

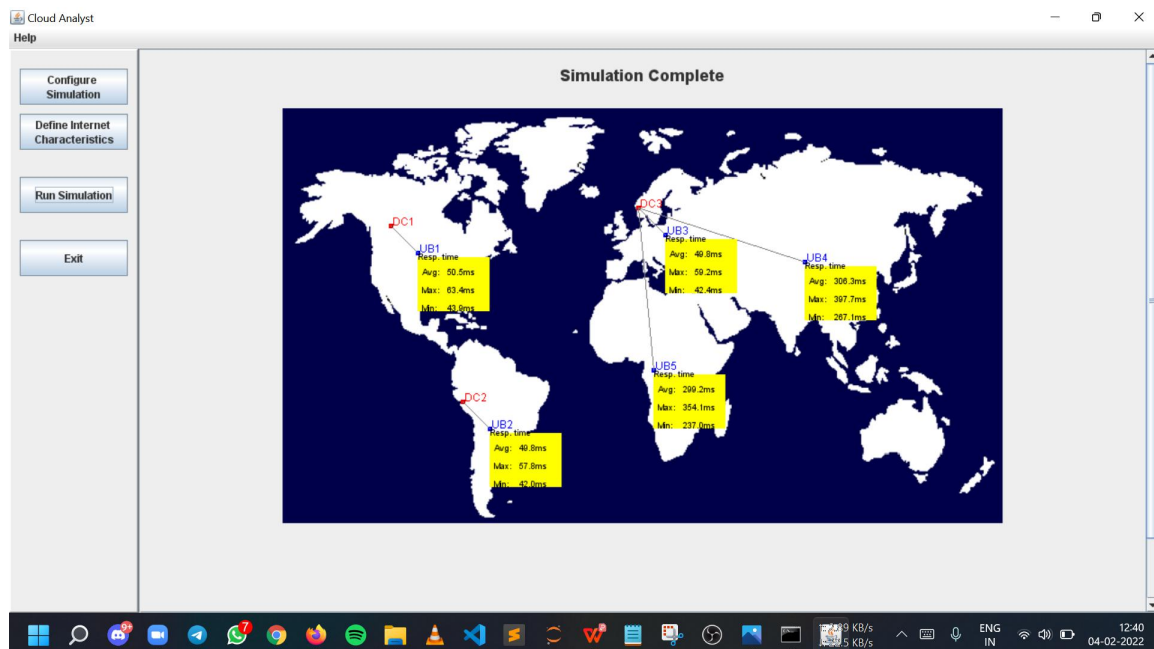
# Lab Assignment 4

Chaudhary Hamdan  
1905387  
Date: 04-02-2022

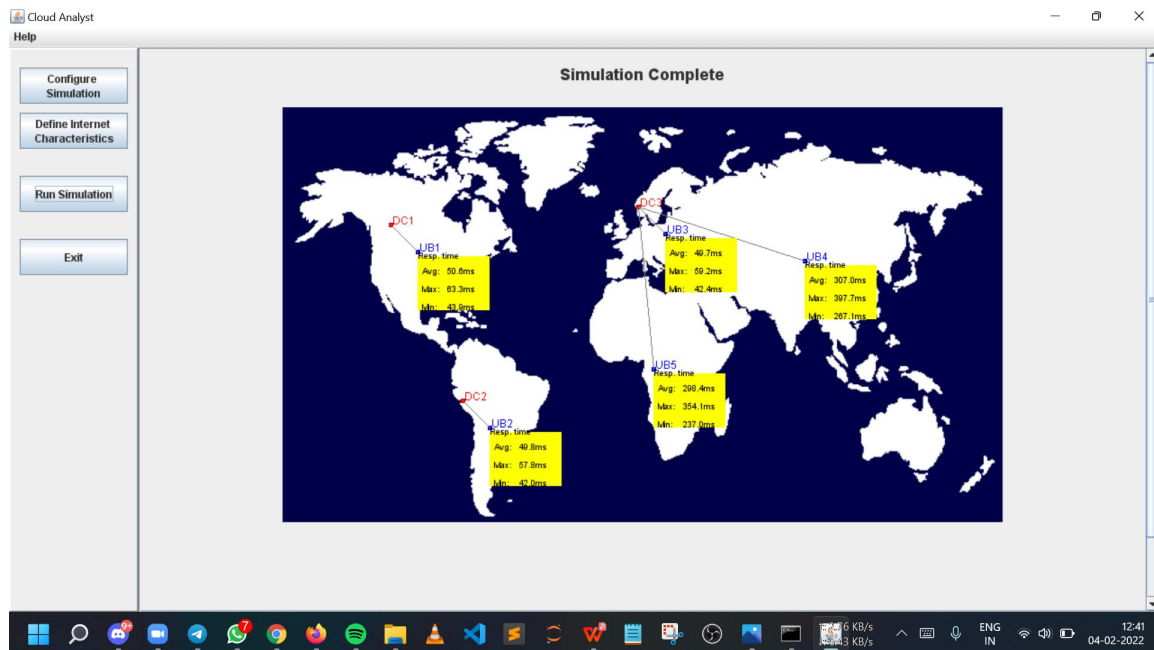
Question: Take 5 User Bases, 3 Data Centers.  
Change Service Broker Policy and Load Balancing Policy.  
Find Response times and detailed output.  
Draw graph of all 9 response times.

Screenshots:

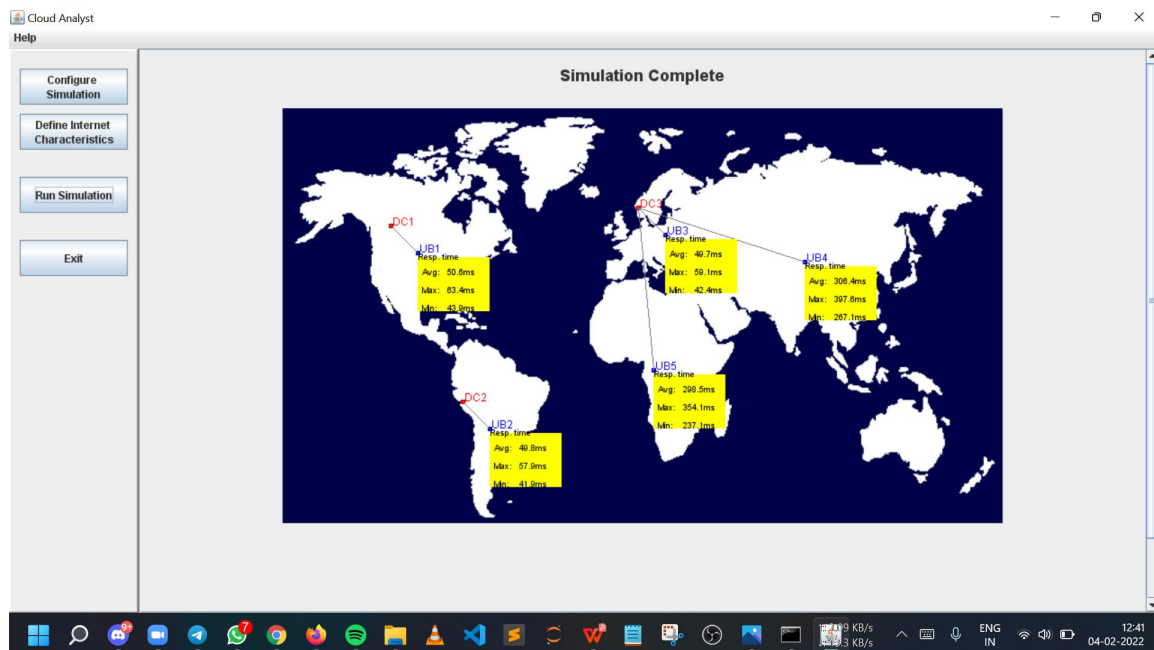
Closest Data Center -> Round Robin:



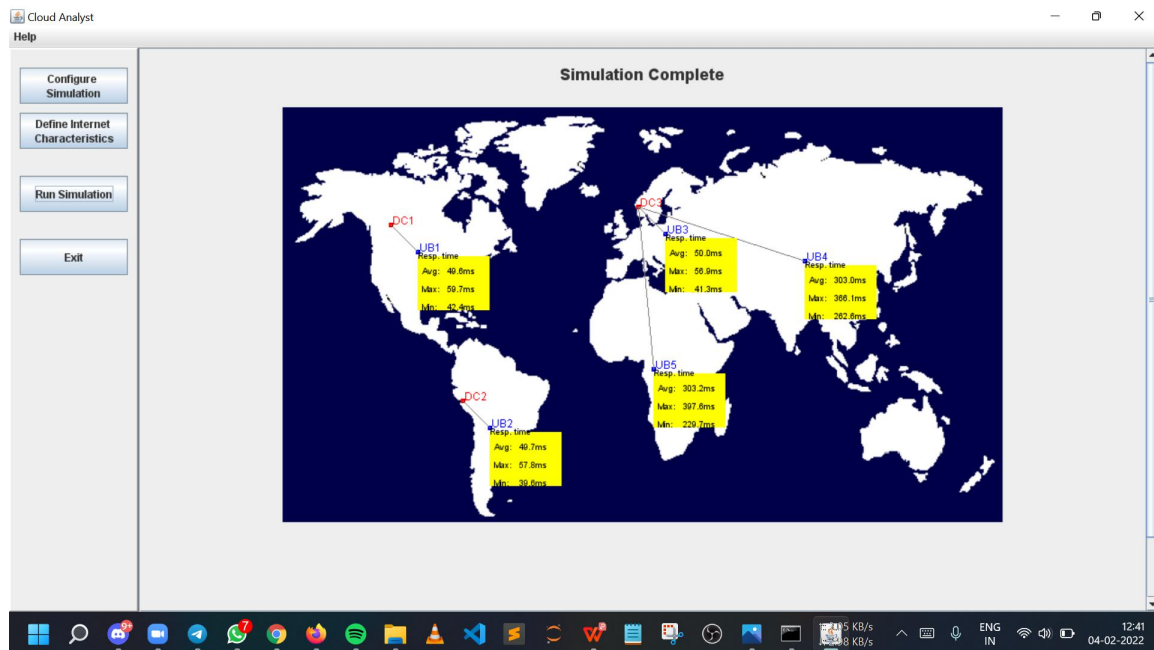
## Closest Data Center -> Equally SpreadCurrent Execution Load:



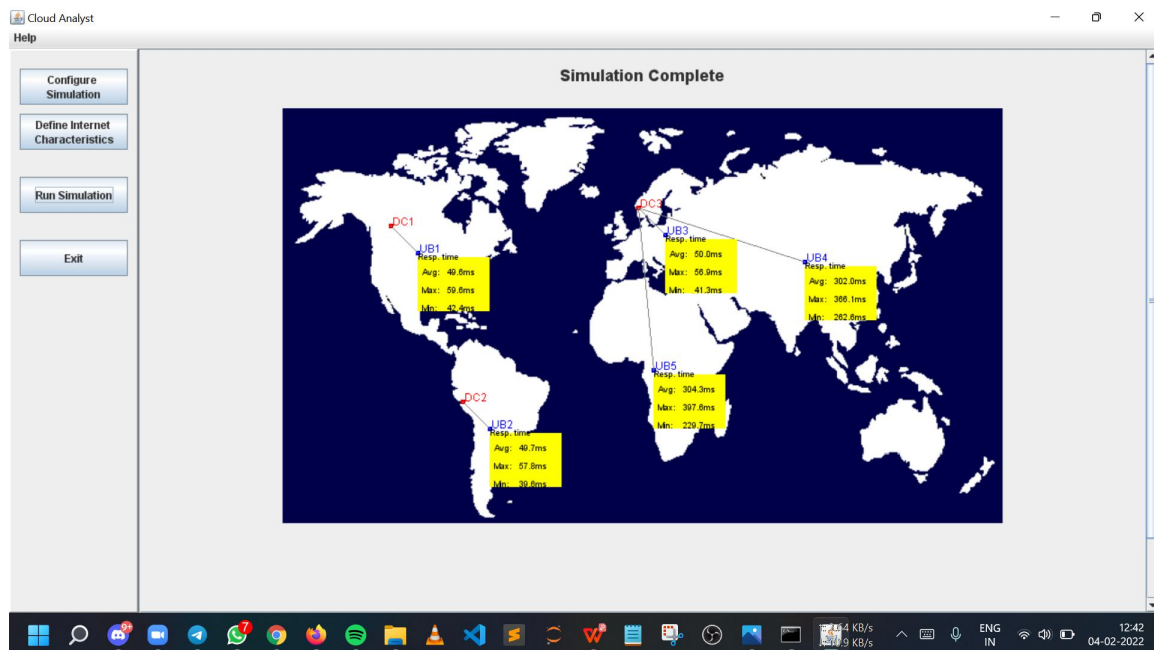
## Closest Data Center -> Throttled:



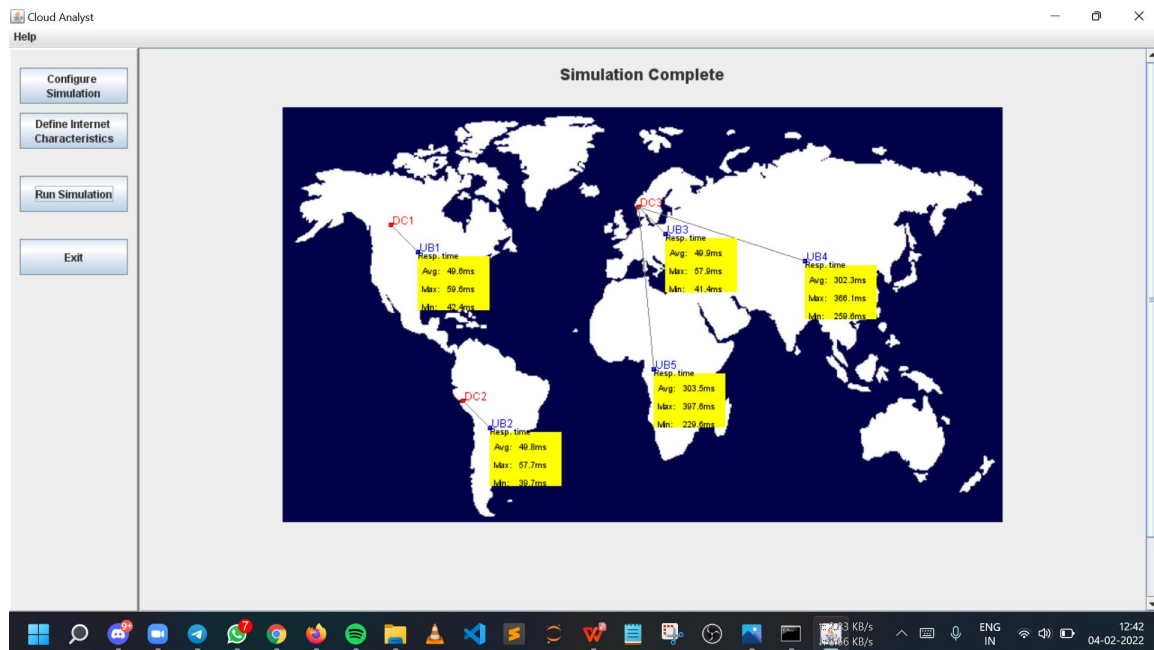
## Optimise Response Time -> Round Robbin:



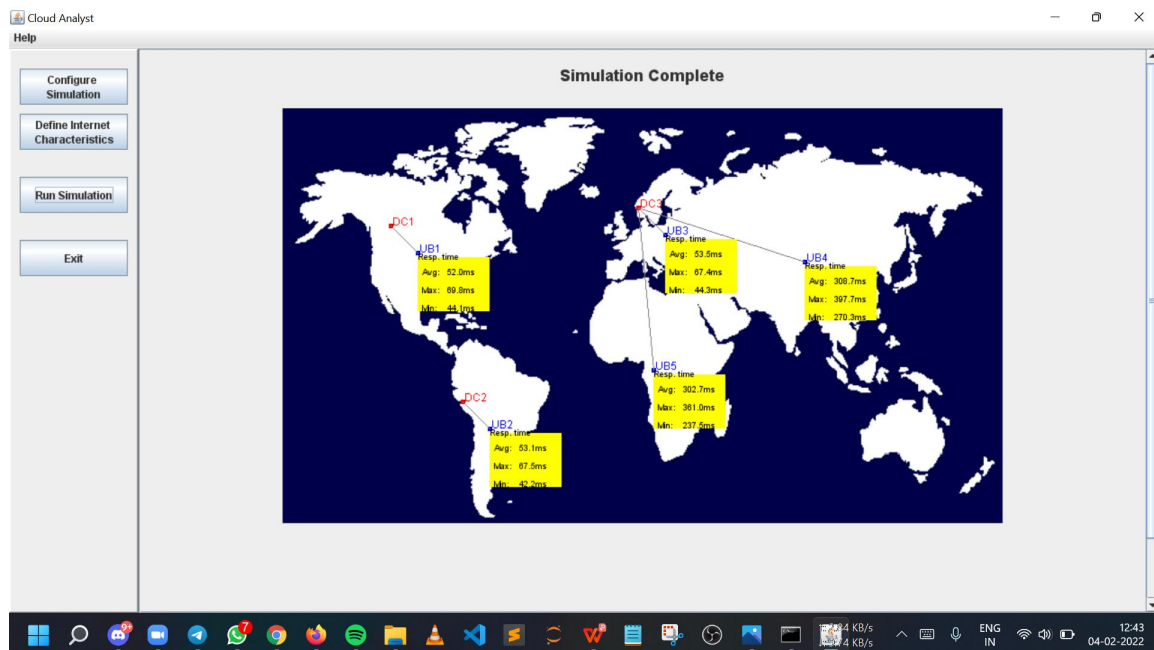
## Optimise Response Time -> Equally SpreadCurrent Execution Load:



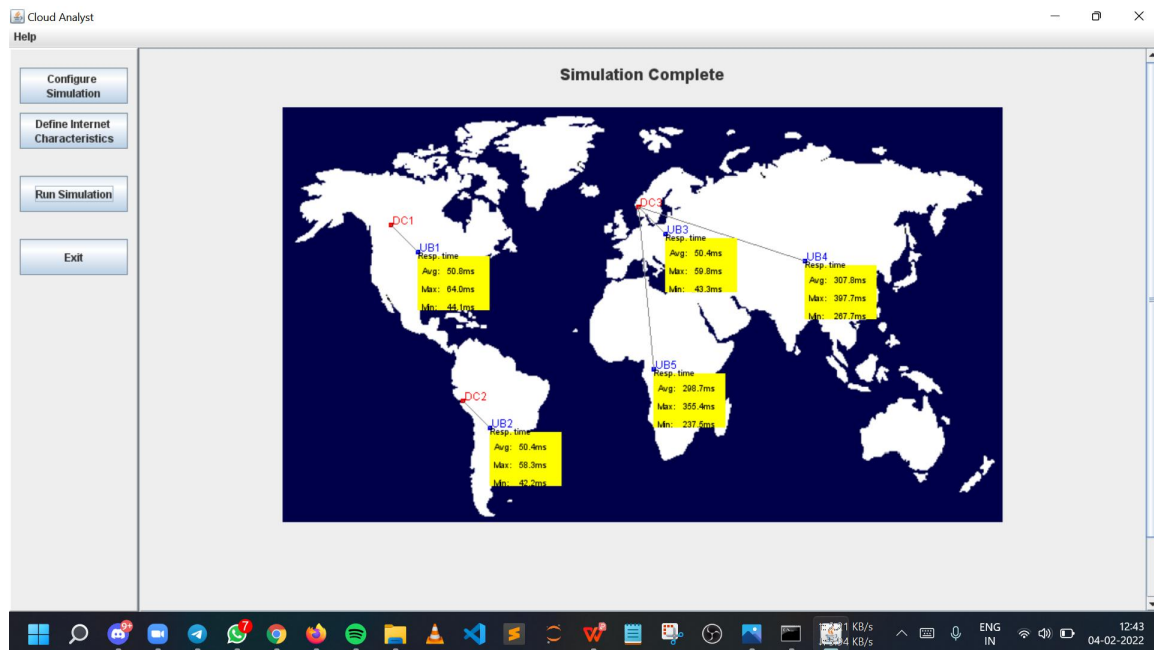
## Optimise Response Time -> Throttled:



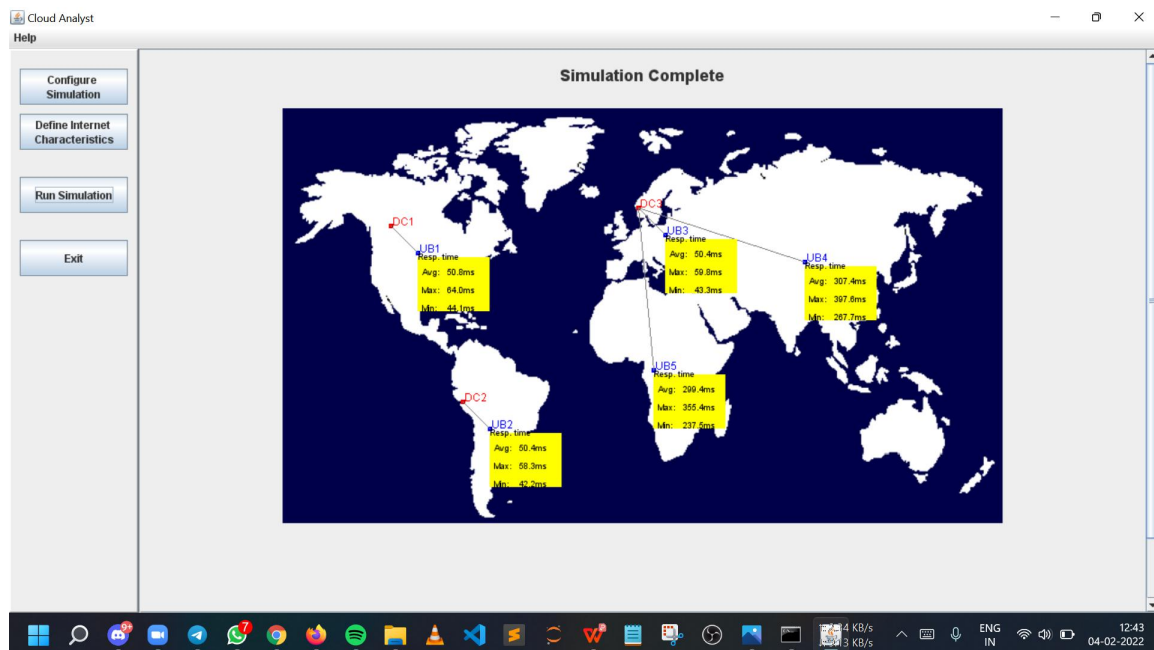
## Reconfigure Dynamically with L -> Round Robbin:



## Reconfigure Dynamically with L -> Equally Spread Current Execution Load:



## Reconfigure Dynamically with L -> Throttled:



**PDFs of all detailed results will be attached  
in the following pages.**

## Overall Response Time Summary

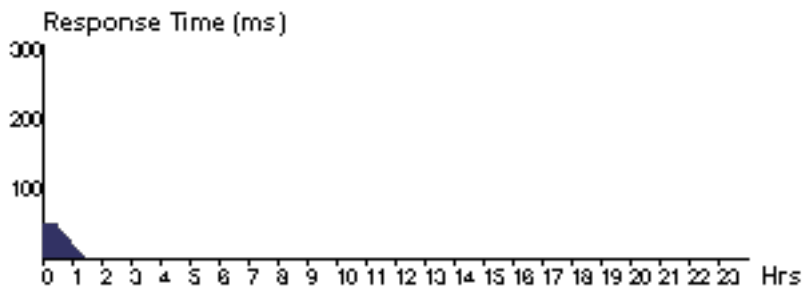
	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
Overall response time:	151.68	41.97	397.72
Data Center processing time:	0.49	0.03	1.01

## Response Time by Region

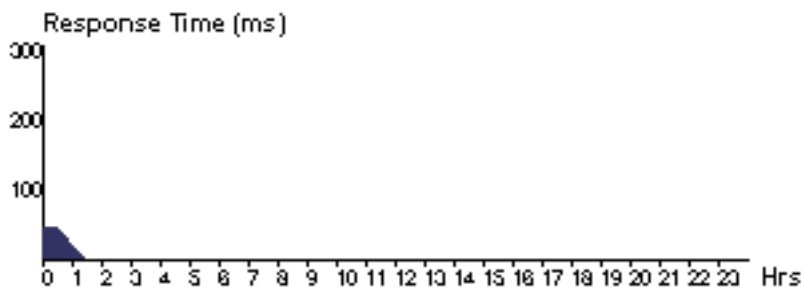
<b>Userbase</b>	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
UB1	50.57	43.86	63.44
UB2	49.82	41.97	57.79
UB3	49.70	42.38	59.21
UB4	306.47	267.14	397.72
UB5	299.03	237.04	354.14

## User Base Hourly Response Times

### UB1

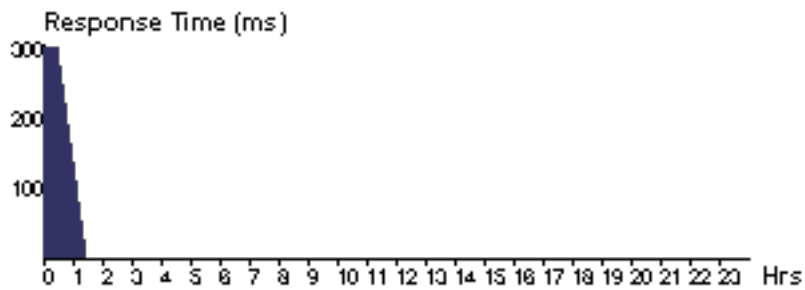
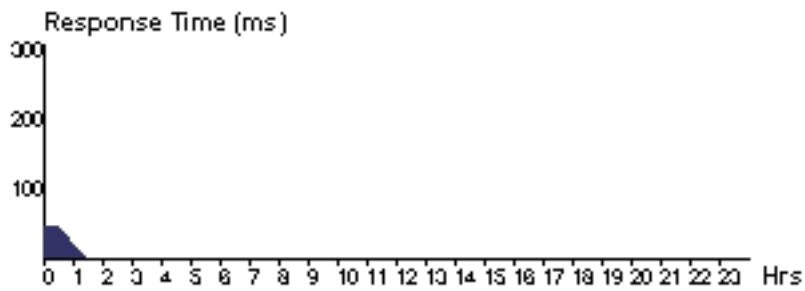


### UB2

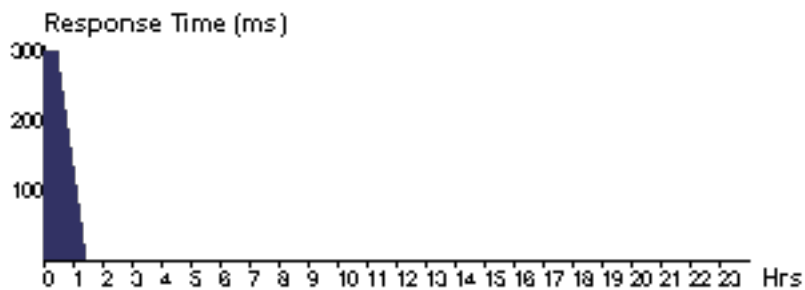


### UB3

### UB4



UB5



## Data Center Request Servicing Times

Data Center	Avg (ms)	Min (ms)	Max (ms)
DC1	0.56	0.03	0.96
DC2	0.53	0.05	1.01
DC3	0.46	0.03	1.00

## Data Center Hourly Average Processing Times

DC1

DC2

DC3

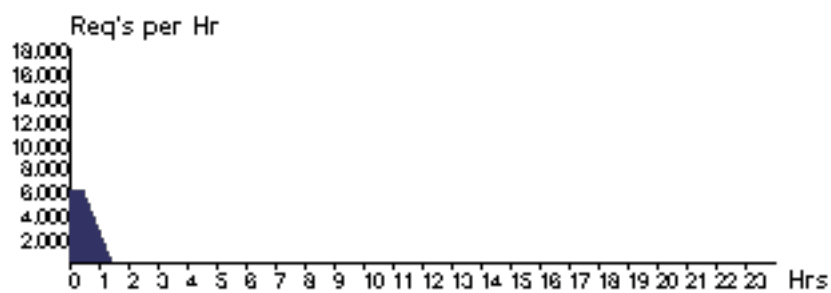


## Data Center Hourly Loading

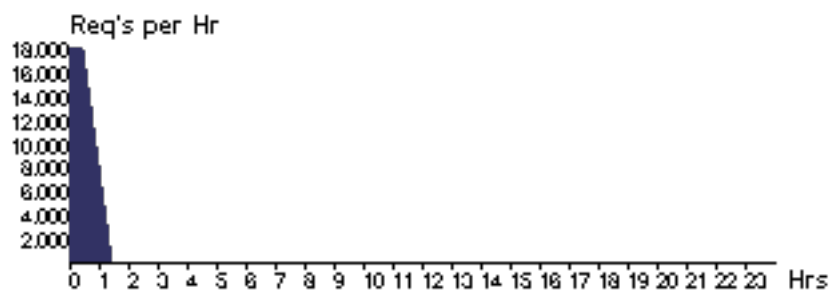
DC1



DC2



DC3



Cost

Total Virtual Machine Cost (\$):	1.51
Total Data Transfer Cost (\$):	0.29
Grand Total: (\$)	1.80

Data Center	VM Cost \$	Data Transfer Cost \$	Total \$
DC2	0.50	0.06	0.56
DC1	0.50	0.06	0.56
DC3	0.50	0.18	0.68

## Overall Response Time Summary

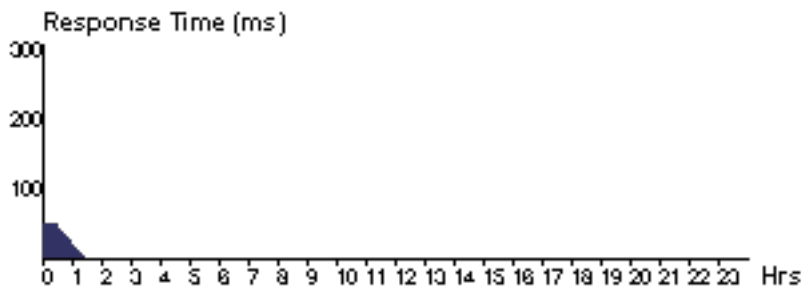
	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
Overall response time:	151.69	41.97	397.72
Data Center processing time:	0.49	0.02	1.01

## Response Time by Region

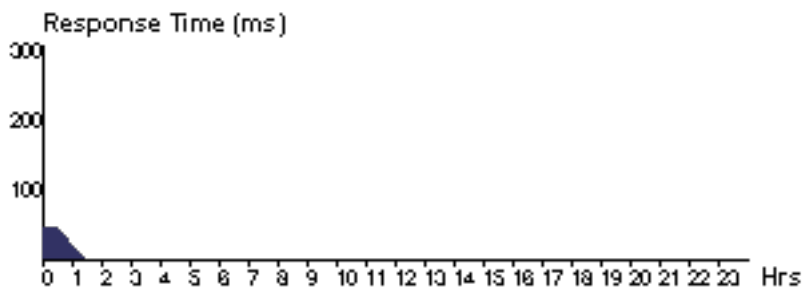
<b>Userbase</b>	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
UB1	50.49	43.86	63.35
UB2	49.76	41.97	57.78
UB3	49.81	42.38	59.21
UB4	306.74	267.14	397.72
UB5	298.81	237.04	354.14

## User Base Hourly Response Times

### UB1

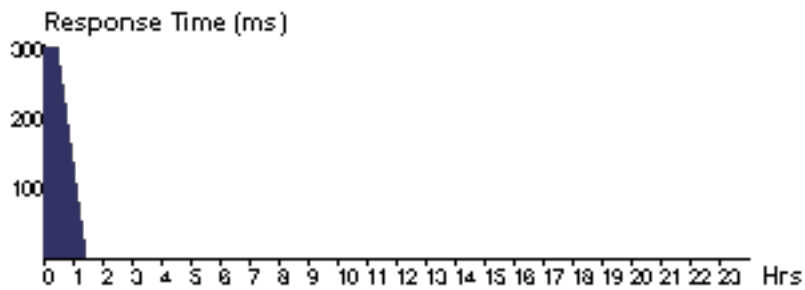
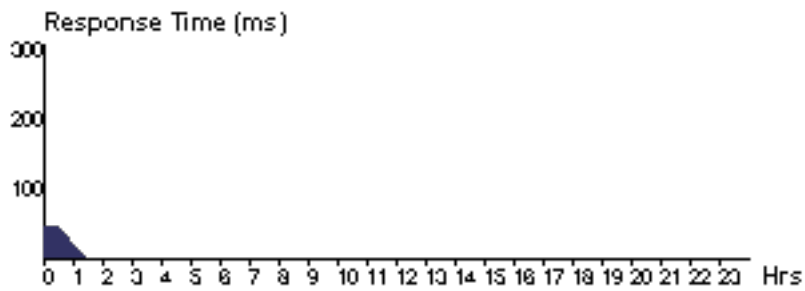


### UB2

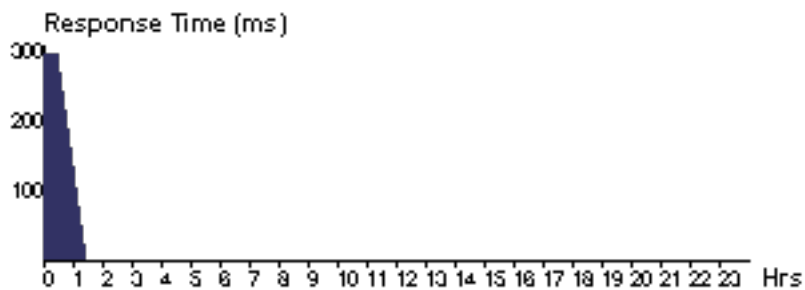


### UB3

### UB4



UB5



## Data Center Request Servicing Times

Data Center	Avg (ms)	Min (ms)	Max (ms)
DC1	0.55	0.03	0.96
DC2	0.54	0.05	1.01
DC3	0.46	0.02	1.00

## Data Center Hourly Average Processing Times

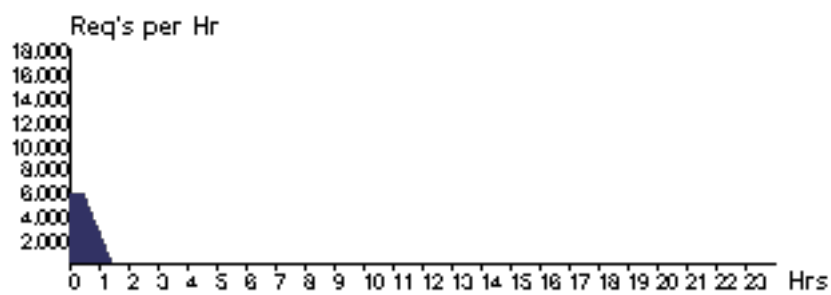
DC1

DC2

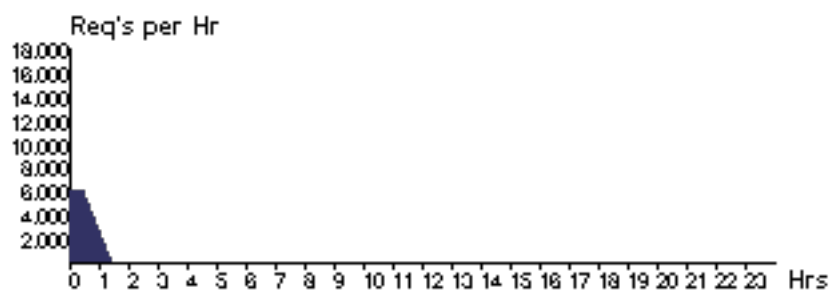
DC3

## Data Center Hourly Loading

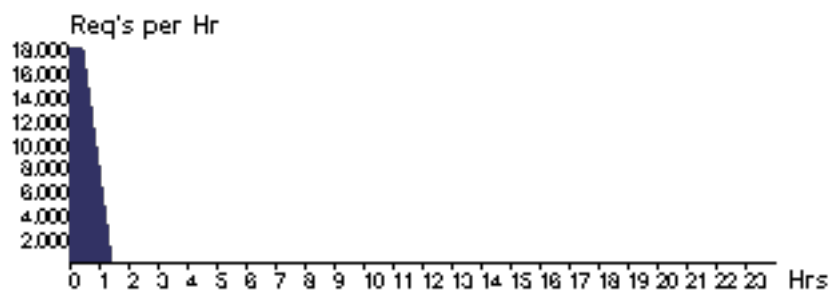
DC1



DC2



DC3



Cost

Total Virtual Machine Cost (\$): 1.51  
Total Data Transfer Cost (\$): 0.29  
Grand Total: (\$) 1.80

Data Center	VM Cost \$	Data Transfer Cost \$	Total \$
DC2	0.50	0.06	0.56
DC1	0.50	0.06	0.56
DC3	0.50	0.18	0.68

### Overall Response Time Summary

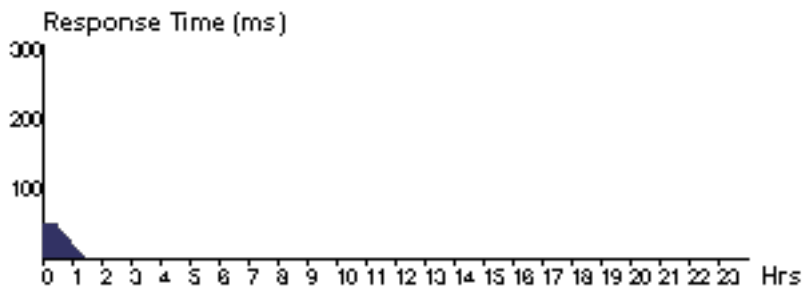
	Avg (ms)	Min (ms)	Max (ms)
Overall response time:	151.66	41.90	397.64
Data Center processing time:	0.48	0.10	0.89

### Response Time by Region

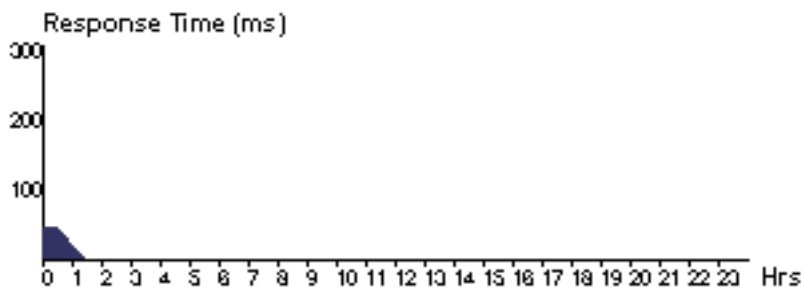
Userbase	Avg (ms)	Min (ms)	Max (ms)
UB1	50.48	43.86	63.36
UB2	49.68	41.90	57.89
UB3	49.87	42.38	59.13
UB4	306.54	267.14	397.64
UB5	298.89	237.14	354.14

### User Base Hourly Response Times

#### UB1

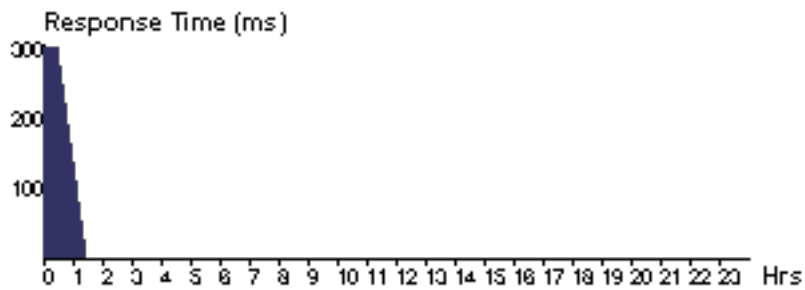
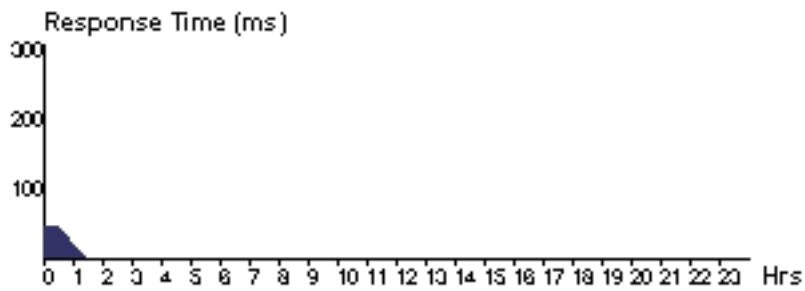


#### UB2

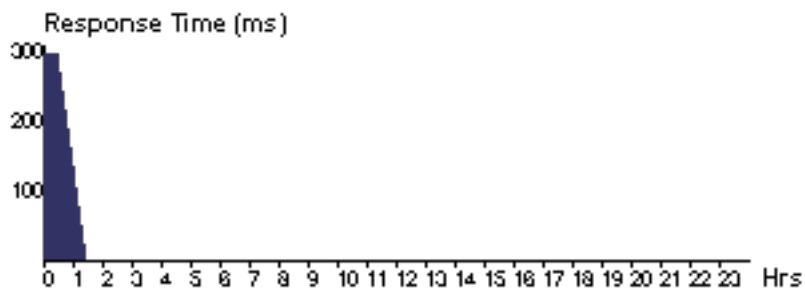


#### UB3

#### UB4



UB5



## Data Center Request Servicing Times

Data Center	Avg (ms)	Min (ms)	Max (ms)
DC1	0.54	0.10	0.86
DC2	0.53	0.14	0.89
DC3	0.44	0.13	0.88

## Data Center Hourly Average Processing Times

DC1

DC2

DC3

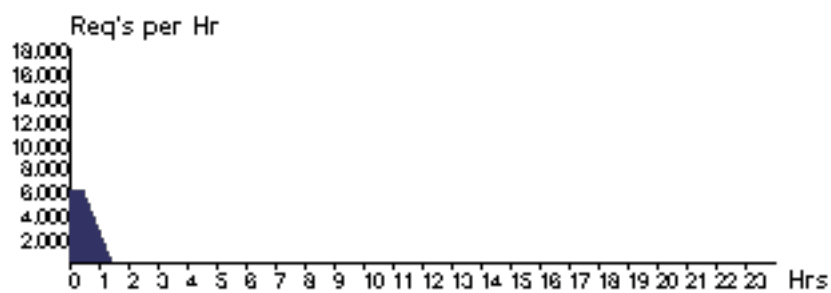


## Data Center Hourly Loading

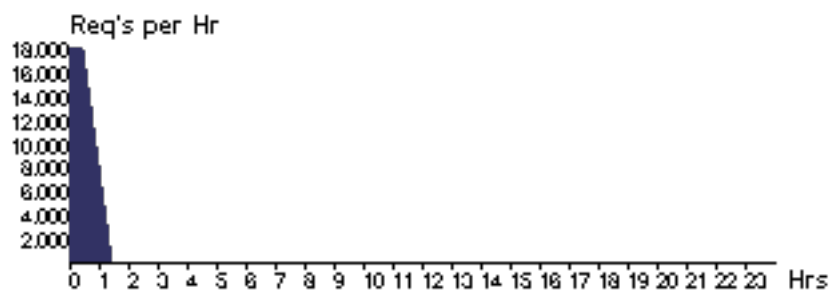
DC1



DC2



DC3



Cost

Total Virtual Machine Cost (\$): 1.51  
Total Data Transfer Cost (\$): 0.29  
Grand Total: (\$) 1.80

Data Center	VM Cost \$	Data Transfer Cost \$	Total \$
DC2	0.50	0.06	0.56
DC1	0.50	0.06	0.56
DC3	0.50	0.18	0.68

## Overall Response Time Summary

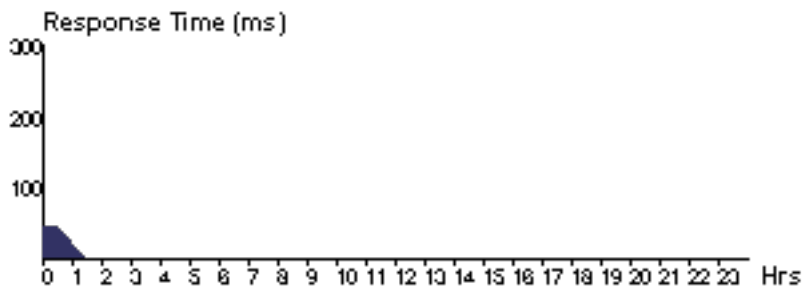
	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
Overall response time:	151.78	39.60	397.64
Data Center processing time:	0.47	0.03	1.01

## Response Time by Region

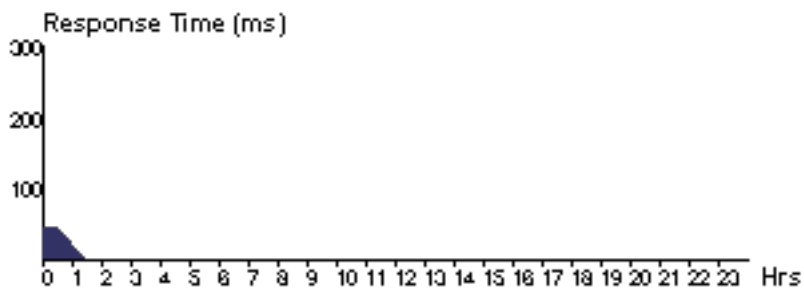
<b>Userbase</b>	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
UB1	49.59	42.42	59.71
UB2	49.71	39.60	57.78
UB3	49.94	41.30	56.87
UB4	302.95	262.64	366.13
UB5	303.72	229.74	397.64

## User Base Hourly Response Times

### UB1

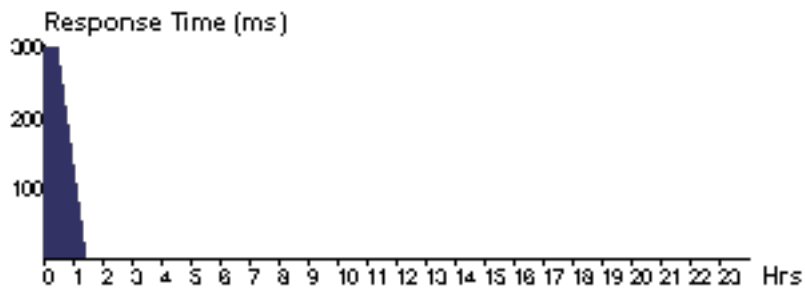
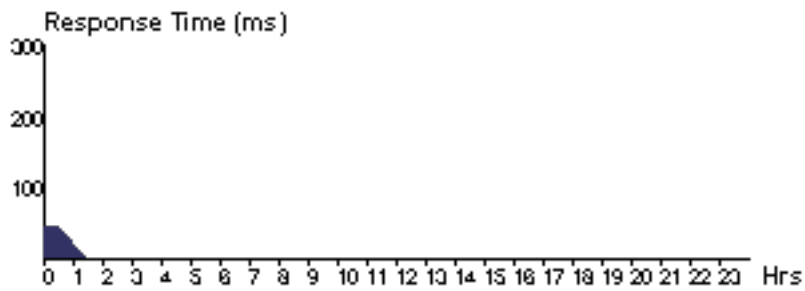


### UB2

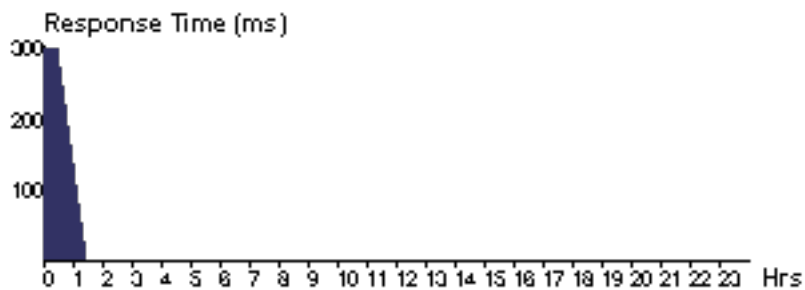


### UB3

### UB4



UB5



## Data Center Request Servicing Times

Data Center	Avg (ms)	Min (ms)	Max (ms)
DC1	0.52	0.03	0.96
DC2	0.48	0.05	1.01
DC3	0.44	0.03	1.00

## Data Center Hourly Average Processing Times

DC1

DC2

DC3

## Data Center Hourly Loading

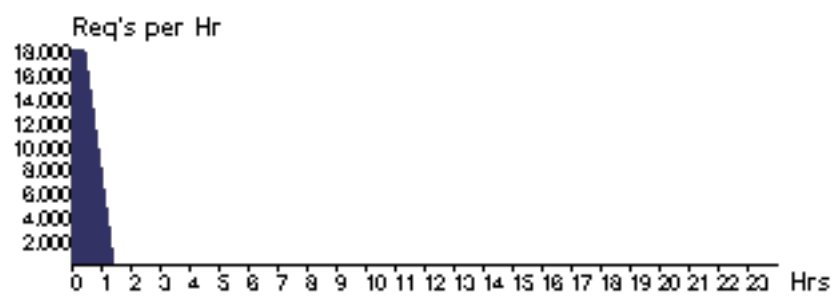
DC1



DC2



DC3



Cost

Total Virtual Machine Cost (\$): 1.51  
Total Data Transfer Cost (\$): 0.29  
Grand Total: (\$) 1.80

Data Center	VM Cost \$	Data Transfer Cost \$	Total \$
DC2	0.50	0.06	0.56
DC1	0.50	0.06	0.56
DC3	0.50	0.18	0.68

## Overall Response Time Summary

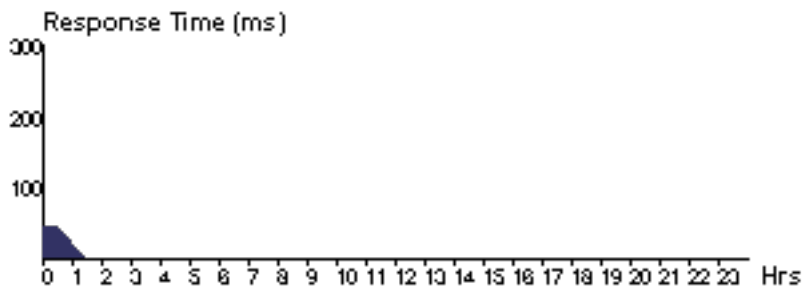
	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
Overall response time:	151.66	39.60	397.61
Data Center processing time:	0.46	0.02	1.01

## Response Time by Region

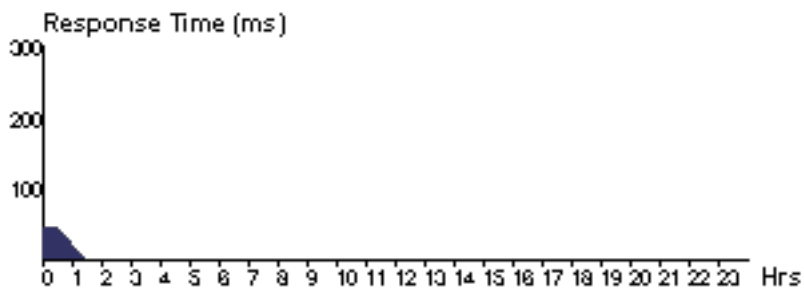
<b>Userbase</b>	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
UB1	49.69	42.36	59.61
UB2	49.78	39.60	57.78
UB3	49.87	41.30	56.87
UB4	302.29	262.64	366.13
UB5	303.67	229.74	397.61

## User Base Hourly Response Times

### UB1

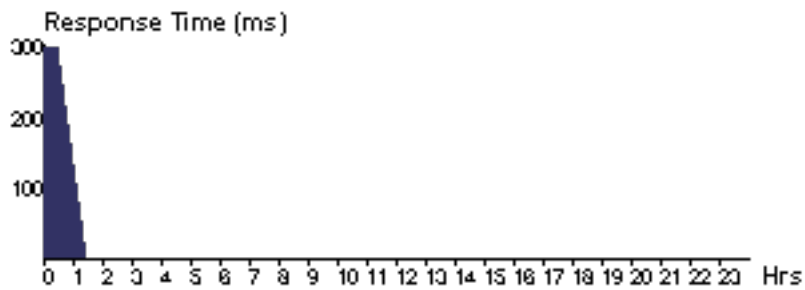
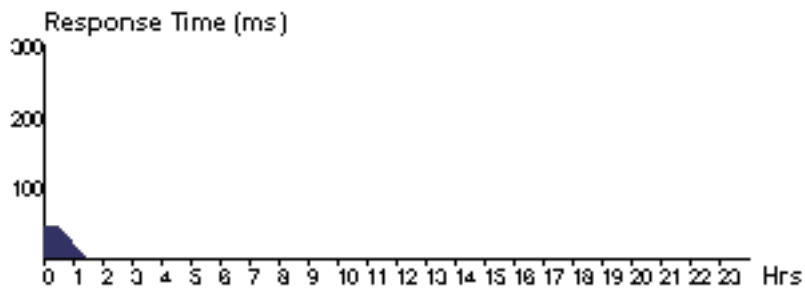


### UB2

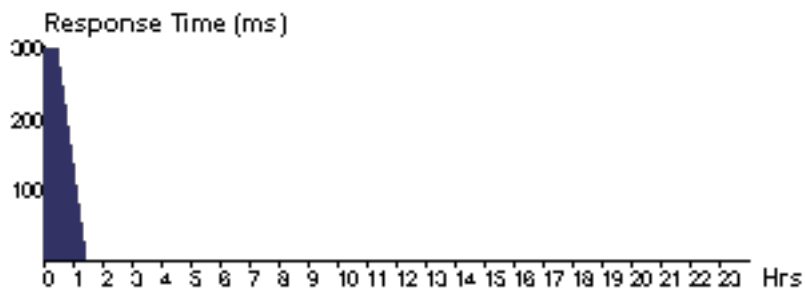


### UB3

### UB4



UB5



## Data Center Request Servicing Times

Data Center	Avg (ms)	Min (ms)	Max (ms)
DC1	0.52	0.03	0.99
DC2	0.49	0.05	1.01
DC3	0.44	0.02	1.00

## Data Center Hourly Average Processing Times

DC1

DC2

DC3

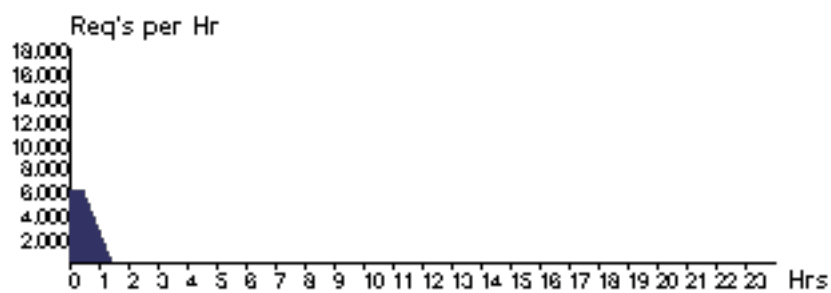


## Data Center Hourly Loading

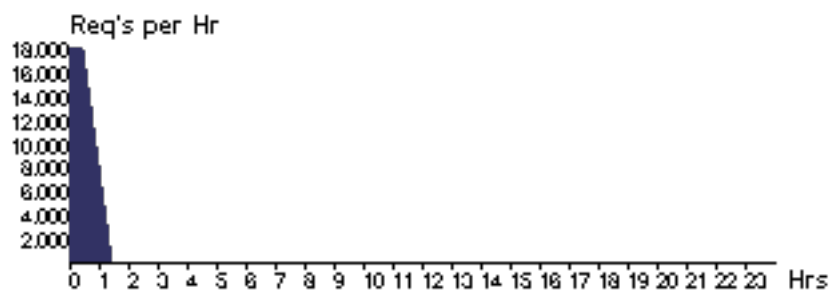
DC1



DC2



DC3



Cost

Total Virtual Machine Cost (\$): 1.51  
Total Data Transfer Cost (\$): 0.29  
Grand Total: (\$) 1.80

Data Center	VM Cost \$	Data Transfer Cost \$	Total \$
DC2	0.50	0.06	0.56
DC1	0.50	0.06	0.56
DC3	0.50	0.18	0.68

## Overall Response Time Summary

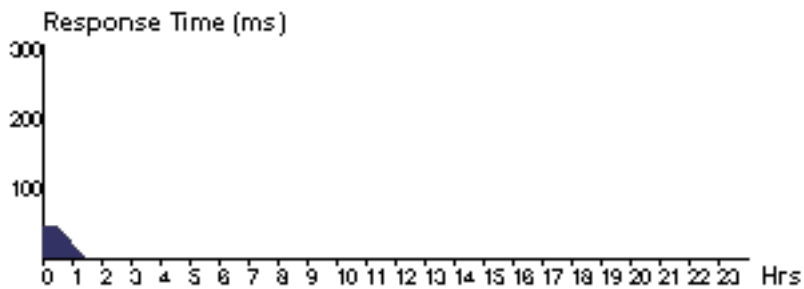
	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
Overall response time:	151.50	39.65	397.64
Data Center processing time:	0.45	0.10	0.89

## Response Time by Region

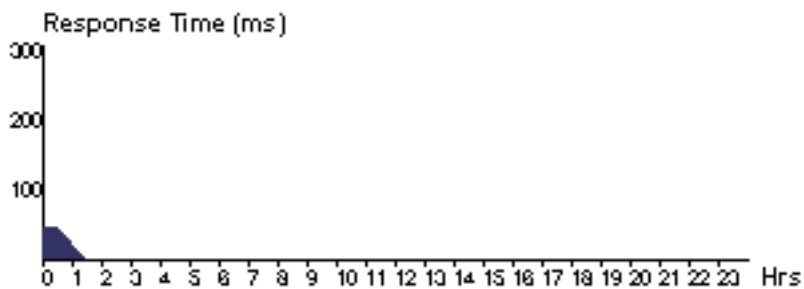
<b>Userbase</b>	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
UB1	49.74	42.36	59.61
UB2	49.86	39.65	57.65
UB3	49.85	41.38	56.88
UB4	300.73	259.64	366.15
UB5	304.28	229.64	397.64

## User Base Hourly Response Times

### UB1

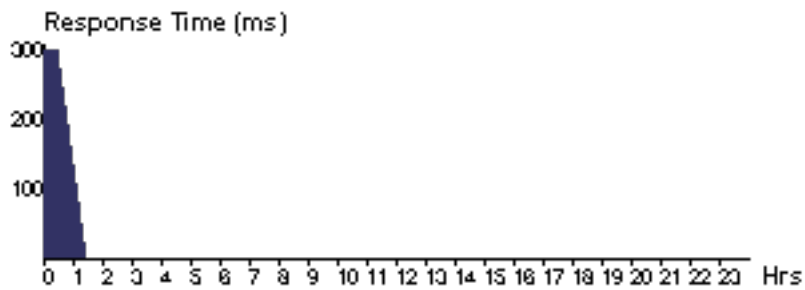
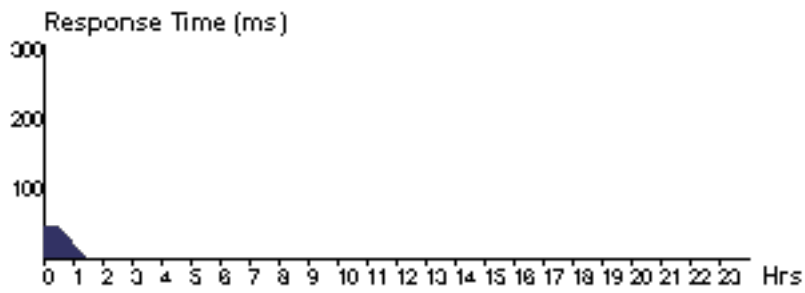


### UB2

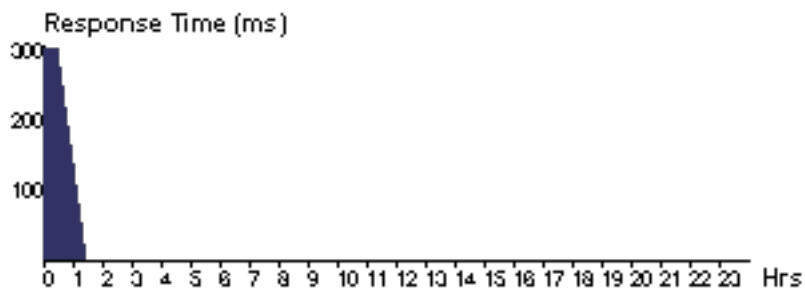


### UB3

### UB4



UB5



## Data Center Request Servicing Times

Data Center	Avg (ms)	Min (ms)	Max (ms)
DC1	0.49	0.10	0.86
DC2	0.48	0.13	0.89
DC3	0.42	0.13	0.88

## Data Center Hourly Average Processing Times

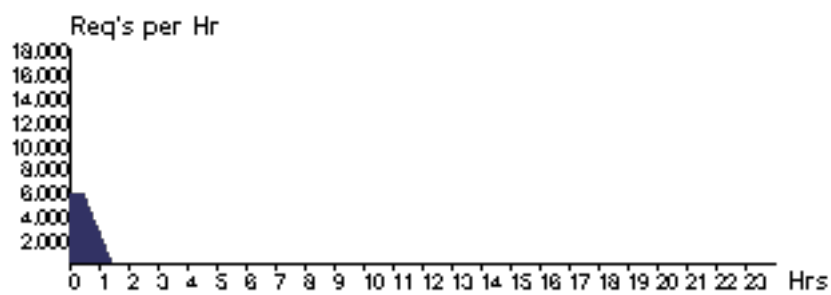
DC1

DC2

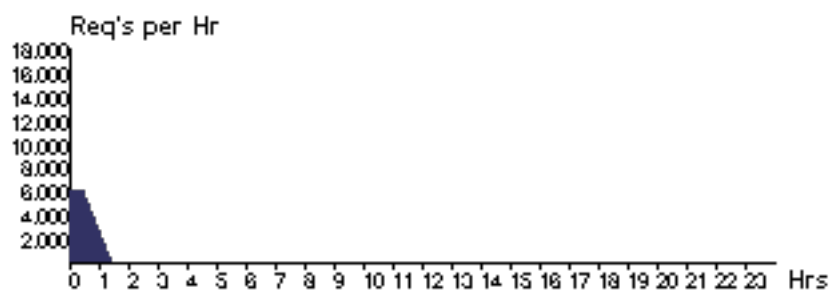
DC3

## Data Center Hourly Loading

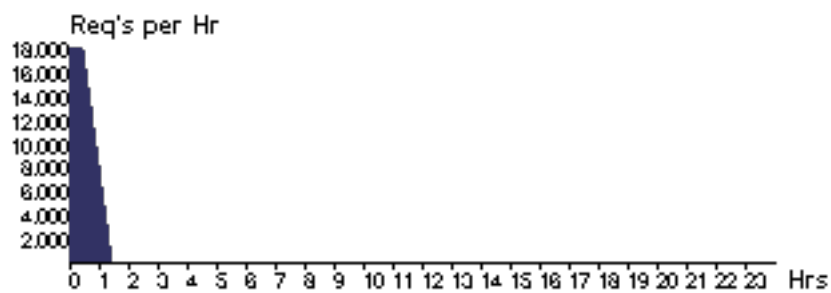
DC1



DC2



DC3



Cost

Total Virtual Machine Cost (\$): 1.51  
Total Data Transfer Cost (\$): 0.29  
Grand Total: (\$) 1.80

Data Center	VM Cost \$	Data Transfer Cost \$	Total \$
DC2	0.50	0.06	0.56
DC1	0.50	0.06	0.56
DC3	0.50	0.18	0.68

## Overall Response Time Summary

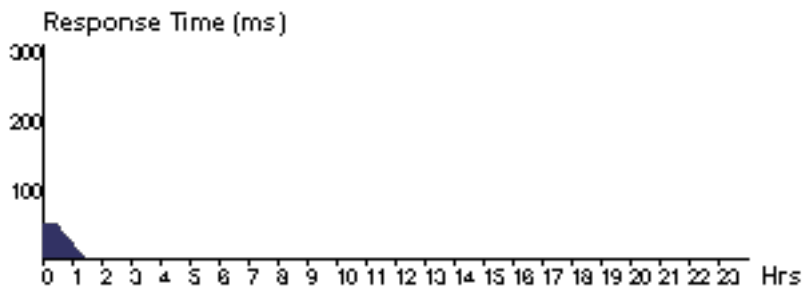
	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
Overall response time:	154.35	42.23	397.67
Data Center processing time:	3.23	0.05	17.29

## Response Time by Region

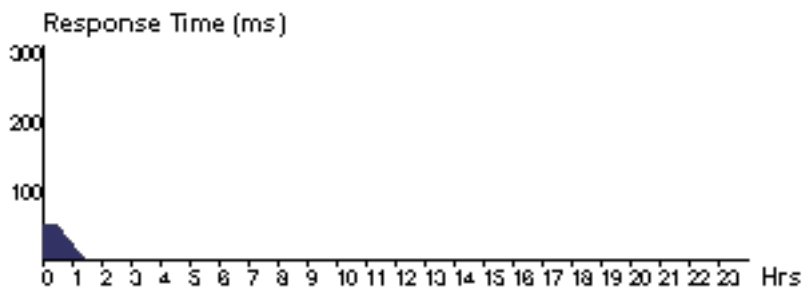
<b>Userbase</b>	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
UB1	52.06	44.11	69.78
UB2	53.03	42.23	65.55
UB3	52.86	44.42	67.40
UB4	309.63	267.69	397.67
UB5	301.34	237.77	361.02

## User Base Hourly Response Times

### UB1

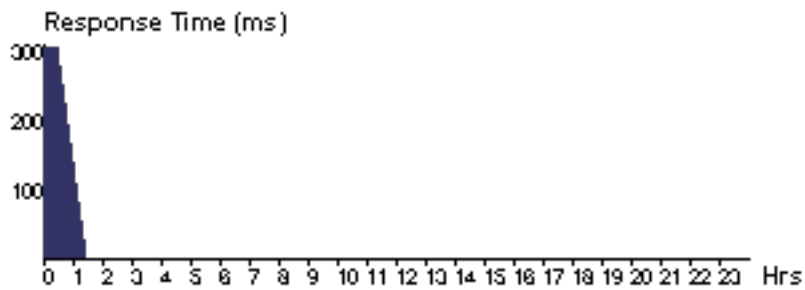
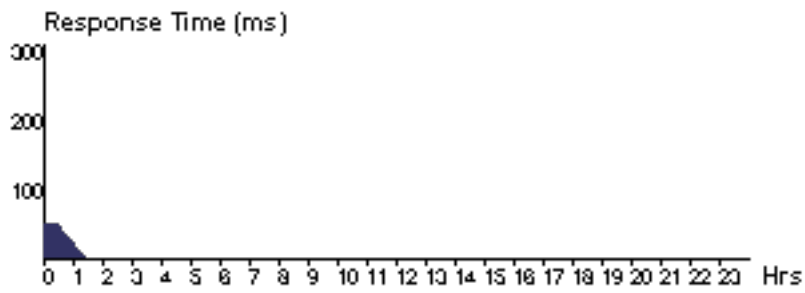


### UB2

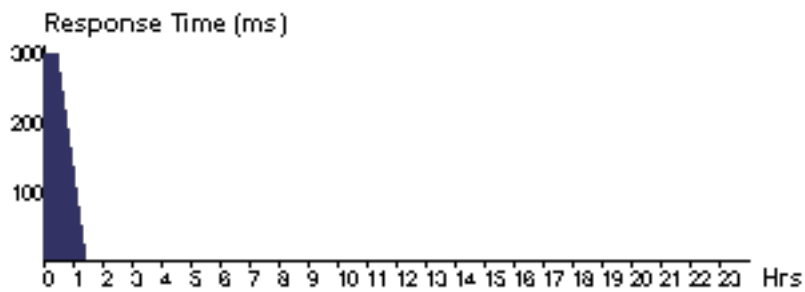


### UB3

### UB4



UB5

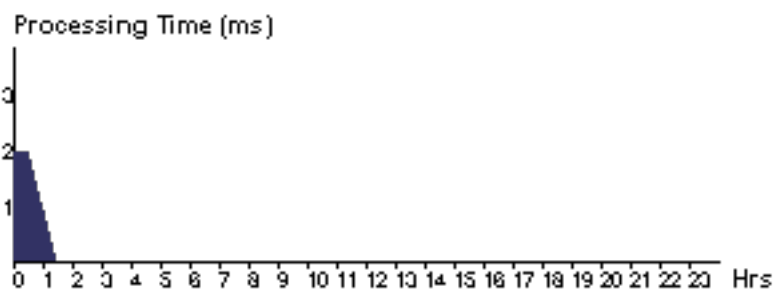


## Data Center Request Servicing Times

Data Center	Avg (ms)	Min (ms)	Max (ms)
DC1	2.06	0.06	7.03
DC2	3.81	0.05	17.29
DC3	3.42	0.09	14.76

## Data Center Hourly Average Processing Times

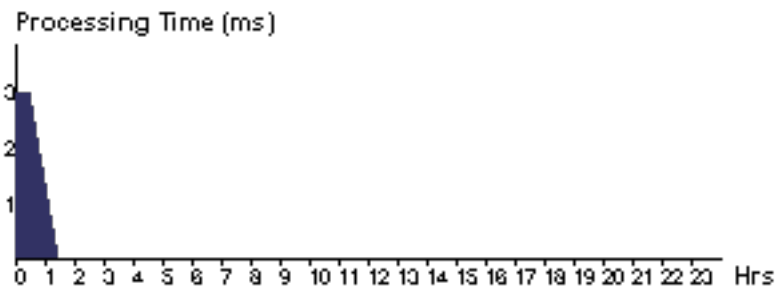
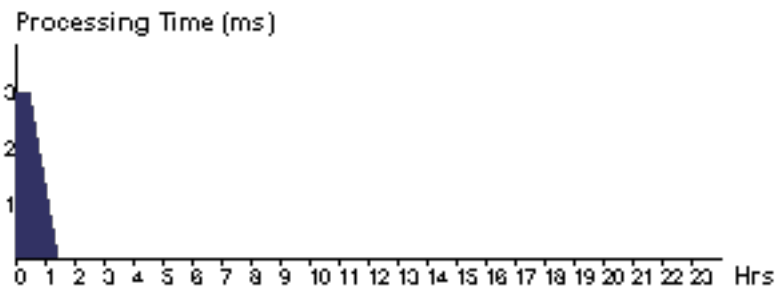
DC1



DC2

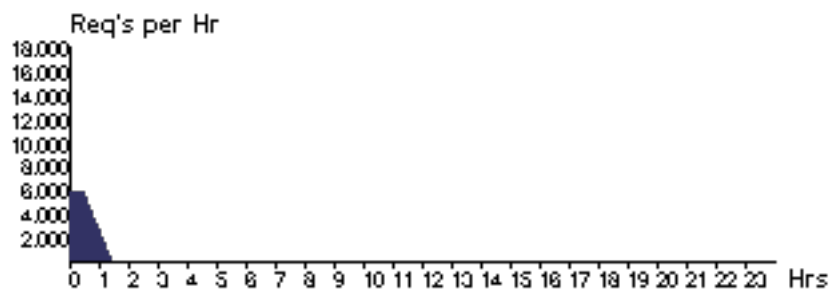
DC3



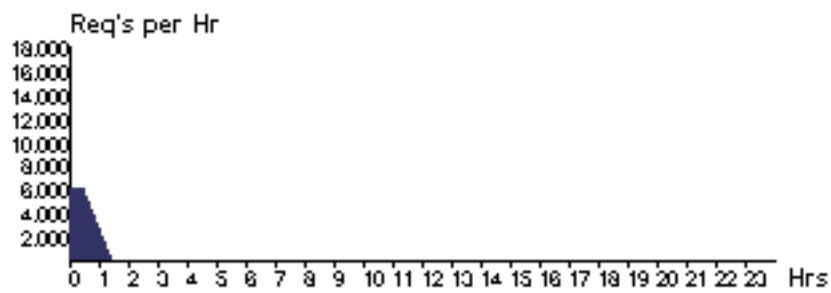


## Data Center Hourly Loading

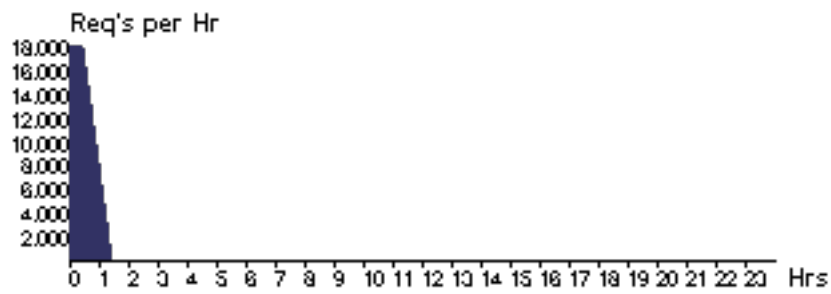
### DC1



### DC2



### DC3



## Cost

Total Virtual Machine Cost (\$): 9.49  
Total Data Transfer Cost (\$): 0.29  
Grand Total: (\$) 9.78

Data Center	VM Cost \$	Data Transfer Cost \$	Total \$
DC2	3.16	0.06	3.22
DC1	3.07	0.06	3.13
DC3	3.26	0.18	3.43

## Overall Response Time Summary

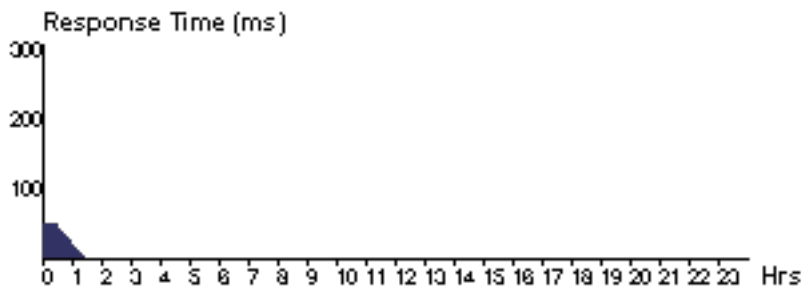
	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
Overall response time:	152.20	42.23	397.67
Data Center processing time:	1.04	0.05	2.30

## Response Time by Region

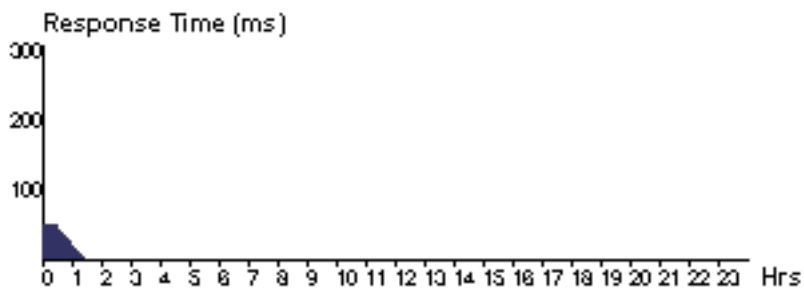
<b>Userbase</b>	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
UB1	50.76	44.11	63.98
UB2	50.40	42.23	58.33
UB3	50.41	43.28	59.76
UB4	307.45	267.69	397.67
UB5	299.15	237.47	355.42

## User Base Hourly Response Times

### UB1

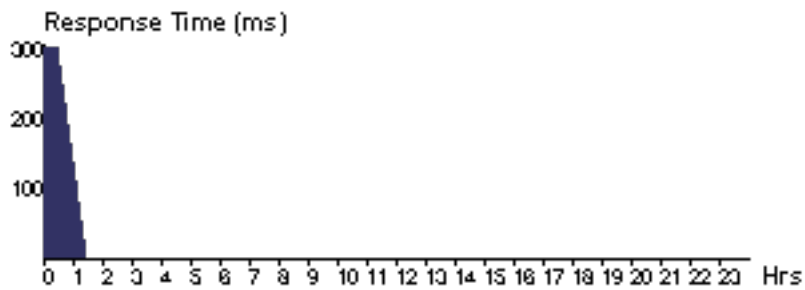
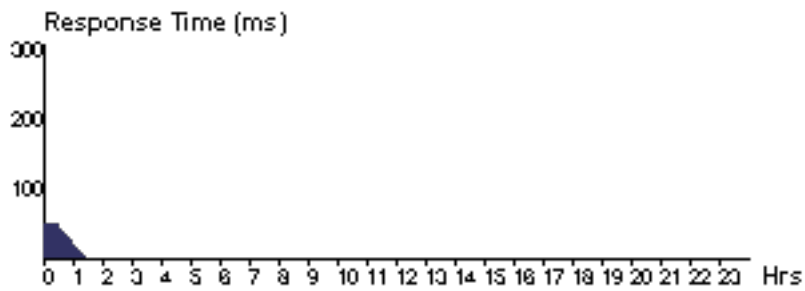


### UB2

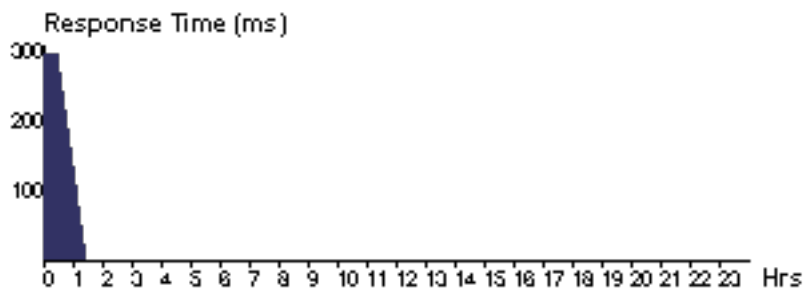


### UB3

### UB4



UB5



## Data Center Request Servicing Times

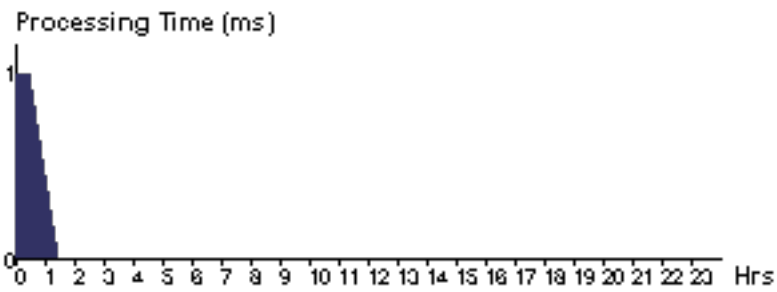
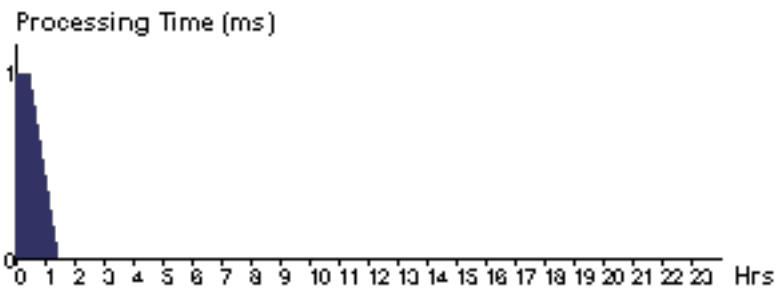
Data Center	Avg (ms)	Min (ms)	Max (ms)
DC1	0.81	0.05	1.51
DC2	1.15	0.05	2.16
DC3	1.07	0.10	2.30

## Data Center Hourly Average Processing Times

DC1

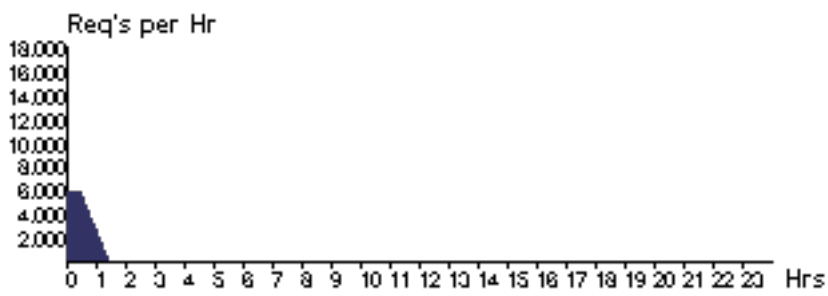
DC2

DC3

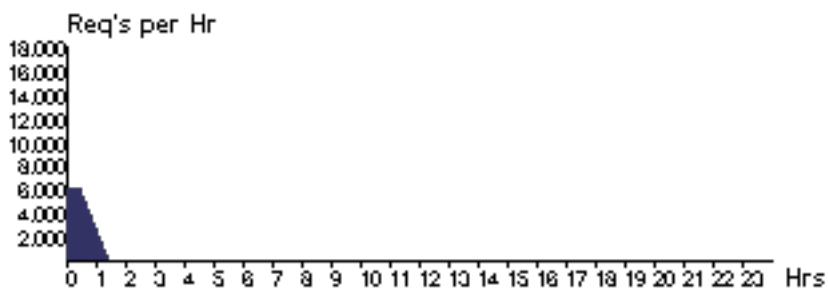


## Data Center Hourly Loading

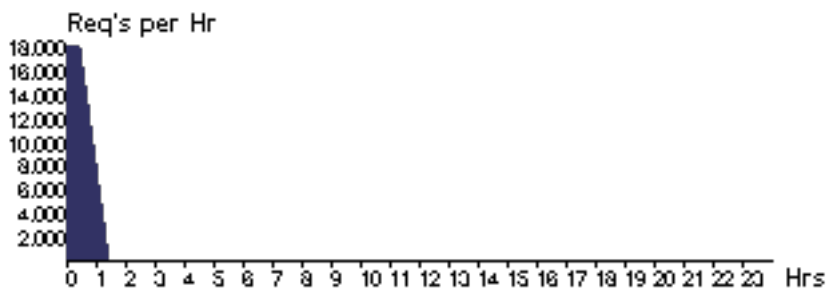
### DC1



### DC2



### DC3



## Cost

Total Virtual Machine Cost (\$):	9.49
Total Data Transfer Cost (\$):	0.29
Grand Total: (\$)	9.78

Data Center	VM Cost \$	Data Transfer Cost \$	Total \$
DC2	3.16	0.06	3.22
DC1	3.07	0.06	3.13
DC3	3.26	0.18	3.43

## Overall Response Time Summary

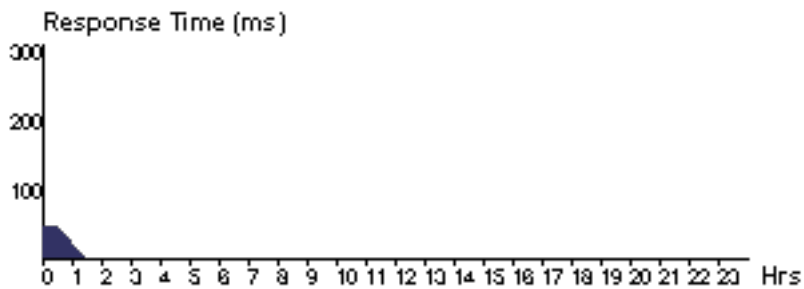
	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
Overall response time:	152.22	42.23	397.64
Data Center processing time:	1.04	0.10	2.30

## Response Time by Region

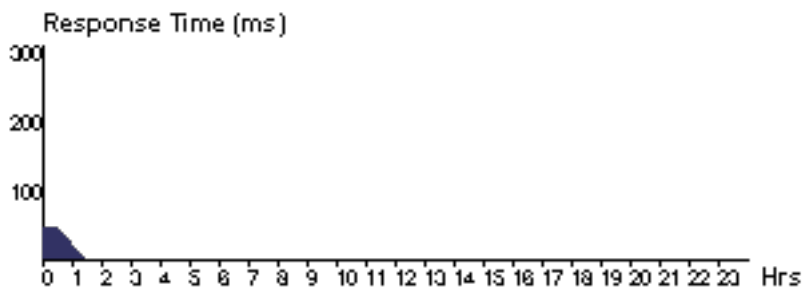
<b>Userbase</b>	<b>Avg (ms)</b>	<b>Min (ms)</b>	<b>Max (ms)</b>
UB1	50.78	44.11	63.98
UB2	50.38	42.23	58.33
UB3	50.42	43.28	59.76
UB4	308.76	267.69	397.64
UB5	297.99	237.47	355.42

## User Base Hourly Response Times

### UB1

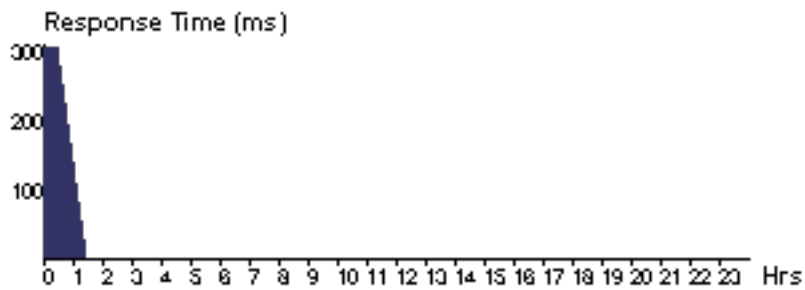
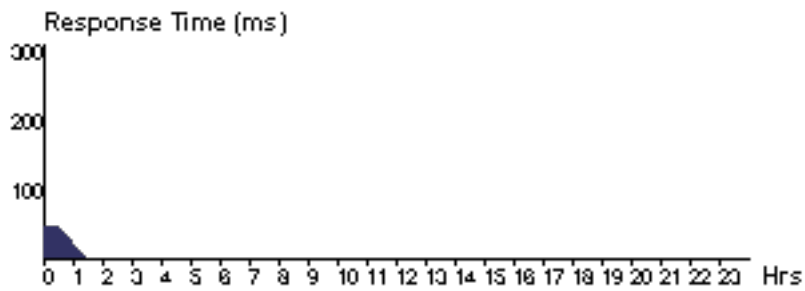


### UB2

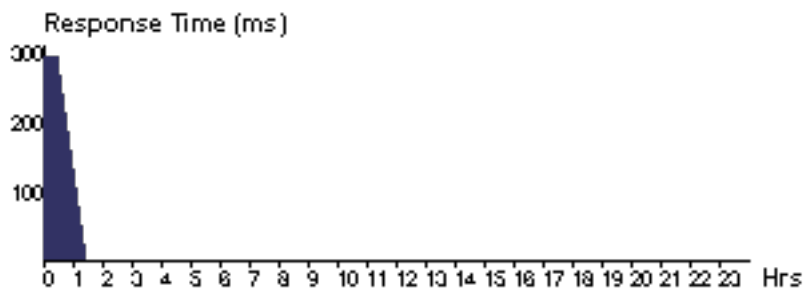


### UB3

### UB4



UB5



## Data Center Request Servicing Times

Data Center	Avg (ms)	Min (ms)	Max (ms)
DC1	0.82	0.10	1.51
DC2	1.15	0.14	2.16
DC3	1.08	0.13	2.30

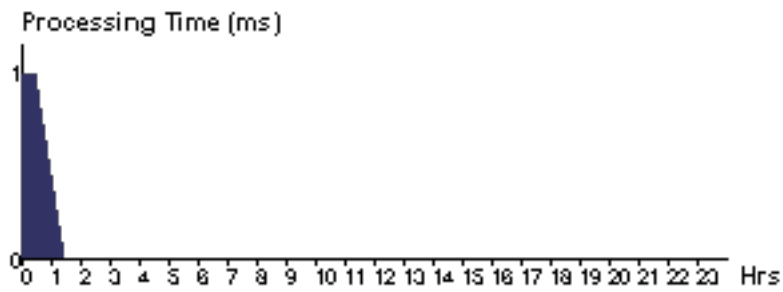
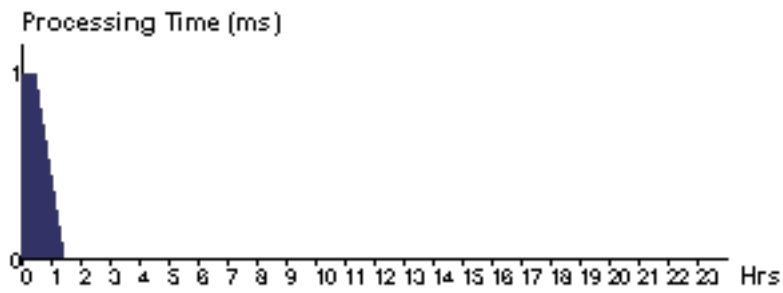
## Data Center Hourly Average Processing Times

DC1

DC2

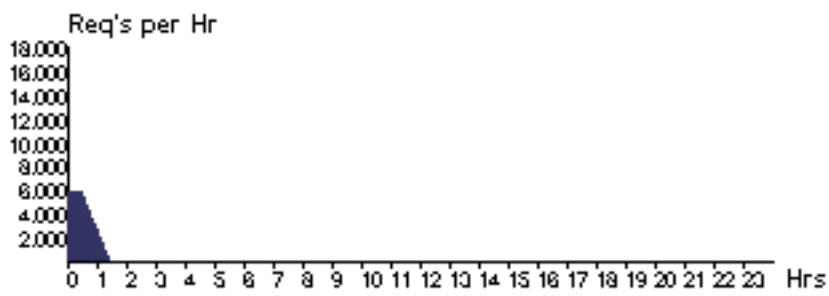
DC3



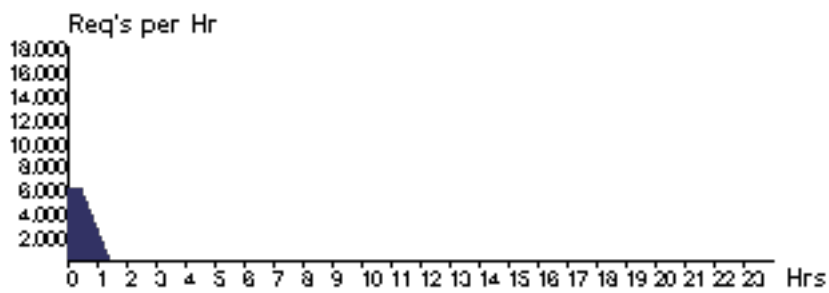


## Data Center Hourly Loading

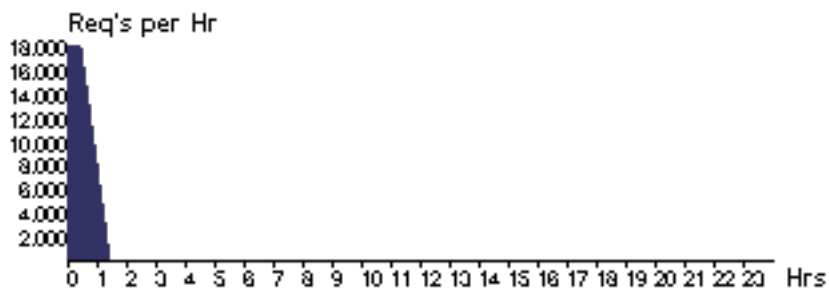
### DC1



### DC2



### DC3



## Cost

Total Virtual Machine Cost (\$):	9.57
Total Data Transfer Cost (\$):	0.29
Grand Total: (\$)	9.87

Data Center	VM Cost \$	Data Transfer Cost \$	Total \$
DC2	3.16	0.06	3.22
DC1	3.16	0.06	3.22
DC3	3.25	0.18	3.43