

2.0 Apache Jmeter

Apache JMeter is an open-source software tool designed for load testing, performance testing, and functional testing of web applications. Developed by the Apache Software Foundation, JMeter allows users to simulate heavy loads on servers, networks, or objects to assess their performance under various conditions.

2.1 Features Selected for Testing

1. Login
2. Dashboard
3. Admin Control Panel
4. Add Employee
5. Time Management
6. Punch
7. Post
8. Pay Grade
9. Directory
10. Profile setting
11. Maintenance
12. Subordinate Control
13. Recruitment
14. Attendance Management
15. Notification
16. Application Tracking
17. Performance Tracking

2.2 Git-Hub Link

- <https://github.com/Farnas-Utsho/Jmeter>

2.3 Test Result Analysis

Serial No	Request	Expected Load	Max Response Time	Min Throughput	Max Jitter (millisec)	Min Bandwidth
1	Admin Login	500 - 1500	112923	9.9/sec	34859.5	12.72 kb/sec
2	Admin Functionality	500 - 1500	118567	17.23/sec	45896.8	15.83kb/sec
4	Add Employee	500 - 1500	116565	14.57/sec	44986.2	16.54 kb/sec
3	Punch In	500 - 1500	115983	18.2/sec	23568.5	10.6 kb/sec
4	Directory	500 - 1500	162321	24.9/sec	38043.3	23.09 kb/sec
5	Adding paygrade	500 - 1500	135578	19.5/sec	44569.8	9.6 jlb/sec
6	Create Timesheet	500 - 1500	154789	13.5/sec	390897.2	14.6kb/sec

2.4 Total 5 Test Suites, 20 Test Cases

1. Admin Login
2. Time Management
3. Directory
4. Admin Functionality
5. Add Employee

2.5 Test Performed in Test Suite

1. **Load Test:** Checks performance under expected loads.
2. **Stress Test:** Pushes the system to its limits to identify failure points.
3. **Spike Test:** Assesses performance during sudden load spikes.
4. **Concurrency test:** A testing technique to detect the defects in an application when multiple users are logged in.

2.6 Test Suite 1: Admin login.

- **Test Case 1:** Load Testing for Employee List

Test Scenario: Evaluate system behavior under increasing load for the Admin log-in.

Precondition :

Landing on the OrangeHRM landing page

Using a valid username and password

Logged into the OrangeHRM system.

After doing 1 or 2 activities

Test Steps:

Gradually increase the number of users accessing the employee list from 500 to 1500.

Measure the system response time for each increment.

Expected Results:

The system should maintain stable response times under increasing user loads.

Monitor the list response times for any anomalies or degradation.

- **Test Case 2:** Stress Testing for Employee List

Test Scenario: Apply sudden and extreme load to the admin logging.

Preconditions:

Landing on the OrangeHRM landing page

Using a valid username and password

Logged into the OrangeHRM system.

After doing 1 or 2 activities

Test Steps:

Simulate a 10000user increase in user load on the admin log-in and go for 80000 users.

Monitor system behavior, response times, and any errors.

Expected Results:

The system should handle the sudden load without crashing or significant performance degradation. Evaluate system stability during and after the stress test.

- **Test Case 3:** Spike Testing for Admin Login

Test Scenario: Simulate sudden spikes in admin log-in.

Preconditions:

Landing on the OrangeHRM landing page

Using a valid username and password

Logged into the OrangeHRM system.

After doing 1 or 2 activities

Test Steps:

Initiate rapid and significant user actions on the admin login page. Start with 5000 users then gradually decrease Monitor system performance and responsiveness.

Expected Results:

The system should handle sudden spikes without critical failures or data inconsistencies. Assess system recovery time after the spike.

● **Test Case 4:** Concurrency Testing for Admin Log-in

Test Scenario: Evaluate system stability under sustained load for the employee list.

Preconditions:

Landing on the OrangeHRM landing page

Using a valid username and password

Logged into the OrangeHRM system.

Logged into the OrangeHRM system

Test Steps:

Maintain a consistent user load on the employee list for an extended duration.

Monitor system performance, memory usage, and any potential degradation.

Expected Results:

The system should maintain stable response times and functionalities without significant memory leaks or performance degradation over time.

2.7 Test Suite 2: Time management

- **Test Case 1:** Load Testing for Time Management.

Test Scenario: Evaluate system behavior under increasing load for the Employee Reviews.

Preconditions:

Logged into the OrangeHRM system.

Access to the "Time Management".

Test Steps:

Gradually increase the number of users accessing the Employee Reviews from 500 to 1500. Measure the system response time for each increment.

Expected Results:

The system should maintain stable response times under increasing user loads. Monitor the list response times for any anomalies or degradation.

- **Test Case 3:** Stress Testing for Time Management.

Test Scenario: Apply sudden and extreme load to the Employee Reviews.

Preconditions:

Logged into the OrangeHRM system.

Access to the "Time Management".

Test Steps:

Simulate a 10000user increase in user load on the admin log-in and go for 80000 users.

Monitor system behavior, response times, and any errors.

Expected Results:

The system should handle the sudden load without crashing or significant performance degradation.

Evaluate system stability during and after the stress test.

- **Test Case 3:** Spike Testing for Time Management.

Test Scenario: Simulate sudden spikes in Employee Reviews usage.

Preconditions:

Logged into the OrangeHRM system.

Access to the "Time Management".

Test Steps:

Initiate rapid and significant user actions on the Time management.

Monitor system performance and responsiveness.

Expected Results: The system should handle sudden spikes without critical failures or data inconsistencies.

Assess system recovery time after the spike.

- **Test Case 4:** Concurrency Testing for Time Management.

Test Scenario: Evaluate system stability under sustained load for the Time management.

Preconditions:

Logged into the OrangeHRM system.

Access to the "Time Management" module.

Test Steps:

Maintain a consistent user load on the Time management.

Monitor system performance, memory usage, and any potential degradation.

Expected Results:

The system should maintain stable response times and functionalities without significant memory leaks or performance degradation over time.

2.8 Test Suite 3: Directory

- **Test Case 1:** Load Testing for Directory

Test Scenario: Evaluate system behavior under increasing load for the dashboard.

Preconditions:

Logged into the OrangeHRM system.

Access to the "Directory".

Search one or two employee

Test Steps:

Gradually increase the number of users accessing the Directory from 500 to 1500.

Measure the system response time for each increment.

Expected Results:

The system should maintain stable response times under increasing user loads.

Monitor the list response times for any anomalies or degradation.

- **Test Case 2:** Stress Testing for Directory

Test Scenario: Apply sudden and extreme load to the Directory.

Preconditions:

Logged into the OrangeHRM system.

Access to the "Directory".

Search one or two employee

Test Steps:

Simulate a sudden increase in user load from(10000 - 80000) on the Directory.

Monitor system behavior, response times, and any errors.

Expected Results:

The system should handle the sudden load without crashing or significant performance degradation.

Evaluate system stability during and after the stress test.

- **Test Case 3:** Spike Testing for Dashboard

Test Scenario: Simulate sudden spikes in Dashboard usage.

Preconditions:

Logged into the OrangeHRM system.

Access to the "Directory".

Search one or two employee

Test Steps:

Initiate rapid and significant user actions on the Directory.

Monitor system performance and responsiveness.

Expected Results:

The system should handle sudden spikes without critical failures or data inconsistencies.

Assess system recovery time after the spike.

- **Test Case 4:** Testing concurrency for Directory

Test Scenario: Evaluate system stability under sustained load for the Directory.

Preconditions:

Logged into the OrangeHRM system.

Access to the "Directory".

Search one or two employee

Test Steps:

Maintain a consistent user load on the Directory.

Monitor system performance, memory usage, and any potential degradation.

Expected Results:

The system should maintain stable response times and functionalities without significant memory leaks or performance degradation over time.

2.9 Test Suite 4: Admin Functionality

- **Test Case 1:** Load Testing for Admin

Test Scenario: Evaluate system behavior under increasing load for the Admin.

Preconditions:

Logged into the OrangeHRM system.

The system is operational and accessible.

Log into the Maintenance section

Test Steps:

Gradually increase the number of users accessing the Admin from 50 to 700.

Measure the system response time for each increment.

Expected Results:

The system should maintain stable response times under increasing user loads.

Monitor the list response times for any anomalies or degradation.

- **Test Case 2:** Stress Testing for Admin

Test Scenario: Apply sudden and extreme load to the Admin.

Preconditions:

Logged into the OrangeHRM system.

The system is operational and accessible.

Log into the Maintenance section

Test Steps:

Simulate a sudden 300% increase in user load on the Admin.

Monitor system behavior, response times, and any errors.

Expected Results:

The system should handle the sudden load without crashing or significant performance degradation.

Evaluate system stability during and after the stress test.

- **Test Case 3:** Spike Testing for Admin

Test Scenario: Simulate sudden spikes in Admin usage.

Preconditions:

Logged into the OrangeHRM system.

The system is operational and accessible.

Log into the Maintenance section

Test Steps:

Initiate rapid and significant user actions (e.g., filtering, sorting) on the Admin.

Monitor system performance and responsiveness.

Expected Results:

The system should handle sudden spikes without critical failures or data inconsistencies.

Assess system recovery time after the spike.

- **Test Case 4:** Concurrency Testing for Admin

Test Scenario: Evaluate system stability under sustained load for the Admin.

Preconditions:

Logged into the OrangeHRM system.

The system is operational and accessible.

Log into the Maintenance section

Test Steps: Maintain a consistent user load on the Admin Maintenance for an extended duration.

Monitor system performance, memory usage, and any potential degradation.

Expected Results:

The system should maintain stable response times and functionalities without significant memory leaks or performance degradation over time.

3.0 Test Suite 5: Add Employee

- **Test Case 1:** Load Testing for Add Employee

Test Scenario: Evaluate system behavior under increasing load for the Add Employee.

Preconditions:

Logged into the OrangeHRM system.

Access to the "Add Employee".

Test Steps:

Gradually increase the number of users accessing the Add Employee from 500 to 1500.

Measure the system response time for each increment.

Expected Results:

The system should maintain stable response times under increasing user loads.

Monitor the list response times for any anomalies or degradation.

- **Test Case 2:** Stress Testing for Add Employee

Test Scenario: Apply sudden and extreme load to the Add Employee.

Preconditions:

Logged into the OrangeHRM system.

Direct access to the "Add Employee".

Add one or two employee

Test Steps:

Simulate the increase in user load on the Add Employee (10000 - 80000).

Monitor system behavior, response times, and any errors.

Expected Results:

The system should handle the sudden load without crashing or significant performance degradation.

Evaluate system stability during and after the stress test.

- **Test Case 3:** Spike Testing for Add Employee

Test Scenario: Simulate sudden spikes in Add Employee usage.

Preconditions:

Logged into the OrangeHRM system.

Access to the "Add Employee".

Add one or two employee

Test Steps:

Initiate rapid and significant user actions on the Add Employee.

Monitor system performance and responsiveness.

Expected Results:

The system should handle sudden spikes without critical failures or data inconsistencies.

Assess system recovery time after the spike.

- **Test Case 4:** Concurrency testing for Add Employee

Test Scenario: Evaluate system stability under sustained load for the Add Employee.

Preconditions:

Logged into the OrangeHRM system.

Access to the "Add Employee".

Test Steps:

Maintain a consistent user load on the Add Employee.

Monitor system performance, memory usage, and any potential degradation.

Expected Results:

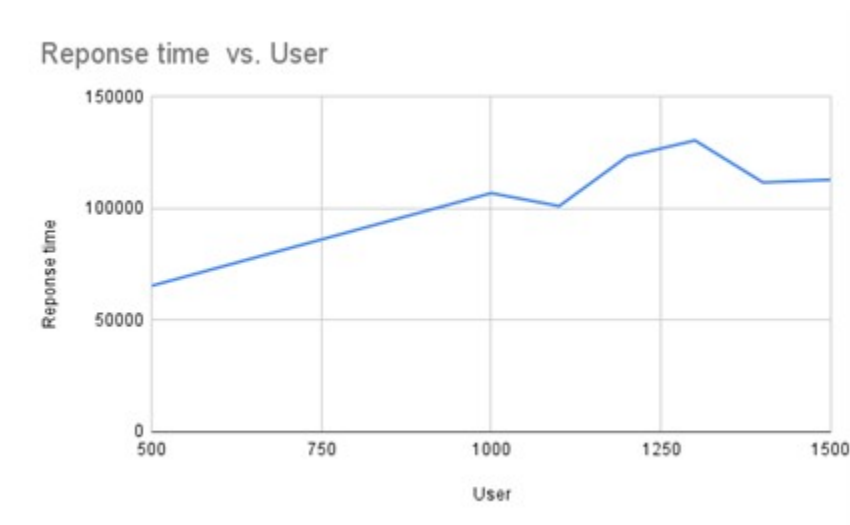
The system should maintain stable response times and functionalities without significant memory leaks or performance degradation over time.

3.1 Test Results

- **Test Result 1: Admin login (Load testing)**

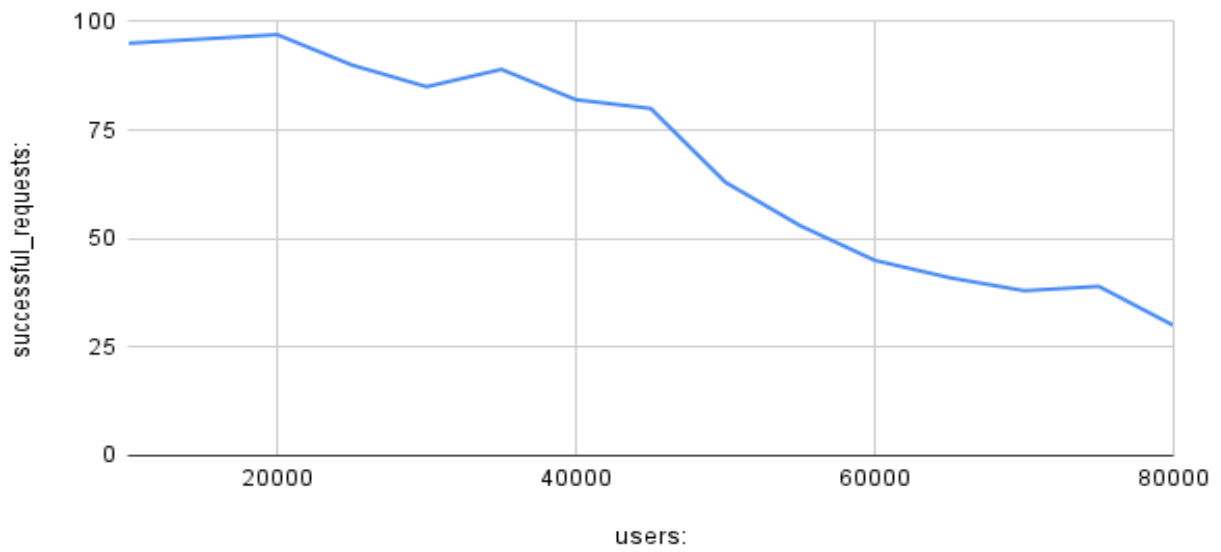
User	Response time
500	65418
600	73719
700	82020
800	90321
900	98622
1000	106923
1100	101123
1200	123323
1300	130523
1400	111723
1500	112923

- **Admin login (Throughput)**



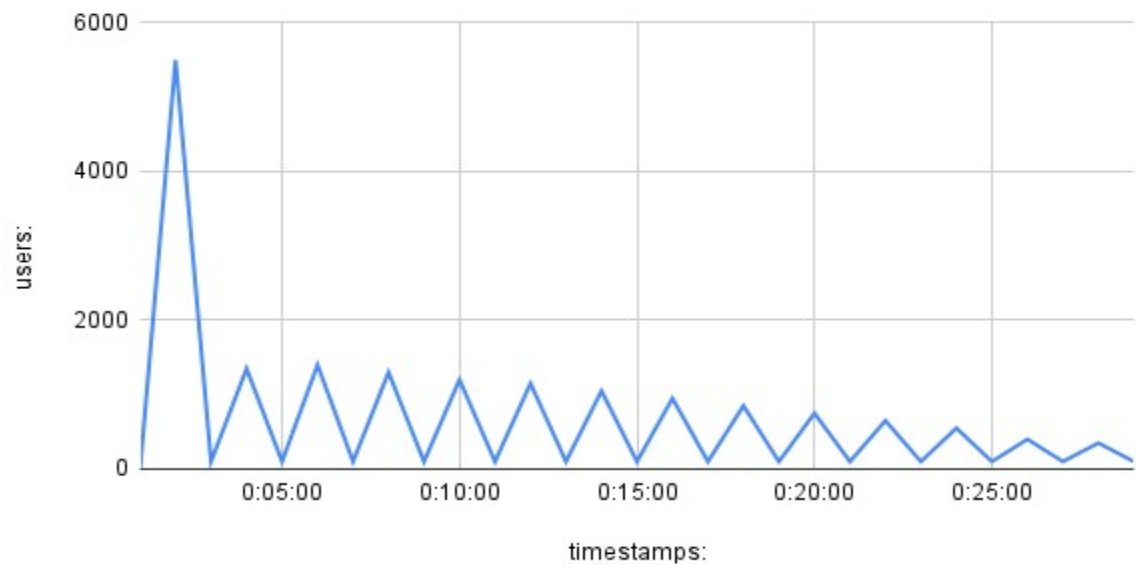
- **Admin login (Throughput)**

successful_requests: vs. users:



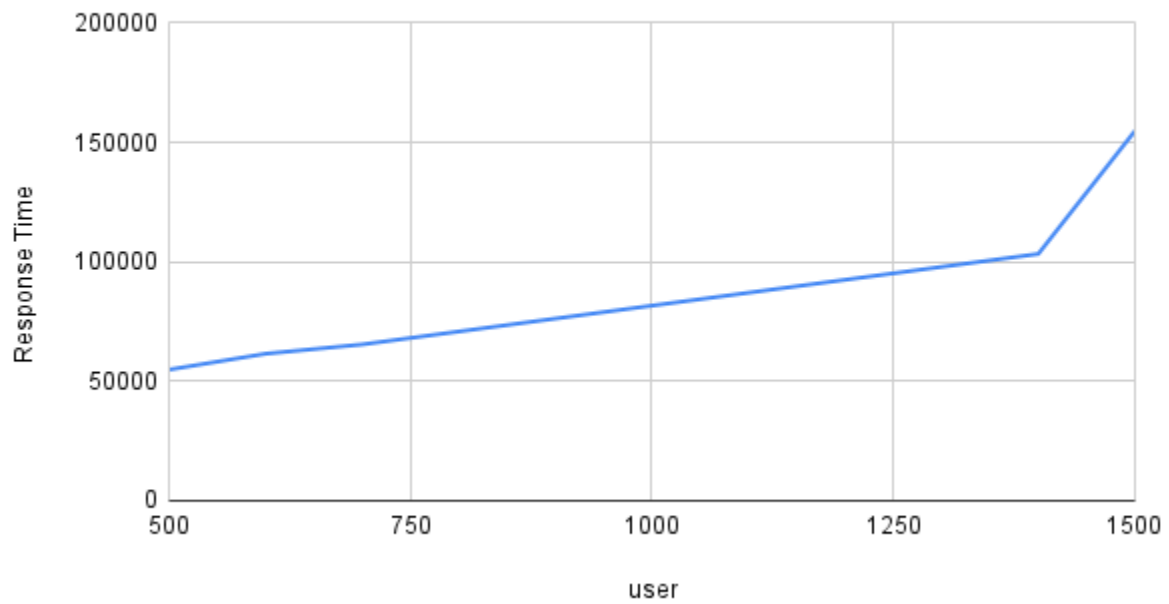
- **Admin Log-in (Spike Testing)**

users: vs. timestamps:



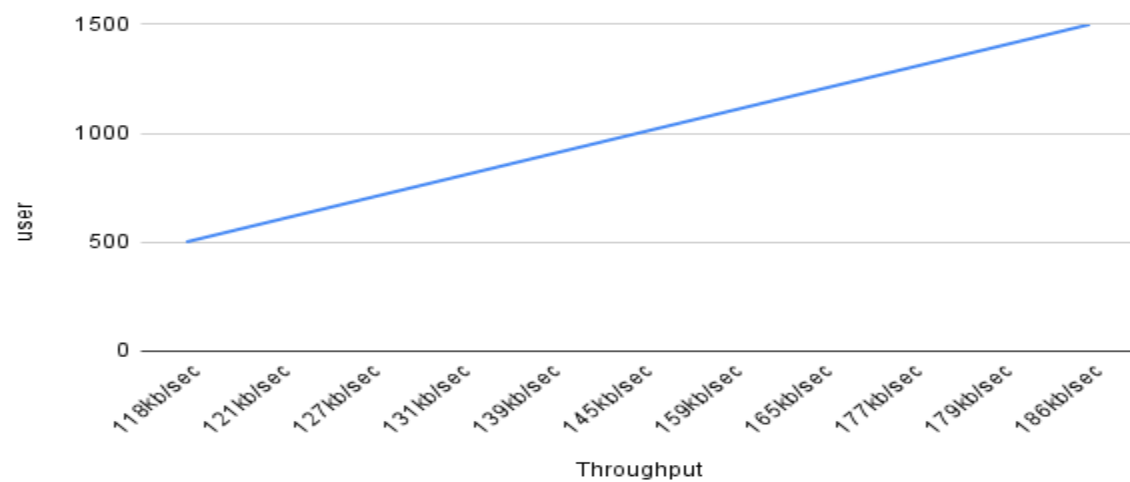
- **Test Result 2: Time management**
- **Load Testing:**

Response Time vs. user



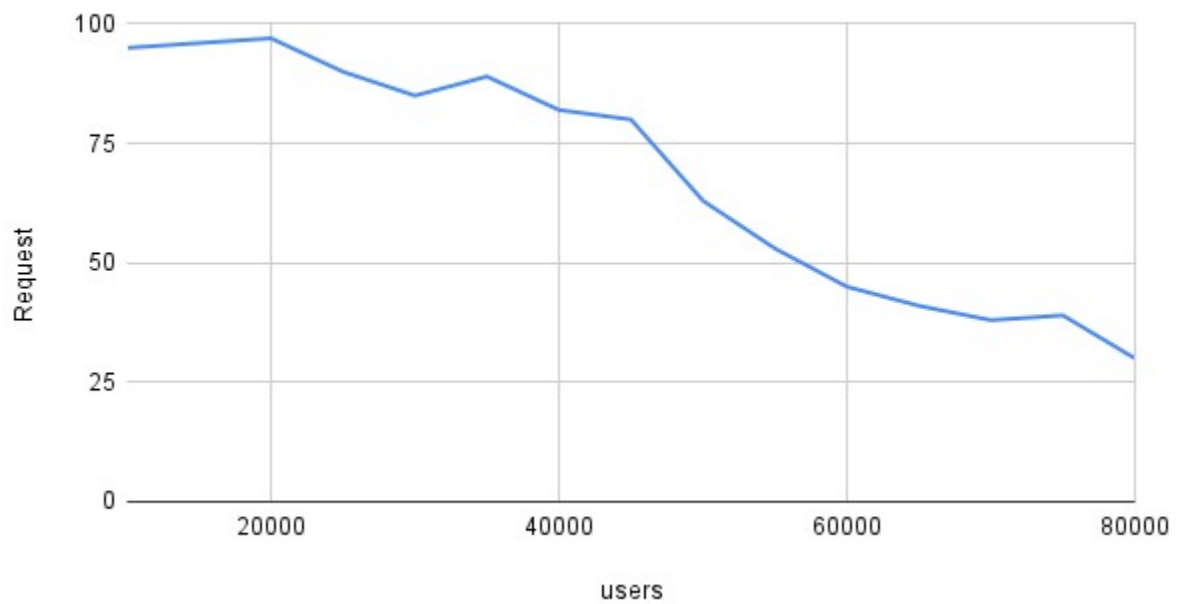
- **Throughput testing**

user vs. Throughput



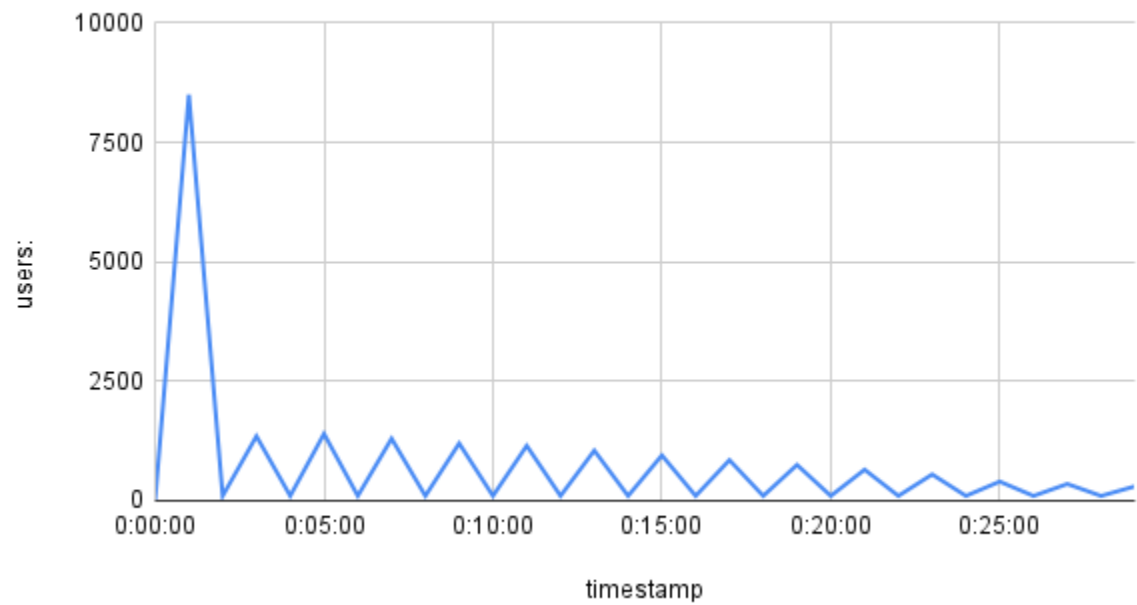
- **Stress testing**

Request vs. users



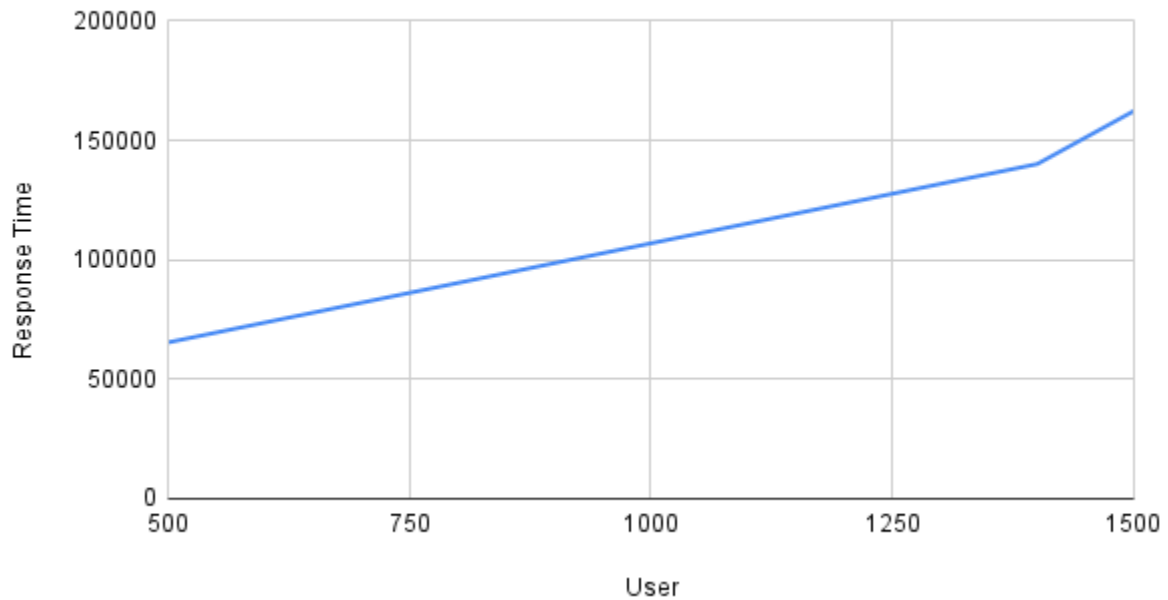
- **Spike testing:**

users: vs. timestamp



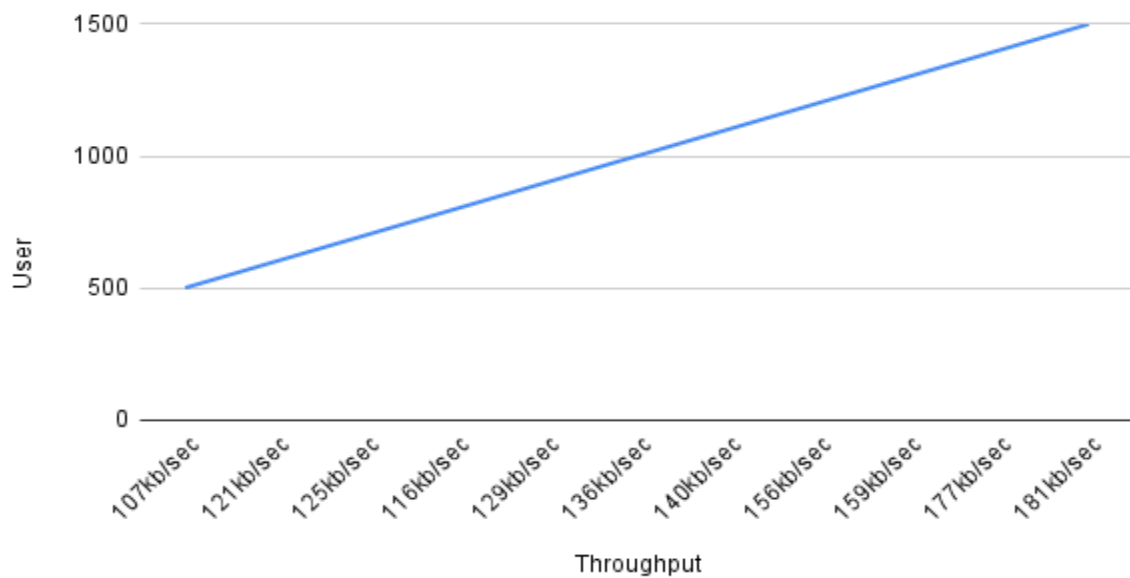
- **Test Result 3: Directory**
- **Load Testing:**

Response Time vs. User



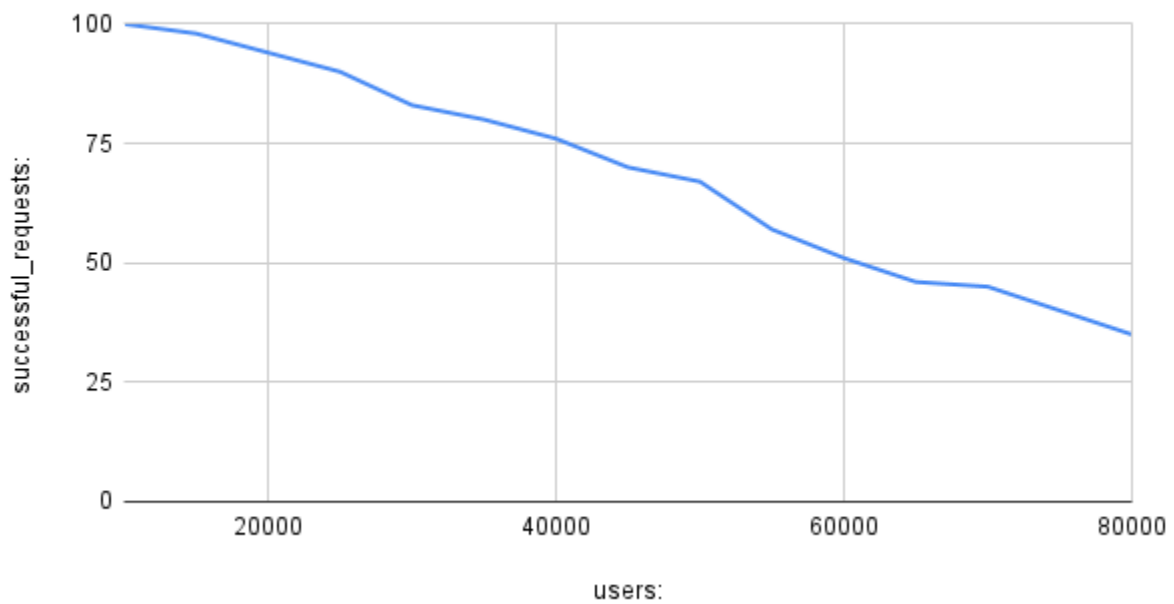
- **Throughput Testing:**

User vs. Throughput



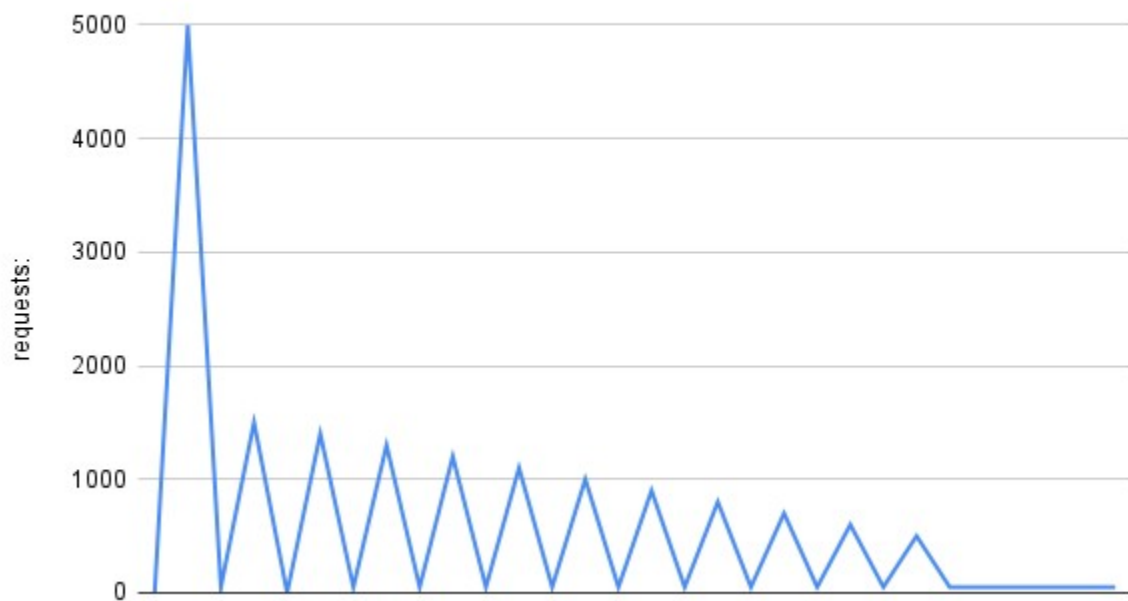
- **Stress Testing:**

successful_requests: vs. users:



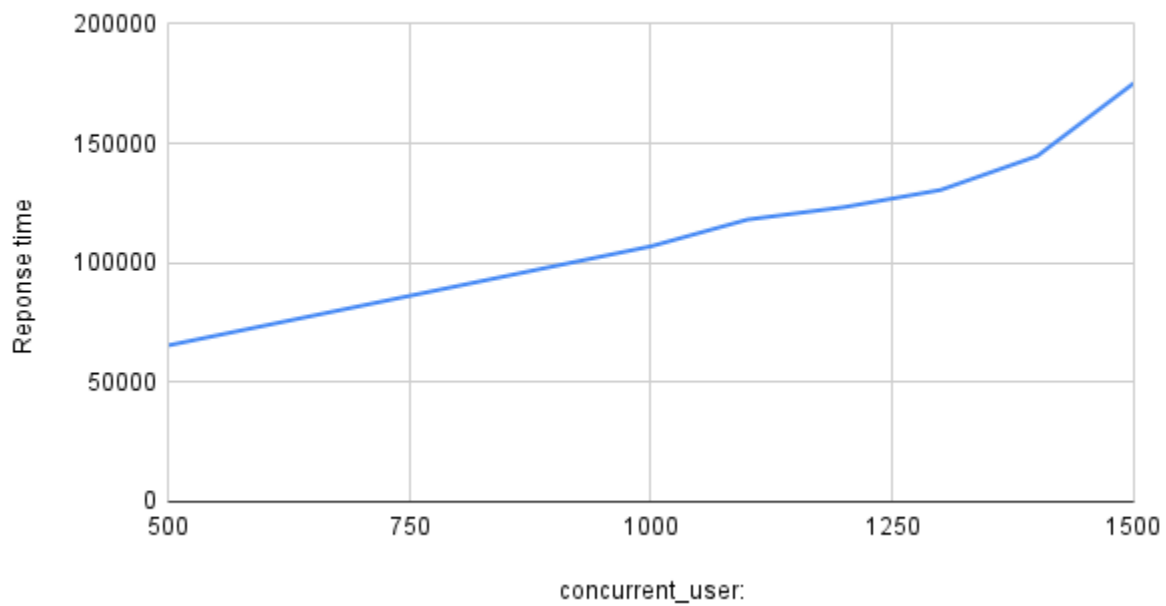
- **Spike Testing:**

requests:



- **Concurrency testing:**

Reponse time vs. concurrent_user:

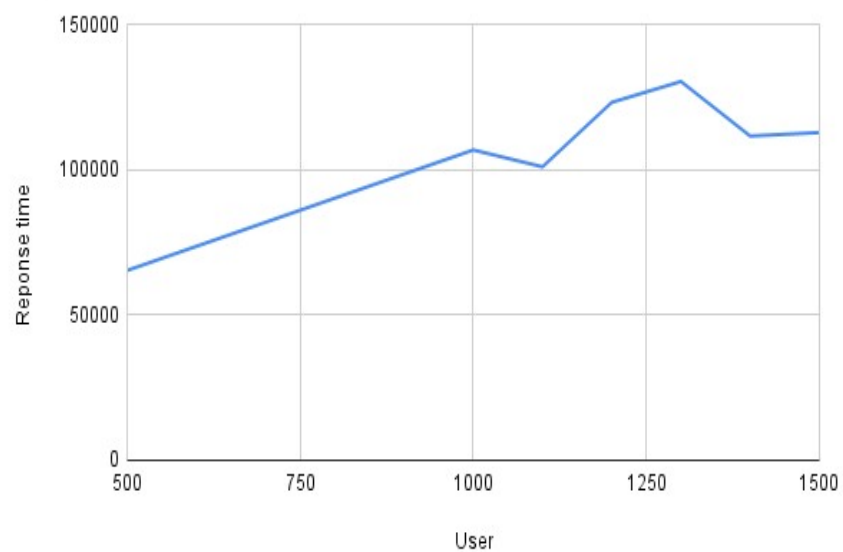


- **Test Result 4: Admin Management**

- **Load Testing:**

User	Response Time
500	45278
600	50792
700	56306
800	61820
900	67334
1000	72848
1100	78362
1200	83876
1300	89390
1400	94904
1500	135578

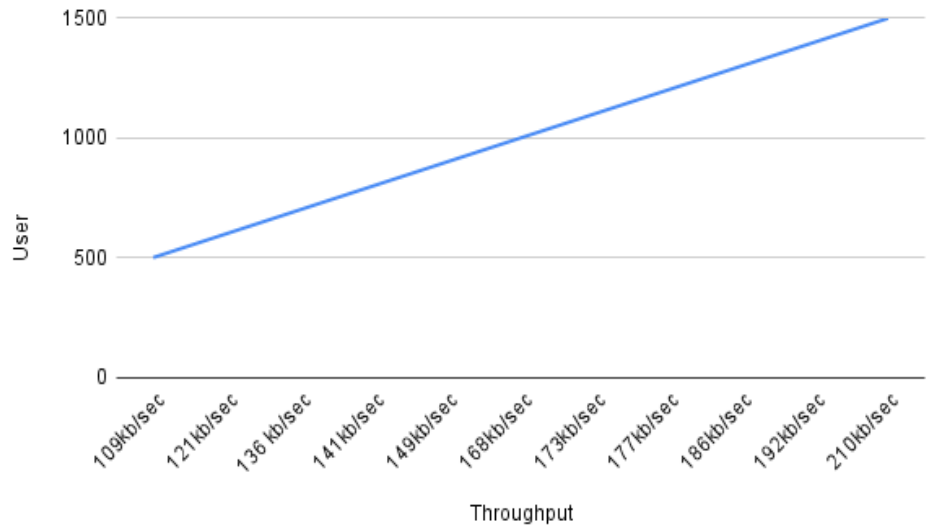
Reponse time vs. User



- **Throughput**

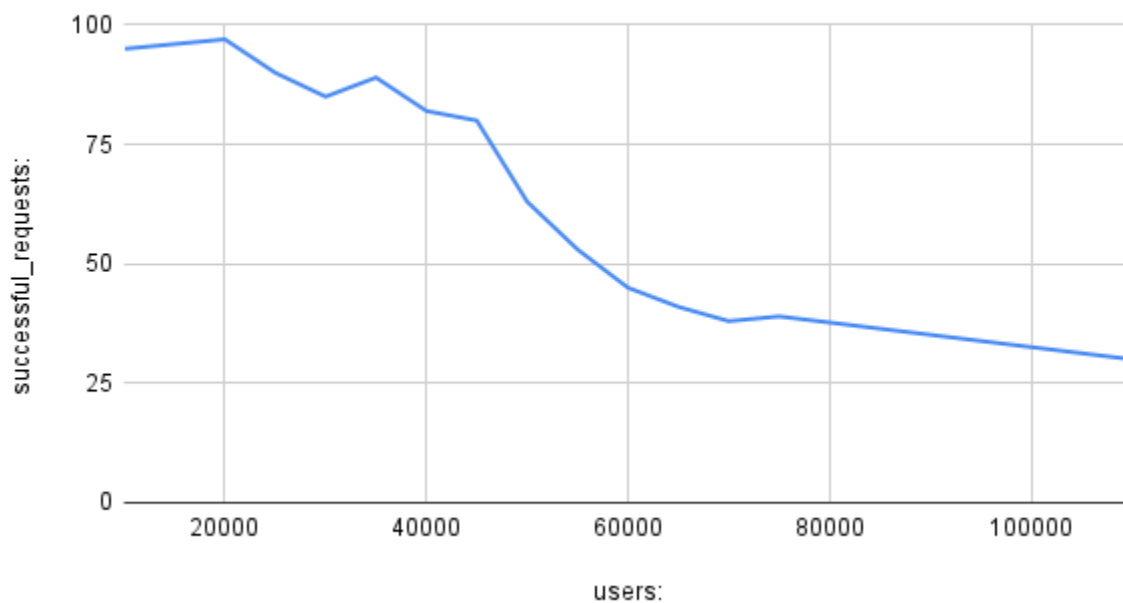
User	Throughput
500	109kb/sec
600	121kb/sec
700	136 kb/sec
800	141kb/sec
900	149kb/sec
1000	168kb/sec
1100	173kb/sec
1200	177kb/sec
1300	186kb/sec
1400	192kb/sec
1500	210kb/sec

User vs. Throughput



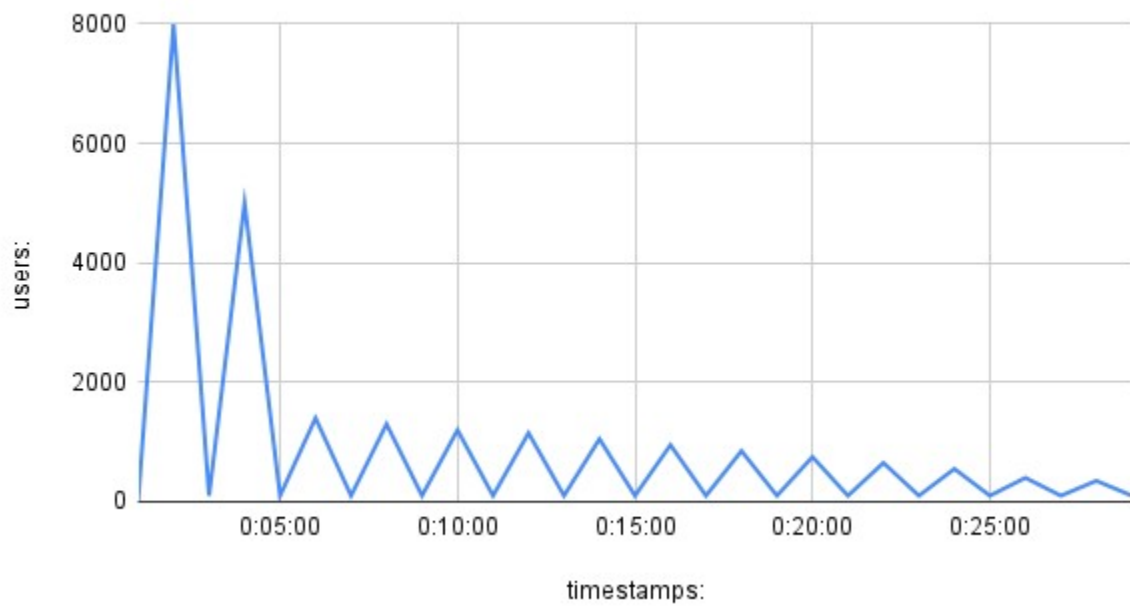
- **Stress testing :**

successful_requests: vs. users:



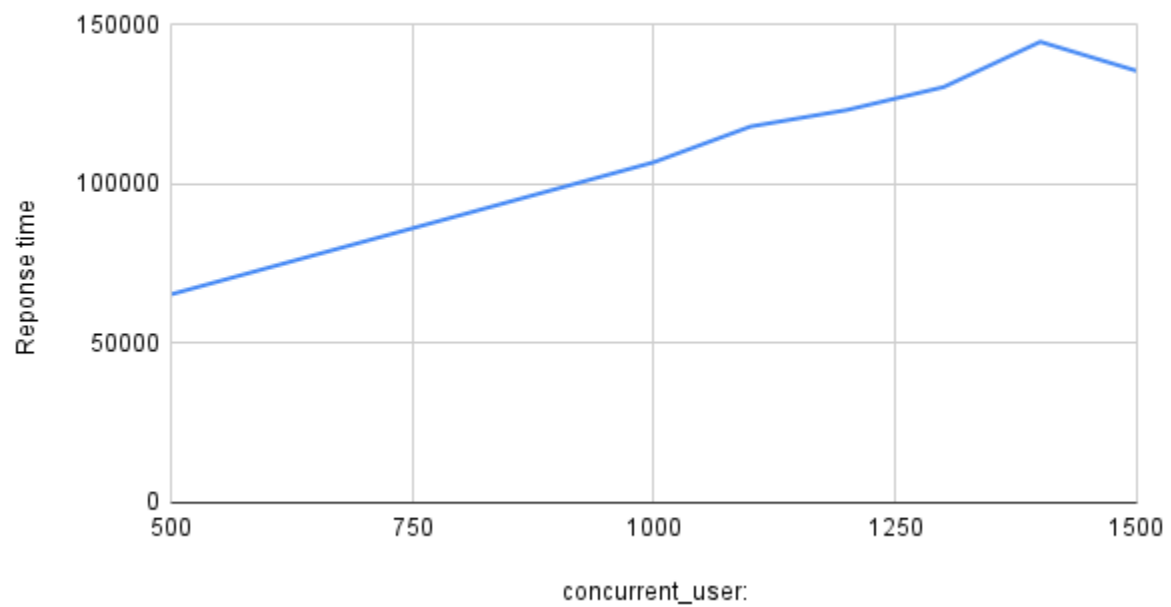
- **Spike testing:**

users: vs. timestamps:



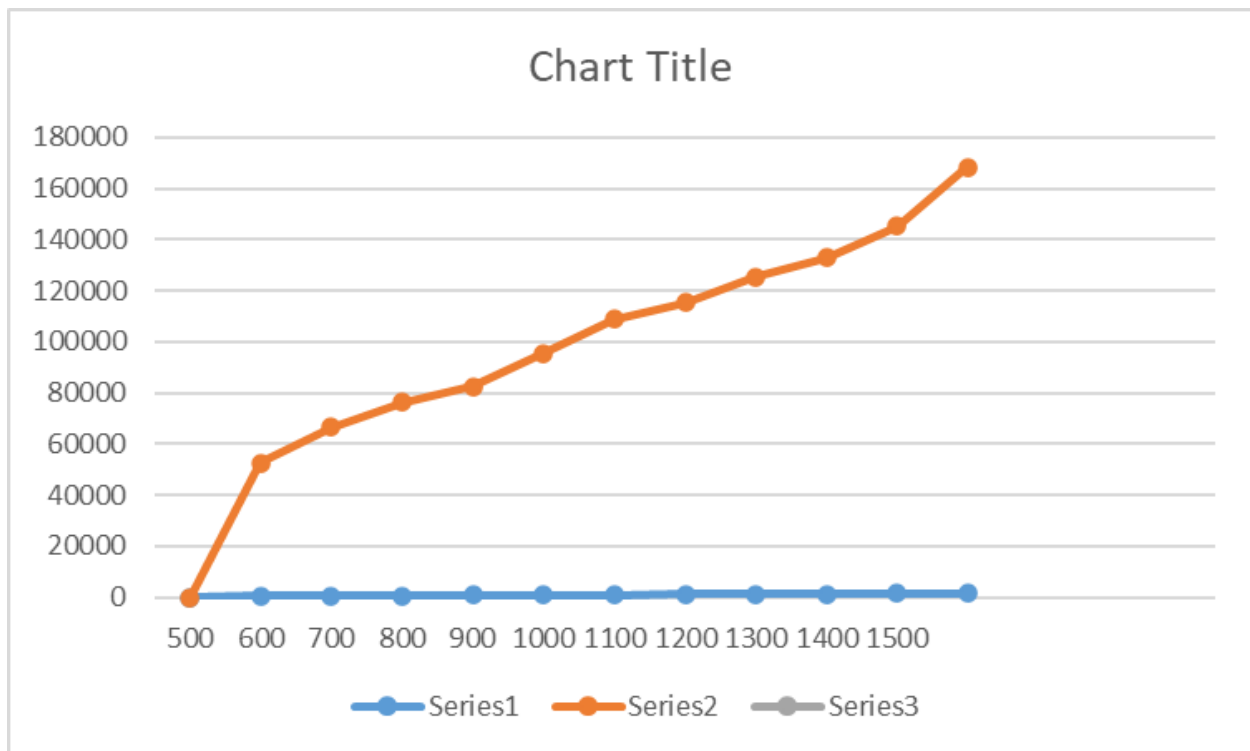
- **Concurrency testing:**

Reponse time vs. concurrent_user:

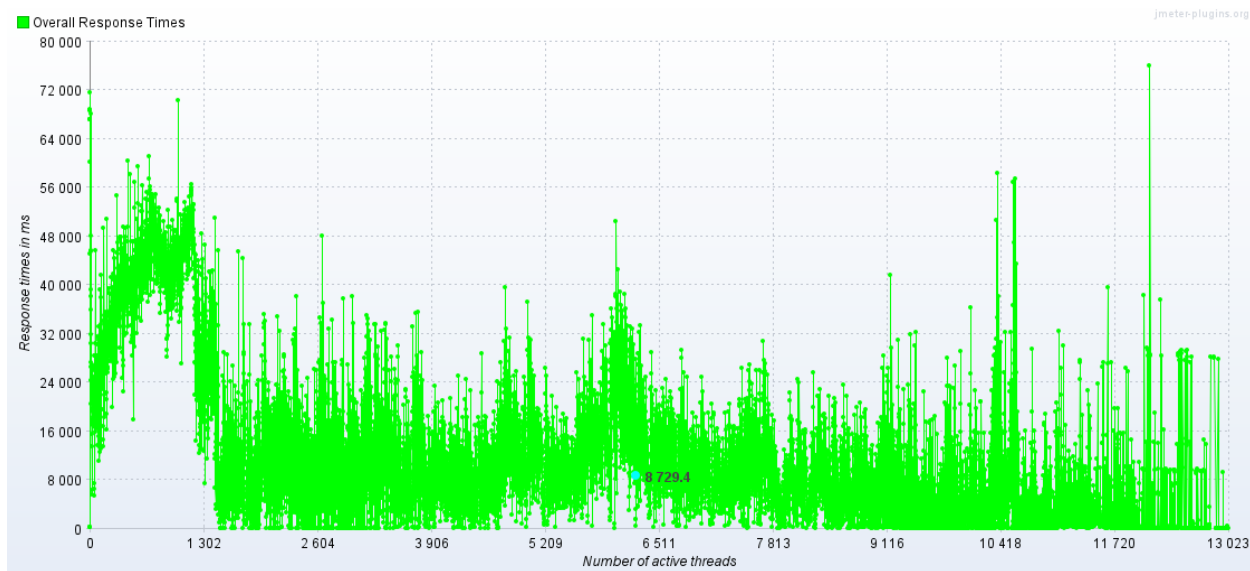


- **Test Result 5: Add employee**
- **Load Testing**

User	Response time
500	52554
600	66569
700	76345
800	82463
900	95463
1000	108711
1100	115475
1200	125478
1300	133065
1400	145288
1500	168524

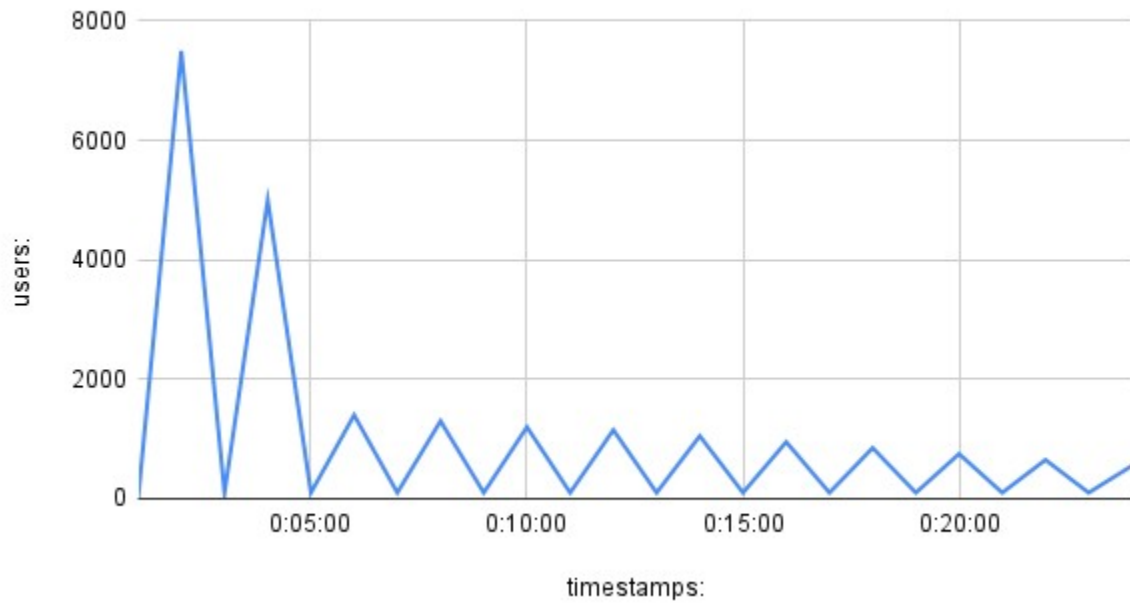


Stress Testing



- Spike Testing :

users: vs. timestamps:



- **Concurrency Testing :**

Reponse time vs. concurrent_user:

