



## Framework Implementation Project

### Message Broker Version 1.0 Load Test

October 27, 2000



## Introduction

This report outlines a series of eight tests that were conducted to determine the capabilities of the Framework Implementation Message Broker Version 1.0. An overview of the results is included in table 1.0. The specifics of each test are included below.

Table 1.0

Test Case	Description	Results (Average)
1	One Client Sending Messages to a Single Queue	19.55 Messages/Second
2	One Client Sending Messages to Multiple Queues	1.16 Messages/Second
3	Multiple Clients Sending Messages to a Single Queue	19.78 Messages/Second
4	Long Term (72 hours) Test	~20 Messages/Second
5	Multiple Clients Establishing Connections	6.96 Connections/Second
6	Single Client Establishing Queues	1.57 Queues/Second
7	Multiple Clients Establishing Queues	8.25 Queues/Second
8	Maximum Number of Queues Established	927.2 Queues

## Systems Used

### The Message Broker

Machine Name: gaserver2.marc.gatech.edu  
Number of Processors and Speed: 4 Pentium @ 133 Mhz  
RAM: 196 MB  
Operating System: Windows NT Server Version 4.0  
Software Used: Message Broker Version 1.0

### Simulator 1

Machine Name: hemlock.marc.gatech.edu  
Number of Processors and Speed: 1 Pentium III @ 733 Mhz  
RAM: 128 MB  
Operating System: Windows NT Workstation  
Software Used: This test client used a Java applet to interact with the message broker.

### Simulators 2-6

Machine Names: Various  
Number of Processors and Speed: 1 Sparc @ 433 Mhz  
RAM: 128 MB  
Operating System: Sun Solaris version 2.6  
Software Used: These test clients used an application written in C to interact with the message broker. The applications wrapped various Java classes to accomplish the functionality.

## Test Cases

### Test Case 1, (One Client Sending Messages to a Single Queue)

Simulator 1 used a single Java applet client to test the message broker. The single applet sent as many messages as possible to a single message broker queue. The purpose was to determine the speed at which a single client could send messages to a single message broker queue.

Table 1.1

<b>Trial</b>	<b>Time Duration (Seconds)</b>	<b>Messages Passed</b>	<b>Rate (Messages/Second)</b>
1	60	1109	18.49
2	60	1139	18.98
3	60	1062	17.70
4	60	1188	19.80
5	60	1292	21.50
6	60	1170	19.50
7	60	1243	20.71
8	60	1221	20.35
9	60	1127	18.78
10	60	1180	19.67
<b>Average</b>	<b>60</b>	<b>1173.1</b>	<b>19.55</b>

### Test Case 2, (One Client Sending Messages to Multiple Queues)

Simulator 1 used a single Java applet to test the message broker. The applet sent as many messages as possible to multiple message broker queues. The purpose was to determine the speed at which a single client could send messages to multiple message broker queues.

Table 1.2

<b>Trial</b>	<b>Time Duration (Seconds)</b>	<b>Messages Passed</b>	<b>Rate (Messages/Second)</b>
1	60	70	1.17
2	60	68	1.13
3	60	77	1.28
4	60	71	1.18
5	60	69	1.15
6	60	63	1.05
7	60	68	1.13
8	60	71	1.18
9	60	73	1.21
10	60	69	1.15
<b>Average</b>	<b>60</b>	<b>69.9</b>	<b>1.16</b>

Note: The above decrease in message handling capability is not due to Message Broker message handling capability. This is because the client sends messages in a sequence and the slowdown is due to the client and not the message broker.

### Test Case 3 (Multiple Clients Sending Messages to a Single Queue)

Simulator 1 used multiple Java applet clients to test the message broker. The applets sent as many messages as possible to a single message broker queue. The purpose was to determine the speed at which multiple clients could send messages to a single message broker queue.

Table 1.3

<b>Trial</b>	<b>Time Duration (Seconds)</b>	<b>Messages Passed</b>	<b>Rate (Messages/Seconds)</b>
1	60	1255	20.91
2	60	1169	19.48
3	60	1305	21.75
4	60	1224	20.40
5	60	1170	19.50
6	60	1196	19.93
7	60	1110	18.50
8	60	1183	19.71
9	60	1131	18.85
10	60	1127	18.78
<b>Average</b>	<b>60</b>	<b>1187</b>	<b>19.78</b>

Note: The average rate increases a little bit, about .3 messages per second. But still the Message Broker message handling capacity is not changed a lot. Therefore the above calculations regarding message broker with 1 client and 1 queue represent the raw Message handling capability of Message Broker

### Test Case 4, (Long Term Test)

Simulator 2 used a single client to pass messages to the message broker over a 72-hour period through a persistent connection. During this period, messages were sent to the broker at a consistent rate of about 20 messages/second. This test was conducted to pursue the resilience of Message Broker under a constant strain.

Table 1.4

<b>Trial</b>	<b>Time Duration (Hours)</b>	<b>Rate (Messages/Second)</b>
1	72	~20

### Test Case 5, (Multiple Clients Establishing Connections)

Simulator 2 used multiple clients to establish connections with the message broker. A single application spawned multiple threads, which simulated multiple client connections. The purpose was to determine how quickly connections to the message broker could be established.

Table 1.5

<b>Trial</b>	<b>Time Duration (Seconds)</b>	<b>Connections Made</b>	<b>Rate (Connections/Second)</b>
1	60	418	6.96
2	60	420	7.00
3	60	414	6.90
4	60	410	6.83
5	60	421	7.01
6	60	415	6.91
7	60	423	7.05
8	60	416	6.93
9	60	421	7.01
10	60	418	6.96
<b>Average</b>	<b>60</b>	<b>417.6</b>	<b>6.96</b>

### Test Case 6, (Single Client Establishing Queues)

Simulator 2 used a single client to establish connections with the message broker and establish a message broker queue. The purpose was to determine how quickly queues could be established.

Table 1.6

<b>Trial</b>	<b>Time Duration (Seconds)</b>	<b>Queues Established</b>	<b>Rate (Queues/Second)</b>
1	60	94	1.56
2	60	97	1.61
3	60	93	1.55
4	60	101	1.68
5	60	96	1.60
6	60	89	1.48
7	60	94	1.56
8	60	87	1.45
9	60	98	1.63
10	60	93	1.55
<b>Average</b>	<b>60</b>	<b>94.2</b>	<b>1.57</b>

**Test Case 7, (Many Clients Establishing Queues)**

Simulators 2-6 used a single client to establish connections with the message broker and establish a message broker queue. The purpose of this test was to determine how quickly multiple clients could establish queues.

Table 1.7

<b>Trial</b>	<b>Time Duration (Seconds)</b>	<b>Queues Established</b>	<b>Rate (Queues/Second)</b>
1	60	500	8.35
2	60	497	8.28
3	60	480	8.00
4	60	508	8.46
5	60	510	8.50
6	60	489	8.15
7	60	492	8.20
8	60	497	8.28
9	60	486	8.10
10	60	489	8.15
<b>Average</b>	<b>60</b>	<b>94.2</b>	<b>8.25</b>

**Test Case 8, (Maximum Number of Queues Established)**

Simulators 2-6 attempted to establish as many message broker queues as possible before the message broker "crashed" (out of bounds exception was generated). Each trial took approximately 2 minutes.

Table 1.8

<b>Trial</b>	<b>Queues Established</b>
1	916
2	937
3	908
4	953
5	972
<b>Average</b>	<b>937.2</b>

**Implementer**

Sumit Vohra, October 27, 2000