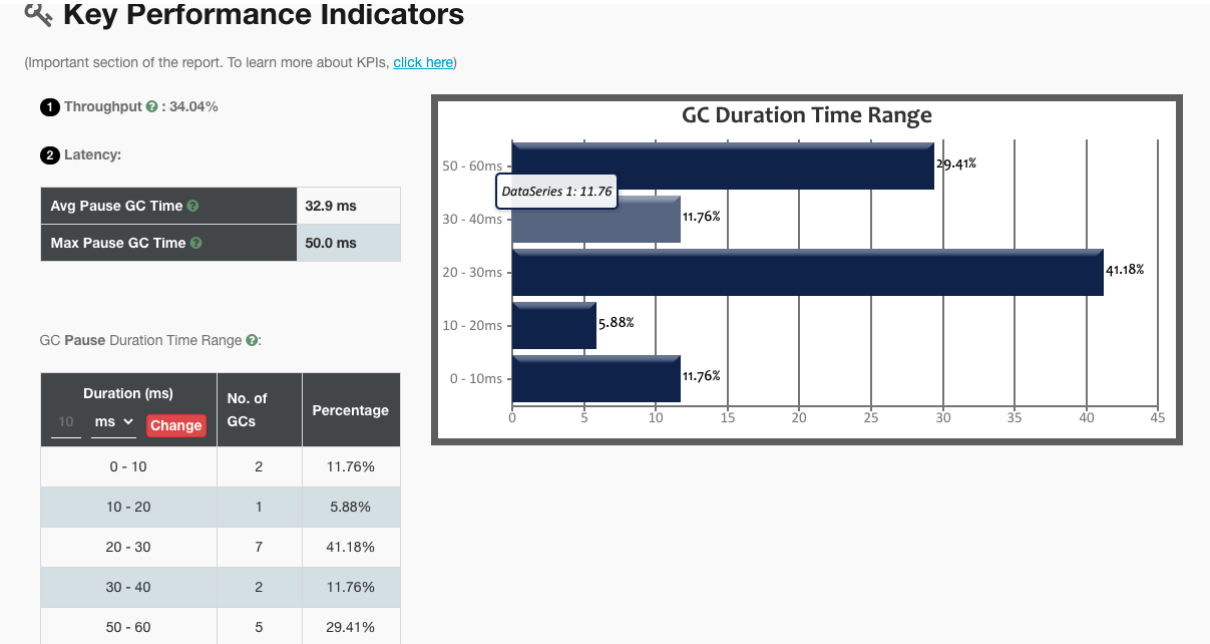
# GCLogAnalysis 分析

1. 垃圾收集器

   分别使用 Serial GC、Parallel GC、CMS GC、G1GC 对 GCLogAnalysis.java 运行分析，使用参数分别为-Xmx512m -Xms512m，-Xmx1g -Xms1g，-Xmx2g -Xms2g，-Xmx4g -Xms4g 以及不设置-Xms。输出文档:GC_LOG，使用 GC Easy 对结果进行图形化展示。

2. 串行 GC 分析

   1）GC 暂停时间




   -Xmx512m -Xms512m 时，GC 暂停时间最优，平均 GC 暂停时间为 32.9ms，最长 GC 暂停时间为 50ms。20-30 时间段内占比相对较高。

(Important section of the report. To learn more about KPIs, click here)

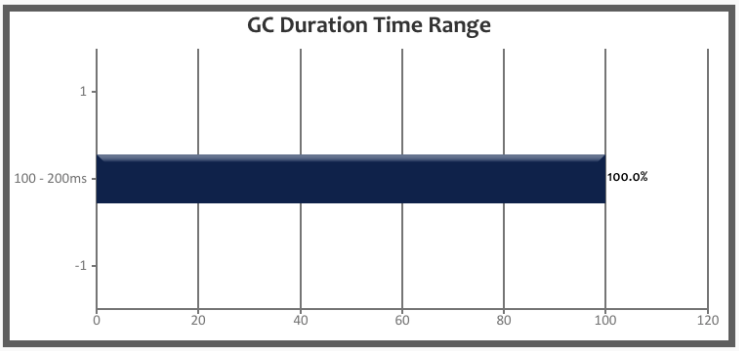
1 Throughput : 7.692%

2 Latency:

| | |
|---|---|
| Avg Pause GC Time | 150 ms |
| Max Pause GC Time | 170 ms |

GC Pause Duration Time Range:

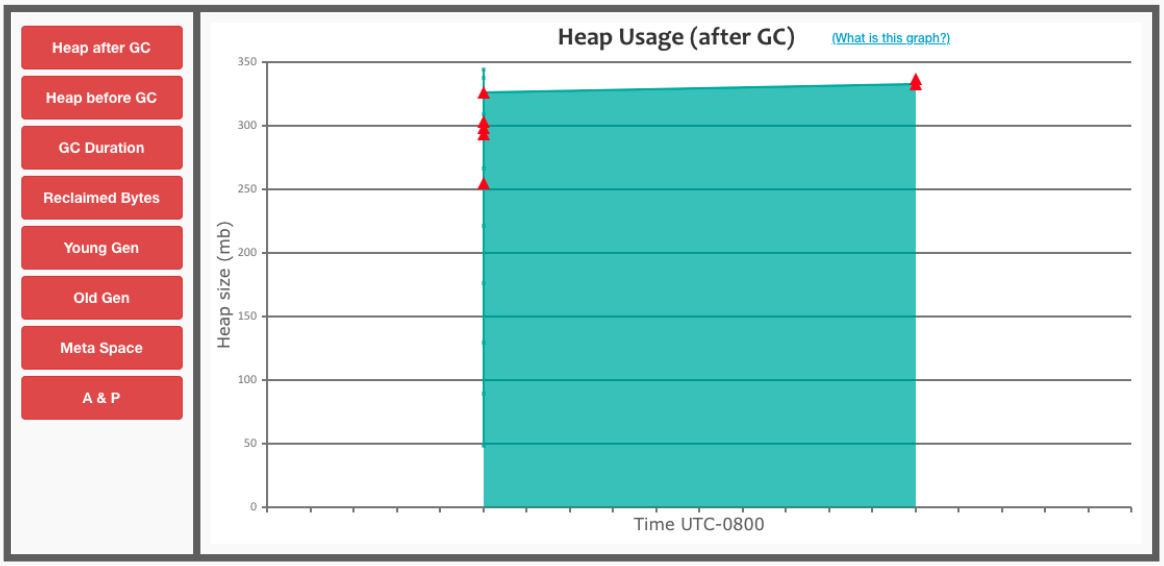
| Duration (ms) 100 ms Change | No. of GCs | Percentage |
|---|---|---|
| 100 - 200 | 2 | 100.0% |



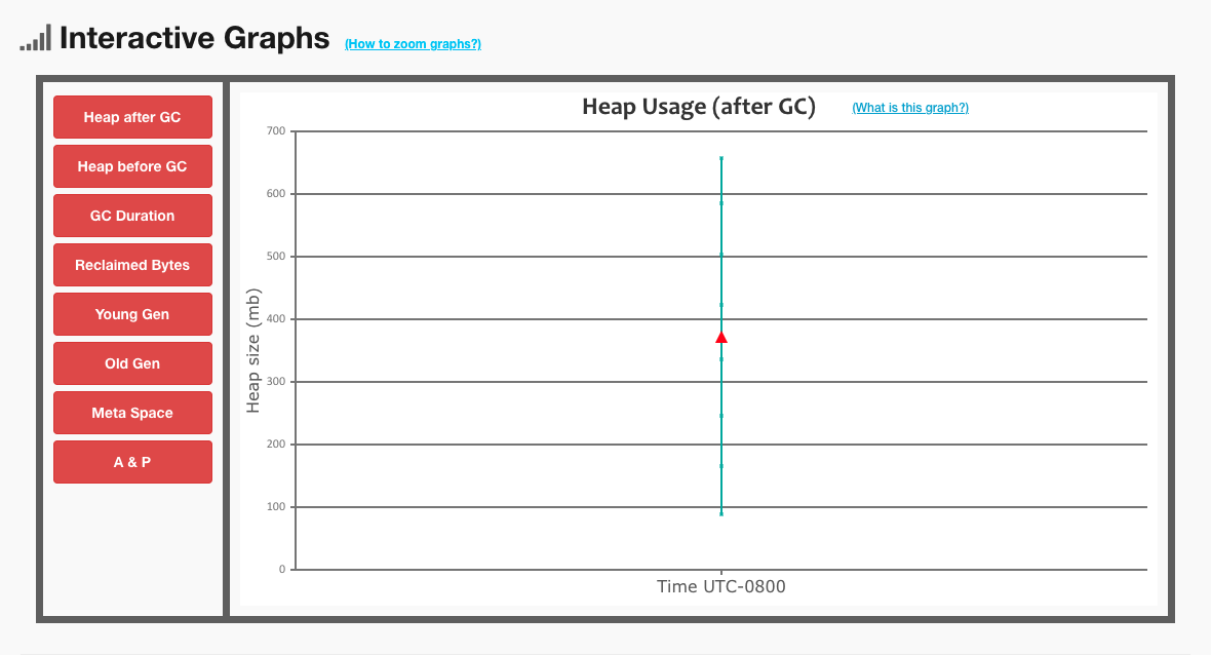

-Xmx4g -Xms4g 时，GC 暂停时间最长，平均 GC 暂停时间为 150ms，最长 GC 暂停时间为 170ms。100-200 时间段，占比较高。

2）堆内存使用情况

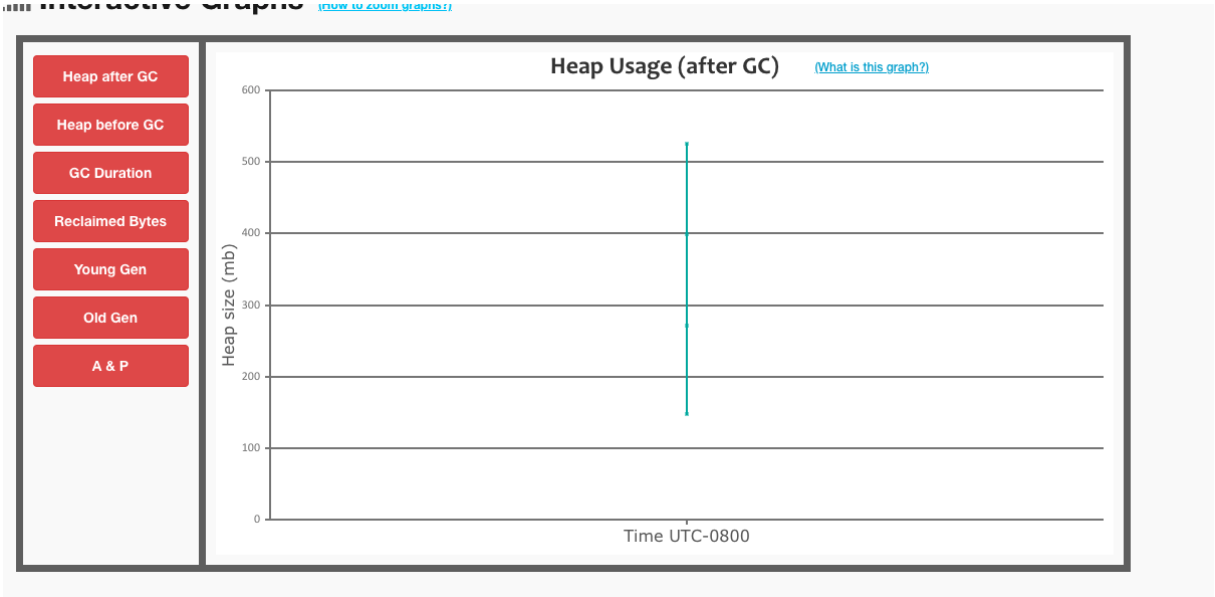
-Xmx512m -Xms512m



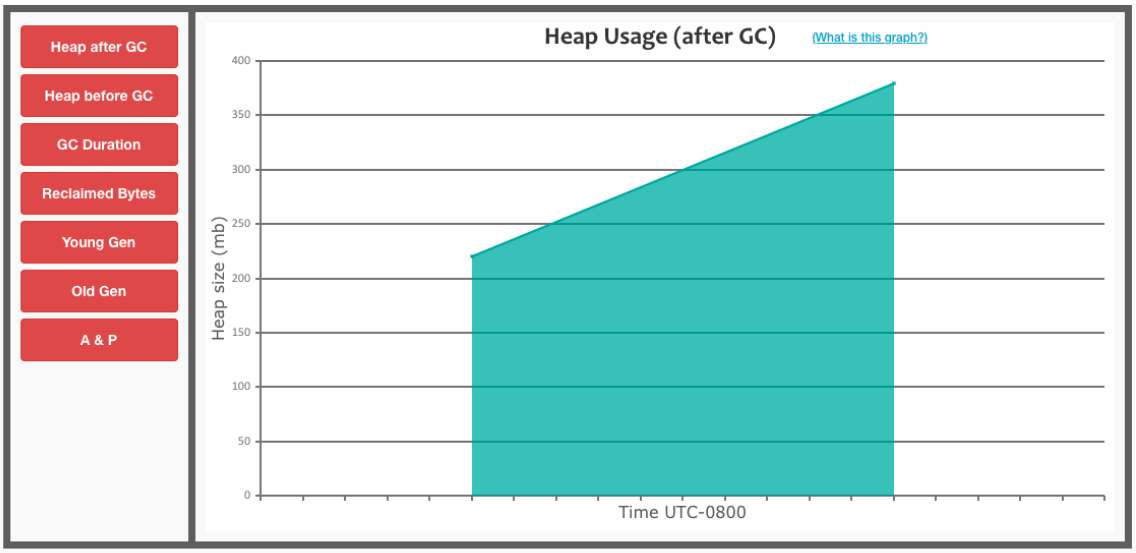

-Xmx1g -Xms1g




-Xmx2g -Xms2g

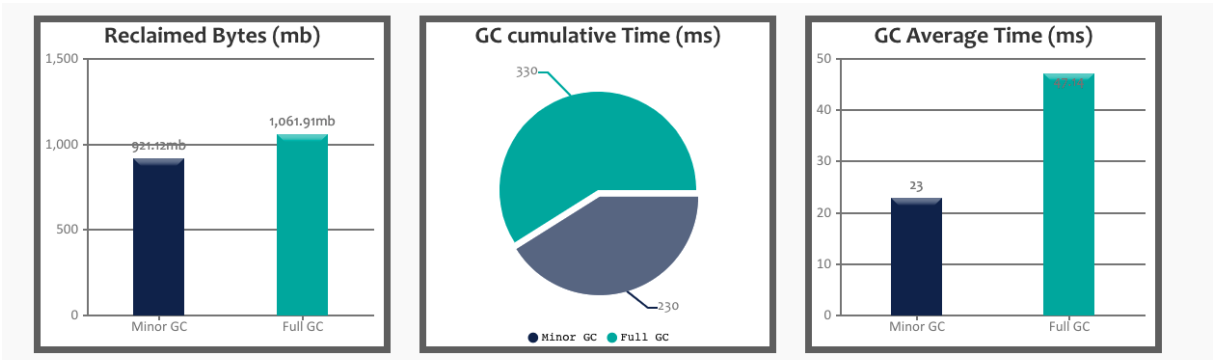



-Xmx4g -Xms4g




3) GC 情况统计

-Xmx512m -Xms512m




Total GC stats

| | |
|---|---|
| Total GC count | 17 |
| Total reclaimed bytes | 1.94 gb |
| Total GC time | 560 ms |
| Avg GC time | 32.9 ms |
| GC avg time std dev | 15.2 ms |
| GC min/max time | 0 / 50.0 ms |
| GC Interval avg time | 53.0 ms |

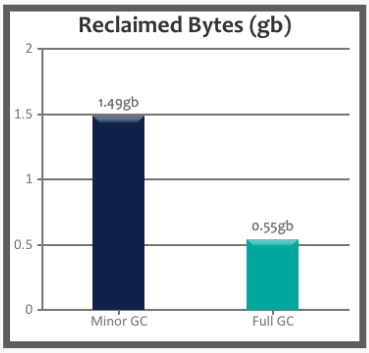
Minor GC stats

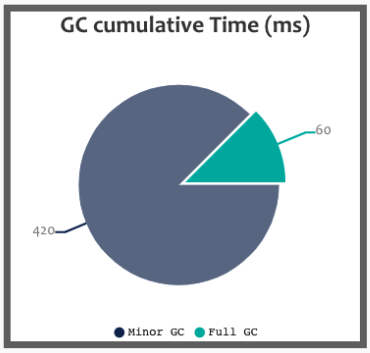
| | |
|---|---|
| Minor GC count | 10 |
| Minor GC reclaimed | 921.12 mb |
| Minor GC total time | 230 ms |
| Minor GC avg time | 23.0 ms |
| Minor GC avg time std dev | 11.9 ms |
| Minor GC min/max time | 0 / 30.0 ms |
| Minor GC Interval avg | 77.0 ms |

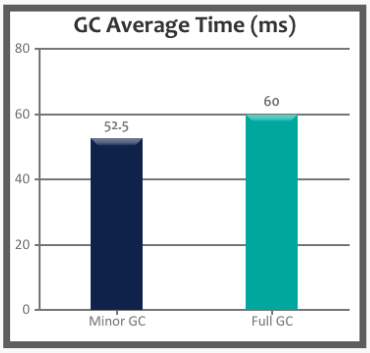
Full GC stats

| | |
|---|---|
| Full GC Count | 7 |
| Full GC reclaimed | 1.04 gb |
| Full GC total time | 330 ms |
| Full GC avg time | 47.1 ms |
| Full GC avg time std dev | 4.52 ms |
| Full GC min/max time | 40.0 ms / 50.0 ms |
| Full GC Interval avg | 83.0 ms |

-Xmx1g -Xms1g




Total GC stats

| | |
|---|---|
| Total GC count | 9 |
| Total reclaimed bytes | 2.04 gb |
| Total GC time | 480 ms |
| Avg GC time | 53.3 ms |
| GC avg time std dev | 6.67 ms |
| GC min/max time | 40.0 ms / 60.0 ms |
| GC Interval avg time | 97.0 ms |

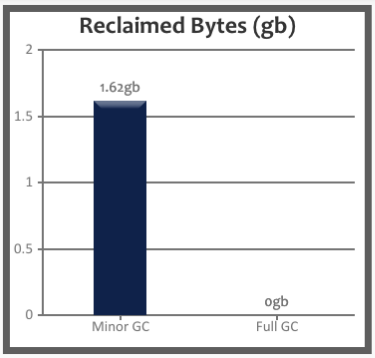
Minor GC stats

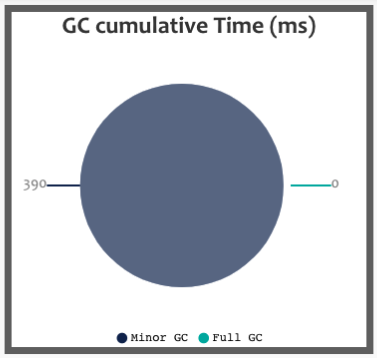
| | |
|---|---|
| Minor GC count | 8 |
| Minor GC reclaimed | 1.49 gb |
| Minor GC total time | 420 ms |
| Minor GC avg time | 52.5 ms |
| Minor GC avg time std dev | 6.61 ms |
| Minor GC min/max time | 40.0 ms / 60.0 ms |
| Minor GC Interval avg | 98.0 ms |

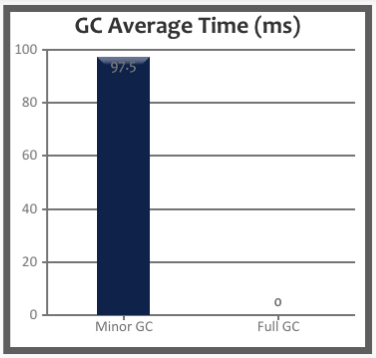
Full GC stats

| | |
|---|---|
| Full GC Count | 1 |
| Full GC reclaimed | 558.11 mb |
| Full GC total time | 60.0 ms |
| Full GC avg time | 60.0 ms |
| Full GC avg time std dev | 0 |
| Full GC min/max time | 60.0 ms / 60.0 ms |
| Full GC Interval avg | n/a |

-Xmx2g -Xms2g




Total GC stats

| | |
|---|---|
| Total GC count | 4 |
| Total reclaimed bytes | n/a |
| Total GC time | 390 ms |
| Avg GC time | 97.5 ms |
| GC avg time std dev | 13.0 ms |
| GC min/max time | 90.0 ms / 120 ms |
| GC Interval avg time | 187 ms |

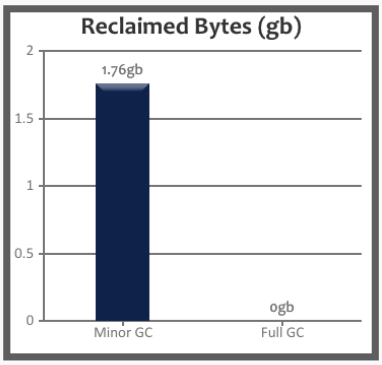
Minor GC stats

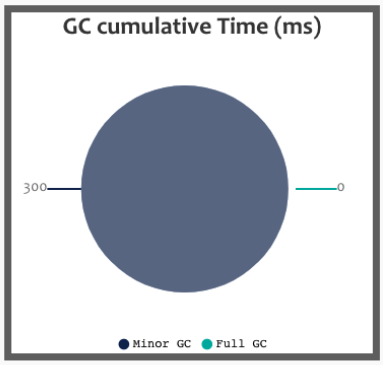
| | |
|---|---|
| Minor GC count | 4 |
| Minor GC reclaimed | 1.62 gb |
| Minor GC total time | 390 ms |
| Minor GC avg time | 97.5 ms |
| Minor GC avg time std dev | 13.0 ms |
| Minor GC min/max time | 90.0 ms / 120 ms |
| Minor GC Interval avg | 187 ms |

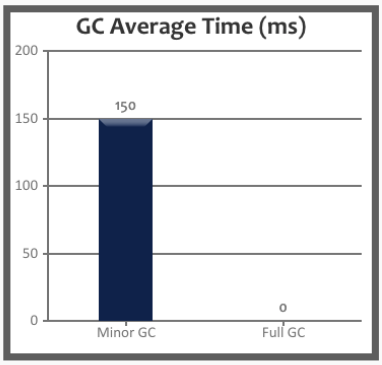
Full GC stats

| | |
|---|---|
| Full GC Count | 0 |
| Full GC reclaimed | n/a |
| Full GC total time | n/a |
| Full GC avg time | n/a |
| Full GC avg time std dev | n/a |
| Full GC min/max time | n/a |
| Full GC Interval avg | n/a |

-Xmx4g -Xms4g




Total GC stats

| | |
|---|---|
| Total GC count | 2 |
| Total reclaimed bytes | n/a |
| Total GC time | 300 ms |
| Avg GC time | 150 ms |
| GC avg time std dev | 20.0 ms |
| GC min/max time | 130 ms / 170 ms |
| GC Interval avg time | 325 ms |

Minor GC stats

| | |
|---|---|
| Minor GC count | 2 |
| Minor GC reclaimed | 1.76 gb |
| Minor GC total time | 300 ms |
| Minor GC avg time | 150 ms |
| Minor GC avg time std dev | 20.0 ms |
| Minor GC min/max time | 130 ms / 170 ms |
| Minor GC Interval avg | 325 ms |

Full GC stats

| | |
|---|---|
| Full GC Count | 0 |
| Full GC reclaimed | n/a |
| Full GC total time | n/a |
| Full GC avg time | n/a |
| Full GC avg time std dev | n/a |
| Full GC min/max time | n/a |
| Full GC Interval avg | n/a |

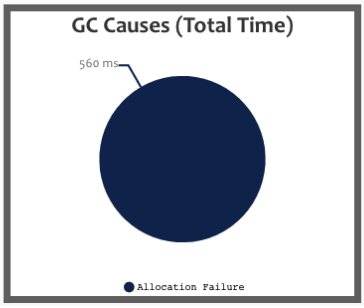
4) GC 原因

-Xmx512m -Xms512m

GC Causes

(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| Allocation Failure | 17 | 32.9 ms | 50.0 ms | 560 ms |

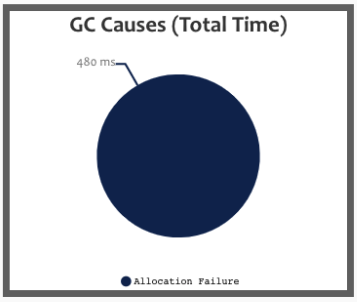



-Xmx1g -Xms1g

## GC Causes

(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| Allocation Failure | 9 | 53.3 ms | 60.0 ms | 480 ms |

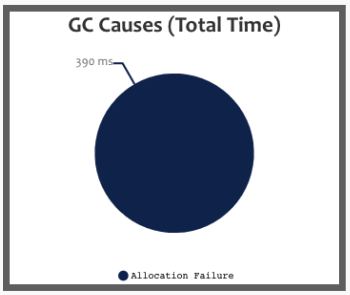



-Xmx2g -Xms2g

## GC Causes

(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| Allocation Failure | 4 | 97.5 ms | 120 ms | 390 ms |

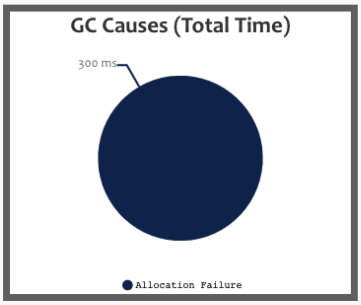



-Xmx4g -Xms4g

## GC Causes

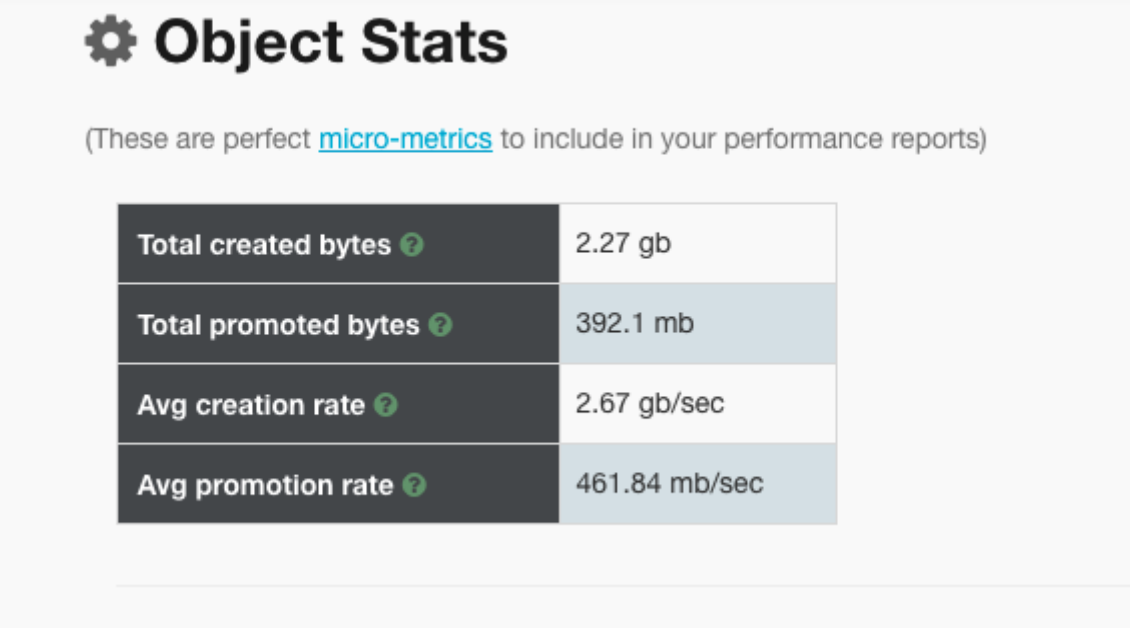
(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| Allocation Failure | 2 | 150 ms | 170 ms | 300 ms |

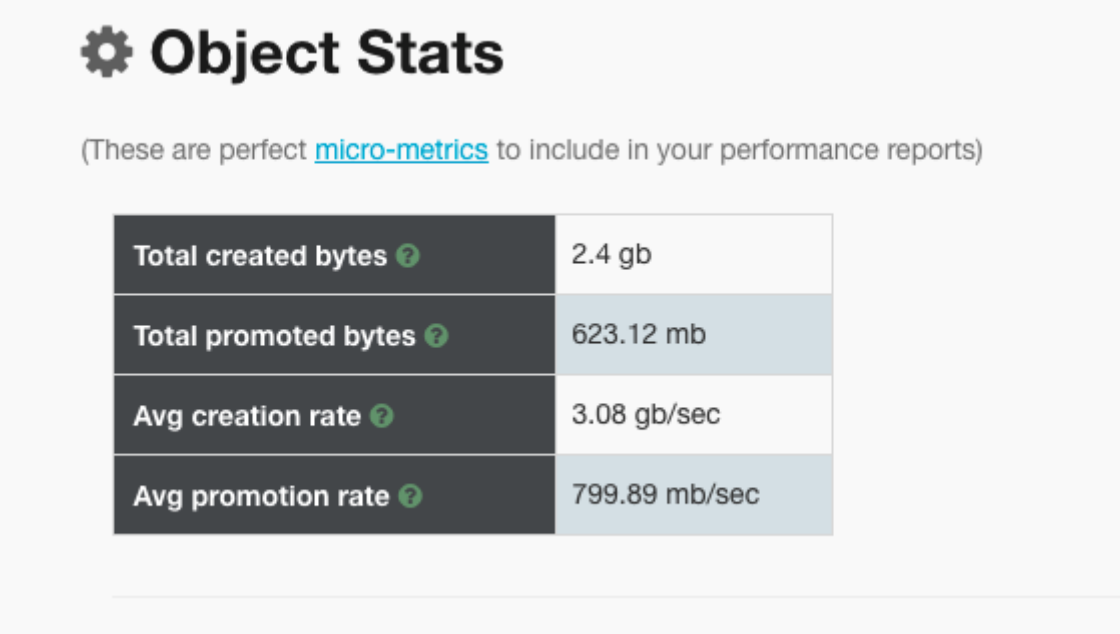



5) 内存分配速度

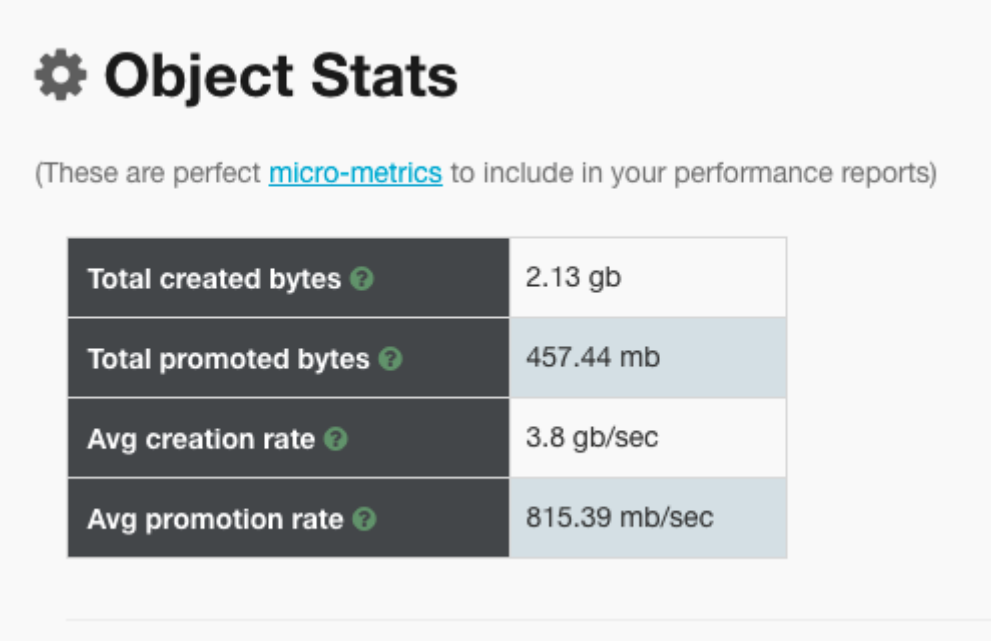
-Xmx512m -Xms512m



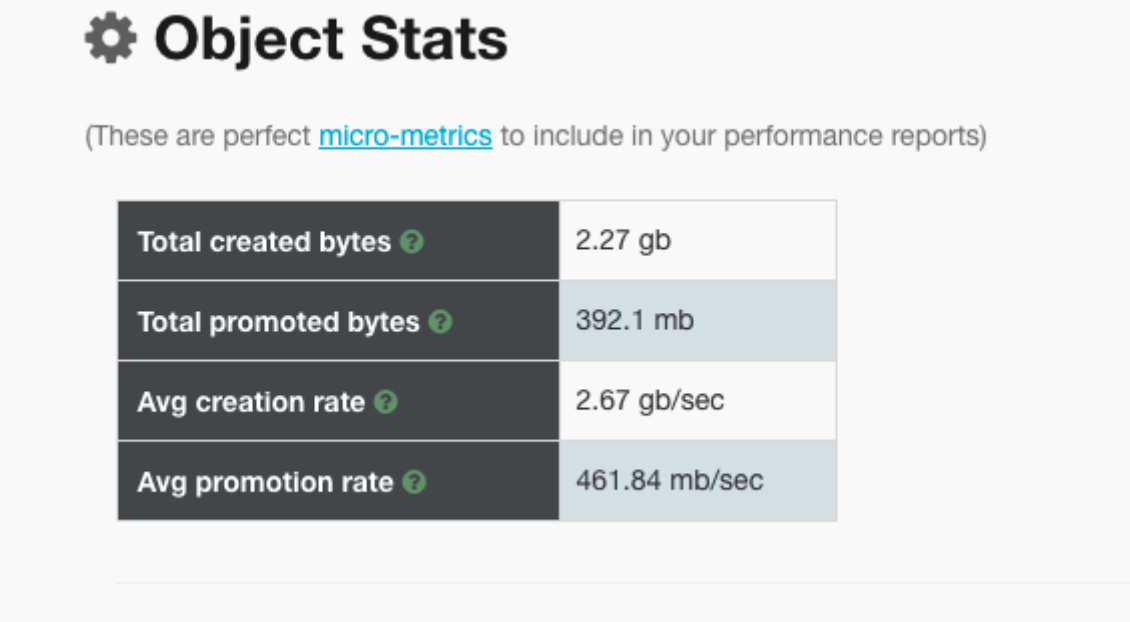

-Xmx1g -Xms1g




-Xmx2g -Xms2g




-Xmx4g -Xms4g




3. 并行 GC 分析

1 ) GC 暂停时间

(Important section of the report. To learn more about KPIs, click here)

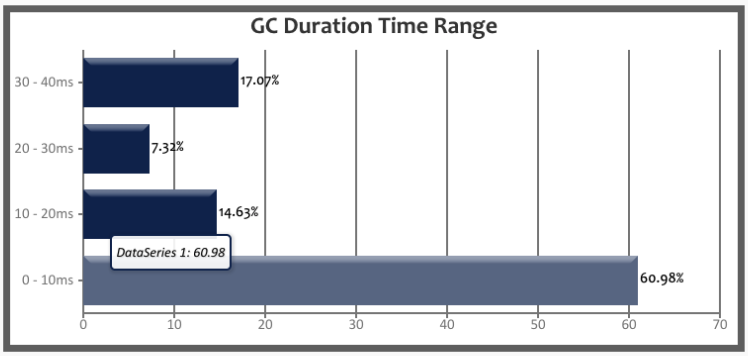
1 Throughput : 34.225%

2 Latency:

| | |
|---|---|
| Avg Pause GC Time | 14.4 ms |
| Max Pause GC Time | 40.0 ms |

GC Pause Duration Time Range:

| Duration (ms) 10 ms Change | No. of GCs | Percentage |
|---|---|---|
| 0 - 10 | 25 | 60.98% |
| 10 - 20 | 6 | 14.63% |
| 20 - 30 | 3 | 7.32% |
| 30 - 40 | 7 | 17.07% |




-Xmx512m -Xms512m 时，GC 暂停时间最优，平均 GC 暂停时间为 14.4ms，最长 GC 暂停时间为 40ms。0-10 时间段内占比较高。

## Key Performance Indicators

(Important section of the report. To learn more about KPIs, click here)

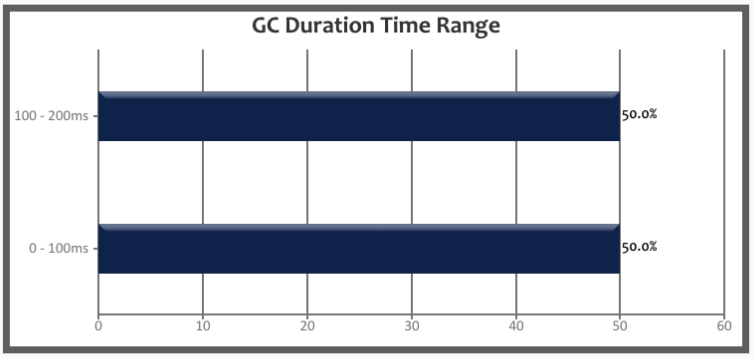
1 Throughput : 17.266%

2 Latency:

| | |
|---|---|
| Avg Pause GC Time | 115 ms |
| Max Pause GC Time | 130 ms |

GC Pause Duration Time Range:

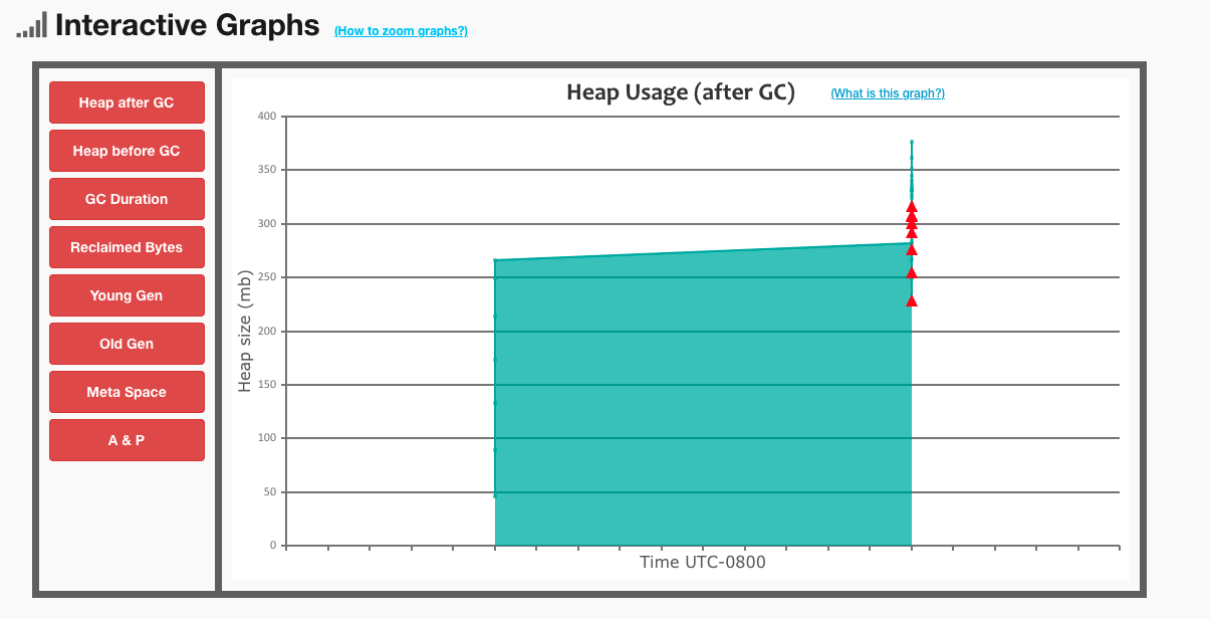
| Duration (ms) 100 ms Change | No. of GCs | Percentage |
|---|---|---|
| 0 - 100 | 1 | 50.0% |
| 100 - 200 | 1 | 50.0% |



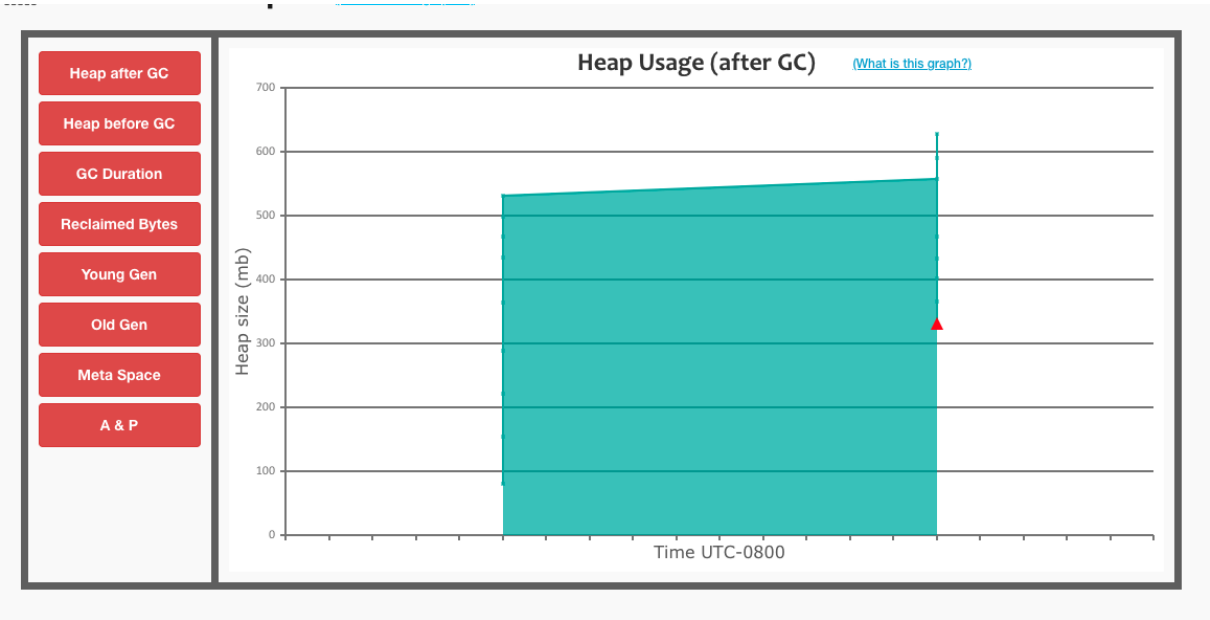

-Xmx4g -Xms4g 时，GC 暂停时间最长，平均 GC 暂停时间为 115ms，最长 GC 暂停时间为 130ms。0-100ms 与 100-200ms 占比相同。

2）堆内存使用情况

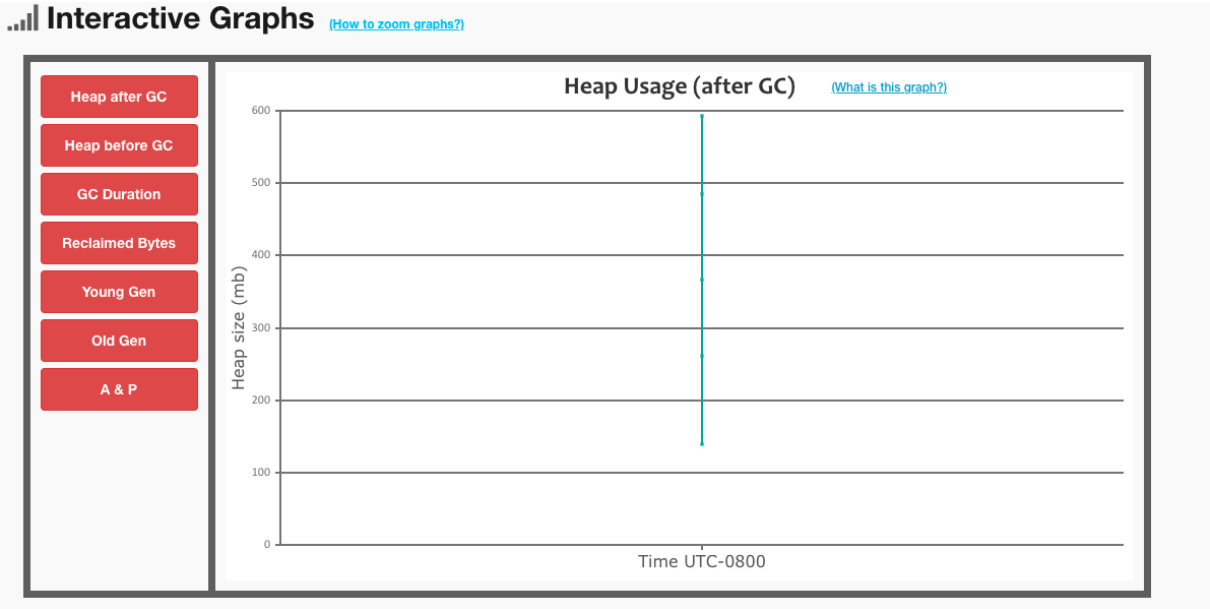
-Xmx512m -Xms512m



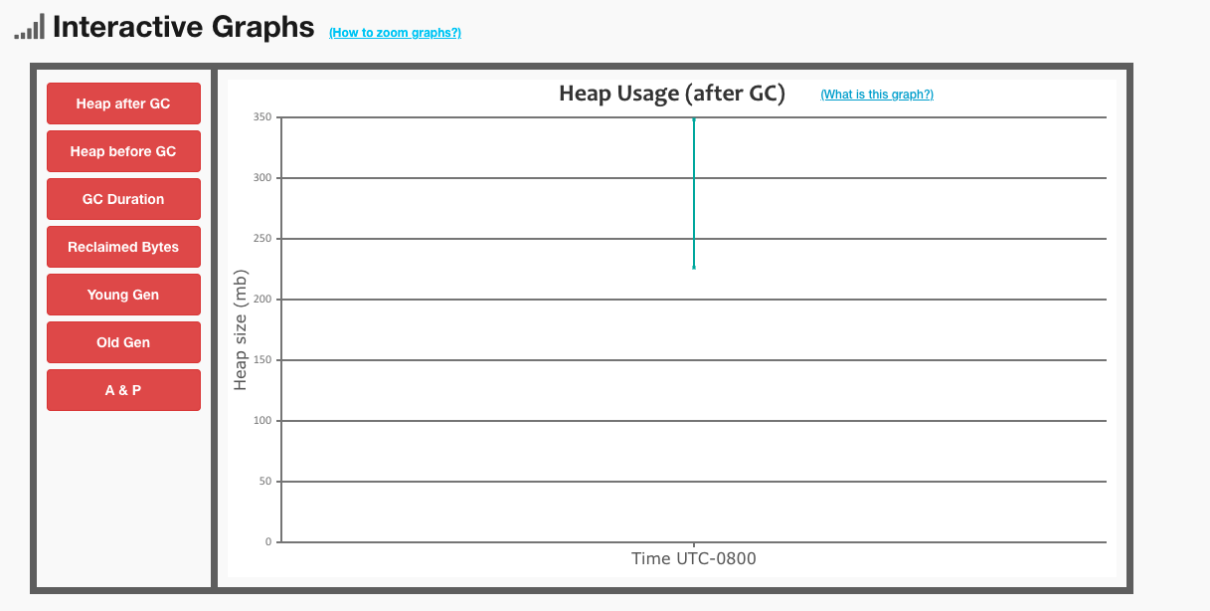

-Xmx1g -Xms1g




-Xmx2g -Xms2g

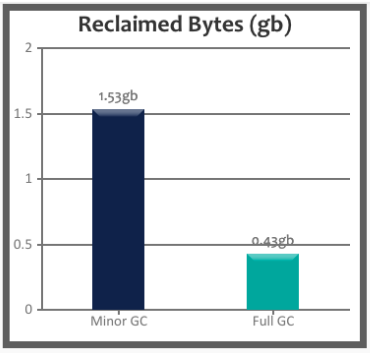


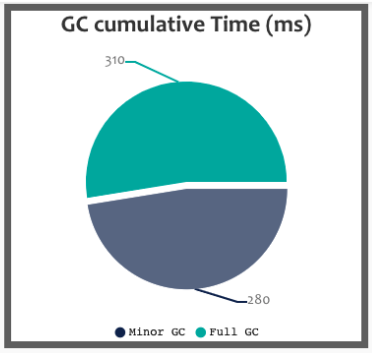

-Xmx4g -Xms4g

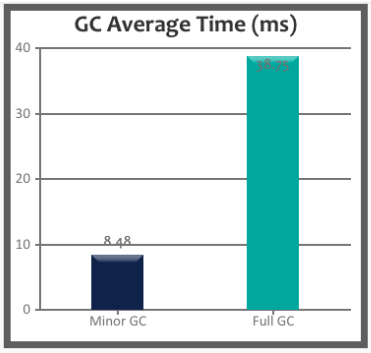



3) GC 情况统计

-Xmx512m -Xms512m




Total GC stats

| | |
|---|---|
| Total GC count | 41 |
| Total reclaimed bytes | 1.96 gb |
| Total GC time | 590 ms |
| Avg GC time | 14.4 ms |
| GC avg time std dev | 14.7 ms |
| GC min/max time | 0 / 40.0 ms |
| GC Interval avg time | 22.0 ms |

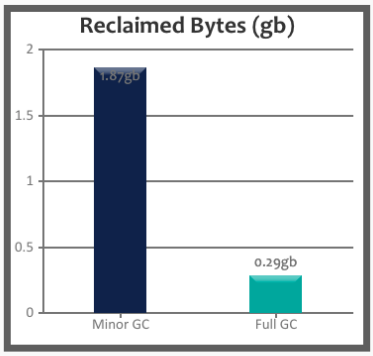
Minor GC stats

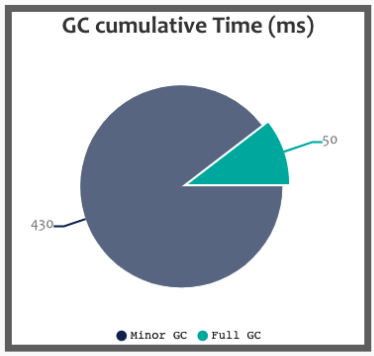
| | |
|---|---|
| Minor GC count | 33 |
| Minor GC reclaimed | 1.53 gb |
| Minor GC total time | 280 ms |
| Minor GC avg time | 8.48 ms |
| Minor GC avg time std dev | 9.25 ms |
| Minor GC min/max time | 0 / 30.0 ms |
| Minor GC Interval avg | 27.0 ms |

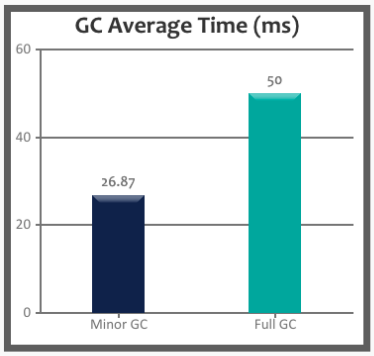
Full GC stats

| | |
|---|---|
| Full GC Count | 8 |
| Full GC reclaimed | 437.75 mb |
| Full GC total time | 310 ms |
| Full GC avg time | 38.7 ms |
| Full GC avg time std dev | 3.31 ms |
| Full GC min/max time | 30.0 ms / 40.0 ms |
| Full GC Interval avg | 79.0 ms |

-Xmx1g -Xms1g




Total GC stats

| | |
|---|---|
| Total GC count | 17 |
| Total reclaimed bytes | 2.16 gb |
| Total GC time | 480 ms |
| Avg GC time | 28.2 ms |
| GC avg time std dev | 15.0 ms |
| GC min/max time | 10.0 ms / 50.0 ms |
| GC Interval avg time | 51.0 ms |

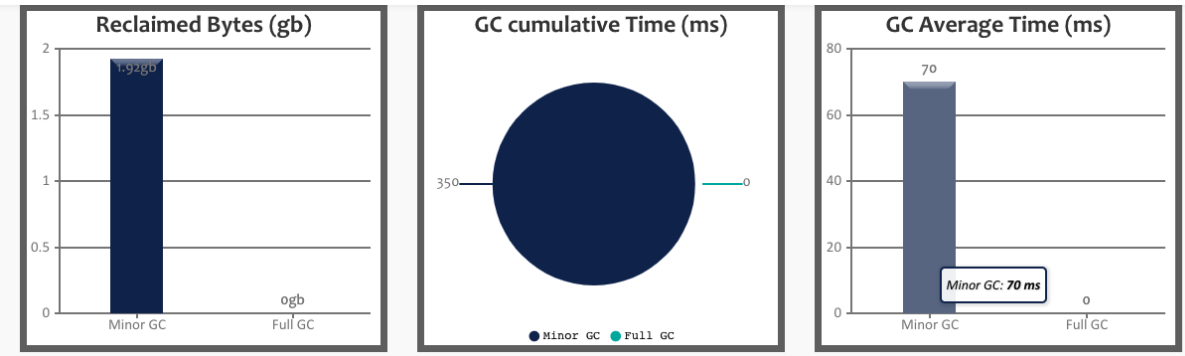
Minor GC stats

| | |
|---|---|
| Minor GC count | 16 |
| Minor GC reclaimed | 1.87 gb |
| Minor GC total time | 430 ms |
| Minor GC avg time | 26.9 ms |
| Minor GC avg time std dev | 14.5 ms |
| Minor GC min/max time | 10.0 ms / 50.0 ms |
| Minor GC Interval avg | 55.0 ms |

Full GC stats

| | |
|---|---|
| Full GC Count | 1 |
| Full GC reclaimed | 296.02 mb |
| Full GC total time | 50.0 ms |
| Full GC avg time | 50.0 ms |
| Full GC avg time std dev | 0 |
| Full GC min/max time | 50.0 ms / 50.0 ms |
| Full GC Interval avg | n/a |

-Xmx2g -Xms2g




Total GC stats

| | |
|---|---|
| Total GC count | 5 |
| Total reclaimed bytes | n/a |
| Total GC time | 350 ms |
| Avg GC time | 70.0 ms |
| GC avg time std dev | 15.5 ms |
| GC min/max time | 60.0 ms / 100 ms |
| GC Interval avg time | 153 ms |

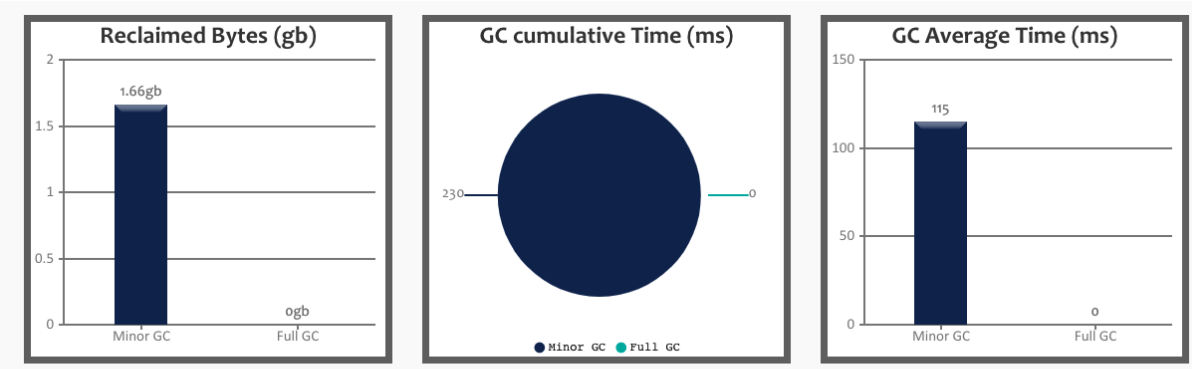
Minor GC stats

| | |
|---|---|
| Minor GC count | 5 |
| Minor GC reclaimed | 1.92 gb |
| Minor GC total time | 350 ms |
| Minor GC avg time | 70.0 ms |
| Minor GC avg time std dev | 15.5 ms |
| Minor GC min/max time | 60.0 ms / 100 ms |
| Minor GC Interval avg | 153 ms |

Full GC stats

| | |
|---|---|
| Full GC Count | 0 |
| Full GC reclaimed | n/a |
| Full GC total time | n/a |
| Full GC avg time | n/a |
| Full GC avg time std dev | n/a |
| Full GC min/max time | n/a |
| Full GC Interval avg | n/a |

-Xmx4g -Xms4g




Total GC stats

| | |
|---|---|
| Total GC count | 2 |
| Total reclaimed bytes | n/a |
| Total GC time | 230 ms |
| Avg GC time | 115 ms |
| GC avg time std dev | 15.0 ms |
| GC min/max time | 100 ms / 130 ms |
| GC Interval avg time | 278 ms |

Minor GC stats

| | |
|---|---|
| Minor GC count | 2 |
| Minor GC reclaimed | 1.66 gb |
| Minor GC total time | 230 ms |
| Minor GC avg time | 115 ms |
| Minor GC avg time std dev | 15.0 ms |
| Minor GC min/max time | 100 ms / 130 ms |
| Minor GC Interval avg | 278 ms |

Full GC stats

| | |
|---|---|
| Full GC Count | 0 |
| Full GC reclaimed | n/a |
| Full GC total time | n/a |
| Full GC avg time | n/a |
| Full GC avg time std dev | n/a |
| Full GC min/max time | n/a |
| Full GC Interval avg | n/a |

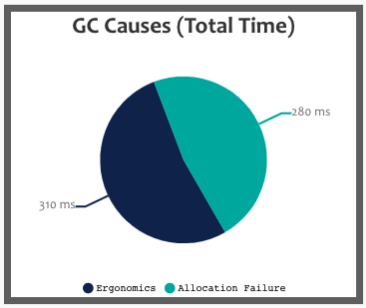
4) GC 原因

-Xmx512m -Xms512m

## GC Causes

(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| Ergonomics | 8 | 38.7 ms | 40.0 ms | 310 ms |
| Allocation Failure | 33 | 8.48 ms | 30.0 ms | 280 ms |

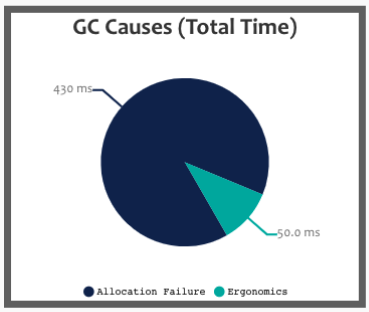



-Xmx1g -Xms1g

## GC Causes

(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| Allocation Failure | 16 | 26.9 ms | 50.0 ms | 430 ms |
| Ergonomics | 1 | 50.0 ms | 50.0 ms | 50.0 ms |

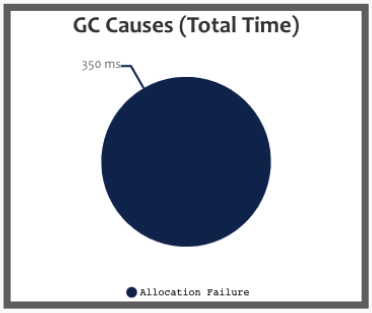



-Xmx2g -Xms2g

## GC Causes

(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| Allocation Failure | 5 | 70.0 ms | 100 ms | 350 ms |

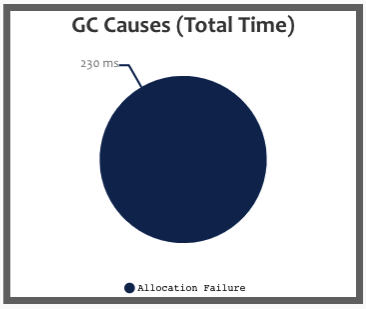



-Xmx4g -Xms4g

## GC Causes

(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| Allocation Failure | 2 | 115 ms | 130 ms | 230 ms |




5）内存分配速度

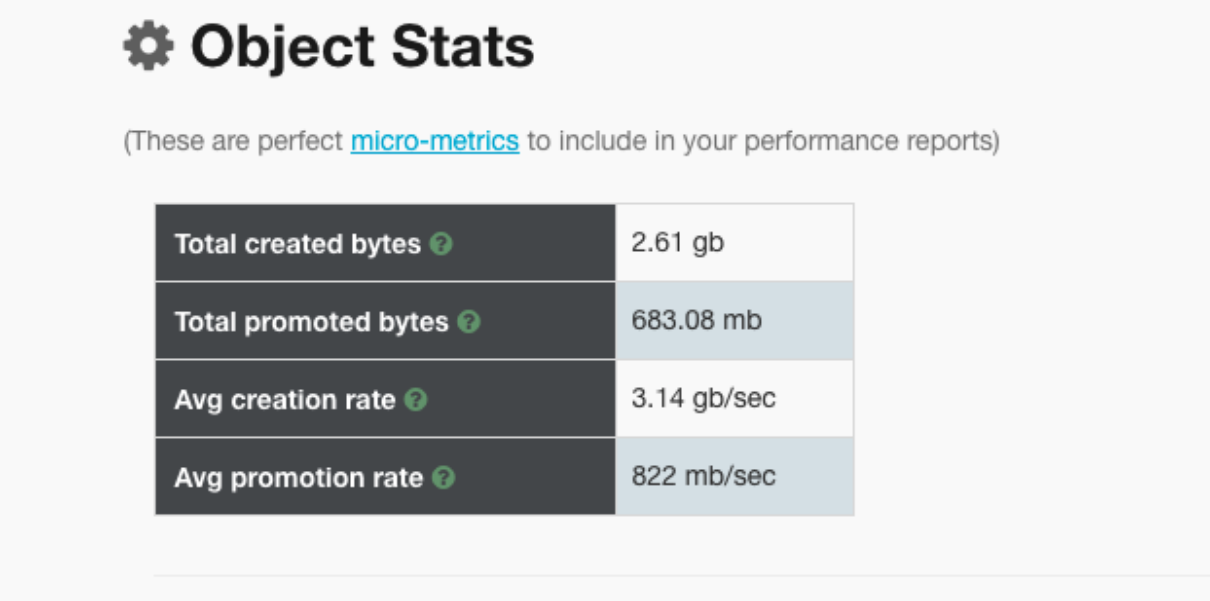
-Xmx512m -Xms512m

## Object Stats

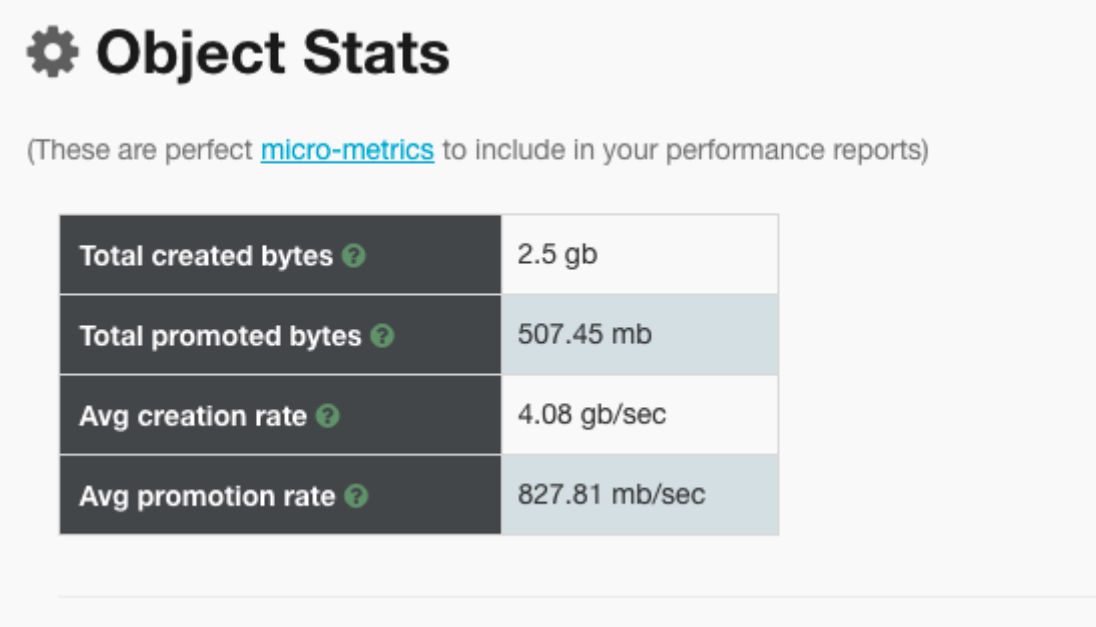
(These are perfect micro-metrics to include in your performance reports)

| | |
|---|---|
| Total created bytes | 2.27 gb |
| Total promoted bytes | 555.1 mb |
| Avg creation rate | 2.53 gb/sec |
| Avg promotion rate | 618.84 mb/sec |

-Xmx1g -Xms1g




-Xmx2g -Xms2g




-Xmx4g -Xms4g

## Object Stats

(These are perfect micro-metrics to include in your performance reports)

| | |
|---|---|
| Total created bytes | 2 gb |
| Total promoted bytes | 178.01 mb |
| Avg creation rate | 7.19 gb/sec |
| Avg promotion rate | 640.31 mb/sec |

4. CMS GC 分析

1）GC 暂停时间

## Key Performance Indicators

(Important section of the report. To learn more about KPIs, click here)

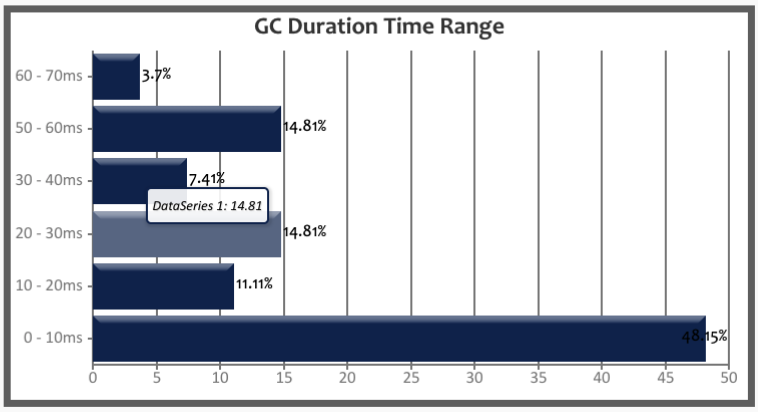
1 Throughput : 41.489%

2 Latency:

| | |
|---|---|
| Avg Pause GC Time | 20.4 ms |
| Max Pause GC Time | 60.0 ms |

GC Pause Duration Time Range:

| Duration (ms) 10 ms Change | No. of GCs | Percentage |
|---|---|---|
| 0 - 10 | 13 | 48.15% |
| 10 - 20 | 3 | 11.11% |




-Xmx512m -Xms512m 时，GC 暂停时间最优，平均 GC 暂停时间为 20.4ms，最长 GC 暂停时间为 60ms。0-10 时间段内占比较高。

1 Throughput : 39.349%

2 Latency:

| Avg Pause GC Time | 82.0 ms |
| --- | --- |
| Max Pause GC Time | 90.0 ms |

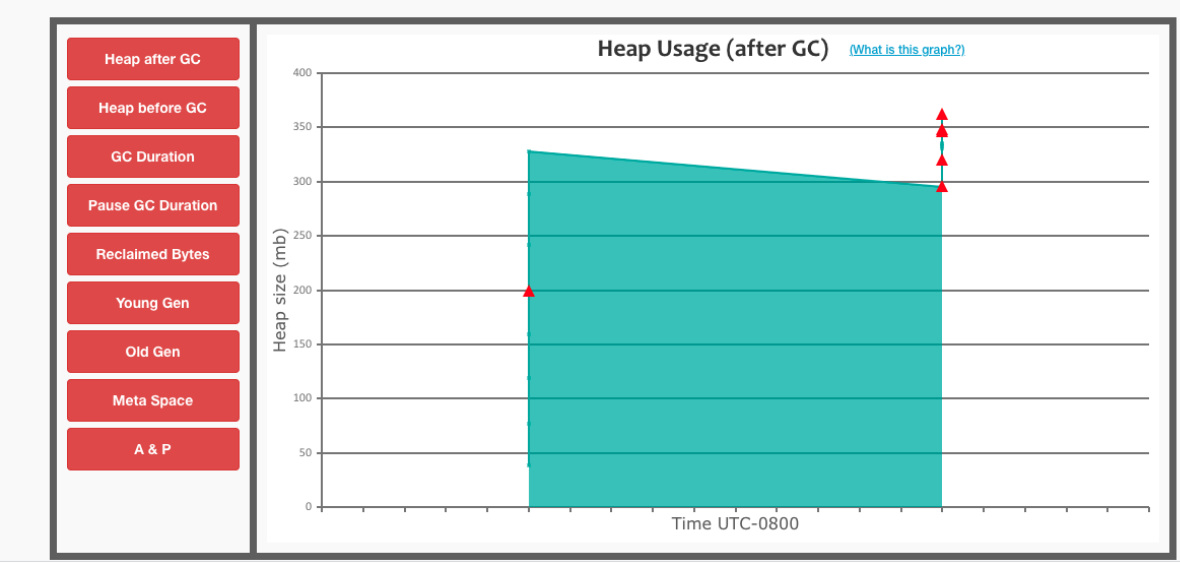
GC Pause Duration Time Range :

| Duration (ms) 10 ms Change | No. of GCs | Percentage |
| --- | --- | --- |
| 70 - 80 | 2 | 40.0% |
| 90 - 100 | 3 | 60.0% |

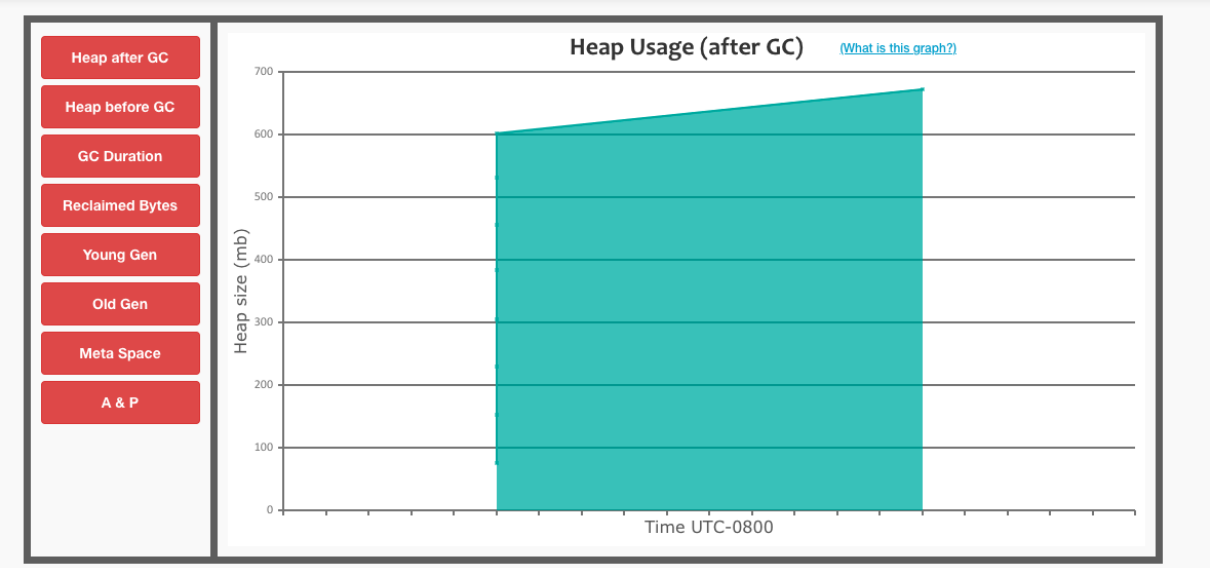
-Xmx4g -Xms4g 时，GC 暂停时间最长，平均 GC 暂停时间为 82ms，最长 GC 暂停时间为 90ms。90-100 时间段，占比较高。

2）堆内存使用情况

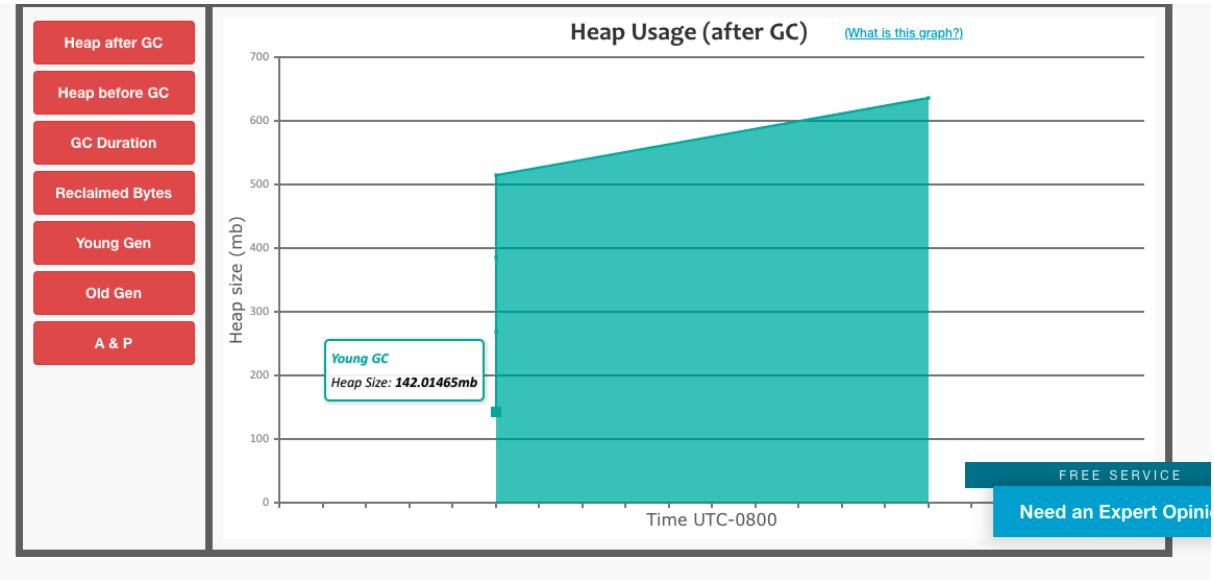
-Xmx512m -Xms512m



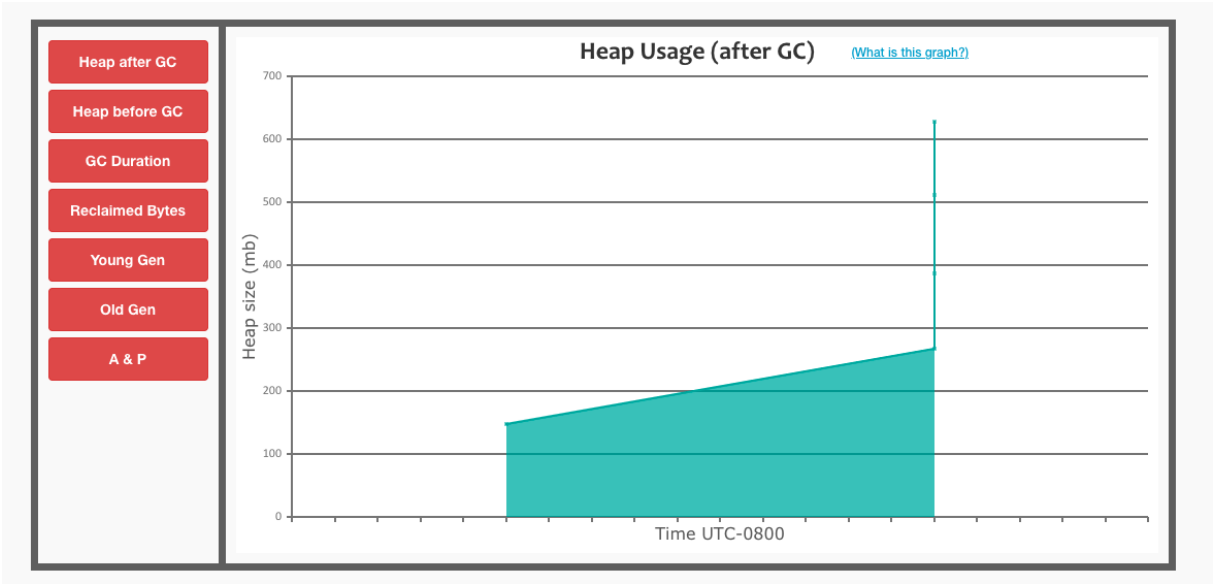

-Xmx1g -Xms1g




-Xmx2g -Xms2g



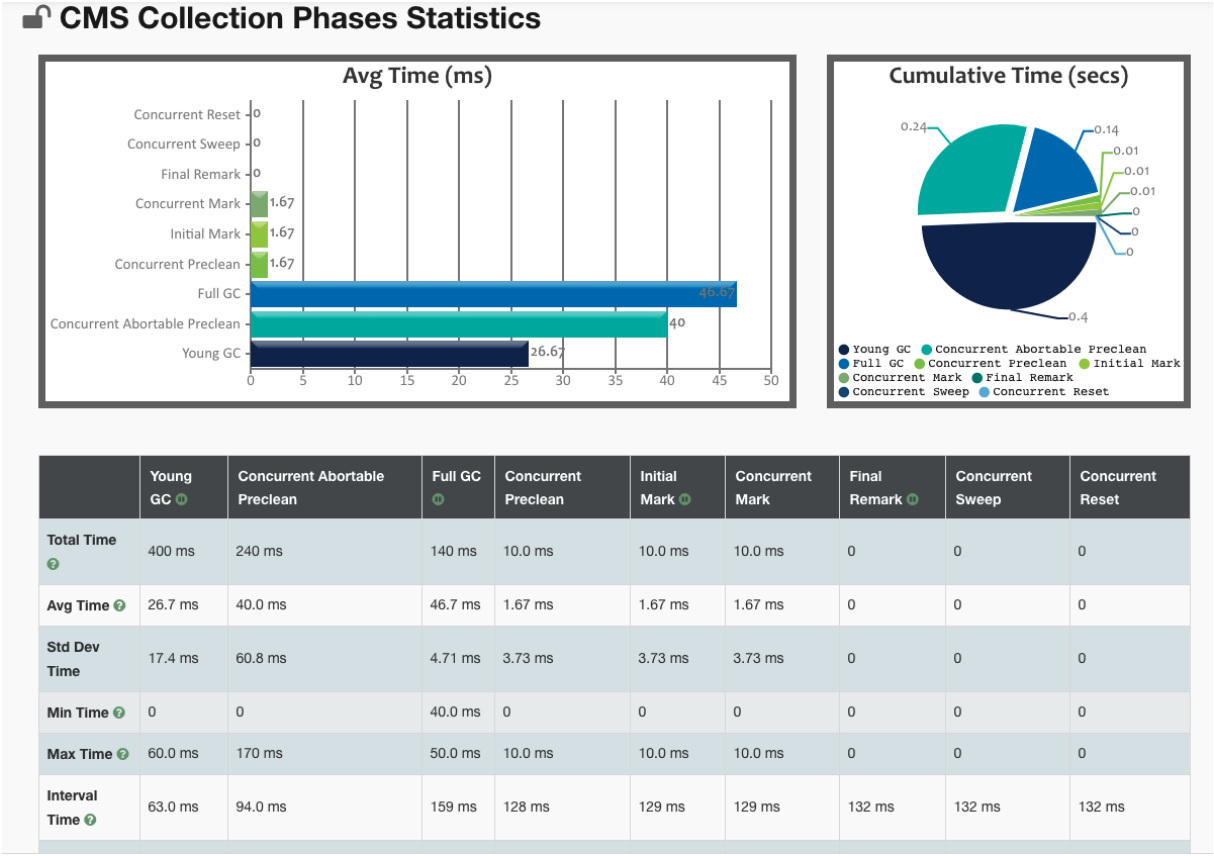

-Xmx4g -Xms4g




可以看出分配内存越大使用率越低。

3) GC 情况统计

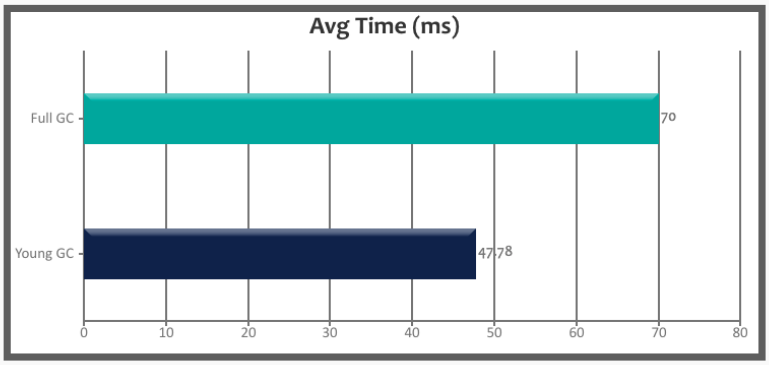
-Xmx512m -Xms512m

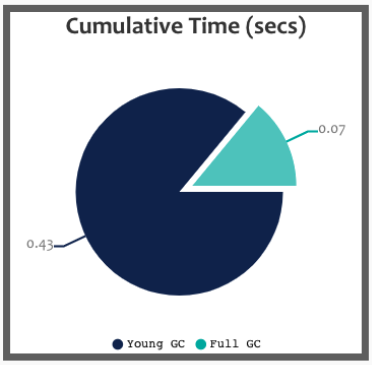



| | Young GC | Concurrent Abortable Preclean | Full GC | Concurrent Preclean | Initial Mark | Concurrent Mark | Final Remark | Concurrent Sweep | Concurrent Reset |
|---|---|---|---|---|---|---|---|---|---|
| Total Time | 400 ms | 240 ms | 140 ms | 10.0 ms | 10.0 ms | 10.0 ms | 0 | 0 | 0 |
| Avg Time | 26.7 ms | 40.0 ms | 46.7 ms | 1.67 ms | 1.67 ms | 1.67 ms | 0 | 0 | 0 |
| Std Dev Time | 17.4 ms | 60.8 ms | 4.71 ms | 3.73 ms | 3.73 ms | 3.73 ms | 0 | 0 | 0 |
| Min Time | 0 | 0 | 40.0 ms | 0 | 0 | 0 | 0 | 0 | 0 |
| Max Time | 60.0 ms | 170 ms | 50.0 ms | 10.0 ms | 10.0 ms | 10.0 ms | 0 | 0 | 0 |
| Interval Time | 63.0 ms | 94.0 ms | 159 ms | 128 ms | 129 ms | 129 ms | 132 ms | 132 ms | 132 ms |

-Xmx1g -Xms1g

## CMS Collection Phases Statistics

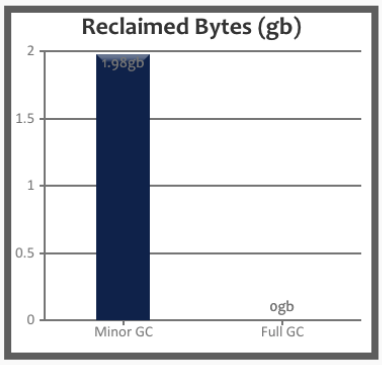


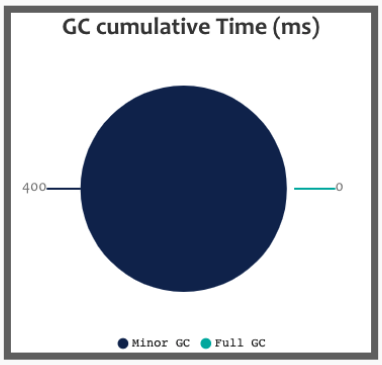



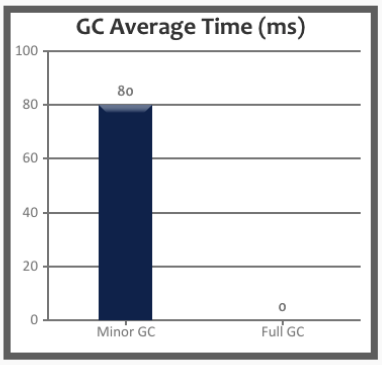

| | Young GC | Full GC |
|---|---|---|
| Total Time | 430 ms | 70.0 ms |
| Avg Time | 47.8 ms | 70.0 ms |
| Std Dev Time | 7.86 ms | 0 |
| Min Time | 30.0 ms | 70.0 ms |
| Max Time | 60.0 ms | 70.0 ms |
| Interval Time | 93.0 ms | n/a |
| Count | 9 | 1 |

-Xmx2g -Xms2g

## GC Statistics




### Total GC stats

| | |
|---|---|
| Total GC count | 5 |
| Total reclaimed bytes | n/a |
| Total GC time | 400 ms |
| Avg GC time | 80.0 ms |
| GC avg time std dev | 14.1 ms |
| GC min/max time | 60.0 ms / 100 ms |
| GC Interval avg time | 166 ms |

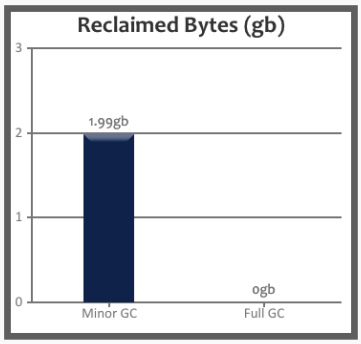
### Minor GC stats

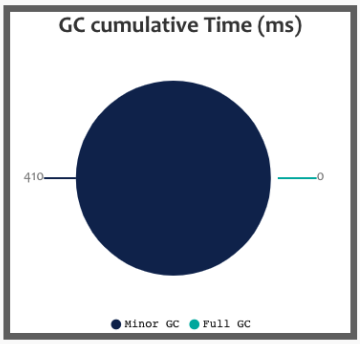
| | |
|---|---|
| Minor GC count | 5 |
| Minor GC reclaimed | 1.98 gb |
| Minor GC total time | 400 ms |
| Minor GC avg time | 80.0 ms |
| Minor GC avg time std dev | 14.1 ms |
| Minor GC min/max time | 60.0 ms / 100 ms |
| Minor GC Interval avg | 166 ms |

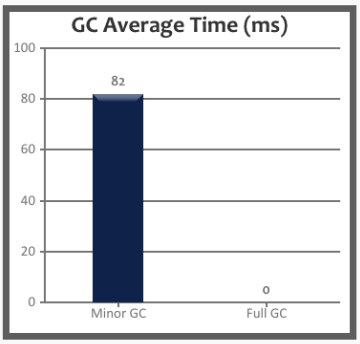
### Full GC stats

| | |
|---|---|
| Full GC Count | 0 |
| Full GC reclaimed | n/a |
| Full GC total time | n/a |
| Full GC avg time | n/a |
| Full GC avg time std dev | n/a |
| Full GC min/max time | n/a |
| Full GC Interval avg | n/a |

-Xmx4g -Xms4g




Total GC stats

| | |
|---|---|
| Total GC count | 5 |
| Total reclaimed bytes | n/a |
| Total GC time | 410 ms |
| Avg GC time | 82.0 ms |
| GC avg time std dev | 9.80 ms |
| GC min/max time | 70.0 ms / 90.0 ms |
| GC Interval avg time | 169 ms |

Minor GC stats

| | |
|---|---|
| Minor GC count | 5 |
| Minor GC reclaimed | 1.99 gb |
| Minor GC total time | 410 ms |
| Minor GC avg time | 82.0 ms |
| Minor GC avg time std dev | 9.80 ms |
| Minor GC min/max time | 70.0 ms / 90.0 ms |
| Minor GC Interval avg | 169 ms |

Full GC stats

| | |
|---|---|
| Full GC Count | 0 |
| Full GC reclaimed | n/a |
| Full GC total time | n/a |
| Full GC avg time | n/a |
| Full GC avg time std dev | n/a |
| Full GC min/max time | n/a |
| Full GC Interval avg | n/a |

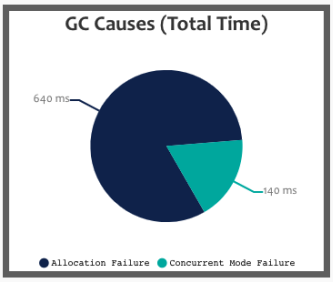
## 4) GC 原因

-Xmx512m -Xms512m

### GC Causes

(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| Allocation Failure | 18 | 35.6 ms | 170 ms | 640 ms |
| Concurrent Mode Failure | 3 | 46.7 ms | 50.0 ms | 140 ms |

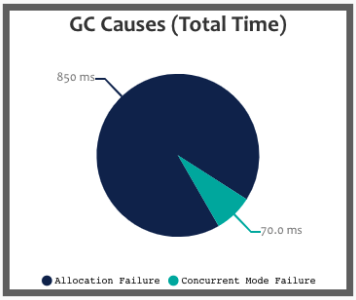



-Xmx1g -Xms1g

### GC Causes

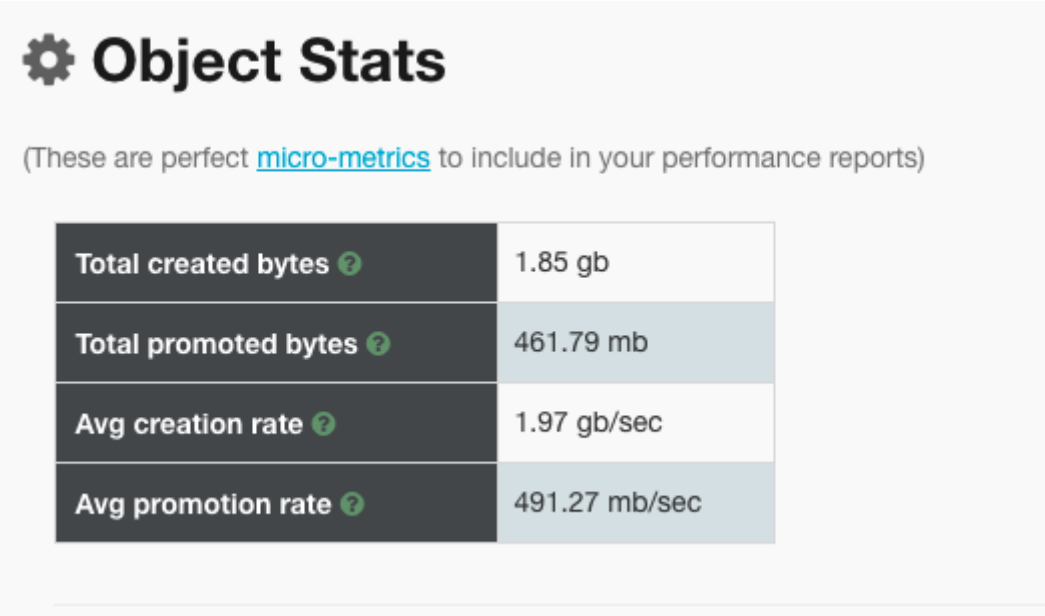
(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| Allocation Failure | 10 | 85.0 ms | 420 ms | 850 ms |
| Concurrent Mode Failure | 1 | 70.0 ms | 70.0 ms | 70.0 ms |

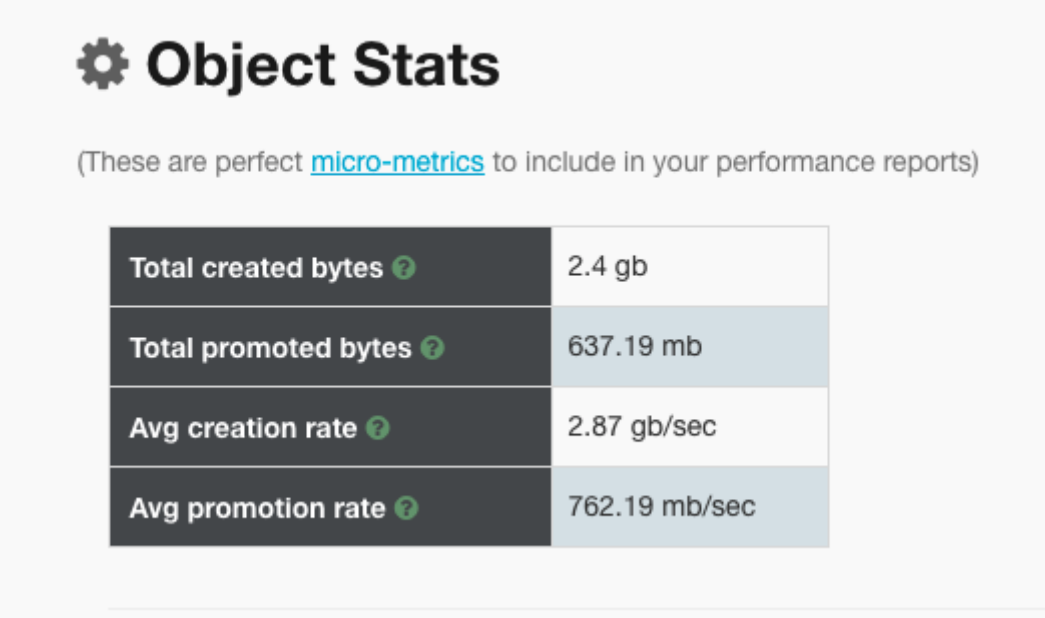


5）内存分配速度

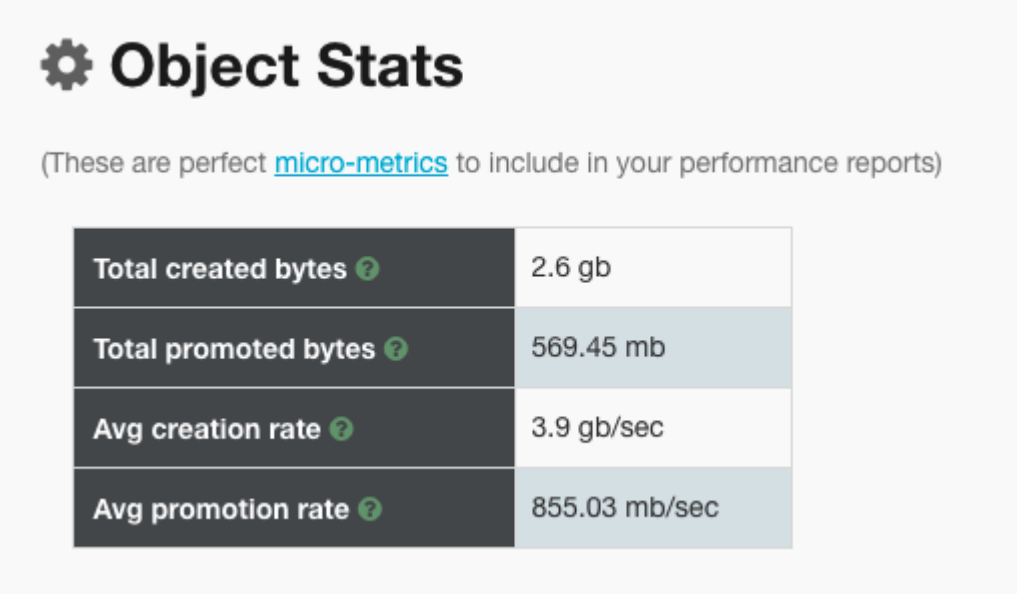
-Xmx512m -Xms512m



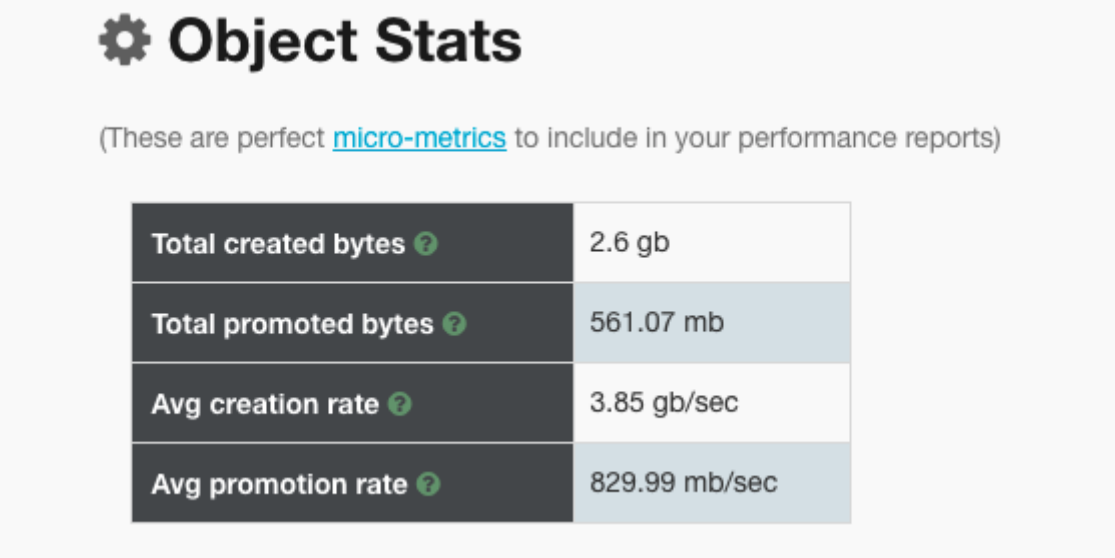

-Xmx1g -Xms1g




-Xmx2g -Xms2g




-Xmx4g -Xms4g




2g 时，创建对象平均率最高，说明内存分配速度更快，平均提升率也更快，young 区晋升至 old 区更快。

5. G1 GC 分析

1）GC 暂停时间

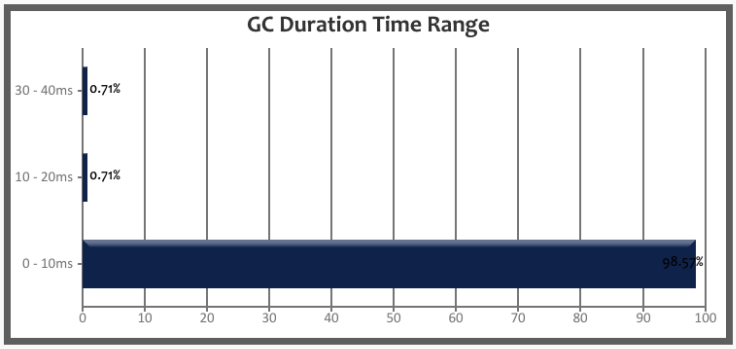
1 Throughput : 67.078%

2 Latency:

| Avg Pause GC Time | 2.29 ms |
|---|---|
| Max Pause GC Time | 40.0 ms |

GC Pause Duration Time Range:

| Duration (ms) 10 ms Change | No. of GCs | Percentage |
|---|---|---|
| 0 - 10 | 138 | 98.57% |
| 10 - 20 | 1 | 0.71% |
| 30 - 40 | 1 | 0.71% |




-Xmx512m -Xms512m 时，GC 暂停时间最优，平均 GC 暂停时间为 2.29ms，最长 GC 暂停时间为 40ms。0-10 时间段内占比较高。

## Key Performance Indicators

(Important section of the report. To learn more about KPIs, click here)

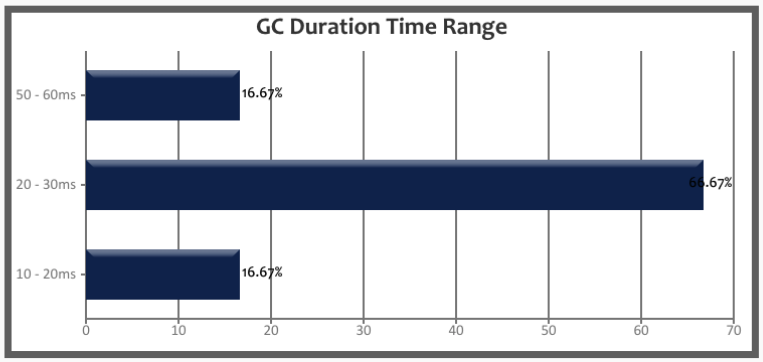
1 Throughput : 50.521%

2 Latency:

| Avg Pause GC Time | 31.7 ms |
|---|---|
| Max Pause GC Time | 50.0 ms |

GC Pause Duration Time Range:

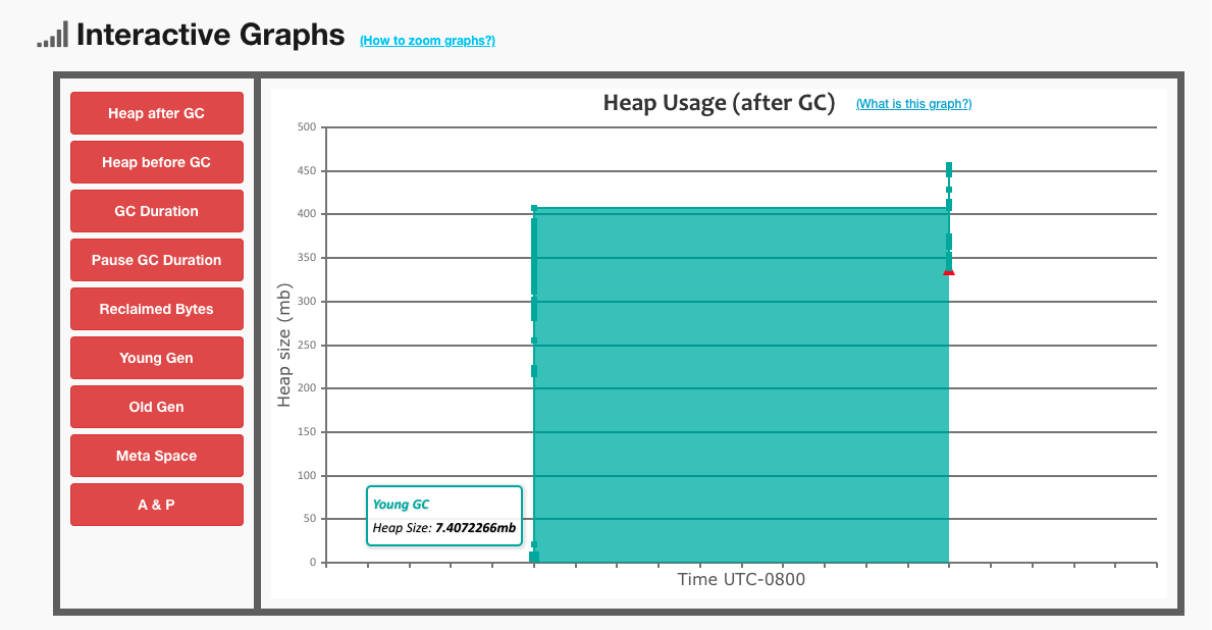
| Duration (ms) 10 ms Change | No. of GCs | Percentage |
|---|---|---|
| 10 - 20 | 2 | 16.67% |
| 20 - 30 | 8 | 66.67% |
| 50 - 60 | 2 | 16.67% |



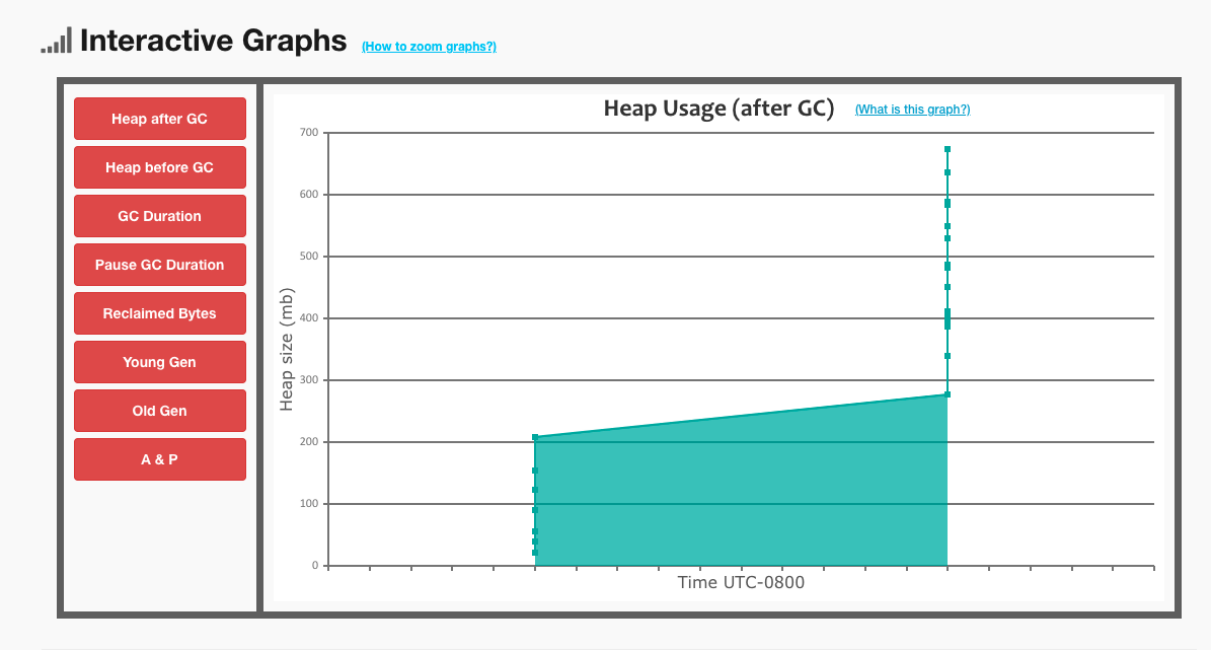

-Xmx4g -Xms4g 时，GC 暂停时间最长，平均 GC 暂停时间为 31.7ms，最长 GC 暂停时间为 50ms。20-30 时间段，占比较高。

2）堆内存使用情况

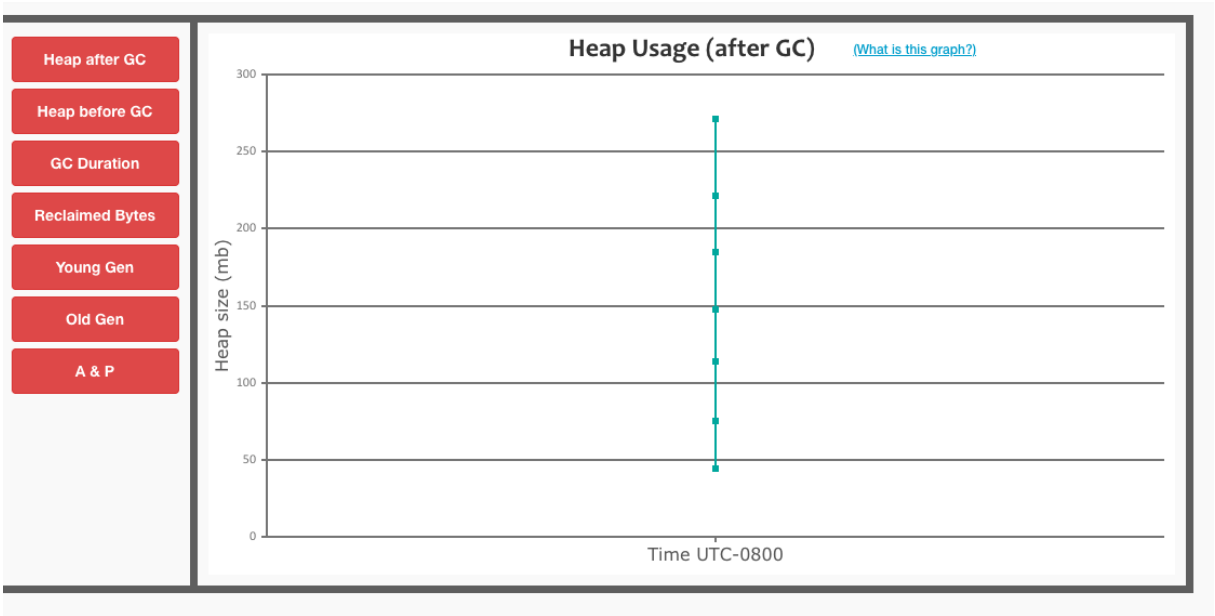
-Xmx512m -Xms512m



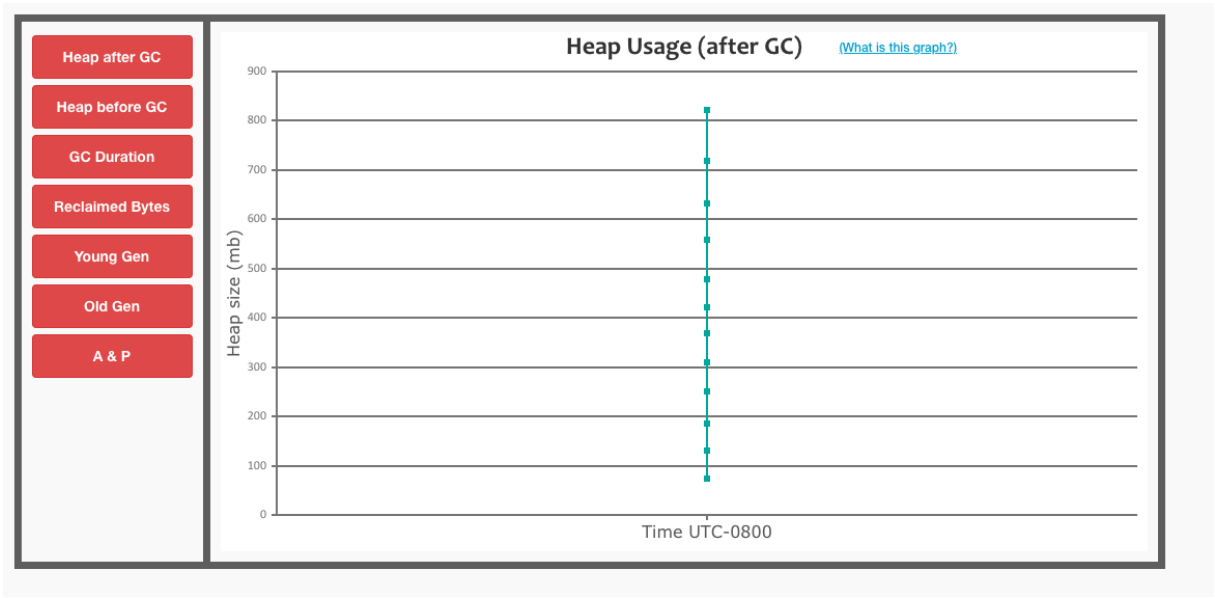

-Xmx1g -Xms1g




-Xmx2g -Xms2g



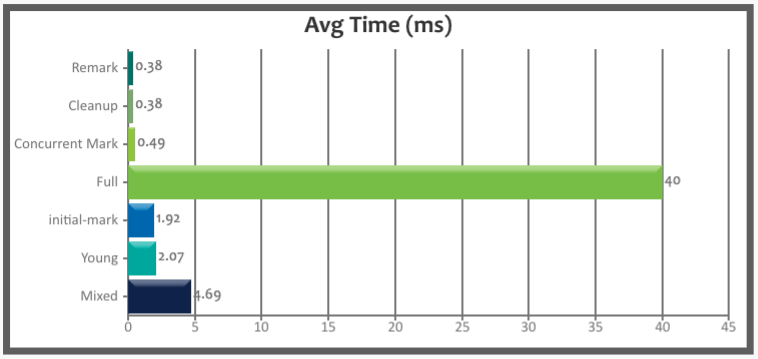

-Xmx4g -Xms4g

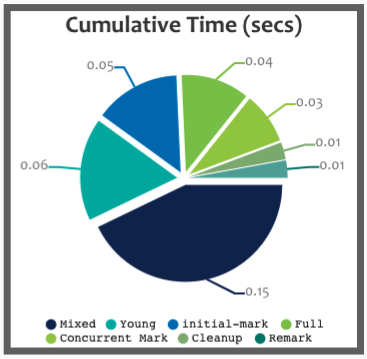



3) GC 情况统计

-Xmx512m -Xms512m

(One G1 GC event has multiple phases. This section provides detailed statistics of each G1 phases.)

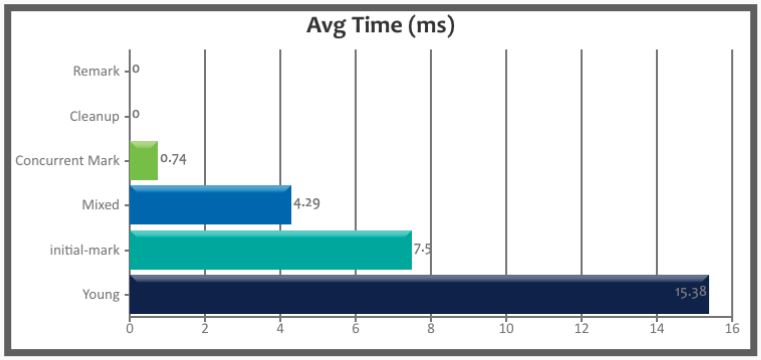


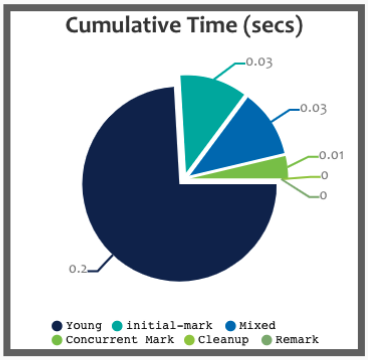




| | Mixed | Young | initial-mark | Full | Concurrent Mark | Cleanup | Remark | Total |
|---|---|---|---|---|---|---|---|---|
| Count | 32 | 29 | 26 | 1 | 52 | 26 | 26 | 192 |
| Total GC Time | 150 ms | 60.0 ms | 50.0 ms | 40.0 ms | 25.2 ms | 10.0 ms | 10.0 ms | 345 ms |
| Avg GC Time | 4.69 ms | 2.07 ms | 1.92 ms | 40.0 ms | 0.485 ms | 0.385 ms | 0.385 ms | 1.80 ms |
| Avg Time std dev | 4.99 ms | 4.83 ms | 3.94 ms | 0 | 0.503 ms | 1.92 ms | 1.92 ms | 4.57 ms |
| Min/Max Time | 0 / 10.0 ms | 0 / 20.0 ms | 0 / 10.0 ms | 0 / 40.0 ms | 0 / 1.88 ms | 0 / 10.0 ms | 0 / 10.0 ms | 0 / 40.0 ms |
| Avg Interval Time | 22.0 ms | 34.0 ms | 28.0 ms | n/a | 14.0 ms | 28.0 ms | 28.0 ms | 24.0 ms |

## -Xmx1g -Xms1g

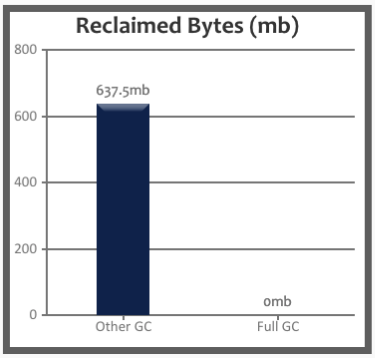
(One G1 GC event has multiple phases. This section provides detailed statistics of each G1 phases.)

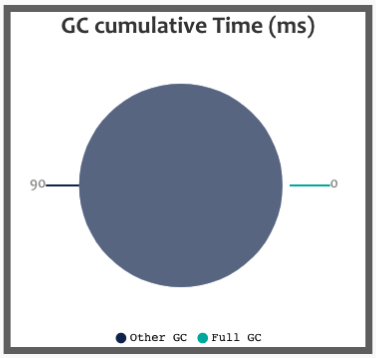


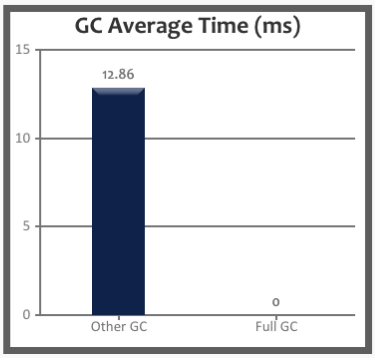




| | Young | initial-mark | Mixed | Concurrent Mark | Cleanup | Remark | Total |
|---|---|---|---|---|---|---|---|
| Count | 13 | 4 | 7 | 8 | 4 | 4 | 40 |
| Total GC Time | 200 ms | 30.0 ms | 30.0 ms | 5.93 ms | 0 | 0 | 266 ms |
| Avg GC Time | 15.4 ms | 7.50 ms | 4.29 ms | 0.741 ms | 0 | 0 | 6.65 ms |
| Avg Time std dev | 10.8 ms | 13.0 ms | 4.95 ms | 0.868 ms | 0 | 0 | 10.1 ms |
| Min/Max Time | 0 / 40.0 ms | 0 / 30.0 ms | 0 / 10.0 ms | 0 / 2.58 ms | 0 / 0 | 0 / 0 | 0 / 40.0 ms |
| Avg Interval Time | 75.0 ms | 132 ms | 63.0 ms | 53.0 ms | 124 ms | 124 ms | 82.0 ms |

## -Xmx2g -Xms2g




Total GC stats

| | |
|---|---|
| Total GC count | 7 |
| Total reclaimed bytes | n/a |
| Total GC time | 90.0 ms |
| Avg GC time | 12.9 ms |
| GC avg time std dev | 4.52 ms |
| GC min/max time | 10.0 ms / 20.0 ms |
| GC Interval avg time | 42.0 ms |

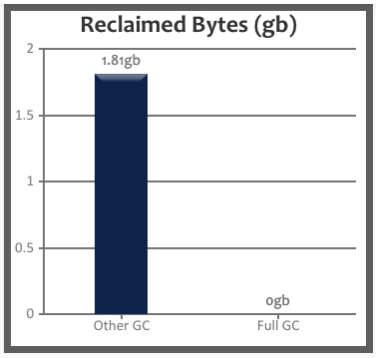
Other GC stats

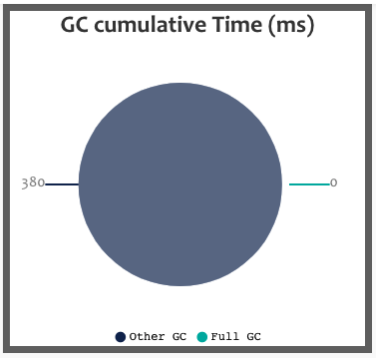
| | |
|---|---|
| Other GC count | 7 |
| Other GC reclaimed | 637.5 mb |
| Other GC total time | 90.0 ms |
| Other GC avg time | 12.9 ms |
| Other GC avg time std dev | 4.52 ms |
| Other GC min/max time | 10.0 ms / 20.0 ms |
| Other GC Interval avg | 42.0 ms |

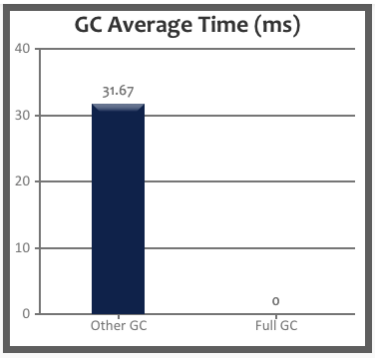
Full GC stats

| | |
|---|---|
| Full GC Count | 0 |
| Full GC reclaimed | n/a |
| Full GC total time | n/a |
| Full GC avg time | n/a |
| Full GC avg time std dev | n/a |
| Full GC min/max time | n/a |
| Full GC Interval avg | n/a |

-Xmx4g -Xms4g




Total GC stats

| | |
|---|---|
| Total GC count | 12 |
| Total reclaimed bytes | n/a |
| Total GC time | 380 ms |
| Avg GC time | 31.7 ms |
| GC avg time std dev | 8.98 ms |
| GC min/max time | 20.0 ms / 50.0 ms |
| GC Interval avg time | 69.0 ms |

Other GC stats

| | |
|---|---|
| Other GC count | 12 |
| Other GC reclaimed | 1.81 gb |
| Other GC total time | 380 ms |
| Other GC avg time | 31.7 ms |
| Other GC avg time std dev | 8.98 ms |
| Other GC min/max time | 20.0 ms / 50.0 ms |
| Other GC Interval avg | 69.0 ms |

Full GC stats

| | |
|---|---|
| Full GC Count | 0 |
| Full GC reclaimed | n/a |
| Full GC total time | n/a |
| Full GC avg time | n/a |
| Full GC avg time std dev | n/a |
| Full GC min/max time | n/a |
| Full GC Interval avg | n/a |

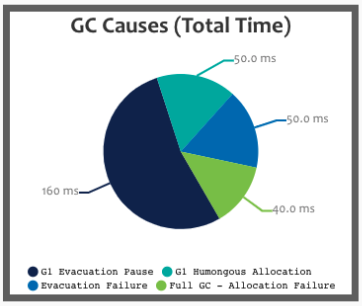
4) GC 原因

-Xmx512m -Xms512m

## GC Causes

(What events caused GCs & how much time they consumed?)

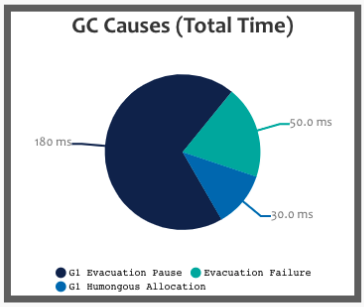
| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| G1 Evacuation Pause | 53 | 3.02 ms | 10.0 ms | 160 ms |
| G1 Humongous Allocation | 26 | 1.92 ms | 10.0 ms | 50.0 ms |
| Evacuation Failure | 8 | 6.25 ms | 20.0 ms | 50.0 ms |
| Full GC - Allocation Failure | 1 | 40.0 ms | 40.0 ms | 40.0 ms |




-Xmx1g -Xms1g

(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| G1 Evacuation Pause | 18 | 10.0 ms | 30.0 ms | 180 ms |
| Evacuation Failure | 2 | 25.0 ms | 40.0 ms | 50.0 ms |
| G1 Humongous Allocation | 4 | 7.50 ms | 30.0 ms | 30.0 ms |

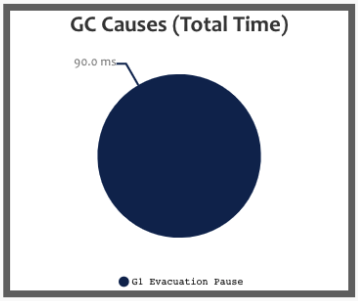



-Xmx2g -Xms2g

## GC Causes

(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| G1 Evacuation Pause | 7 | 12.9 ms | 20.0 ms | 90.0 ms |

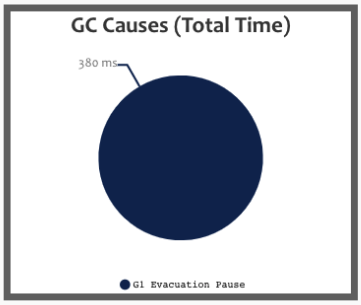



-Xmx4g -Xms4g

## GC Causes

(What events caused GCs & how much time they consumed?)

| Cause | Count | Avg Time | Max Time | Total Time |
|---|---|---|---|---|
| G1 Evacuation Pause | 12 | 31.7 ms | 50.0 ms | 380 ms |




5）内存分配速度

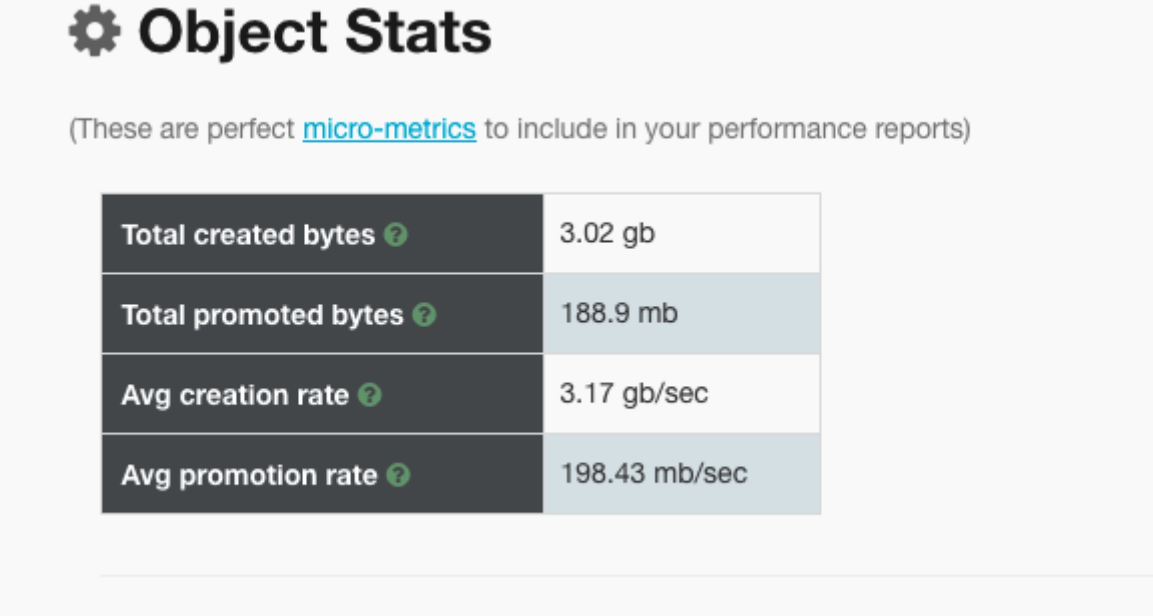
-Xmx512m -Xms512m

## Object Stats

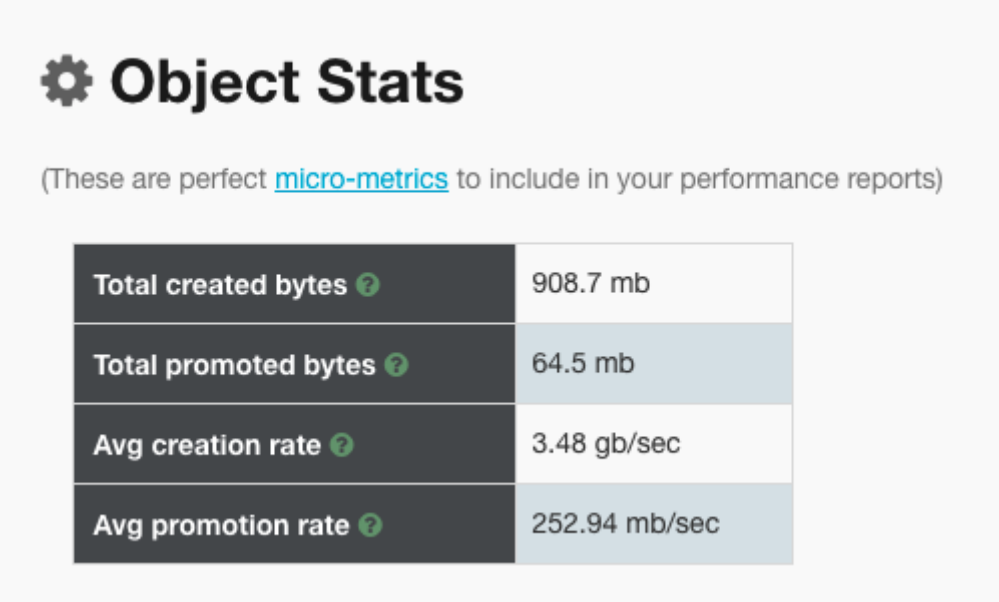
(These are perfect micro-metrics to include in your performance reports)

| | |
|---|---|
| Total created bytes | 2.81 gb |
| Total promoted bytes | 411.1 mb |
| Avg creation rate | 2.89 gb/sec |
| Avg promotion rate | 422.94 mb/sec |

-Xmx1g -Xms1g




-Xmx2g -Xms2g




-Xmx4g -Xms4g

# Object Stats

(These are perfect micro-metrics to include in your performance reports)

| | |
|---|---|
| Total created bytes | 2.62 gb |
| Total promoted bytes | 769.7 mb |
| Avg creation rate | 3.41 gb/sec |
| Avg promotion rate | 1,002.21 mb/sec |