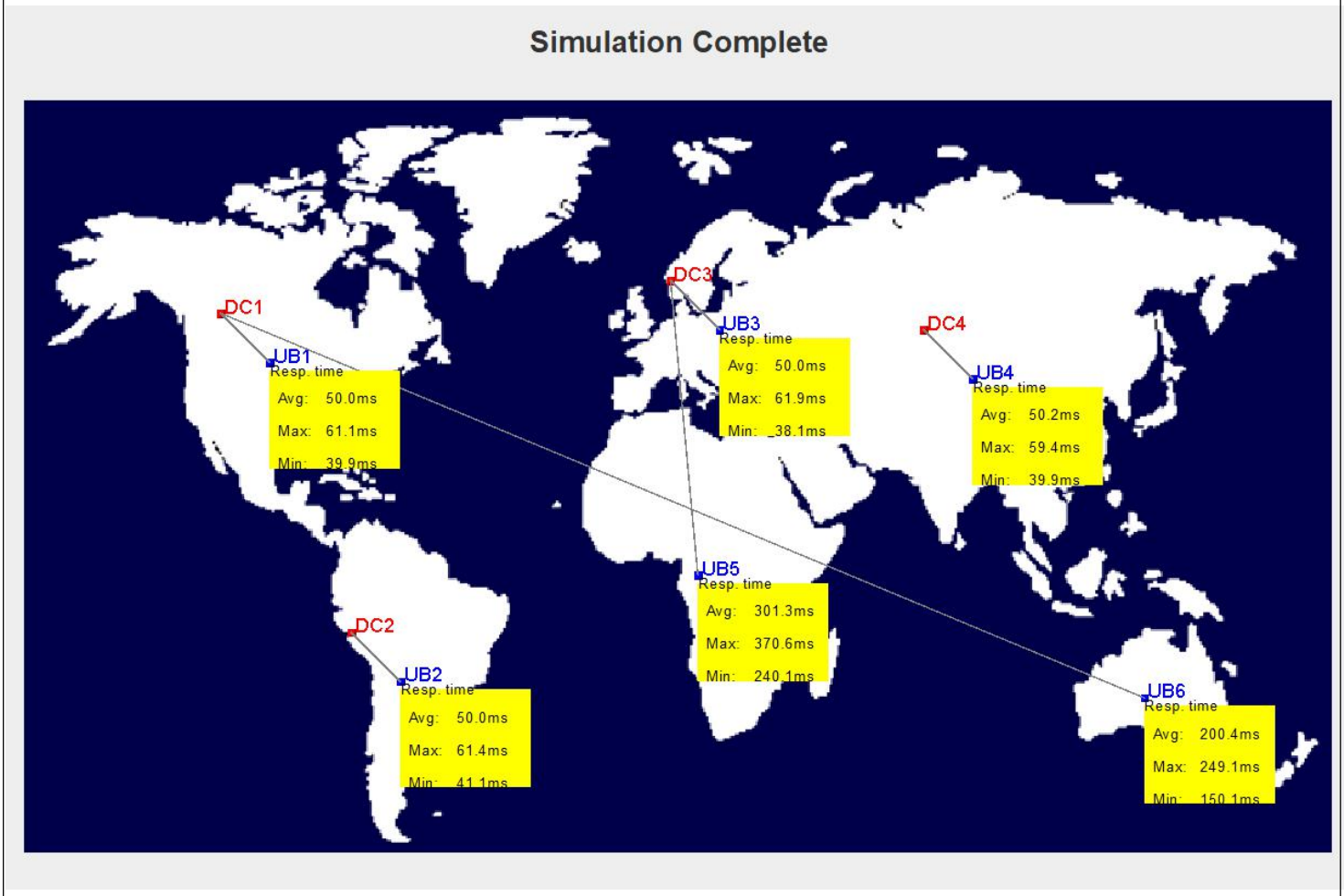



## Cost

| | |
|---|---|
| Total Virtual Machine Cost ($): | 2.01 |
| Total Data Transfer Cost ($): | 0.38 |
| Grand Total: ($) | 2.39 |

| Data Center | **VM Cost $** | **Data Transfer Cost $** | **Total $** |
|---|---|---|---|
| DC2 | 0.50 | 0.07 | 0.57 |
| DC1 | 0.50 | 0.13 | 0.63 |
| DC4 | 0.50 | 0.06 | 0.57 |
| DC3 | 0.50 | 0.13 | 0.63 |

2)Optimized Resource Time:



Results of the Simulation Completed at: 02/02/2022 10:50:32

## Overall Response Time Summary

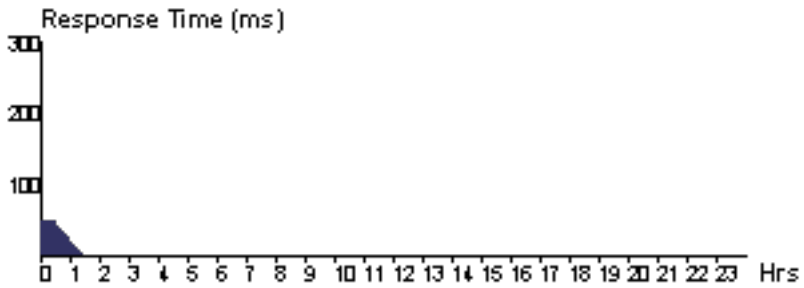
| | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| Overall response time: | 118.00 | 38.13 | 370.64 |
| Data Center processing time: | 0.41 | 0.02 | 0.89 |

## Response Time by Region

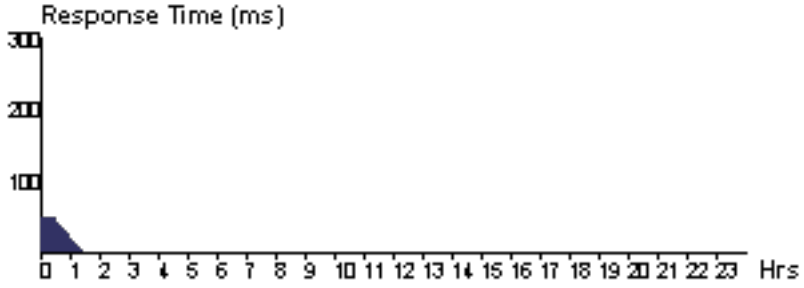
| Userbase | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| UB1 | 49.99 | 39.86 | 61.11 |
| UB2 | 49.98 | 41.14 | 61.39 |
| UB3 | 50.03 | 38.13 | 61.88 |
| UB4 | 50.18 | 39.88 | 59.39 |
| UB5 | 301.27 | 240.14 | 370.64 |
| UB6 | 200.38 | 150.11 | 249.11 |

## User Base Hourly Response Times

UB1

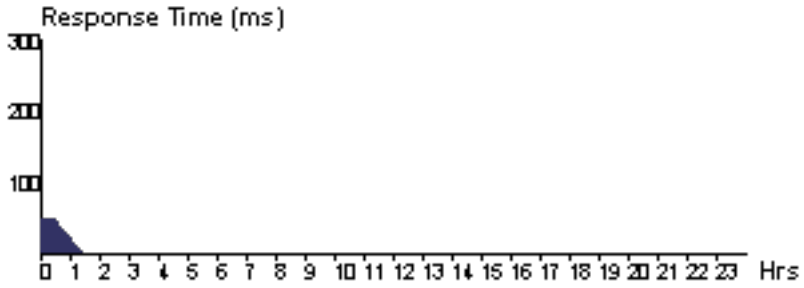


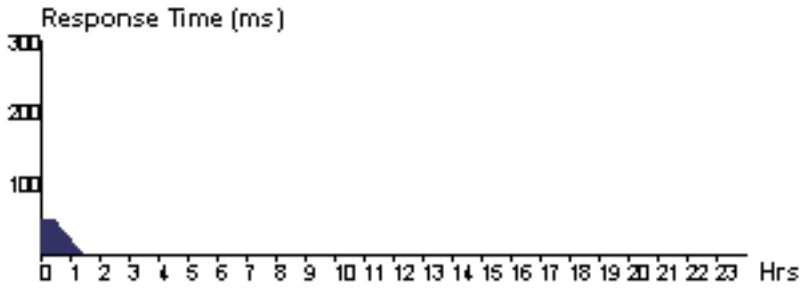

UB2



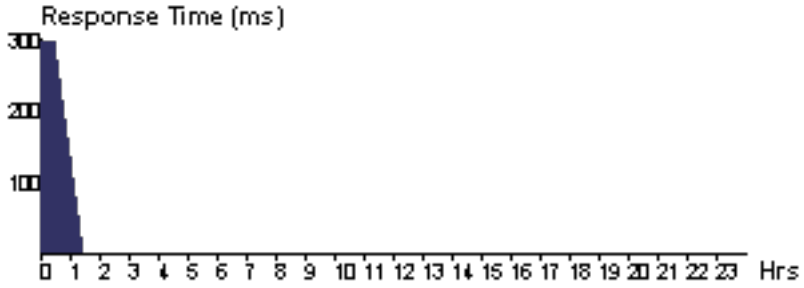

UB3

UB4

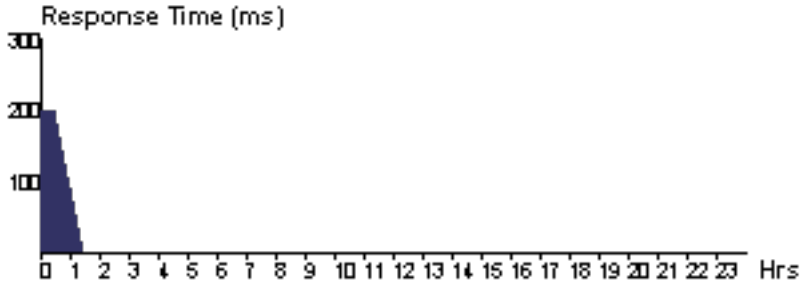



UB5




UB6




Data Center Request Servicing Times

| Data Center | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| DC1 | 0.29 | 0.02 | 0.86 |
| DC2 | 0.51 | 0.02 | 0.89 |
| DC3 | 0.43 | 0.02 | 0.88 |
| DC4 | 0.50 | 0.02 | 0.88 |

Data Center Hourly Average Processing Times

DC1

DC2

DC3

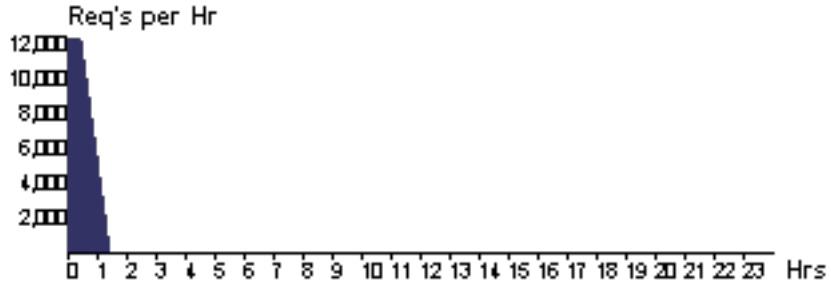
DC4

Data Center Hourly Loading

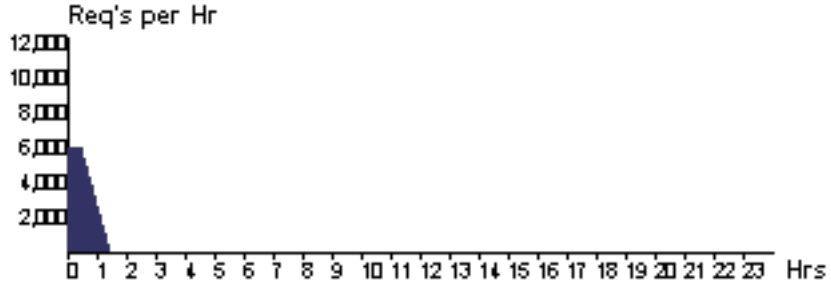
DC1

DC2

DC3




DC4

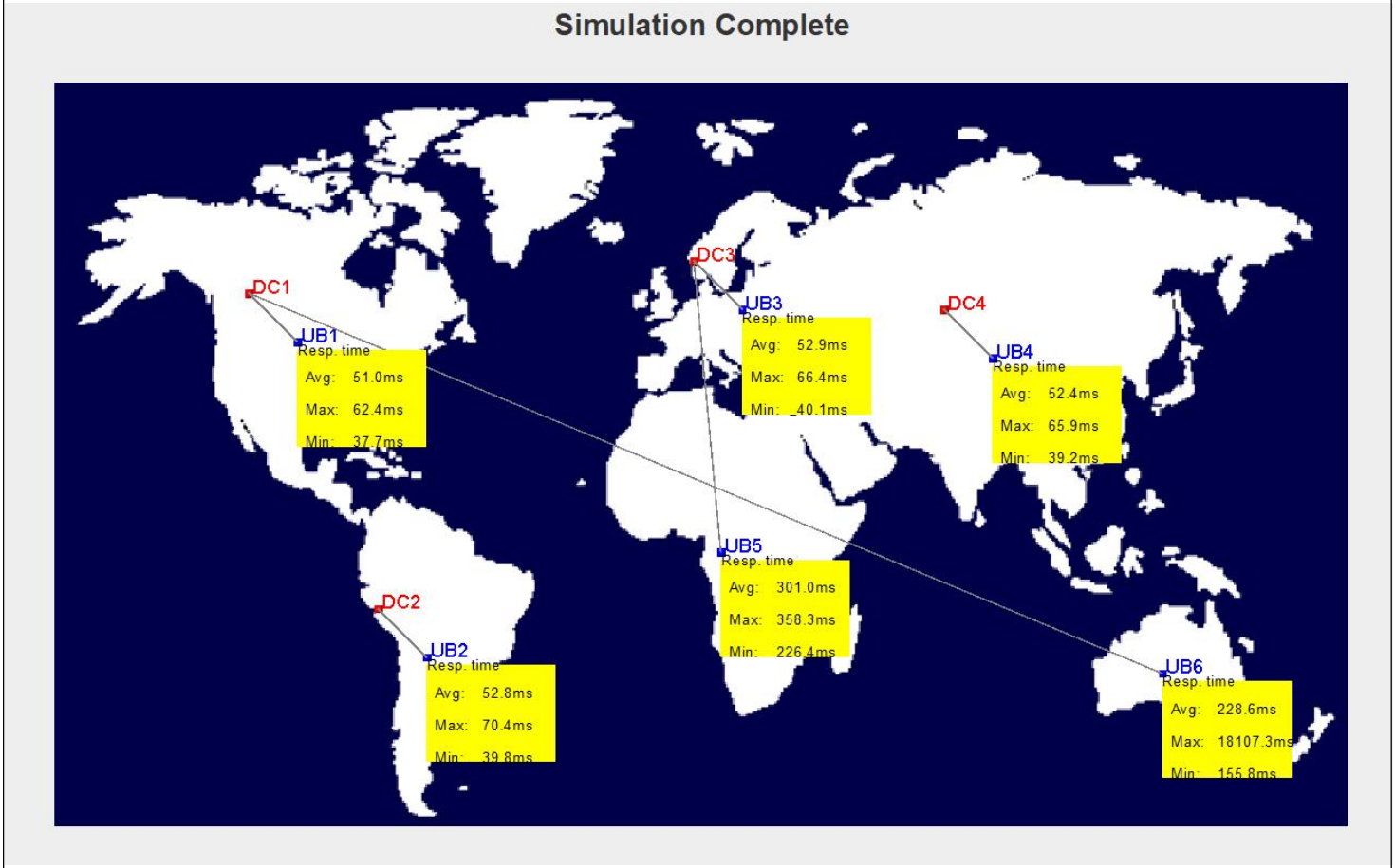



## Cost

| | |
|---|---|
| Total Virtual Machine Cost ($): | 2.01 |
| Total Data Transfer Cost ($): | 0.38 |
| Grand Total: ($) | 2.39 |

| Data Center | **VM Cost $** | **Data Transfer Cost $** | **Total $** |
|---|---|---|---|
| DC2 | 0.50 | 0.07 | 0.57 |
| DC1 | 0.50 | 0.13 | 0.63 |
| DC4 | 0.50 | 0.06 | 0.57 |
| DC3 | 0.50 | 0.13 | 0.63 |

2) Reconfigure Dynamically:



Results of the Simulation Completed at: 02/02/2022 10:52:40

## Overall Response Time Summary

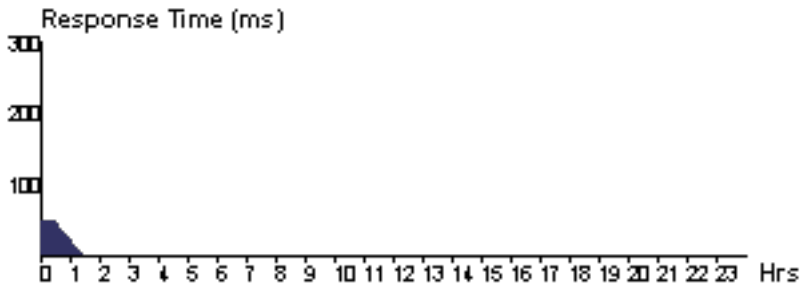
| | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| Overall response time: | 124.12 | 37.66 | 18107.26 |
| Data Center processing time: | 6.76 | 0.02 | 17914.25 |

## Response Time by Region

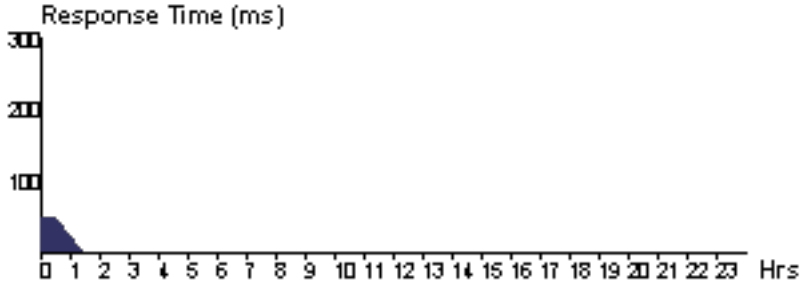
| Userbase | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| UB1 | 50.98 | 37.66 | 62.36 |
| UB2 | 52.81 | 39.79 | 70.45 |
| UB3 | 52.88 | 40.07 | 66.40 |
| UB4 | 52.42 | 39.19 | 65.92 |
| UB5 | 301.00 | 226.37 | 358.27 |
| UB6 | 228.58 | 155.79 | 18107.26 |

## User Base Hourly Response Times

### UB1

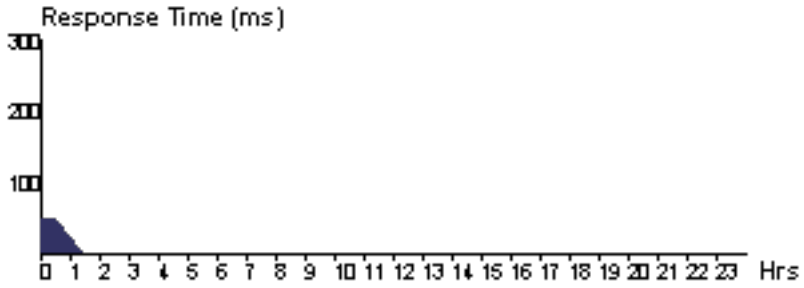


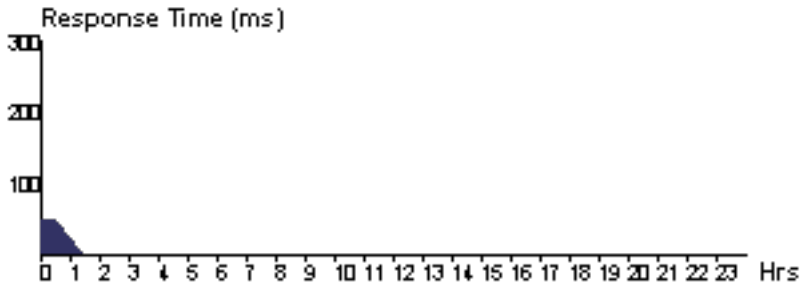

### UB2



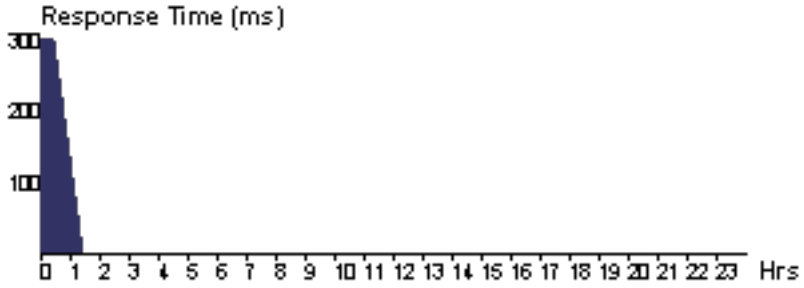

### UB3

### UB4

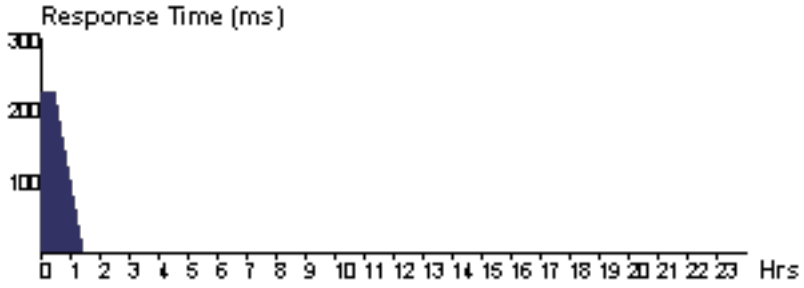



UB5




UB6

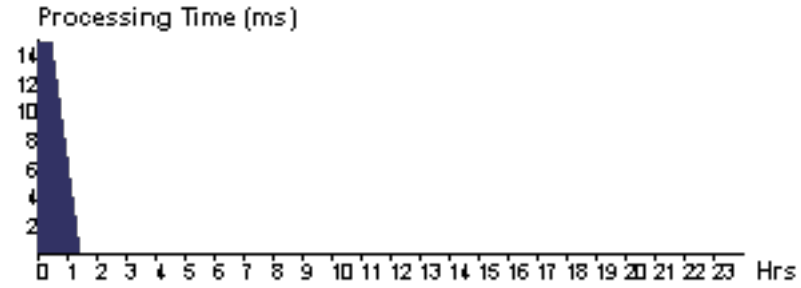



Data Center Request Servicing Times

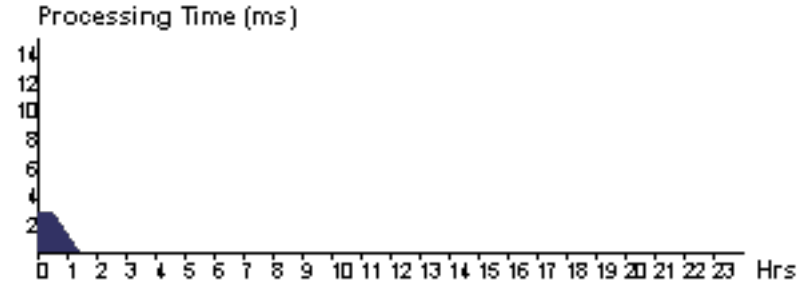
| Data Center | Avg (ms) | Min (ms) | Max (ms) |
|---|---|---|---|
| DC1 | 15.01 | 0.02 | 17914.25 |
| DC2 | 3.38 | 0.07 | 13.76 |
| DC3 | 2.29 | 0.02 | 14.10 |
| DC4 | 2.63 | 0.03 | 11.90 |

Data Center Hourly Average Processing Times

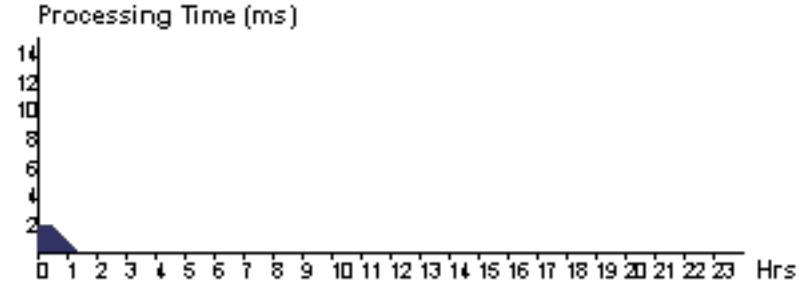
DC1



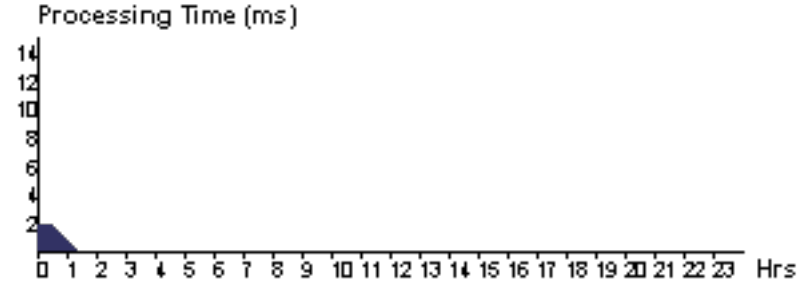

DC2




DC3

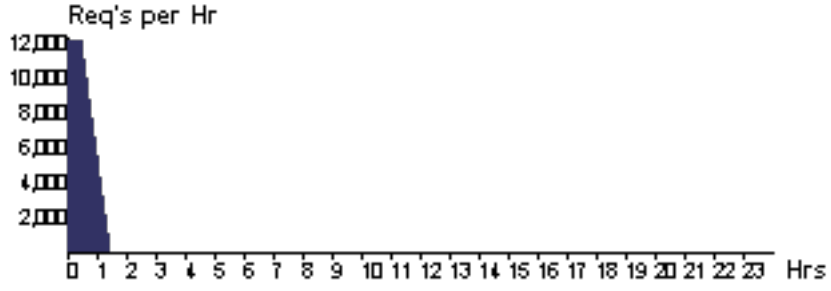



DC4



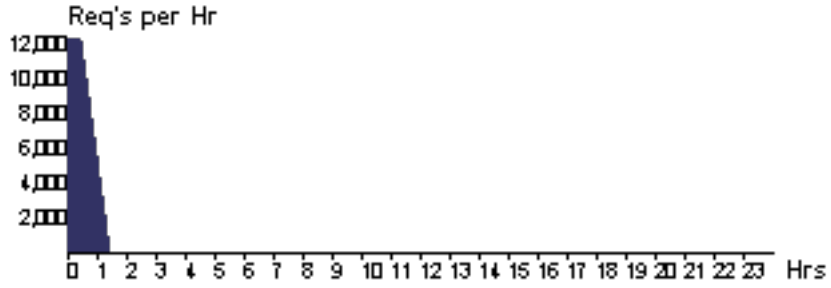

Data Center Hourly Loading

DC1

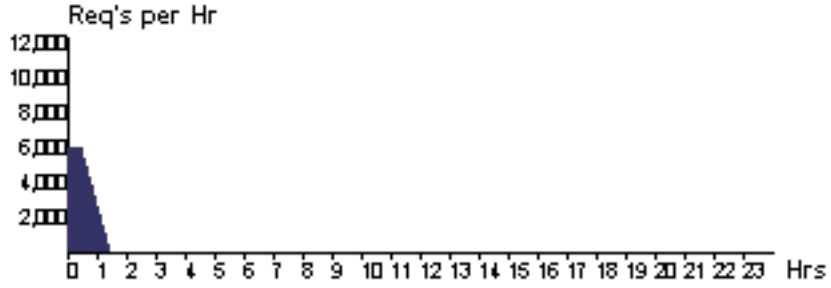



DC2

DC3




DC4




## Cost

| | |
|---|---|
| Total Virtual Machine Cost ($): | 12.43 |
| Total Data Transfer Cost ($): | 0.38 |
| Grand Total: ($) | 12.81 |

| Data Center | **VM Cost $** | **Data Transfer Cost $** | **Total $** |
|---|---|---|---|
| DC2 | 3.18 | 0.07 | 3.24 |
| DC1 | 3.25 | 0.13 | 3.38 |
| DC4 | 2.80 | 0.06 | 2.87 |
| DC3 | 3.19 | 0.13 | 3.32 |