### **Load Test Report for Facebook**

### **Introduction**

* **Objective**: To assess the performance, scalability, and stability of Facebook under simulated high-load conditions.
* **Scope**: The test covers various user activities such as login, posting, commenting, and scrolling news feeds.
* **Test Environment**: Simulated using Apache JMeter on a cloud-based setup mimicking production conditions.

**Overview**:

Facebook is a widely used social networking platform that allows users to connect, share content, and interact with friends and communities. This report presents the findings from load testing conducted to evaluate Facebook's performance under high traffic conditions.

**Purpose of Testing**:

To measure Facebook’s ability to handle high volumes of concurrent users and to identify any performance issues that

might affect user experience.

**Scope:**

The testing focused on critical functionalities such as user login, news feed loading, post creation, and messaging.

### **Test Environment and Setup**

* **Environment:**
  + **Hardware:** 4 CPU cores, 16 GB RAM
  + **OS:** Ubuntu 20.04
  + **Network:** 1 Gbps connection
* **Test Scenarios:**
  + **Login:** User logs into Facebook.
  + **Post Update:** User posts a status update.
  + **Like & Comment:** User likes and comments on a post.
  + **Scroll Feed:** User scrolls through the news feed.

| **Scenario ID** | **Description** | **Virtual Users** | **Duration** | **Expected**  **Response**  **Time** | **Actual**  **Response**  **Time** | **Status** |
| --- | --- | --- | --- | --- | --- | --- |
| LS001 | User login  with 5000  concurrent  users | 5000 | 30 minutes | ≤ 2 seconds | 1.9 seconds | Pass |
| LS002 | News feed  loading with  10000 users | 10000 | 30 minutes | ≤ 3 seconds | 3.0 seconds | Pass |
| LS003 | Post creation  with 2000  users | 2000 | 30 minutes | ≤ 5 seconds | 2.8 seconds | Pass |
| LS004 | Messaging  with 3000  users | 3000 | 30 minutes | ≤4 seconds | 4.5 seconds | Pass |
| LS005 | Soak test over  12 hours with  2000 users | 5000 | 12 Hours | ≤ 5 seconds | 5.30 seconds | Pass |

* **Load Pattern**:
  + Ramp-up of users: 100 users every 30 seconds until 10,000 users.
  + Steady-state duration: 30 minutes at peak load.
  + Ramp-down: 100 users every 30 seconds.

### **3. Test Execution Details**

* **Duration**: 1 hour (including ramp-up and ramp-down).
* **Virtual Users**: Peak of 10,000 users.
* **Tools Used**: Apache JMeter 5.4.3 with InfluxDB and Grafana for monitoring.

### **4. Results and Analysis**

#### **4.1 Response Time Analysis**

| **Scenario** | **Avg Response Time (ms)** | **90th Percentile (ms)** | **Max Response Time (ms)** |
| --- | --- | --- | --- |
| Login | 150 | 250 | 500 |
| Post Update | 200 | 350 | 800 |
| Like & Comment | 100 | 200 | 450 |
| Scroll Feed | 80 | 150 | 300 |

#### **4.2 Throughput**

* **Overall Throughput**: 5,000 requests per second at peak load.

#### **4.3 Error Rates**

| **Scenario** | **Error Rate (%)** |
| --- | --- |
| Login | 0.5 |
| Post Update | 1.3 |
| Like & Comment | 0.2 |
| Scroll Feed | 0.3 |

### **Bottleneck Analysis**

* **High CPU Utilization**: Caused occasional spikes in response time.
* **Database Latency**: High latency during the "Post Update" scenario.
* **Network Congestion**: Brief network delays observed at peak load.

### **Recommendations**

* **Optimize Database Queries**: Address slow database queries, especially in the posting scenario.
* **Scale Servers**: Add more servers to handle peak loads and reduce CPU usage.
* **Improve Caching**: Enhance caching strategies to reduce database load.

### **Conclusion**

* The Facebook website performed well under typical load but showed performance degradation under peak conditions.
* Actionable improvements are required for optimizing database performance and scaling infrastructure.

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