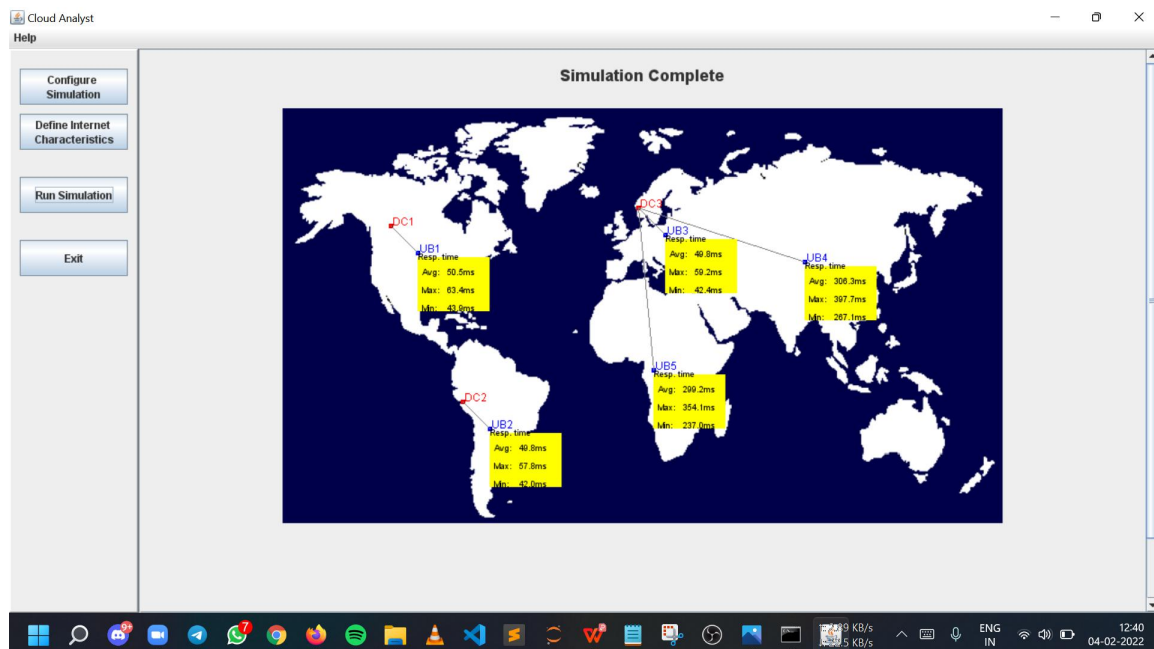# Lab Assignment 4
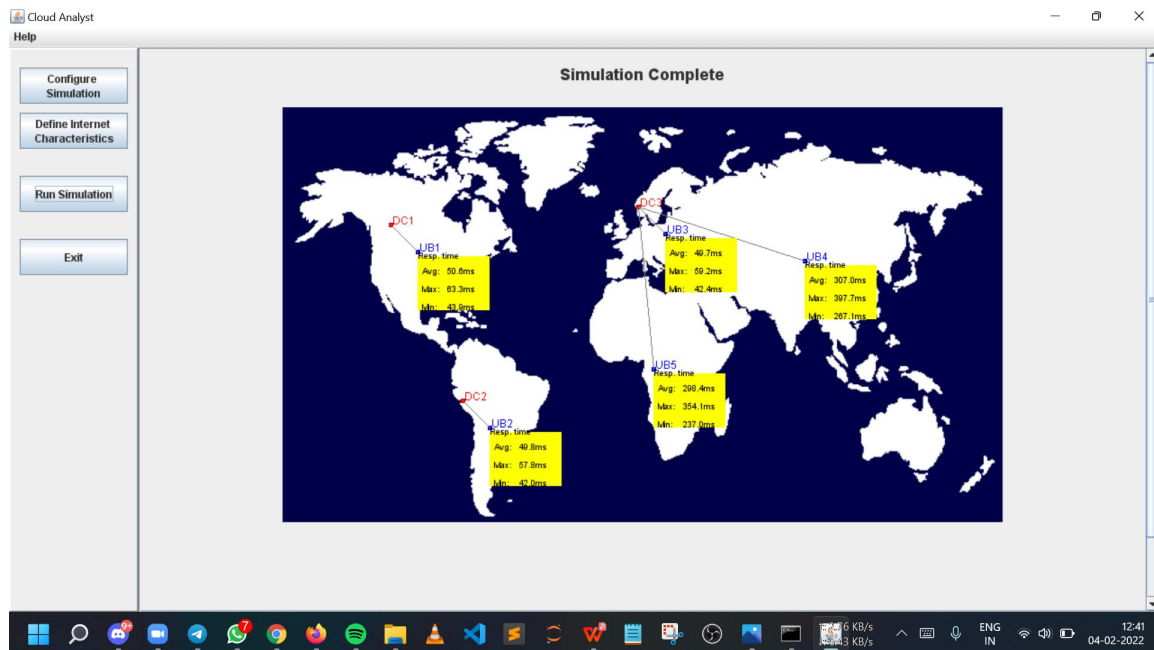# Chaudhary Hamdan
1905387
Date: 04-02-2022

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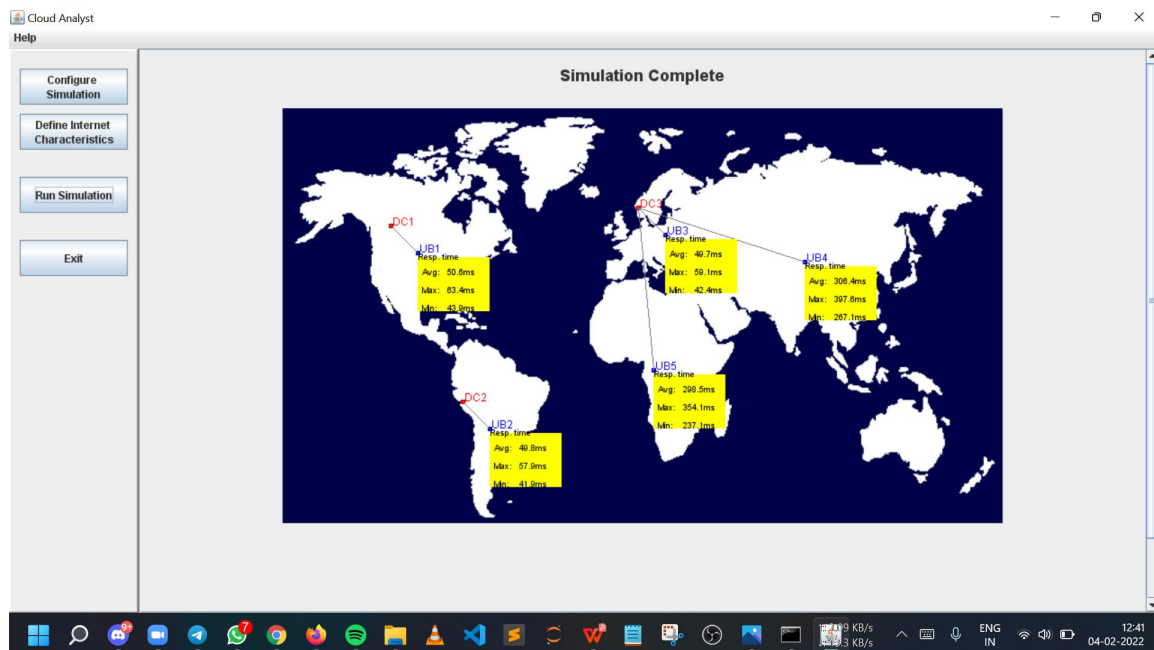**Draw graph of all 9 response times.**

Screenshots:
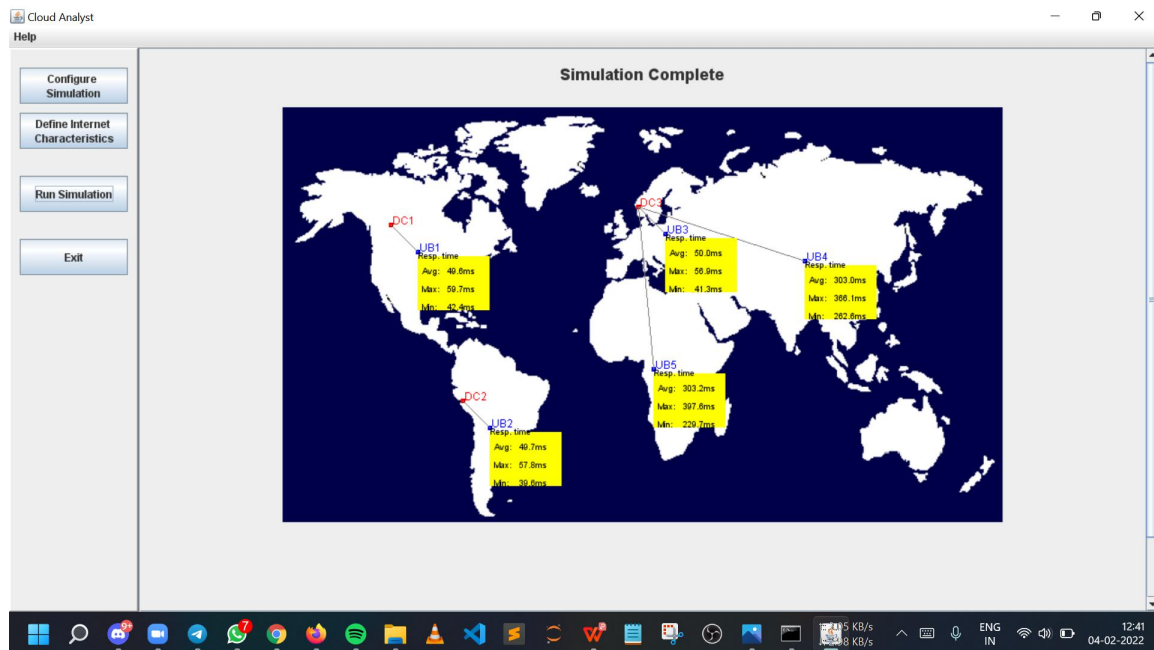
Closest Data Center -> Round Robbin:

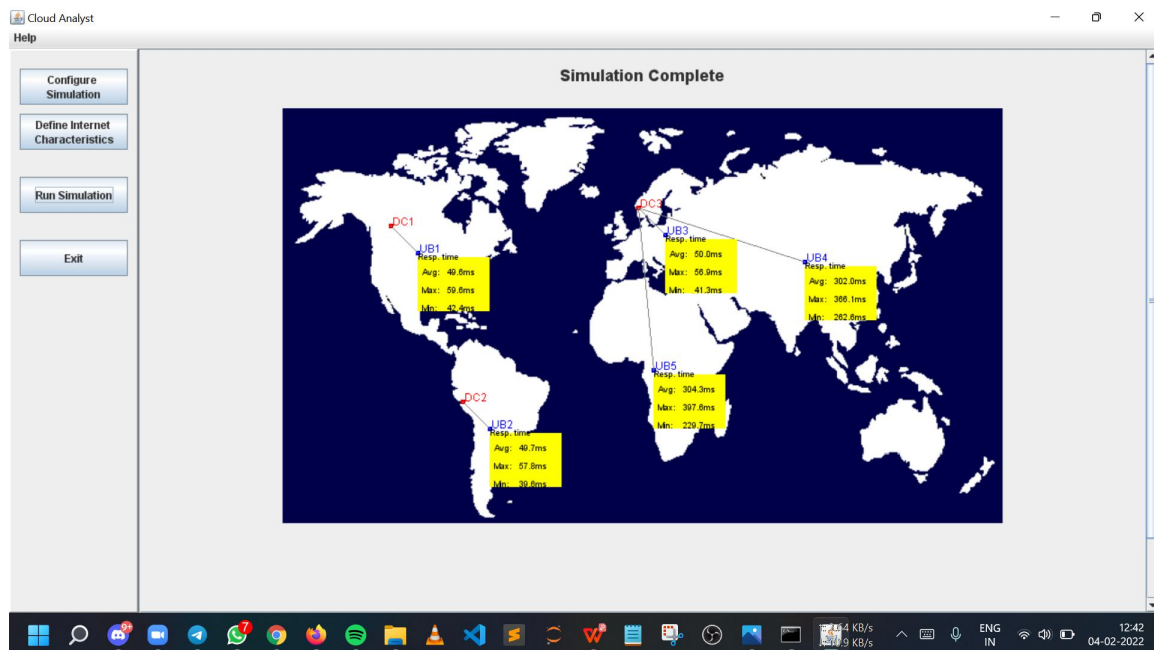## Closest Data Center -> Equally SpreadCurrent Execution Load:

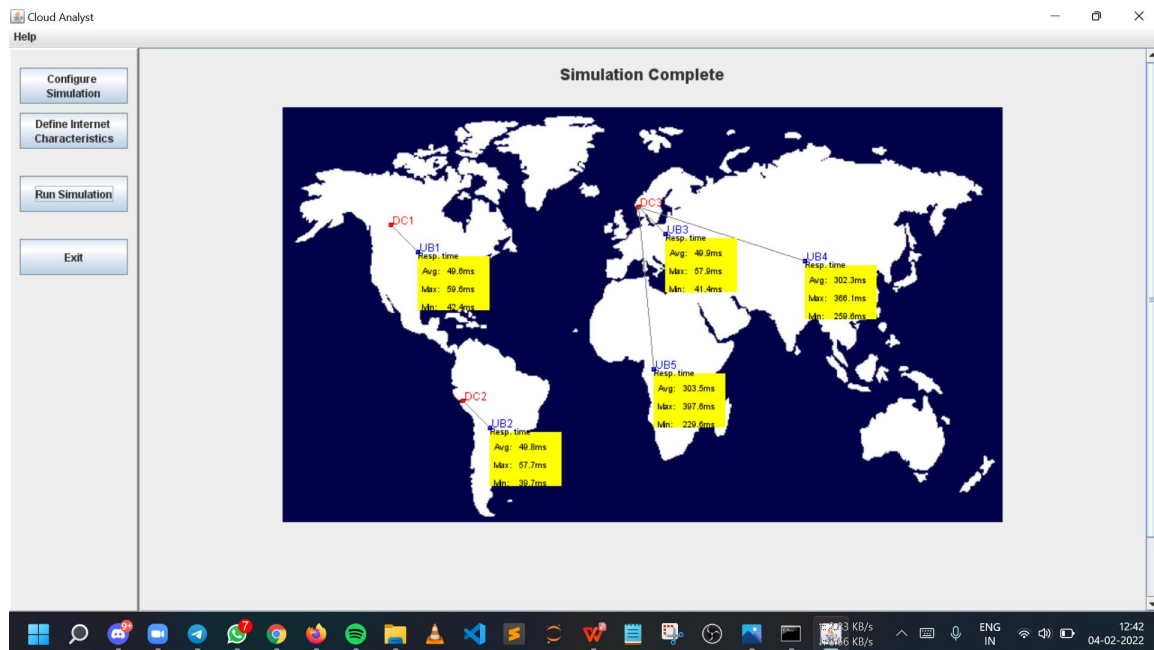

Closest Data Center -> Throttled:
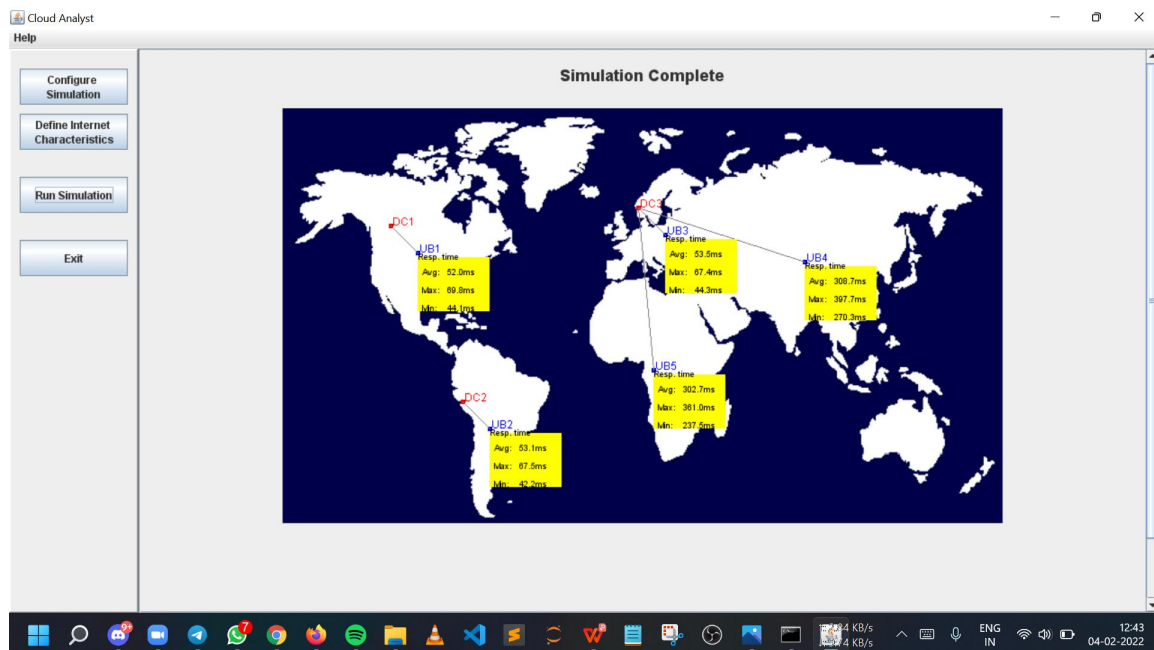
Optimise Response Time -> Round Robbin:

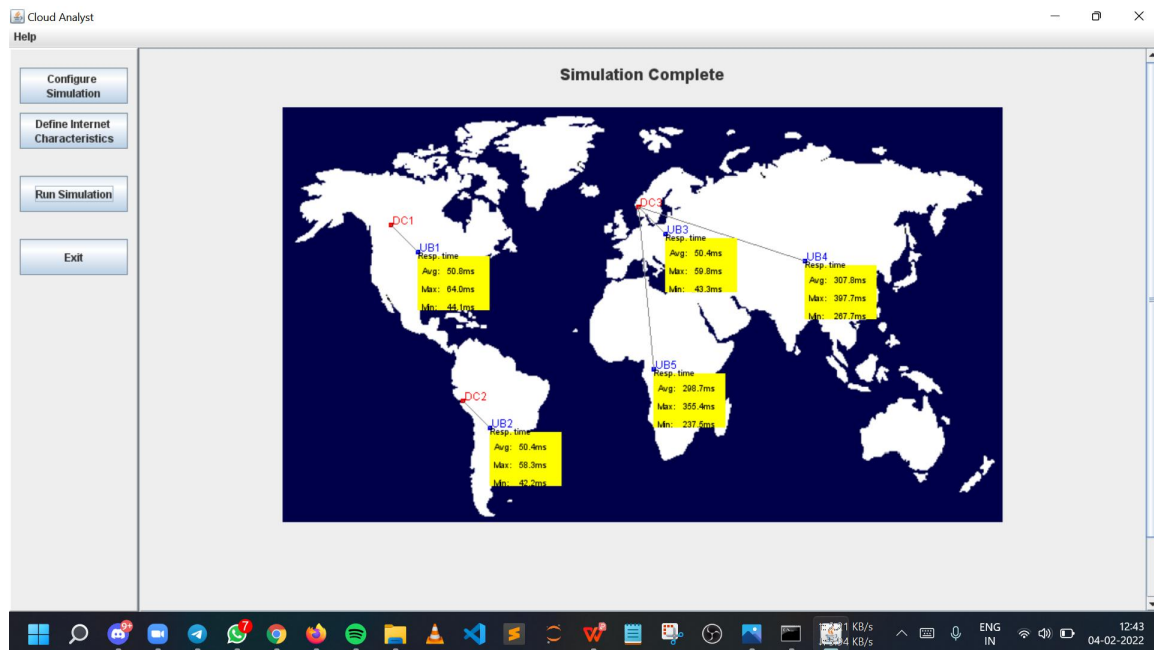## Optimise Response Time -> Equally SpreadCurrent Execution Load:

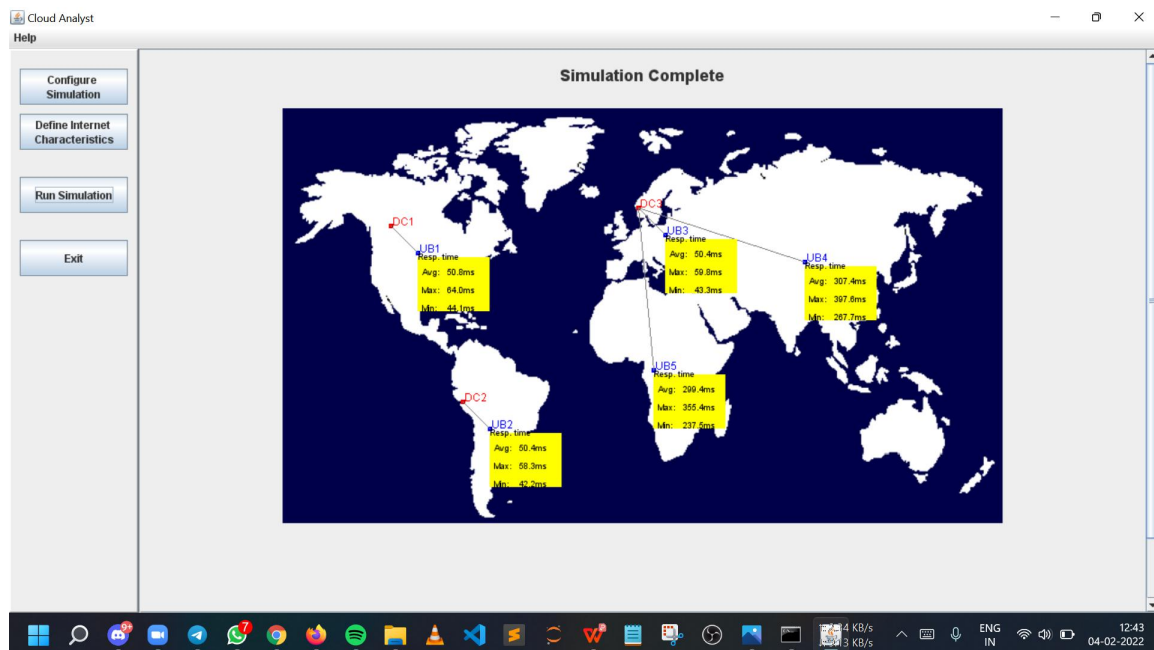## Optimise Response Time -> Throttled:

Reconfigure Dynamically with L -> Round Robbin:

Reconfigure Dynamically with L -> Equally SpreadCurrent Execution Load:

Reconfigure Dynamically with L -> Throttled:

PDFs of all detailed results will be attached in the following pages.
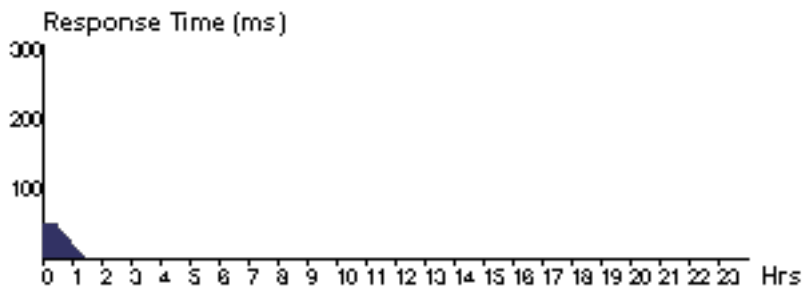
Overall Response Time Summary

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

Response Time by Region
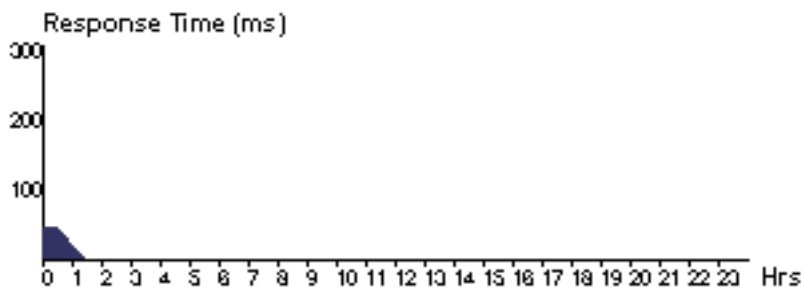
Userbase	Avg (ms)	Min (ms)	Max (ms)
UB1	50.57	43.86	63.44
UB2	49.82	41.97	57.79
UB3	49.70	42.38	59.21
UB4	306.47	267.14	397.72
UB5	299.03	237.04	354.14

User Base Hourly Response Times

UB1

UB2

UB3

UB4

Response Time (ms)

Response Time (ms)

UB5

Response Time (ms)
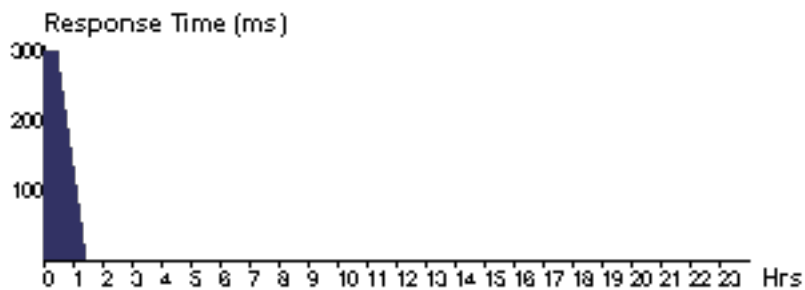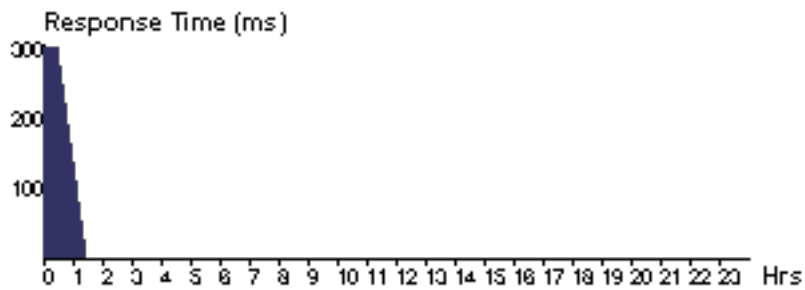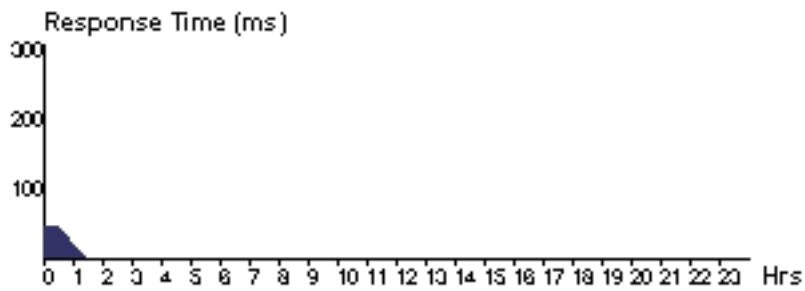
Data Center Request Servicing Times

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
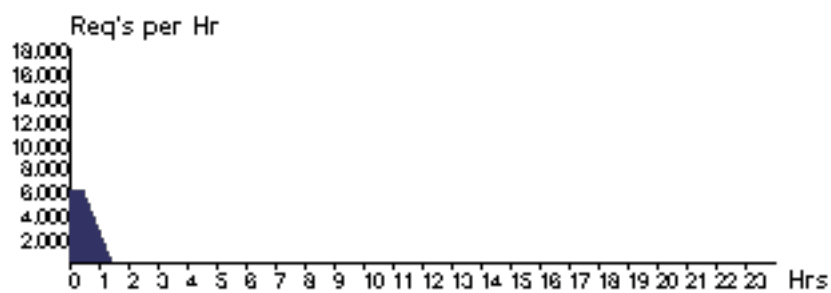
Data Center Hourly Loading

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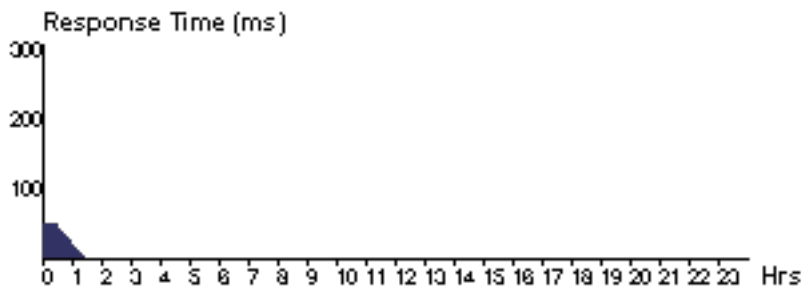
	Avg (ms)	Min (ms)	Max (ms)
Overall response time:	151.69	41.97	397.72
Data Center processing time:	0.49	0.02	1.01

Response Time by Region

Userbase	Avg (ms)	Min (ms)	Max (ms)
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
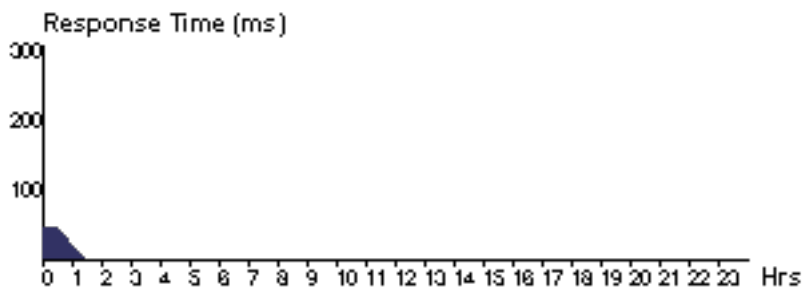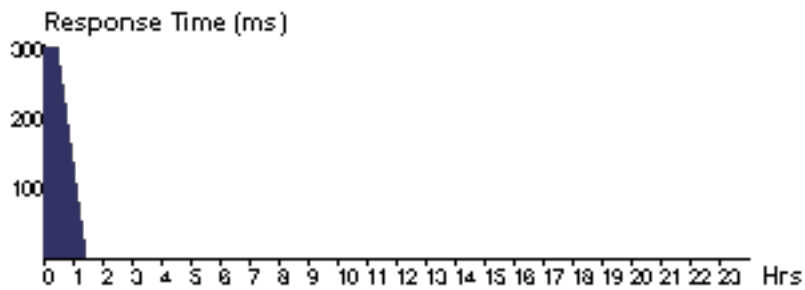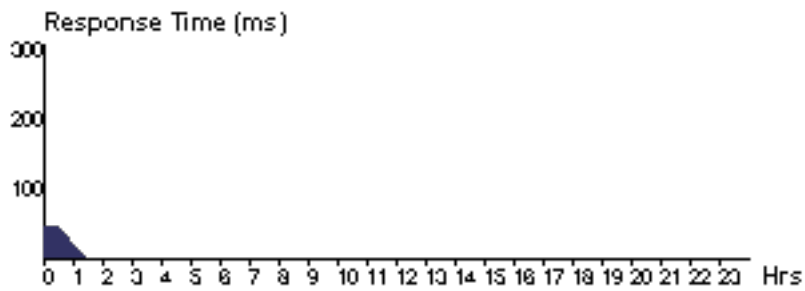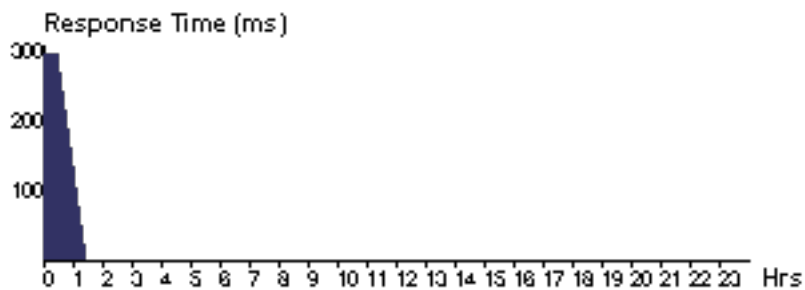
Data Center Request Servicing Times

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
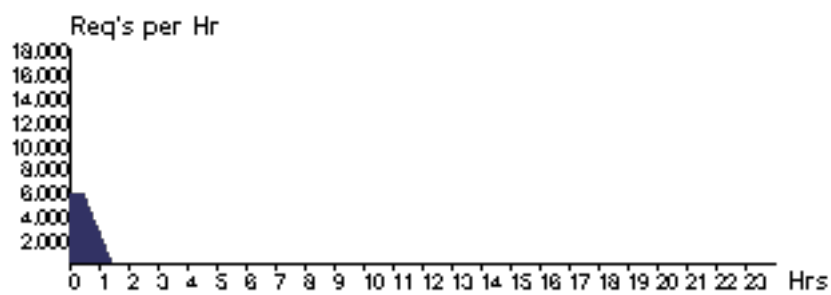
DC1

DC2

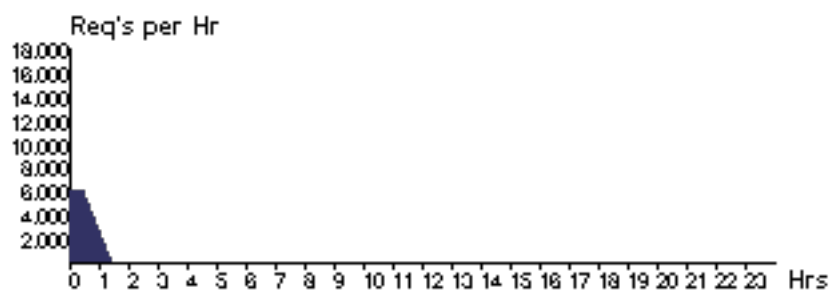DC3

Data Center Hourly Loading
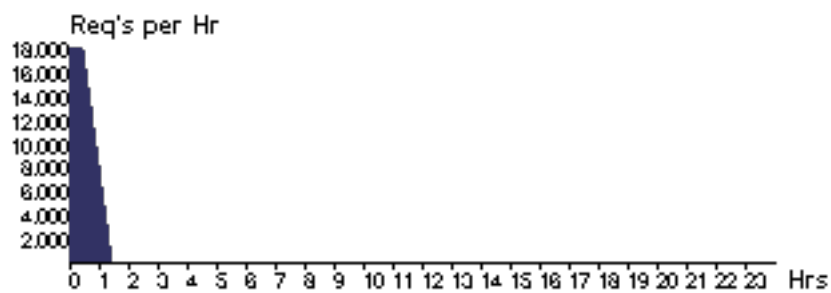
DC1

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
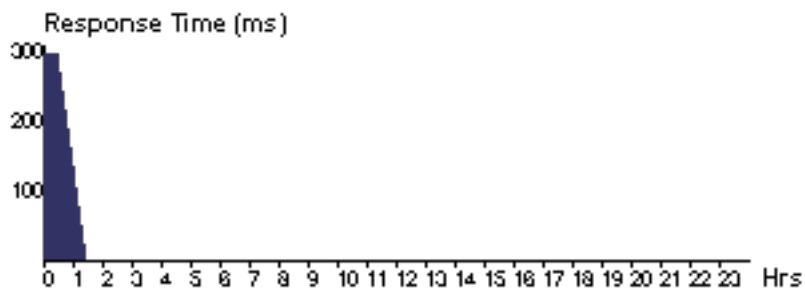
Data Center Request Servicing Times

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
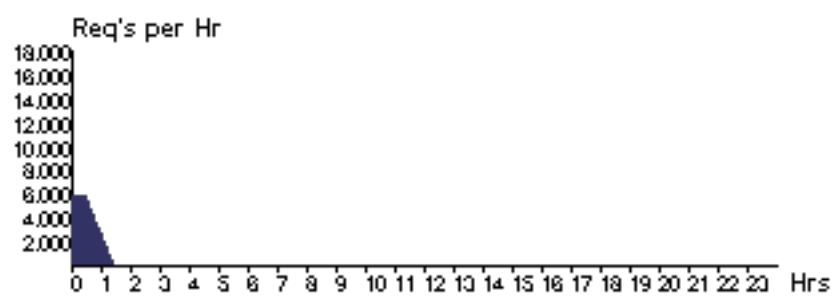
DC1
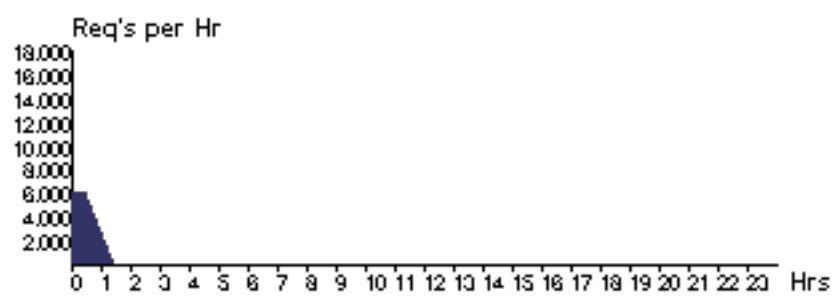
DC2

DC3

Data Center Hourly Loading

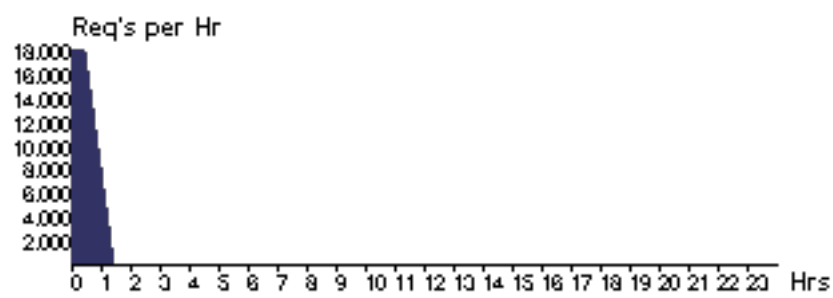## DC1

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

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

Response Time by Region

Userbase	Avg (ms)	Min (ms)	Max (ms)
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
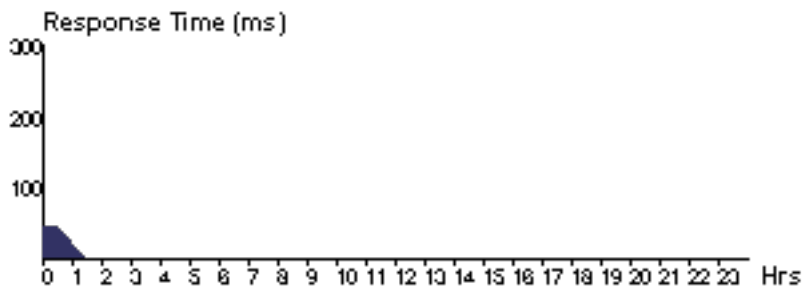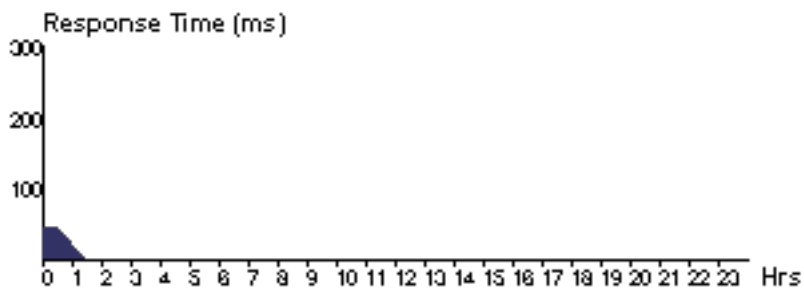
UB1

UB2

UB3
UB4

UB5
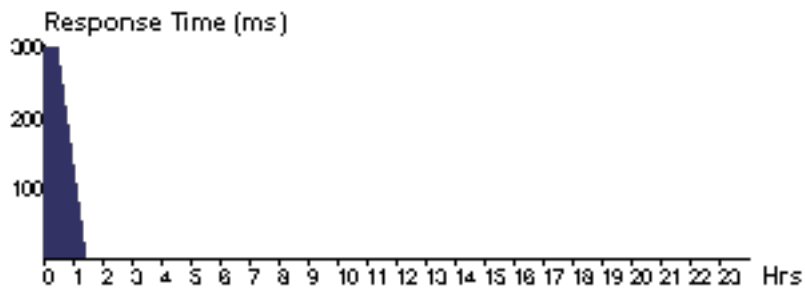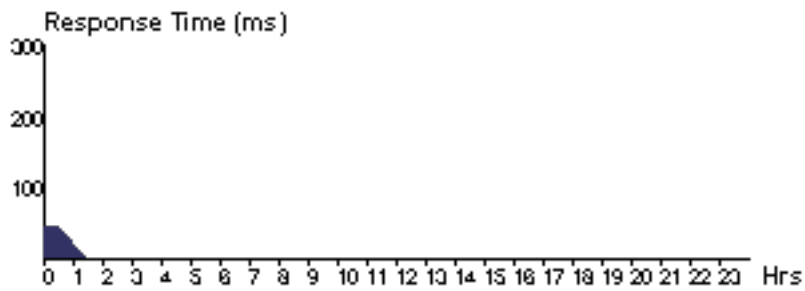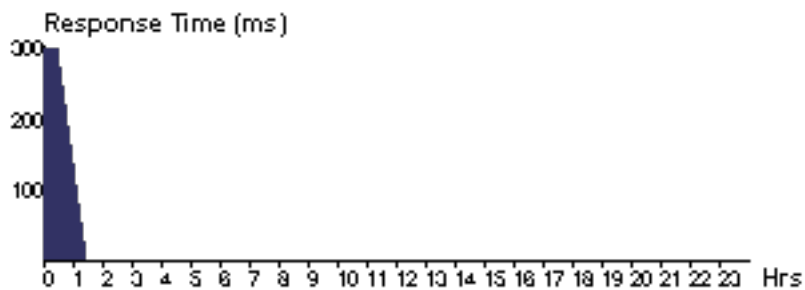
Data Center Request Servicing Times

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
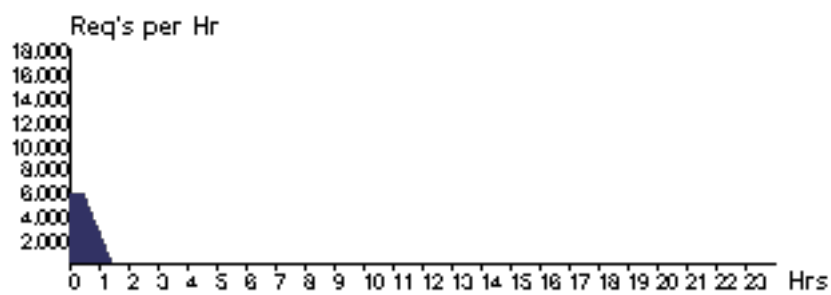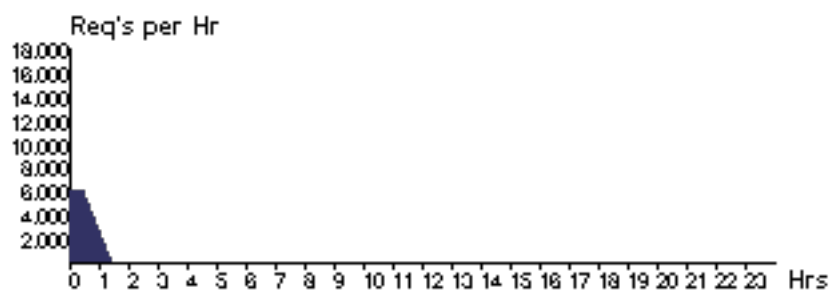
DC1

DC2
DC3

Data Center Hourly Loading
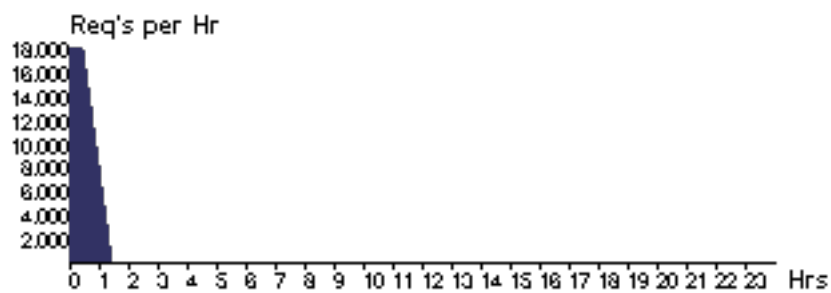
DC1

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

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

Response Time by Region

Userbase	Avg (ms)	Min (ms)	Max (ms)
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
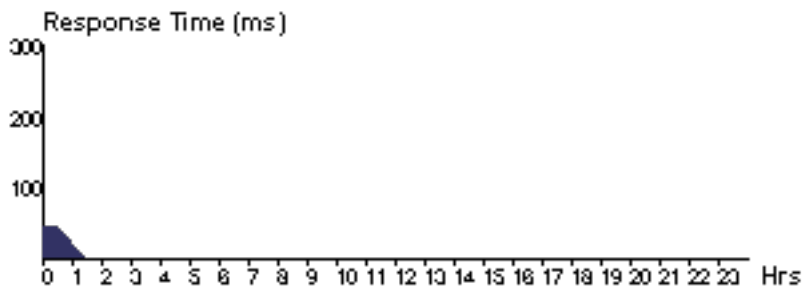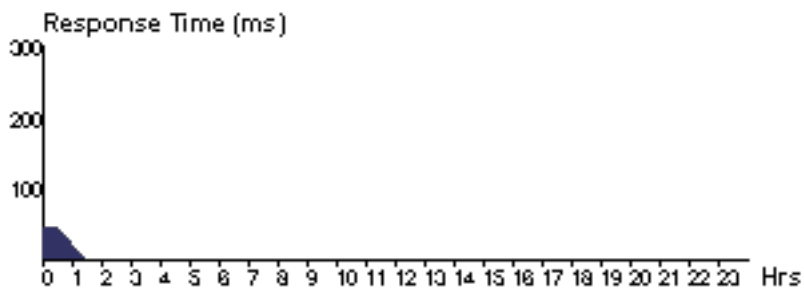
UB1

UB2

UB3
UB4

UB5
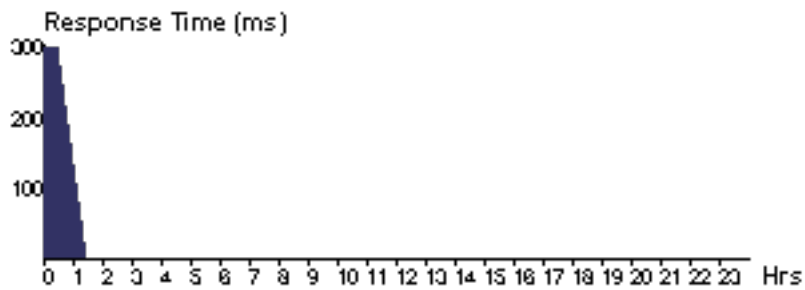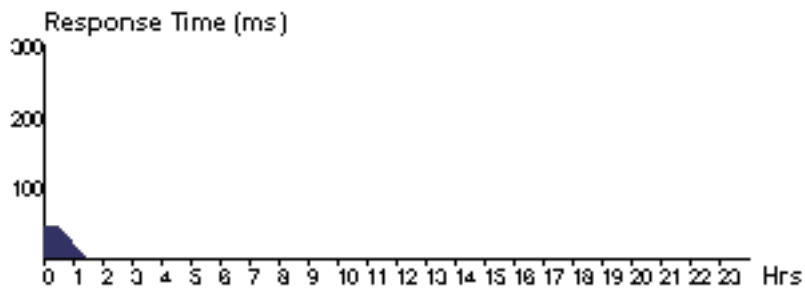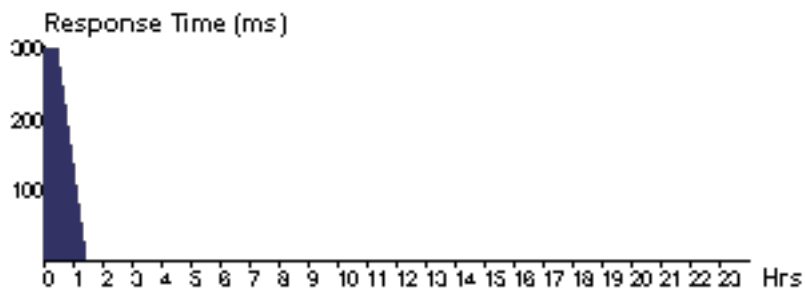
Data Center Request Servicing Times

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
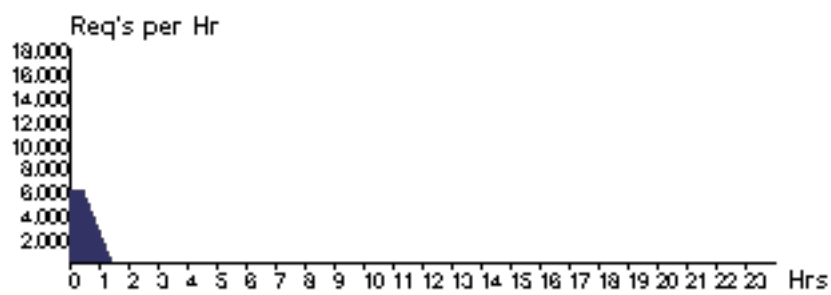
DC2

DC3

Data Center Hourly Loading

DC1

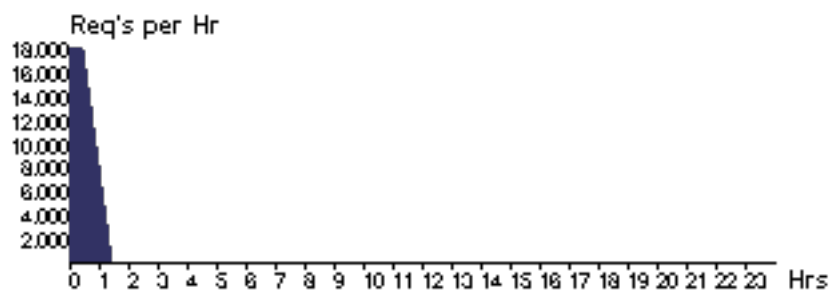
DC2

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

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

Response Time by Region

Userbase	Avg (ms)	Min (ms)	Max (ms)
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
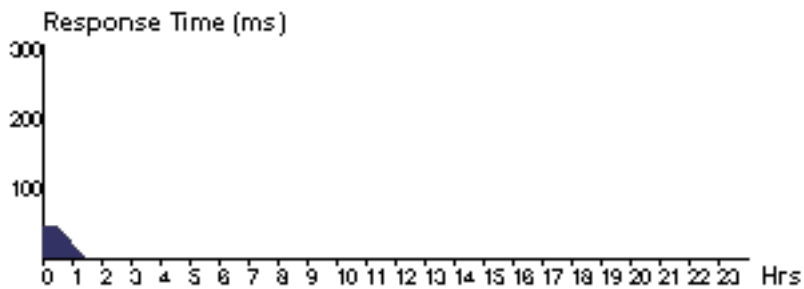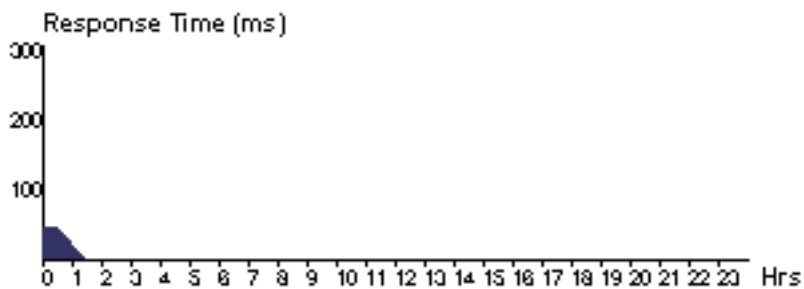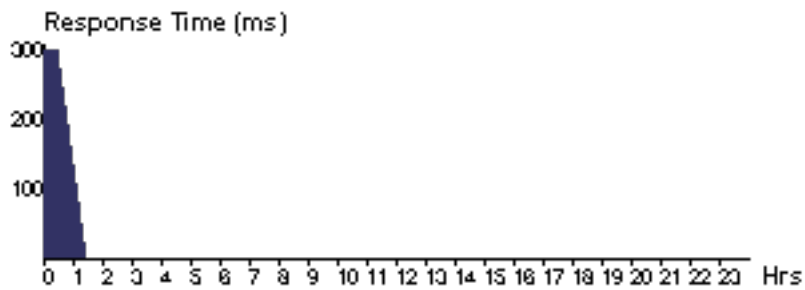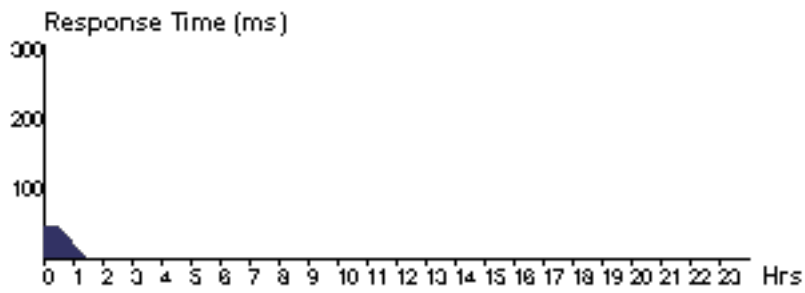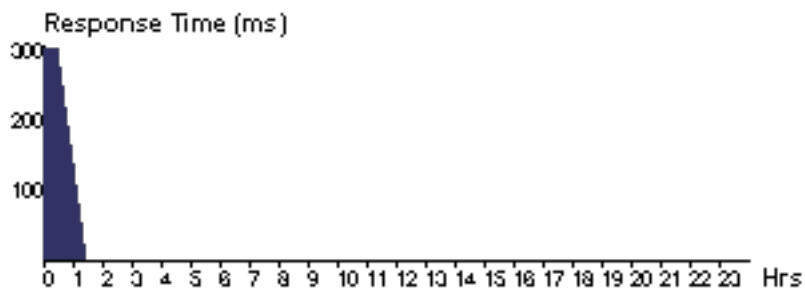
Data Center Request Servicing Times

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
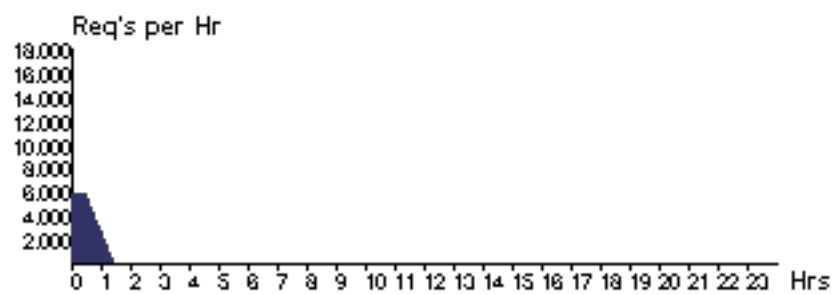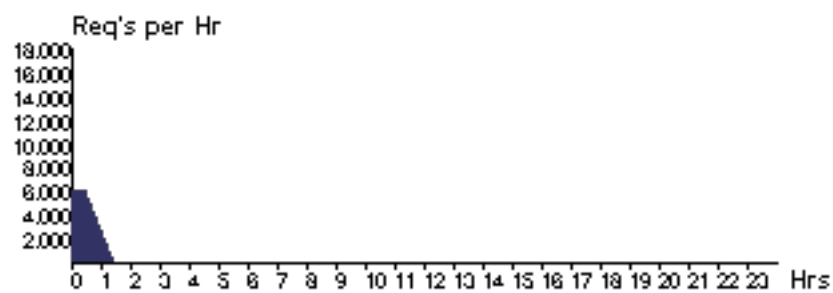
DC1

DC2
DC3

Data Center Hourly Loading
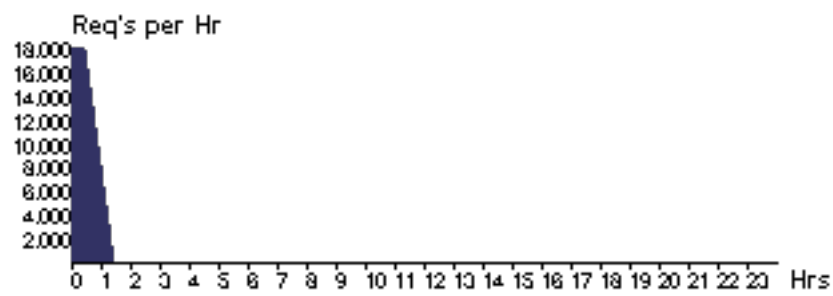
DC1

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

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

Response Time by Region

Userbase	Avg (ms)	Min (ms)	Max (ms)
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

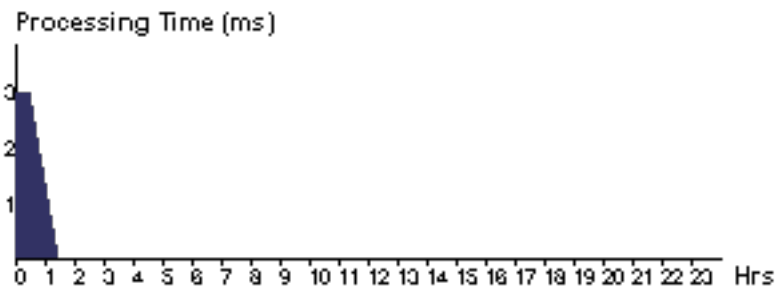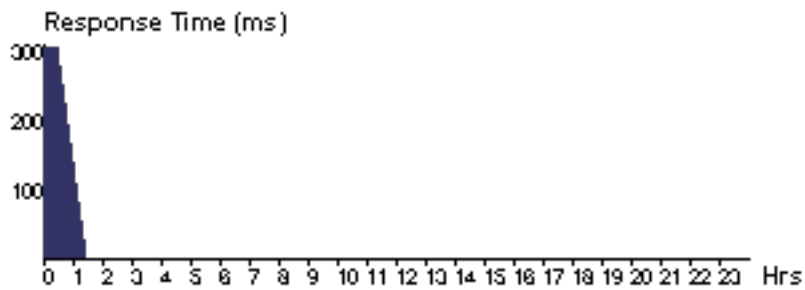## User Base Hourly Response Times

UB1

UB2

UB3
UB4

UB5
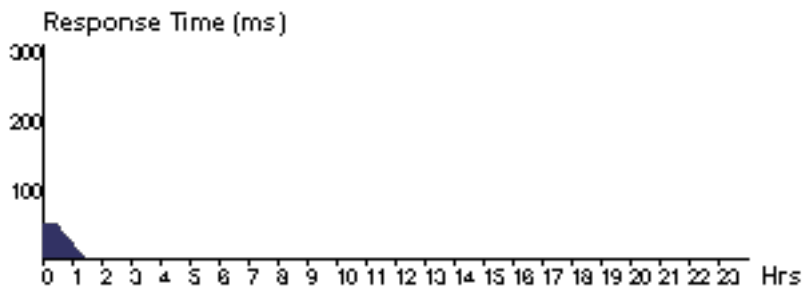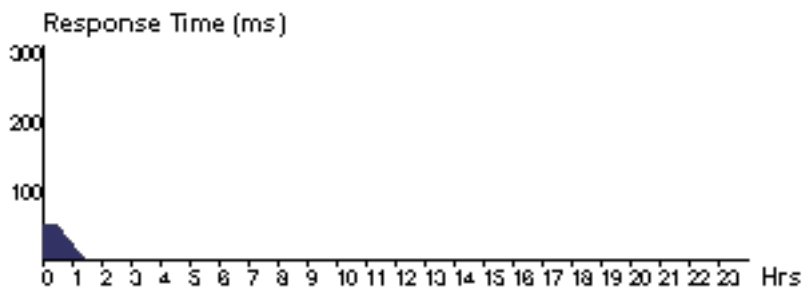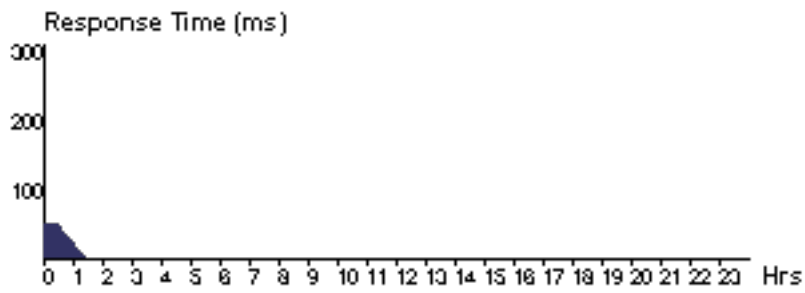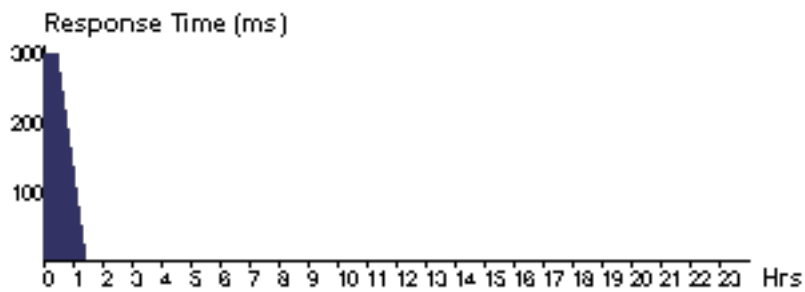
Data Center Request Servicing Times

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

Processing Time (ms)
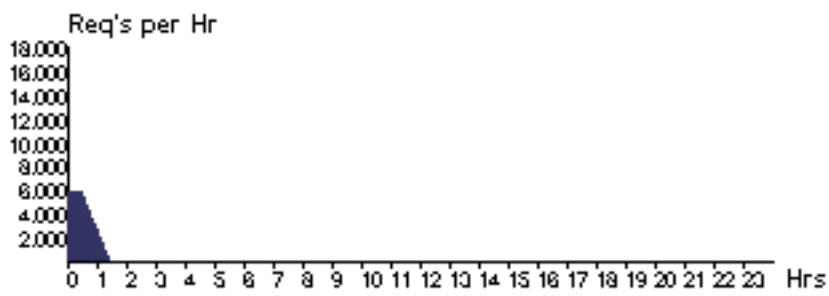

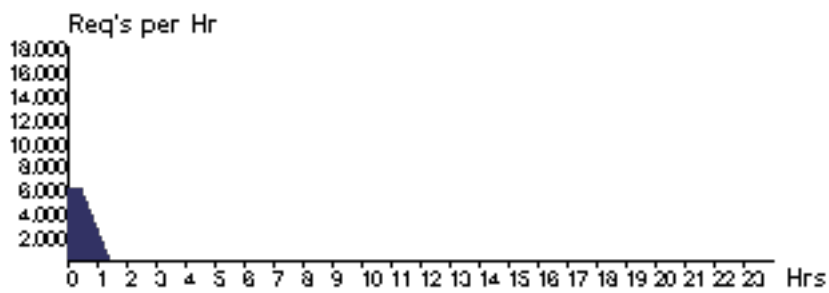**Processing Time (ms)**

Data Center Hourly Loading
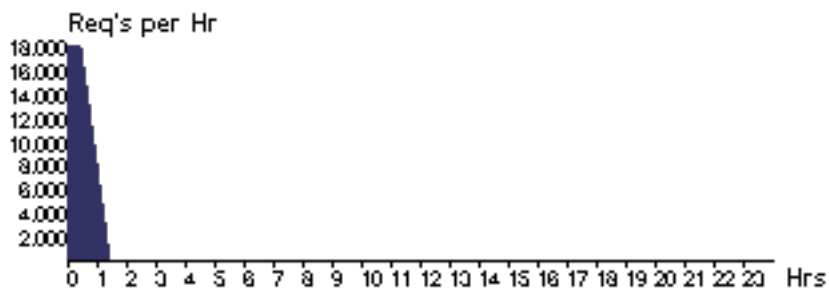
DC1

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

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

Response Time by Region

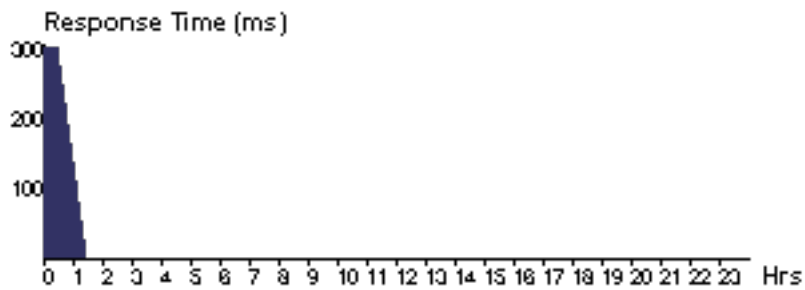| Userbase	Avg (ms)	Min (ms)	Max (ms)
UB1	50.76	44.11	63.98
UB2	50.40	42.23	58.33
UB3	50.41	43.28	59.76
UB4	307.45	267.69	397.67
UB5	299.15	237.47	355.42

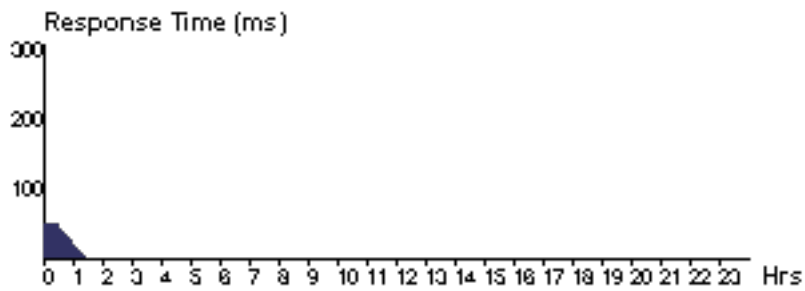## User Base Hourly Response Times

UB1

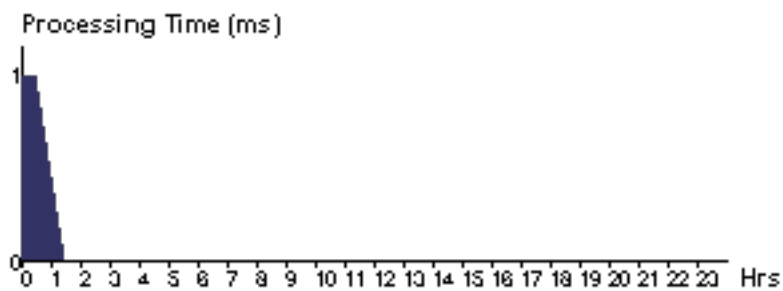### UB2

UB3

UB4

UB5
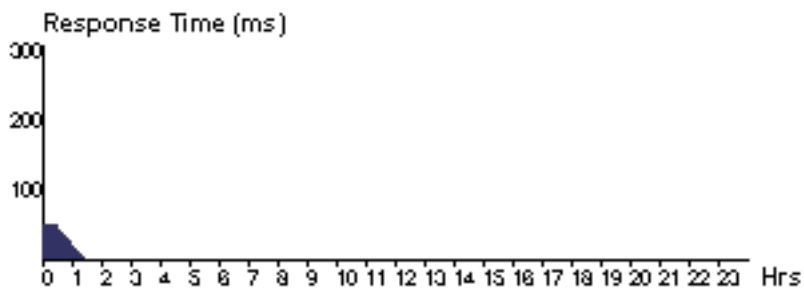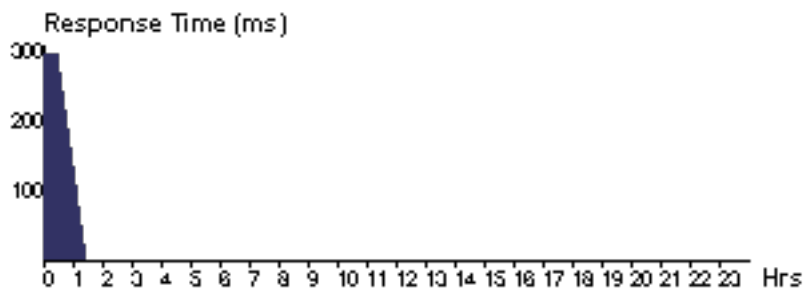
Data Center Request Servicing Times

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

Processing Time (ms)

Processing Time (ms)

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

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

Response Time by Region

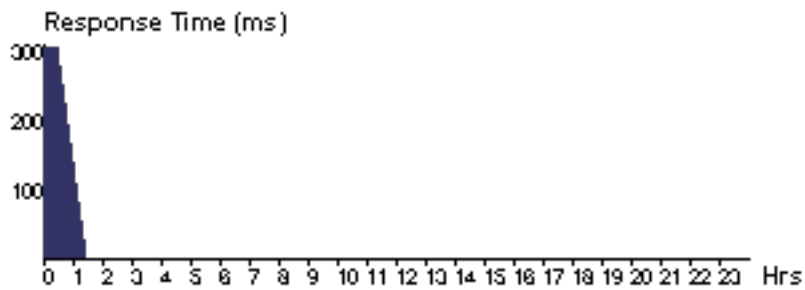| Userbase	Avg (ms)	Min (ms)	Max (ms)
UB1	50.78	44.11	63.98
UB2	50.38	42.23	58.33
UB3	50.42	43.28	59.76
UB4	308.76	267.69	397.64
UB5	297.99	237.47	355.42

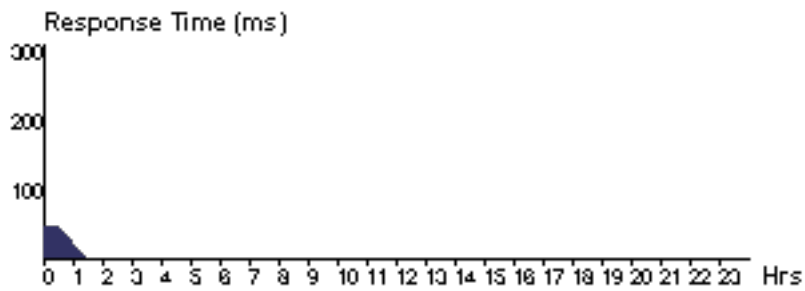## User Base Hourly Response Times

UB1

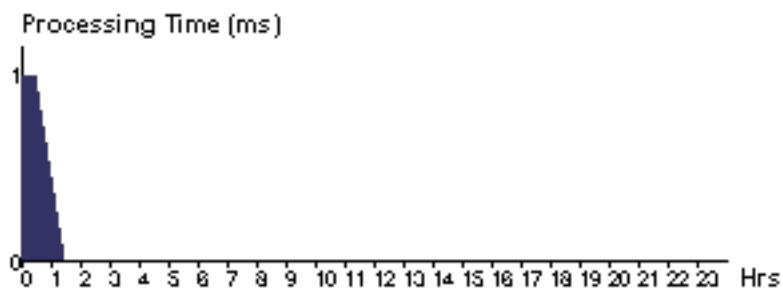### UB2

UB3

UB4

UB5
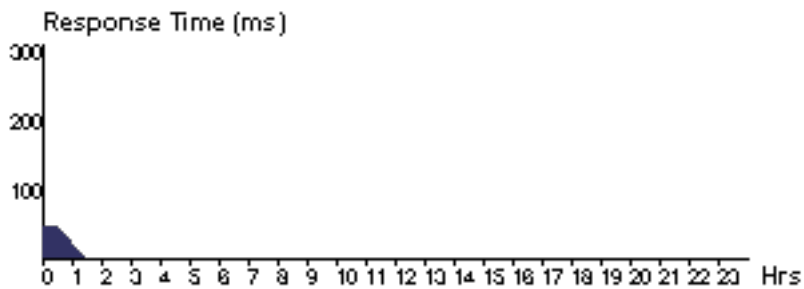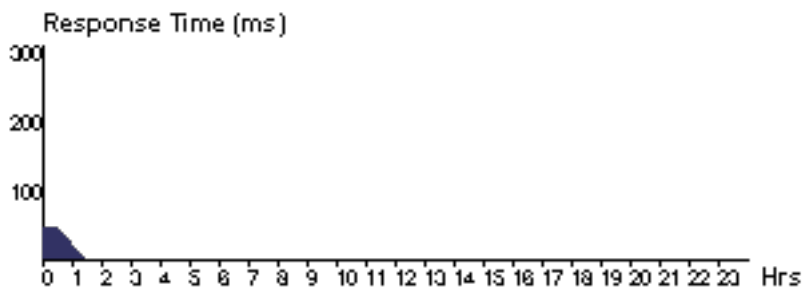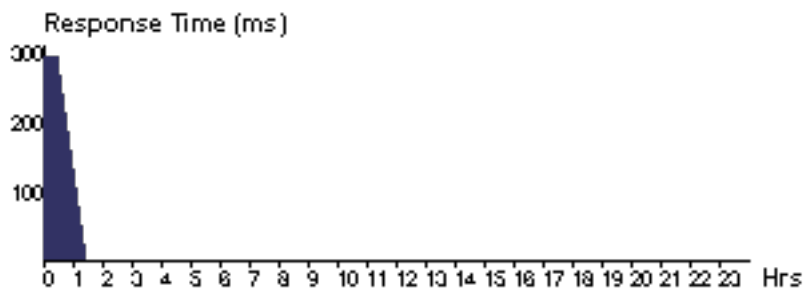
Data Center Request Servicing Times

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

Processing Time (ms)

Processing Time (ms)

Data Center Hourly Loading

DC1

Req's per Hr

DC2

Req's per Hr

DC3

Req's per Hr
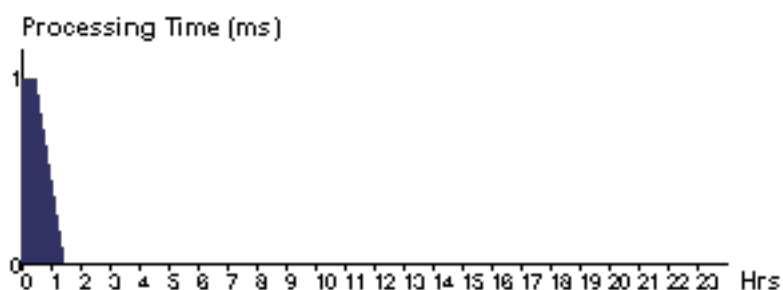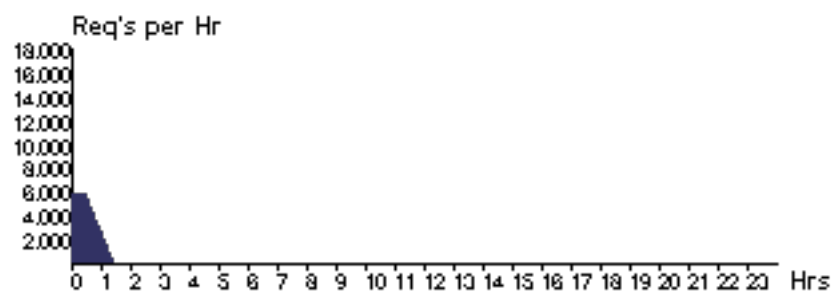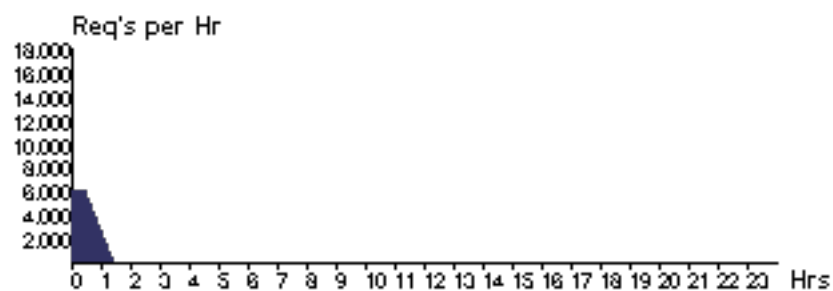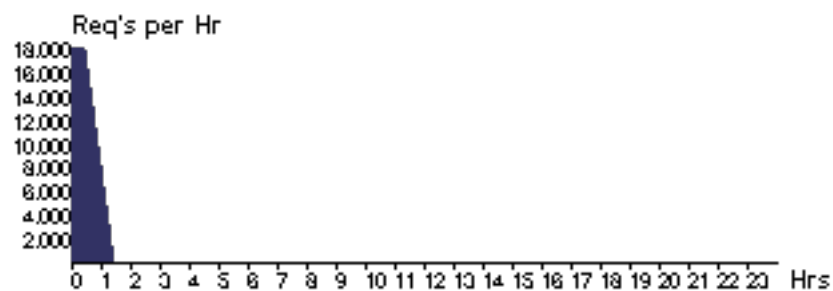
Cost

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

Graph: