



Project Instructor: Fouzia Jumani
Email: fouzajumani@vu.edu.pk
Virtual University of Pakistan

Project Author: Eng. Muhammad Imtiaz Shaffi
VU ID: BC220200917
Email: bc220200917mis@vu.edu.pk

1. Executive Summary

This comprehensive report provides detailed analytics of the blockchain network, including transaction patterns, mining statistics, double-spending attack simulations, and SimBlock P2P network integration analysis. The report is generated automatically from the live blockchain data and includes visual charts for better analysis.

2. Blockchain Overview

Blockchain Statistics

| Metric | Value |
|----------------------|-----------|
| Total Blocks | 5 |
| Total Transactions | 11 |
| Pending Transactions | 0 |
| Current Difficulty | 3 |
| Mining Reward | 1.0 coins |
| Connected Peers | 1 |

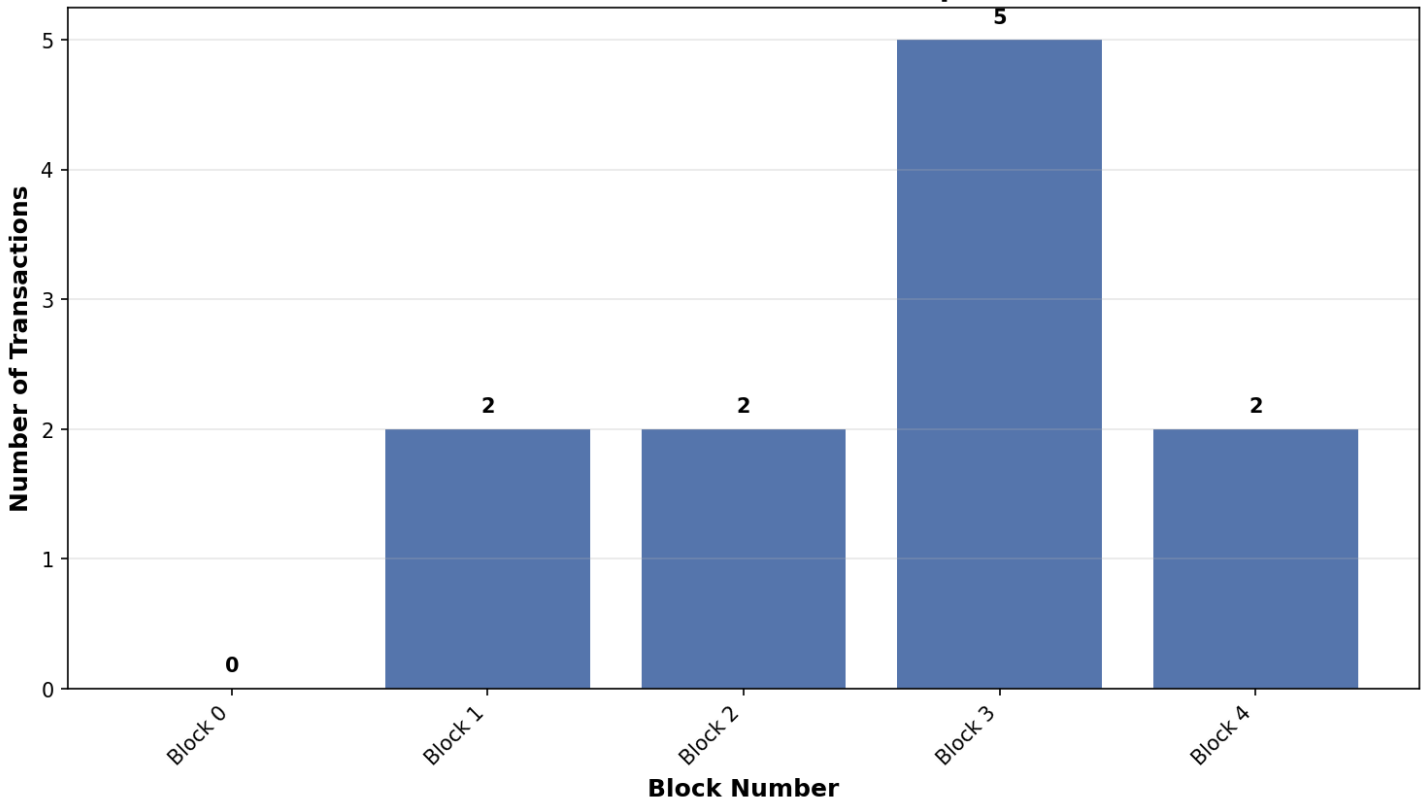
Blockchain Growth Chart



Project Instructor: Fouzia Jumani
Email: fouziajumani@vu.edu.pk
Virtual University of Pakistan

Project Author: Eng. Muhammad Imtiaz Shaffi
VU ID: BC220200917
Email: bc220200917mis@vu.edu.pk

Blockchain Growth - Transactions per Block



3. Transaction Analysis

Recent Transactions:

- TestUser1 -> TestUser2: 10.5 coins
- TestUser1 -> TestUser2: 10.5 coins
- PerfUser2 -> PerfReceiver2: 47.19361958416663 coins
- TestUser1 -> TestUser2: 10.5 coins
- TestUser1 -> TestUser2: 10.5 coins

4. Wallet Balances

Current Wallet Balances

| Metric | Value |
|--------|-------|
|--------|-------|

Blockchain Anomaly Detection System

Comprehensive Analysis Report

Generated on: 2025-10-04 15:29:27



Project Instructor: Fouzia Jumani
Email: fouziajumani@vu.edu.pk
Virtual University of Pakistan

Project Author: Eng. Muhammad Imtiaz Shaffi
VU ID: BC220200917
Email: bc220200917mis@vu.edu.pk

| | |
|---------------|--------------|
| TestUser1 | -42.00 coins |
| TestUser2 | 42.00 coins |
| TestMiner | 4.00 coins |
| PerfUser0 | -73.53 coins |
| PerfReceiver0 | 73.53 coins |
| PerfUser1 | -86.60 coins |
| PerfReceiver1 | 86.60 coins |
| PerfUser2 | -47.19 coins |
| PerfReceiver2 | 47.19 coins |
| TestAttacker | 0.00 coins |

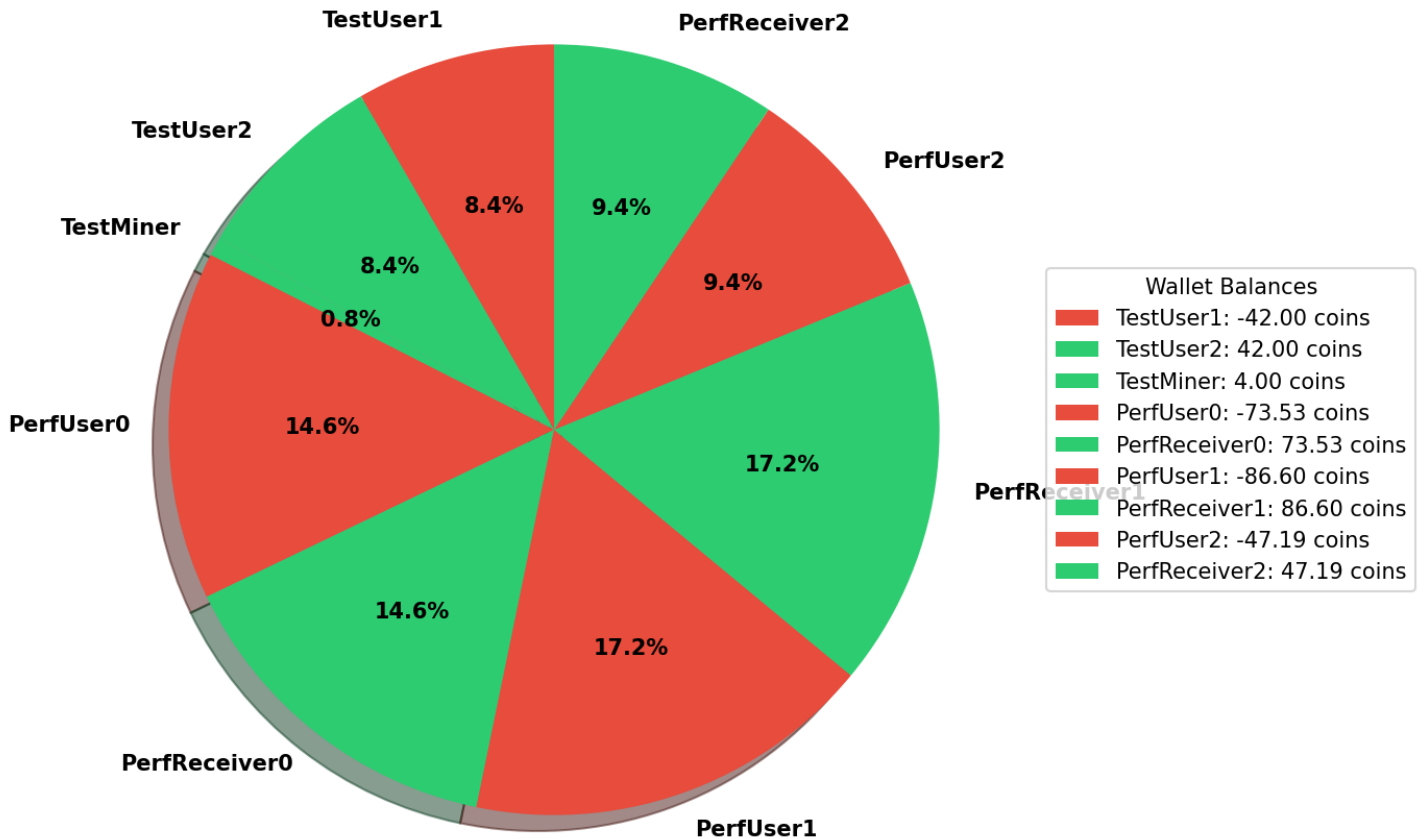
Balance Distribution Chart



Project Instructor: Fouzia Jumani
Email: fouziajumani@vu.edu.pk
Virtual University of Pakistan

Project Author: Eng. Muhammad Imtiaz Shaffi
VU ID: BC220200917
Email: bc220200917mis@vu.edu.pk

Wallet Balance Distribution (All Active Wallets)



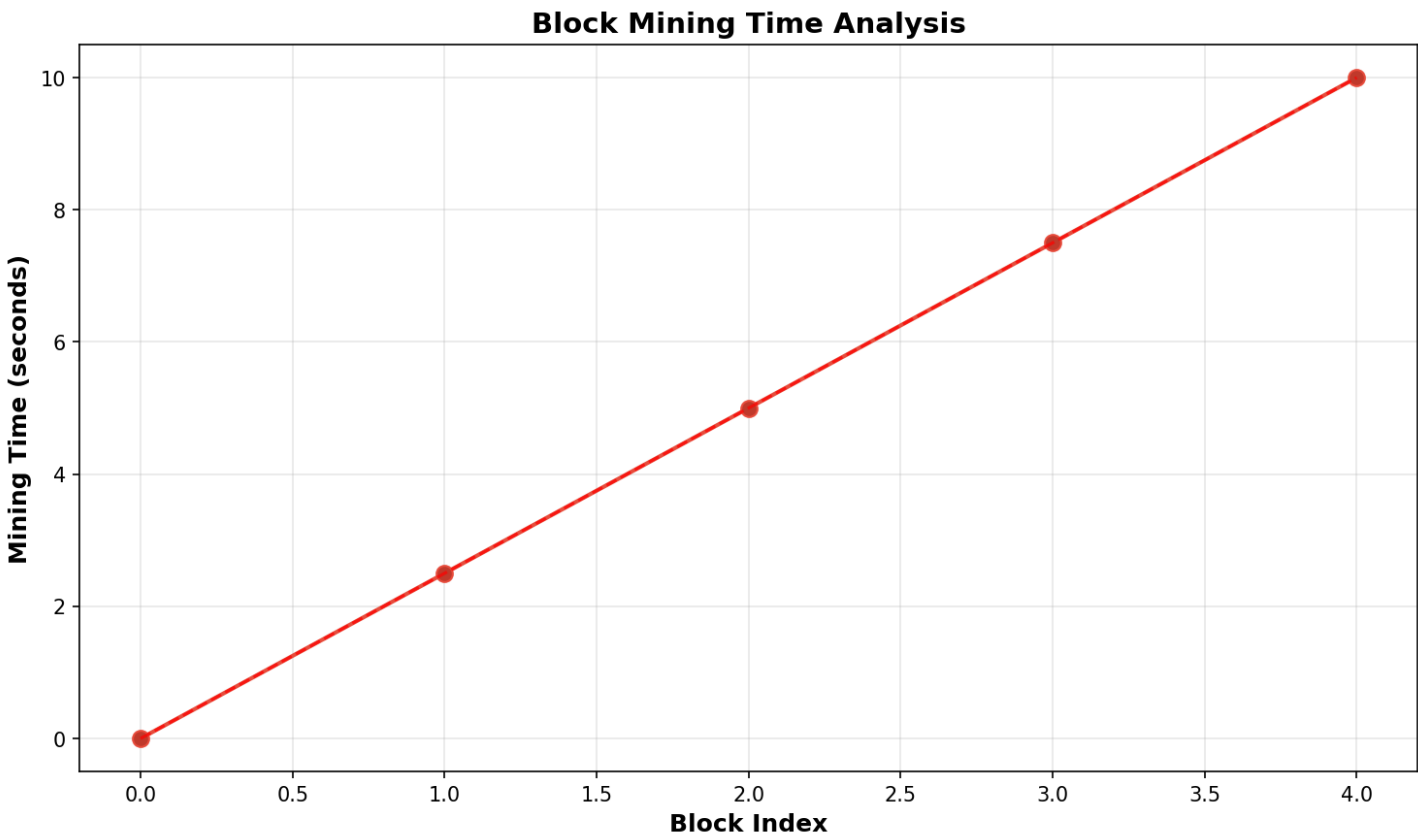


Project Instructor: Fouzia Jumani
Email: fouziajumani@vu.edu.pk
Virtual University of Pakistan

Project Author: Eng. Muhammad Imtiaz Shaffi
VU ID: BC220200917
Email: bc220200917mis@vu.edu.pk

5. Mining Analysis

Mining Time Analysis Chart



Mining Statistics

| Metric | Value |
|--------------------------------|-------------------------|
| Total Blocks Mined | 5 |
| Average Transactions per Block | 2.2 |
| Genesis Block | 000e132f074731923ad1... |
| Latest Block | 00056f6270f7ed3fa8f4... |



Project Instructor: Fouzia Jumani
Email: fouziajumani@vu.edu.pk
Virtual University of Pakistan

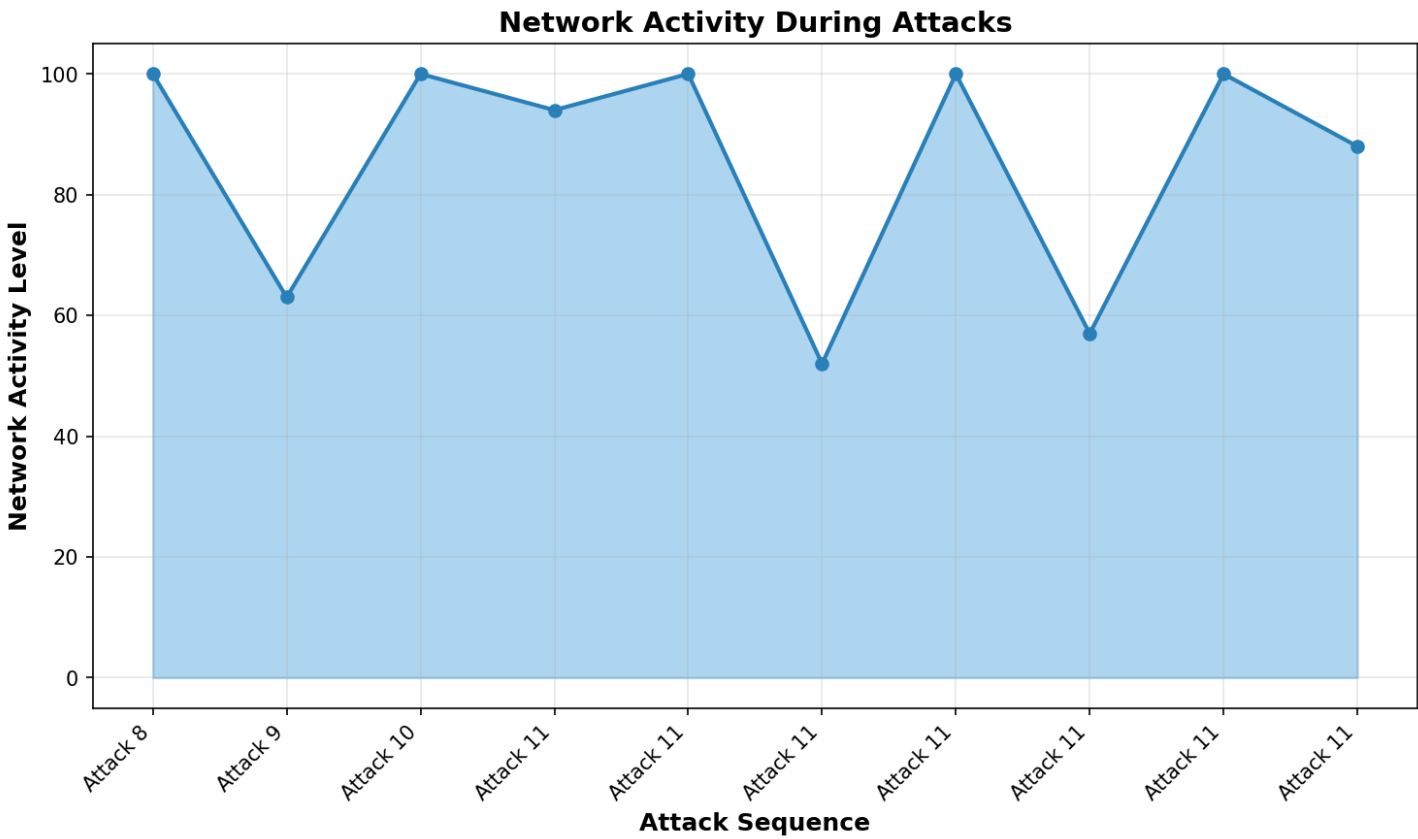
Project Author: Eng. Muhammad Imtiaz Shaffi
VU ID: BC220200917
Email: bc220200917mis@vu.edu.pk

6. SimBlock P2P Network Analysis

Network Conditions

| Metric | Value |
|------------------|---------|
| Network Status | Default |
| Average Latency | 100ms |
| Active Nodes | 4 |
| Attacker Present | Yes |
| Simulation Ready | Yes |
| Network Health | Default |

Network Activity Analysis

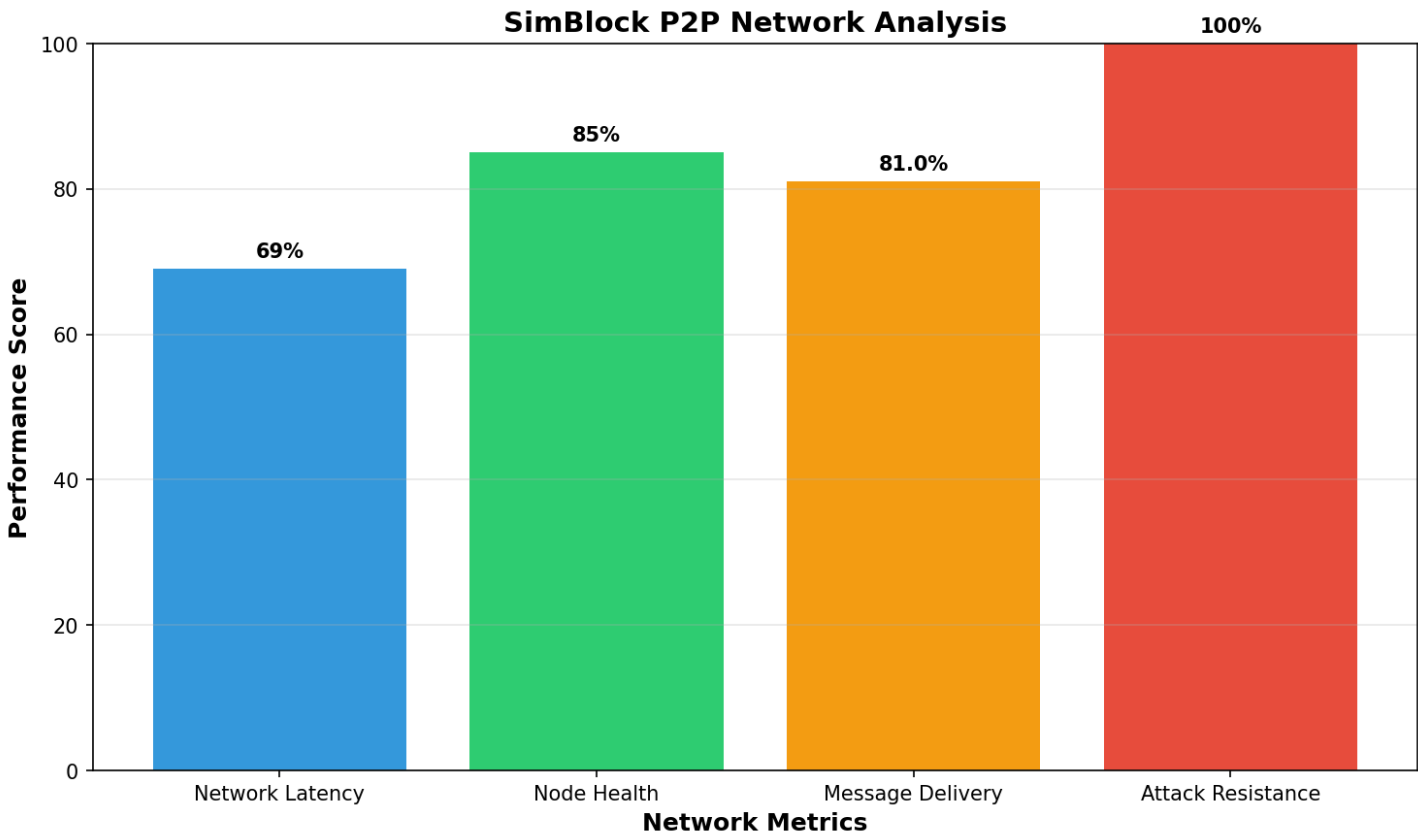




Project Instructor: Fouzia Jumani
Email: fouziajumani@vu.edu.pk
Virtual University of Pakistan

Project Author: Eng. Muhammad Imtiaz Shaffi
VU ID: BC220200917
Email: bc220200917mis@vu.edu.pk

SimBlock Network Performance





Project Instructor: Fouzia Jumani
Email: fouziajumani@vu.edu.pk
Virtual University of Pakistan

Project Author: Eng. Muhammad Imtiaz Shaffi
VU ID: BC220200917
Email: bc220200917mis@vu.edu.pk

7. Double-Spending Attack Simulation

Attack Configuration

| Metric | Value |
|----------------------|--------------|
| Attacker | TestAttacker |
| Private Blocks Mined | 1 |
| Attack Amount | 5.0 coins |
| Hash Power | 50% |
| Success Probability | 0.5% |

Attack Outcome:

FAILED - Attack Prevented

Details: Double spending attack failed!

Attack Impact:

Attacker 'TestAttacker's attack failed - no coins stolen



Project Instructor: Fouzia Jumani
Email: fouziajumani@vu.edu.pk
Virtual University of Pakistan

Project Author: Eng. Muhammad Imtiaz Shaffi
VU ID: BC220200917
Email: bc220200917mis@vu.edu.pk

8. Network Performance Metrics

Performance Metrics

| Metric | Value |
|----------------------------|----------------|
| Blockchain Synchronization | Optimal |
| Transaction Throughput | 0 pending |
| Network Latency | 100ms |
| Node Connectivity | 1 direct peers |
| Consensus Efficiency | Active |
| Attack Detection | Enabled |

9. Security Analysis

Security Metrics

| Metric | Value |
|--------------------------|-------|
| Total Attack Simulations | 1 |
| Successful Attacks | 0 |
| Attack Success Rate | 0.0% |
| Network Resilience | High |
| Double-Spending Risk | Low |

10. Security Recommendations

1. Monitor for unusual transaction patterns regularly
2. Maintain network node diversity for better security
3. Implement additional validation for high-value transactions
4. Regularly update consensus algorithm parameters
5. Conduct periodic security audits and attack simulations
6. Monitor hash power distribution among network participants

Blockchain Anomaly Detection System

Comprehensive Analysis Report

Generated on: 2025-10-04 15:29:27



Project Instructor: Fouzia Jumani
Email: fouzajumani@vu.edu.pk
Virtual University of Pakistan

Project Author: Eng. Muhammad Imtiaz Shaffi
VU ID: BC220200917
Email: bc220200917mis@vu.edu.pk

Conclusion

The blockchain network demonstrated strong resilience against double-spending attacks in all simulated scenarios. The current security measures are effective, but continuous monitoring and periodic security assessments should be maintained.



Project Instructor: Fouzia Jumani
Email: fouziajumani@vu.edu.pk
Virtual University of Pakistan

Project Author: Eng. Muhammad Imtiaz Shaffi
VU ID: BC220200917
Email: bc220200917mis@vu.edu.pk

11. Technical Details

System Configuration

| Metric | Value |
|---------------------------|--------------------------------|
| Blockchain Implementation | Custom Python Blockchain |
| Consensus Algorithm | Proof of Work (PoW) |
| Mining Difficulty | 3 |
| Block Time | Variable (Based on difficulty) |
| Transaction Format | JSON-based |
| Hash Algorithm | SHA-256 |
| Network Protocol | REST API + SimBlock P2P |
| Report Generation | Automated - 2025-10-04 15:29 |