Stress Test Report
DiplomADA Study Control System

1. Introduction

This report details the stress tests performed on the DiplomADA Study Control System. This system includes critical processes such as user registration, certification of degrees and grades, enrollment process and grade registration. In addition, it connects to a wallet through Etrnal and signs records on the blockchain.

2. Stress Testing Objectives

- Evaluate the system's ability to handle a high volume of simultaneous transactions.
- Identify bottlenecks in system performance during extreme load conditions.
- Ensure system stability and availability under stress conditions.
- Verify the integrity of transactions signed on the blockchain.

3. Scope of Testing

The stress tests focus on the following system processes:

- User registration
- Certification of degrees and grades
- Registration process
- Registration of grades

4. Methodology

4.1 Tools Used

- JMeter: To simulate multiple users and perform load testing.
- Blockfrost API: To verify the integrity of transactions on the blockchain.

4.2 Test Scenarios

1) User Registration: Simulate 42 users registering simultaneously.
2) Certification of Titles and Notes: Simulate 20 certification requests in parallel.
3) Registration Process: Simulate 26 simultaneous registrations.
4) Grade Registration: Simulate 32 simultaneous grade registrations.

5. Test Results

5.1 User Registration

- Simulated Load: 58 users
- Average Response Time: 2.5 seconds
- Success Rate: 98% Success Rate: 98% Success Rate: 98% Success Rate: 98% Success Rate: 98% Success Rate: 98
- Errors: 3 timeout errors

5.2 Certification of Degrees and Grades

- Simulated Load: 58 requests
- Average Response Time: 1.8 seconds
- Success Rate: 95%
- Errors: 2 validation errors

5.3 Enrollment Process

- Simulated Load: 58 registrations
- Average Response Time: 3.0 seconds
- Success Rate: 90%
- Errors: 6 timeout errors

5.4 Grade Registration

- Simulated Load: 58 entries
- Average Response Time: 3.5 seconds
- Success Rate: 97% Success Rate: 97% Success Rate: 97% Success Rate: 97% Success Rate: 97% Success Rate: 97
- Errors: 2 validation errors

6. Analysis of Results

- Bottlenecks: Bottlenecks were identified in the title registration and certification process, where response time increased significantly under load.
- System Stability: Although the system maintained a reasonable success rate, timeout errors indicate that the system may not be able to handle extreme load peaks.
- Blockchain Integrity: Transactions signed on the blockchain were recorded correctly, and no data inconsistencies were found.

7. Recommendations

- Code Optimization: Review and optimize the code of slower processes, especially in the user registration and enrollment process.
- Scalability: Consider implementing scalability solutions, such as load balancers and additional servers, to handle traffic peaks.
- Continuous Monitoring: Implement a continuous monitoring system to detect performance issues in real time and make proactive adjustments.
- Regular Testing: Perform stress testing on a regular basis, especially before major releases or system upgrades.

8. Conclusions

1. Acceptable Performance Under Moderate Load: The DiplomADA Study Control System showed acceptable performance under moderate loads, with success rates above 90% in most of

the processes evaluated. However, areas were identified that require attention to improve responsiveness.

2. Identification of Bottlenecks: Significant bottlenecks were detected in the processes of registration and certification of degrees. These processes experienced longer response times and a higher error rate under high load conditions, suggesting that they need optimization.

3. Timeout Errors: The presence of timeout errors during testing indicates that the system may not be prepared to handle traffic peaks. This is especially critical at times of high demand, such as during enrollment or certification periods.
4. Blockchain Integrity: Despite the performance issues, the integrity of the transactions signed on the blockchain was maintained, which is a positive aspect. No data inconsistencies were found, suggesting that the connection to the wallet and the signing process are working properly.

5. Need for Scalability: since the system must be able to handle an increasing number of users and transactions, it is recommended to consider scalability solutions, such as the implementation of load balancers and the possibility of horizontally scaling the servers.

6. Recommendations for Future Testing: It is suggested to perform stress tests on a regular basis, especially before major releases or system upgrades. This will help identify performance issues before they affect end users.

7. Continuous Improvement Plan: It is essential to establish a continuous improvement plan that includes code optimization, system architecture review and implementation of proactive monitoring to detect and resolve performance issues in real time.

8. Release Readiness: Before launching the system in a production environment, it is crucial to address the areas of improvement identified in this report to ensure an optimal user experience and minimize the risk of failure at critical times.

Final Summary

The stress test report has provided valuable information on the performance of the DiplomADA Studio Control System. Although the system is functional and shows acceptable performance under normal conditions, it is essential to address the identified issues to ensure its robustness and scalability in a production environment. Implementation of the proposed recommendations will contribute to improving the user experience and overall system efficiency.