

**PERFORMANCE**

**TEST REPORT**

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# 1. Executive Summary

## 1.1 Purpose of the Document

This is a detailed document explaining the API system, a sample of requests and expected responses, etc. created for **Restful Booker** web app. It includes the response time for different API relating to its feature.

## 1.2 Identification

|  |  |
| --- | --- |
| Version | 1.0.0 |
| Release Date | 22/03/2024 |
| Tool Used | JMeter |
| Prepared by | Department of Quality Assurance, Spiralogics Inc. |

# 2. Introduction

## 2.1 What is Performance Testing?

Performance testing is performed to determine a system's behavior under both normal and anticipated peak load conditions. It helps to identify the maximum operating capacity of an application as well as any bottlenecks and determine which element is causing degradation.

There are different tools for performing load testing of any web-based application. We have used Apache JMeter for the **Restful Booker** application.

## 2.2 About Apache JMeter

Apache JMeter is an open-source application tool designed to load test functional behavior and measure performance on static pages, dynamic resources, and web applications.

## 2.3 Some Special Terminology on JMeter

**2.3.1 Thread Group (User)**

It is the Numbers of users that will be used to create or run the test.

**2.3.2 Ramp up Period (in seconds)**

Amount of time JMeter should take to get all the threads sent for the execution

Example: if Thread Count is 10 and the ramp-up period is 100 seconds, then JMeter will take 100 seconds to get all 10 Threads up and running. The first thread will be sent on 0th second (beginning of the execution) and then each thread will start after 10 seconds i.e. (100/10).

**2.3.3 Listeners**

It is a component that shows the results of the samples. The results can be shown in a tree, tables, graphs or simply written to a log file.

During our Test, we have used "Summary Report" Listeners to show the load Test Result.

**2.3.4 Aggregate Report Listeners**

Some terms used in the "Aggregate Report" Listeners during our test are:

**2.3.4.1 Maximum**

The longest time taken by a sample for a specific label.

**2.3.4.2 Minimum**

The shortest time taken by a sample for a specific label.

**2.3.4.3 Average**

It is the average time taken by all the samples to execute a specific Module.

**2.3.4.4 Error%**

Percentage of Failed requests per Module and Per Request.

**2.3.5 Application Performance Index (Apdex)**

Application Performance Index (Apdex) is an open standard developed by the Apdex alliance to measure application performance. The application response time is converted into user satisfaction with application performance. The Apdex value ranges from 0 to 1.

**2.3.6 Apdex Threshold**

An Apdex threshold in the optimal threshold for the application response time. Based on the Apdex threshold and actual application response time, there are following three kinds of performance:

**2.3.6.1 Satisfied**

Performance of the application is satisfied if the actual application response time is less than or equal to the Apdex threshold. For example, if the Apdex threshold is 1.5 seconds and the response time is 1 second, the result Is satisfied.

**2.3.6.2 Tolerating**

Performance of the application is tolerating if the actual application response time is greater than the Apdex threshold, but less than or equal to 4 times of the Apdex threshold. For example, if the Apdex threshold is 1 seconds, the tolerable upper threshold for the application response time is 4 seconds.

**2.3.6.3 Frustrated**

Performance of the application is frustrated if the actual application response time is greater than 4 times of the Apdex threshold.

# 3. Load Test Specifications

The load test is carried out under following specifications:

|  |  |
| --- | --- |
| CPU Capacity | AMD Ryzen 7 5800H @ 3.20 GHz |
| RAM | 16 GB |
| Operating System | Windows Operating System |
| Test Environment | Restful Booker Server |
| Duration of Performance Test Run (hh:mm:ss) | 03:00:00 |
| Network Bandwidth | 50 Mbps |
| Start Time of Execution (GMT) | 22 March 2024 01:02:23 |
| End Time of Execution (GMT) | 22 March 2024 04:02:23 |

# 4. Load Test Results

## 4.1 Load Test on Modules

The load test is performed for the modules listed below. All the test is performed with the ramp-up period of 5 seconds where the number of users varies from 50 to 1000.

**API 1: GET https://restful-booker.herokuapp.com/booking**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Thread group**  **(Users)** | **Ramp-up period**  **(Sec)** | **Maximum Time (ms)** | **Minimum Time (ms)** | **Average**  **(ms)** | **Error (%)** | **Error**  **Message** |
| 5 | 5 | 4259 | 1499 | 2628 | 0.00 | - |
| 10 | 5 | 2177 | 1595 | 1766 | 0.00 | - |
| 25 | 5 | 1382 | 1277 | 1308 | 0.00 | - |
| 50 | 5 | 1844 | 1591 | 1671 | 0.00 | - |
| 100 | 5 | 1831 | 1583 | 1628 | 0.00 | - |

**API 2: GET https://restful-booker.herokuapp.com/id**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Thread group**  **(Users)** | **Ramp-up period**  **(Sec)** | **Maximum Time (ms)** | **Minimum Time (ms)** | **Average**  **(ms)** | **Error (%)** | **Error**  **Message** |
| 5 | 5 | 1658 | 1374 | 1577 | 100 | Error Code: 418 |
| 10 | 5 | 1666 | 1295 | 1421 | 100 | Error Code: 418 |
| 25 | 5 | 1814 | 1267 | 1362 | 100 | Error Code: 418 |
| 50 | 5 | 1626 | 1267 | 1323 | 100 | Error Code: 418 |
| 100 | 5 | 1463 | 1264 | 1304 | 100 | Error Code: 418 |

**API 3: POST https://restful-booker.herokuapp.com/auth**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Thread group**  **(Users)** | **Ramp-up period**  **(Sec)** | **Maximum Time (ms)** | **Minimum Time (ms)** | **Average**  **(ms)** | **Error (%)** | **Error**  **Message** |
| 5 | 5 | 1798 | 1372 | 1608 | 0.00 | - |
| 10 | 5 | 1743 | 1272 | 1458 | 0.00 | - |
| 25 | 5 | 1738 | 1268 | 1351 | 0.00 | - |
| 50 | 5 | 1643 | 1264 | 1330 | 0.00 | - |
| 100 | 5 | 1448 | 1266 | 1303 | 0.00 | - |

**API 4: POST** [**https://restful-booker.herokuapp.com/booking**](https://restful-booker.herokuapp.com/booking) **using csv dataset config**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Thread group**  **(Users)** | **Ramp-up period**  **(Sec)** | **Maximum Time (ms)** | **Minimum Time (ms)** | **Average**  **(ms)** | **Error (%)** | **Error**  **Message** |
| 5 | 5 | 1825 | 1375 | 1607 | 100 | Error Code: 418 |
| 10 | 5 | 1640 | 1266 | 1375 | 100 | Error Code: 418 |
| 25 | 5 | 1570 | 1266 | 1393 | 100 | Error Code: 418 |
| 50 | 5 | 1479 | 1237 | 1275 | 100 | Error Code: 418 |
| 100 | 5 | 1447 | 1266 | 1310 | 100 | Error Code: 418 |

**API 5: PUT https://restful-booker.herokuapp.com/booking/id**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Thread group**  **(Users)** | **Ramp-up period**  **(Sec)** | **Maximum Time (ms)** | **Minimum Time (ms)** | **Average**  **(ms)** | **Error (%)** | **Error**  **Message** |
| 5 | 5 | 1873 | 1317 | 1619 | 100 | Error Code: 418 |
| 10 | 5 | 1401 | 1265 | 1292 | 100 | Error Code: 418 |
| 25 | 5 | 2203 | 1270 | 1344 | 100 | Error Code: 418 |
| 50 | 5 | 1417 | 1271 | 1294 | 100 | Error Code: 418 |
| 100 | 5 | 1421 | 1295 | 1326 | 100 | Error Code: 418 |

**API 6: PATCH https://restful-booker.herokuapp.com/booking/id**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Thread group**  **(Users)** | **Ramp-up period**  **(Sec)** | **Maximum Time (ms)** | **Minimum Time (ms)** | **Average**  **(ms)** | **Error (%)** | **Error**  **Message** |
| 5 | 5 | 1814 | 1332 | 1543 | 100 | Internal Server Error |
| 10 | 5 | 1674 | 1329 | 1457 | 100 | Internal Server Error |
| 25 | 5 | 1663 | 1312 | 1416 | 100 | Internal Server Error |
| 50 | 5 | 1561 | 1311 | 1347 | 100 | Internal Server Error |
| 100 | 5 | 1580 | 1310 | 1361 | 100 | Internal Server Error |

**API 7: DELETE https://restful-booker.herokuapp.com/booking/id**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Thread group**  **(Users)** | **Ramp-up period**  **(Sec)** | **Maximum Time (ms)** | **Minimum Time (ms)** | **Average**  **(ms)** | **Error (%)** | **Error**  **Message** |
| 5 | 5 | 1770 | 1585 | 1652 | 100 | Method Not Allowed |
| 10 | 5 | 1693 | 1327 | 1526 | 100 | Method Not Allowed |
| 25 | 5 | 1866 | 1317 | 1429 | 100 | Method Not Allowed |
| 50 | 5 | 1563 | 1309 | 1360 | 100 | Method Not Allowed |
| 100 | 5 | 1445 | 1294 | 1335 | 100 | Method Not Allowed |

## 4.2 Error Distribution

|  |  |  |  |
| --- | --- | --- | --- |
| **Module** | **Number of Users** | **Error** | **Error Message** |
| API 1 | 100 | 0 |  |
| API 2 | 100 | 100 | Error 418: ‘I am a teapot’ |
| API 3 | 100 | 0 |  |
| API 4 | 100 | 100 | Error 418: ‘I am a teapot’ |
| API 5 | 100 | 100 | Error 418: ‘I am a teapot’ |
| API 6 | 100 | 100 | Internal Server Error |
| API 7 | 100 | 100 | Method Not Allowed |

# 4.3 Application Performance Index for Restful Booker

Following is the Application Performance Index recorded for various thread groups and modules where toleration threshold was 1500ms and frustrated threshold was 2000ms:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Module**  **/Requests** | **Apdex (5 users)** | **Apdex (10 users)** | **Apdex ( 25 users)** | **Apdex (50 users)** | **Apdex (100 users)** | **Remarks** |
| API 1 | 0 | 0.5 | 1.0 | 0.5 | 0.5 | Satisfactory for 25 requests  Tolerating for 10,50,100 requests.  Frustrating for 5 requests. |
| API 2 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | Tolerating for 5 users.  Satisfactory for the rest. |
| API 3 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | Tolerating for 5 users.  Satisfactory for the rest. |
| API 4 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | Tolerating for 5 users.  Satisfactory for the rest. |
| API 5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | Tolerating for 5 users.  Satisfactory for the rest. |
| API 6 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | Tolerating for 5 users.  Satisfactory for the rest. |
| API 7 | 0.5 | 0.5 | 1.0 | 1.0 | 1.0 | Tolerating for 5 & 10 users.  Satisfactory for the rest. |

# 4. Conclusion

Following are the conclusion after the performance test under the above-mentioned scenarios:

* For each module there was a steady rise in loading time when the count of thread/ user is increased and allocated ramp-up time is 5 sec.
* Error is thrown while performing load test on APIs 2, 4, 5, 6, 7 with error percent 100%.