

Comp438

SOFTWARE TESTING AND QUALITY ASSURANCE

QA Project

Software testing for a Real-world Software Application

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♦ Selection of Application Under Test

We choose Facebook software application as the test subject for several reasons:

- Multi-functionality: Facebook has a wide range of features such as personal account management(Create accounts, login to account, logout,etc), instant messaging(Instant messaging between two person or a group of people), multimedia sharing (posts like: photos, videos, and writings), live streaming, and groups.
- Popularity of the app: Being one of the most widely used apps globally, testing its functionality ensures that multiple scenarios of interest are presented.
- Testing challenges: Due to the mix of functional and non-functional features, Facebook provides a wide range for comprehensive analysis and testing.

◆ <u>Requirements Analysis</u>

After we Analyze the the facebook software app To identify the test cases

• Functional requirements :

Log in, log out and create an account.

Search for people, add friends and accept friend requests.

Create, like and share posts.

Message using the built-in Messenger.

Manage personal settings and protect privacy.

• Non-functional requirements:

Performance: Response time should not exceed 3 seconds for most operations.

Security: Protect user data using strong encryption.

Availability: The application should operate 24 hours a day with minimal downtime.

Ease of use: The user interface should be clear and easy to navigate.

◆ Comprehensive Test Plan

* Introduction

The objective of this test plan is to ensure the quality, reliability, and performance of key functionalities in the Facebook application, including messaging, login, search, and post creation.

* Scope

Inclusions:

- Functional Testing: Sending messages, logging in, searching, creating posts.
- Performance Testing: Evaluating the application's performance under high load.

Exclusions:

 Non-core features such as Marketplace, Stories, Non-core features such as Marketplace, Stories, nor testing of Facebook mobile application.

* Test Objectives

1. Functional Testing Objectives:

- Validate login and logout processes with correct and incorrect credentials.
- Verify the ability to send and receive messages, including handling of attachments.
- Ensure the search function returns relevant results based on keywords.
- Confirm the ability to create, edit, and delete posts, and validate the handling of multimedia content.

2. Performance Testing Objectives:

• Ensure the application can support up to 10,000 concurrent users with acceptable response times (less than 3 seconds).

3. Security Testing Objectives:

• ensure data protection and guarantees the secure handling of sensitive user data.

4. Usability Testing Objectives:

• Assess the user interface for accessibility and ease of navigation.

* Test Strategy

 We plan to use a combination of manual and automated testing to thoroughly and efficiently test Facebook. We plan to use black box testing techniques for functionality testing and Jmeter for performance testing.

* Test Schedule

- Requirements analysis and test plan creation. Start [2012-2024], End [25-12-2024]
- Test case development and test environment setup. Start [26-12-2024], End [1-1-2025]
- Automation test script development and execution Start [2-1-2025], End [5-1-2025]
- Performance testing and analysis. Start [6-1-1015], end [9-1-2025]
- Final report preparation and presentation. Start [10-1-2025], End [12-1-2025]

* Test Resources

- 1. **Personnel**: Manar ,Muna ,Enas , Afnan.
- Tools : Selenium for automated testing, JMeter for performance testing , Jira for Explain the test cases
- 3. **Hardware/Software**: Personal computers ,and access to the Facebook staging environment

* Test Deliverables

- 1. Test Plan Document
- 2. Test Cases Document
- 3. Automation Scripts
- 4. Performance Testing Report
- 5. Final Test Report

* Risks and assumptions

Data Assumption

• test data (user profiles, posts, comments, media files) will be available for all testing scenarios. Real-time data interactions and latency can be simulated effectively.

Resources Assumption:

• tools will be available throughout the testing process. All required test devices (mobile phones, tablets, PCs) covering different operating systems and browsers will be accessible

Risks:

- The inability to repeat testing may miss performance Gaps.
- Test Data Insufficiency: Limited test data may lead to incomplete test coverage.
- Privacy Risks: Testing with real user data may lead to accidental data breaches or violations of privacy laws.
- Data Leak Risks: Improper handling of sensitive data during testing could result in leaks

Dependencies

- All high-priority and critical defects identified during the testing process must be resolved and verified.
- Test Coverage: 100% execution of all planned test cases. All critical user scenarios (e.g., login, posting, messaging, notifications) must pass successfully.
- Regression Testing: A final regression testing cycle must be completed with no critical or high-severity issues.
- Page load time: Less than 2 seconds for key pages (e.g., newsfeed, profile, groups).
- Latency: Acceptable response time for real-time interactions (e.g., messages, notifications).
- Cross-platform Compatibility: Application must work seamlessly across all supported devices, operating systems, and browsers.

* Exit Criteria

The Facebook app must not fail any testing of the core functionalities, and produce the expected testing results reliably.

* Approvals

- A formal review meeting should be held where all group members discuss the test plan and provide feedback.
- After revisions (if any), each member provides written or Oral approval.
- Approvals should be documented in a shared repository for future reference.

* Appendices

References

To learn about tools: youtube Functional Testing: Selenium. Performance Testing: JMeter.

Device matrix: Computer devices (php, asus), browsers (Chrome, Firefox).

• Test Data

User Profiles: Test user accounts

Media Files: images and voice to test upload.

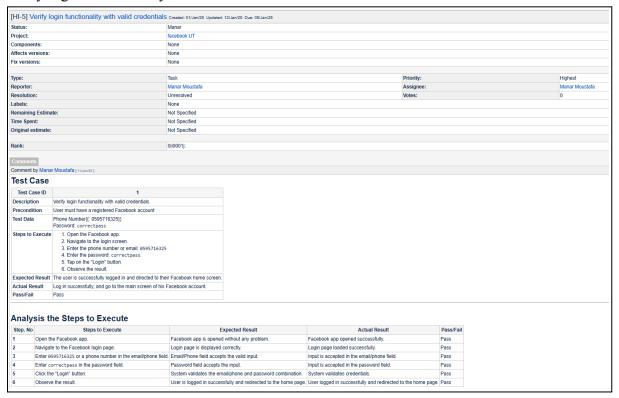
Simulated Connections: Friend lists, and follower relationships for feature validation.

♦ Test Cases

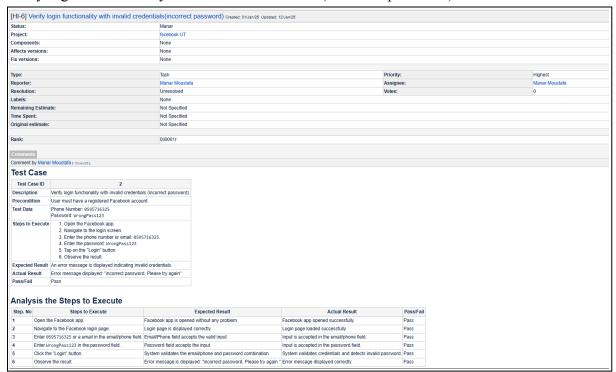
Link for jira \Rightarrow Test Case in Jira

* Login

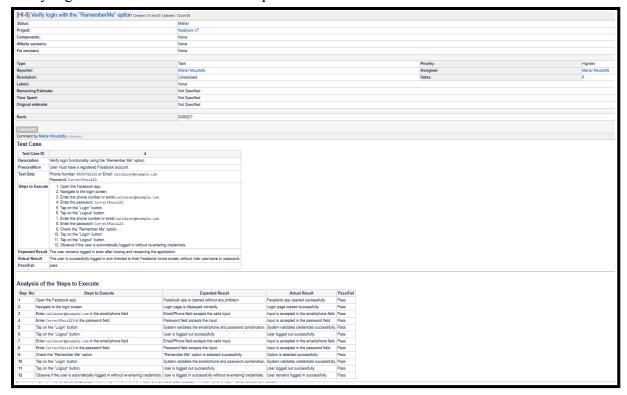
Verify login functionality with valid credentials



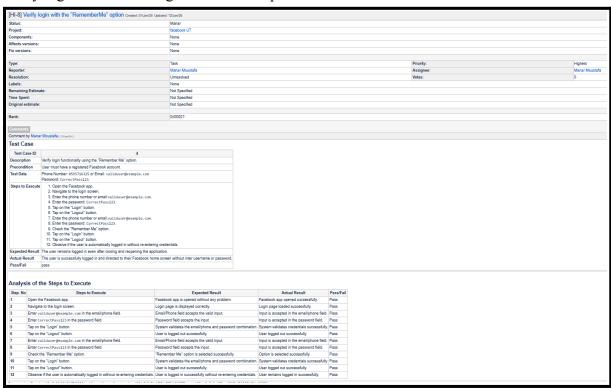
Verify login functionality with invalid credentials(incorrect password)



Verify login with the "RememberMe" option

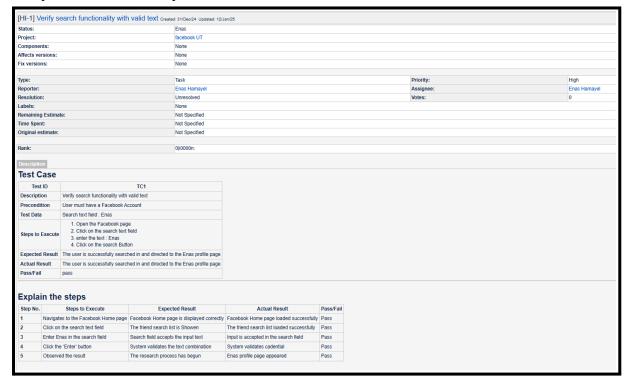


Verify login with the "Forgot Password" option

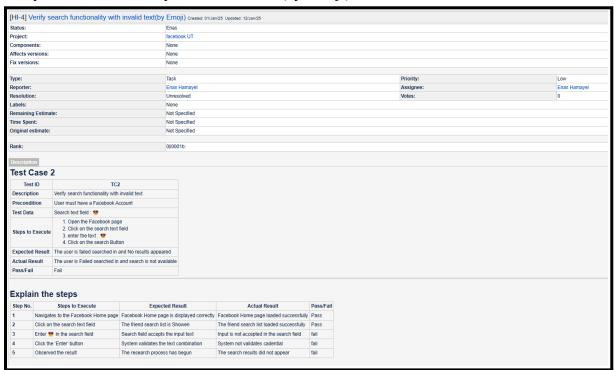


* Search

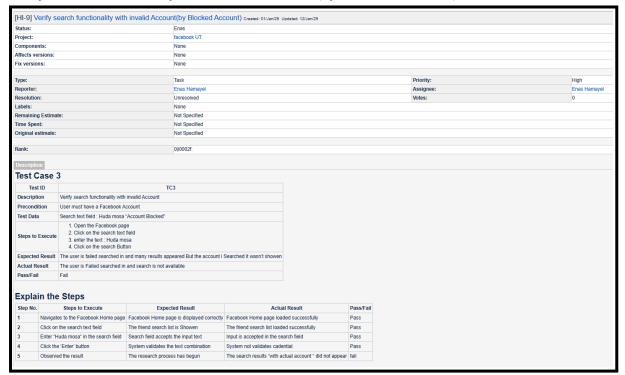
Verify search functionality with valid text



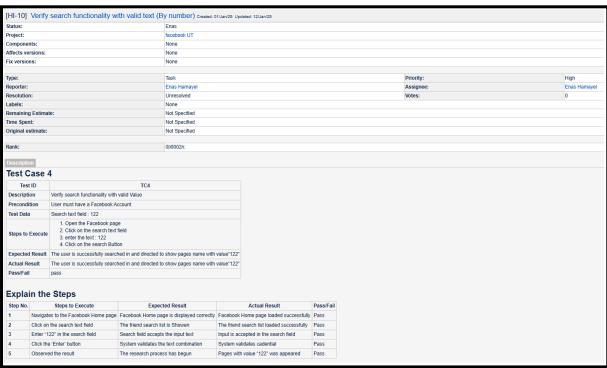
Verify search functionality with invalid text(by Emoji)



Verify search functionality with invalid Account(by Blocked Account)

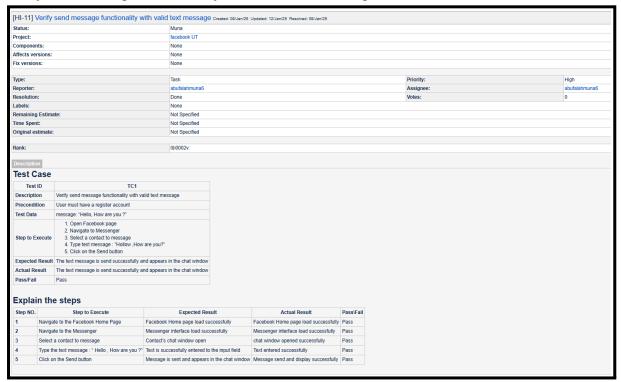


Verify search functionality with valid text (By number)

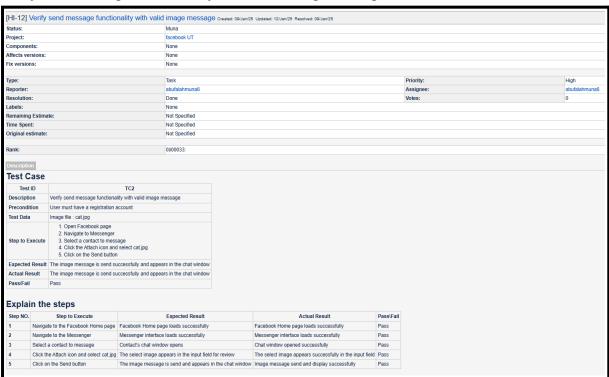


* Send message

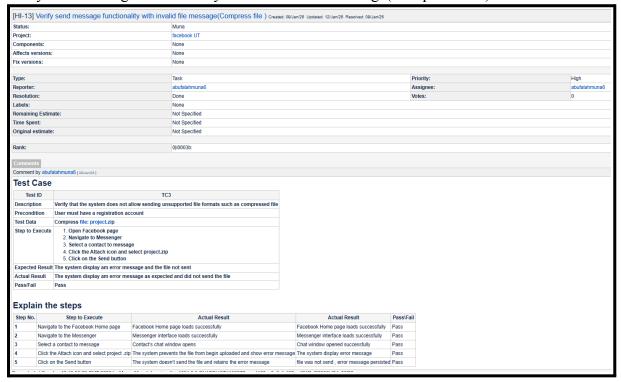
Verify send message functionality with valid text message



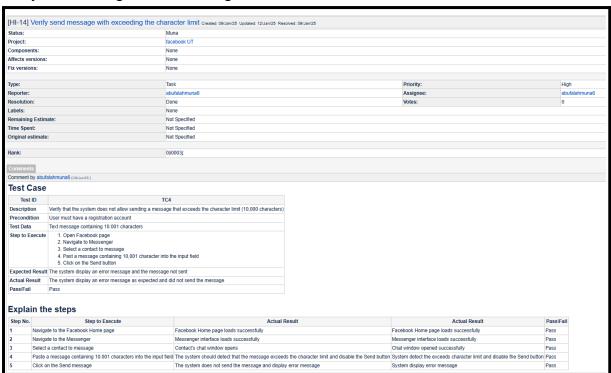
Verify send message functionality with valid image message



Verify send message functionality with invalid file message(Compress file)



Verify send message with exceeding the character limit

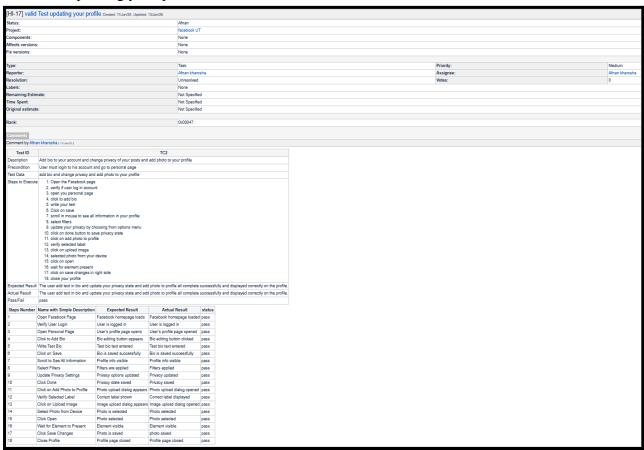


* Posts

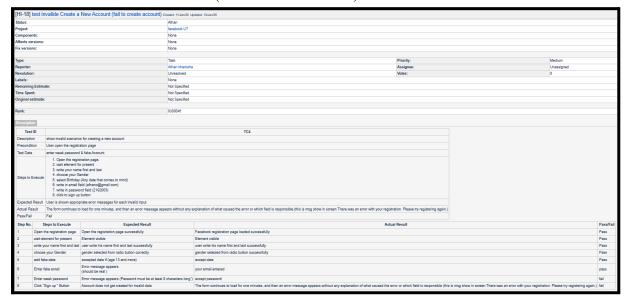
Valid Test Case Assign like To posts and share to WhatsApp



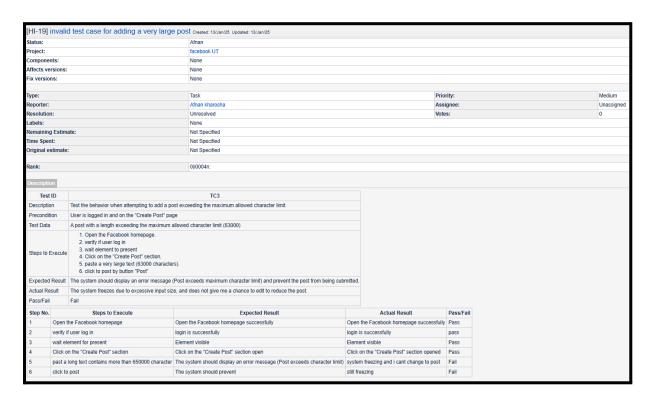
Valid Test updating your profile



Invalide Create a New Account (fail to create account)



Invalid test case for adding a very large post



♦ Test Automation















◆ Performance and load Testing

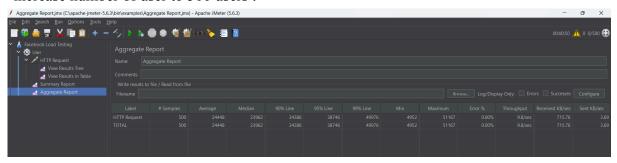
Performance and load tests were conducted on the Facebook platform using JMeter to evaluate the system's ability to handle different user loads. The test started with simulating 100 users initially, and the number was gradually increased until reaching 12,500 users. The system response was measured and the impact of increasing the number of users on the system performance was analyzed.

*At First We Start With 200 Users:



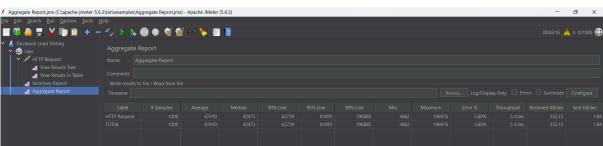
 \rightarrow the system successfully handled 200 requests with a 0.00% error rate, indicating no failures. The average response time was 8966 ms, with a throughput of 10.2 requests per second.

*increase number of user to 500 users:



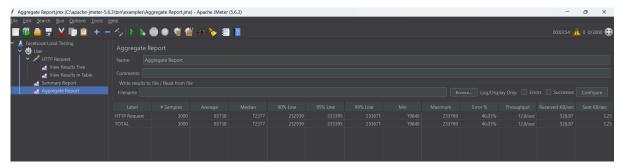
 \rightarrow The test executed 500 requests with indicates successful The system achieved a throughput of 9.8 requests per second with 0.00% errors

*increase number of users to 1000 users



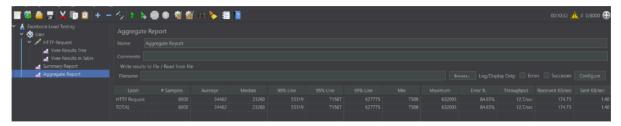
 \rightarrow The test executed 1000 requestsThe system achieve a throughput of 5.17 requests/second the error rate increased to 5.67%.

*increase number of users to 3000 users



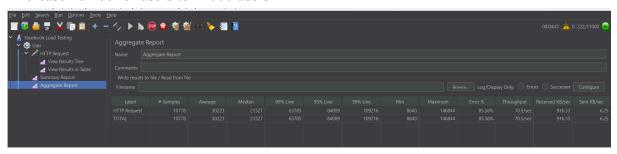
→The test executed 3000 requests, the error rate increased to 46.03% and the throughput was 12.6 requests per second.

*increase number of users to 8000 users



→8000 requests were executed during the test, with throughput reaching 12.7 requests per second. The error rate was very high, reaching 84.65%, meaning that 6772 requests failed.

*increase number of users to 11000 users



 \rightarrow 10,778 requests were executed during the test out of 11,000 and the error rate became very high, reaching 85.58% which means 9,222 requests failed.

*increase number of users to 12500 users



12,191 requests out of 12,500 original requests were executed during the test, with an error rate of 87.20%, meaning that 11,825 requests failed. These results indicate that the system has reached a stress test, where it has been subjected to extreme stress to fail a request.