Blockchain Anomaly Detection System

Comprehensive Analysis Report

Generated on: 2025-10-05 13:12:46

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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	4
Total Transactions	6
Pending Transactions	0
Current Difficulty	3
Mining Reward	2.0 coins
Connected Peers	1

Blockchain Growth Chart

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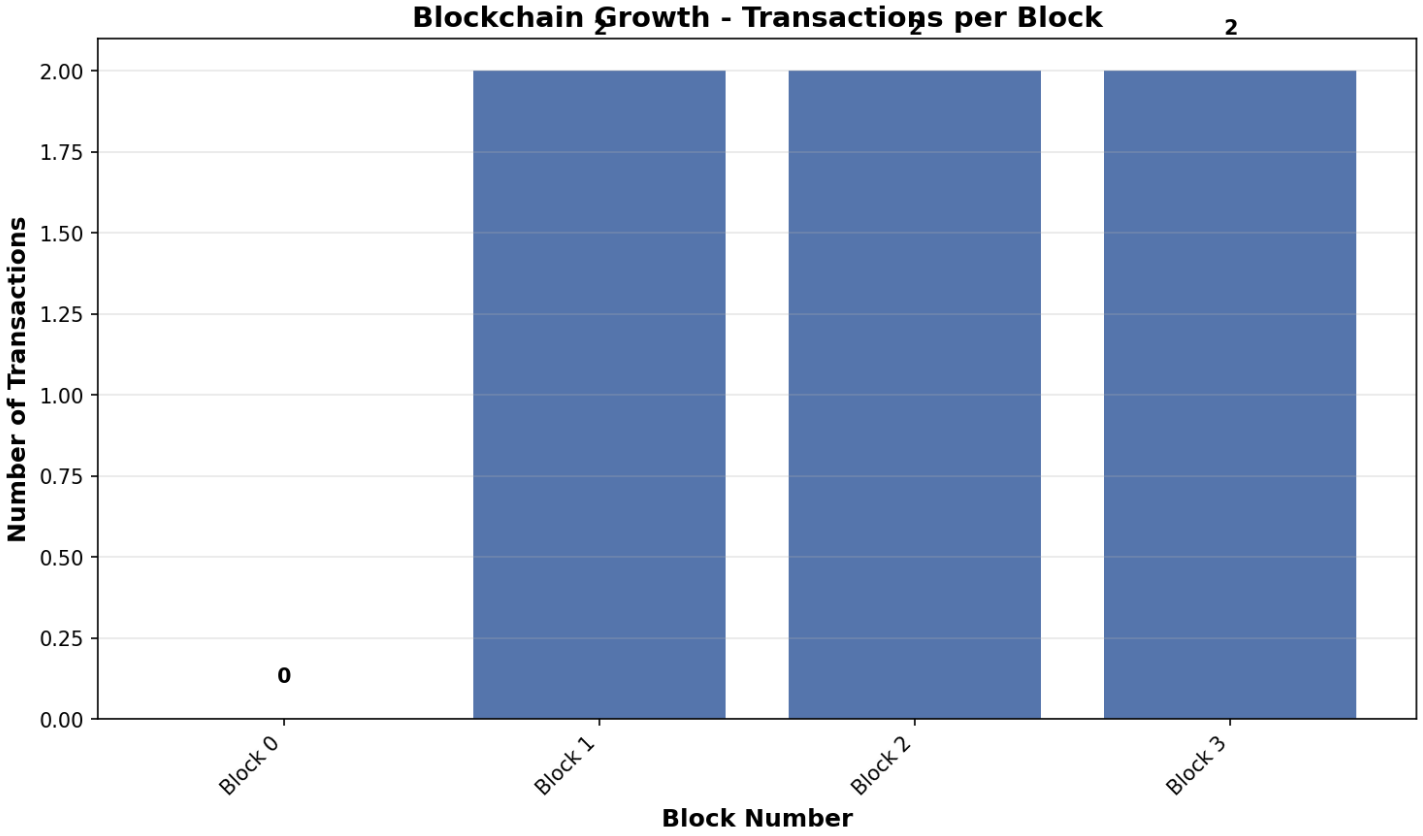

3. Transaction Analysis

Recent Transactions:

- TestUser1 -> TestUser2: 5.0 coins
- TestUser1 -> TestUser2: 5.0 coins
- TestUser1 -> TestUser2: 5.0 coins

4. Wallet Balances

Current Wallet Balances

Metric	Value
TestUser1	-15.00 coins
TestUser2	15.00 coins

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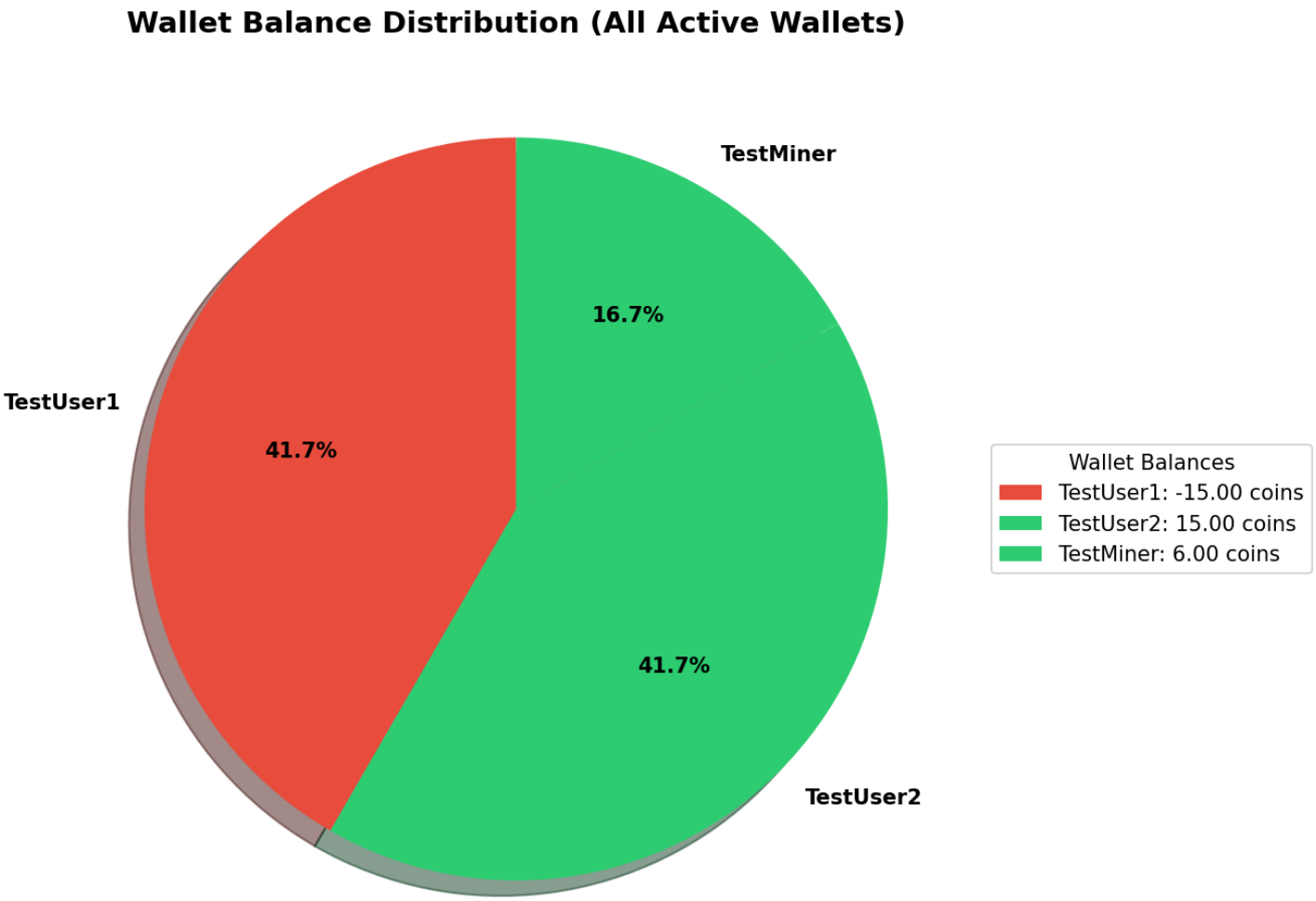
TestMiner	6.00 coins
TestAttacker	0.00 coins

Balance Distribution Chart



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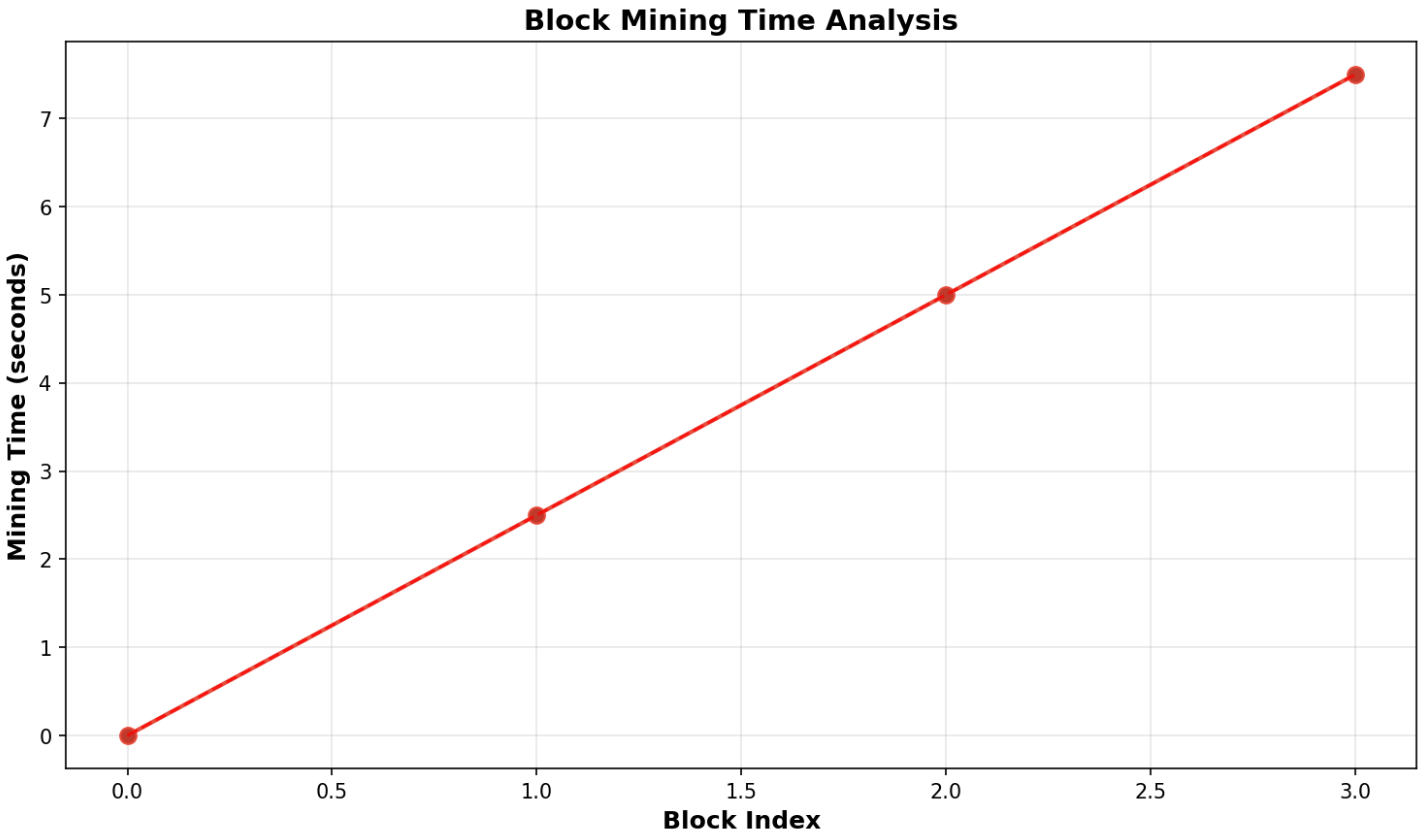
5. Mining Analysis

Mining Time Analysis Chart



Mining Statistics

Metric	Value
Total Blocks Mined	4
Average Transactions per Block	1.5
Genesis Block	0005749dc912e969ecb2...
Latest Block	000b32557b376028c78a...

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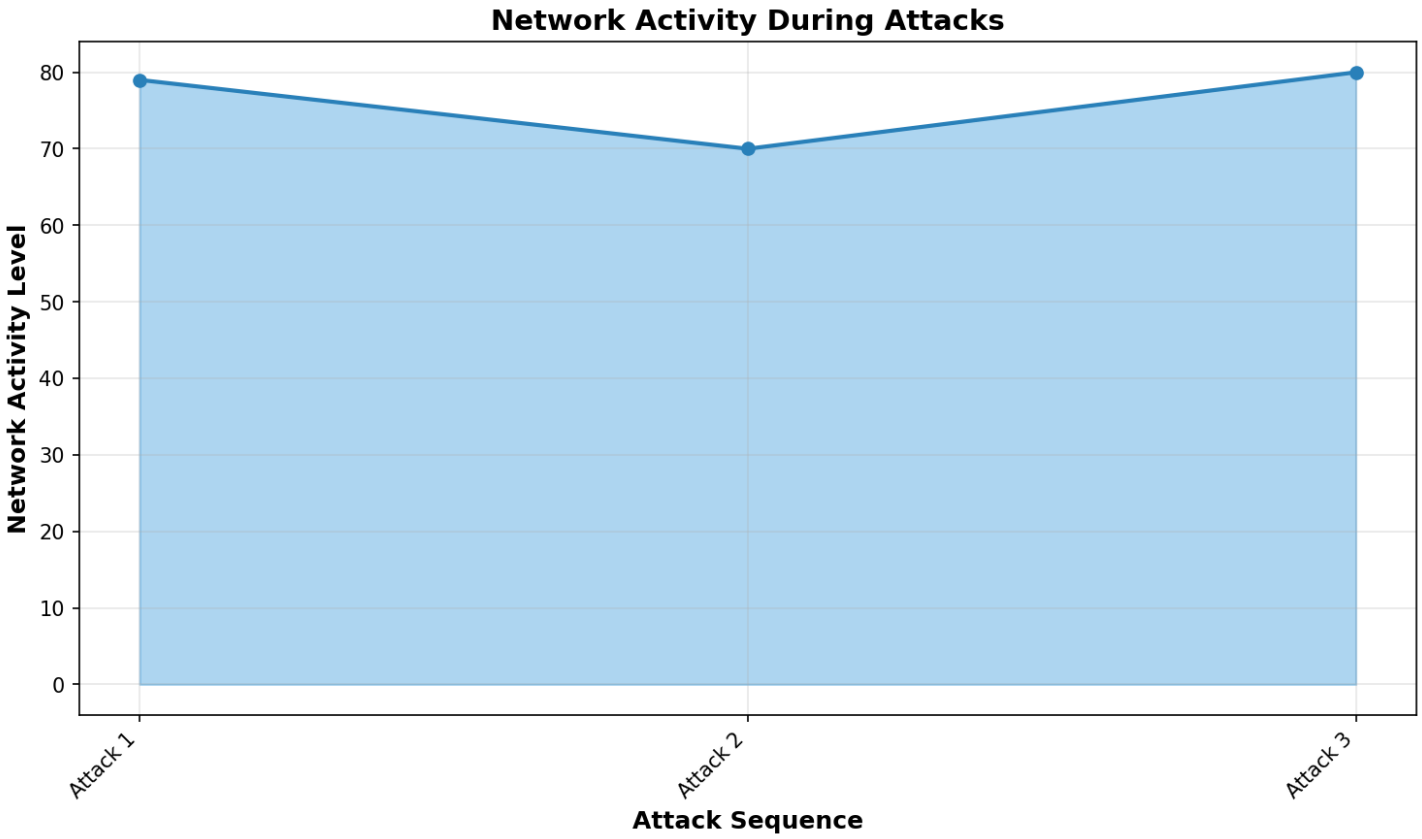
6. SimBlock P2P Network Analysis

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



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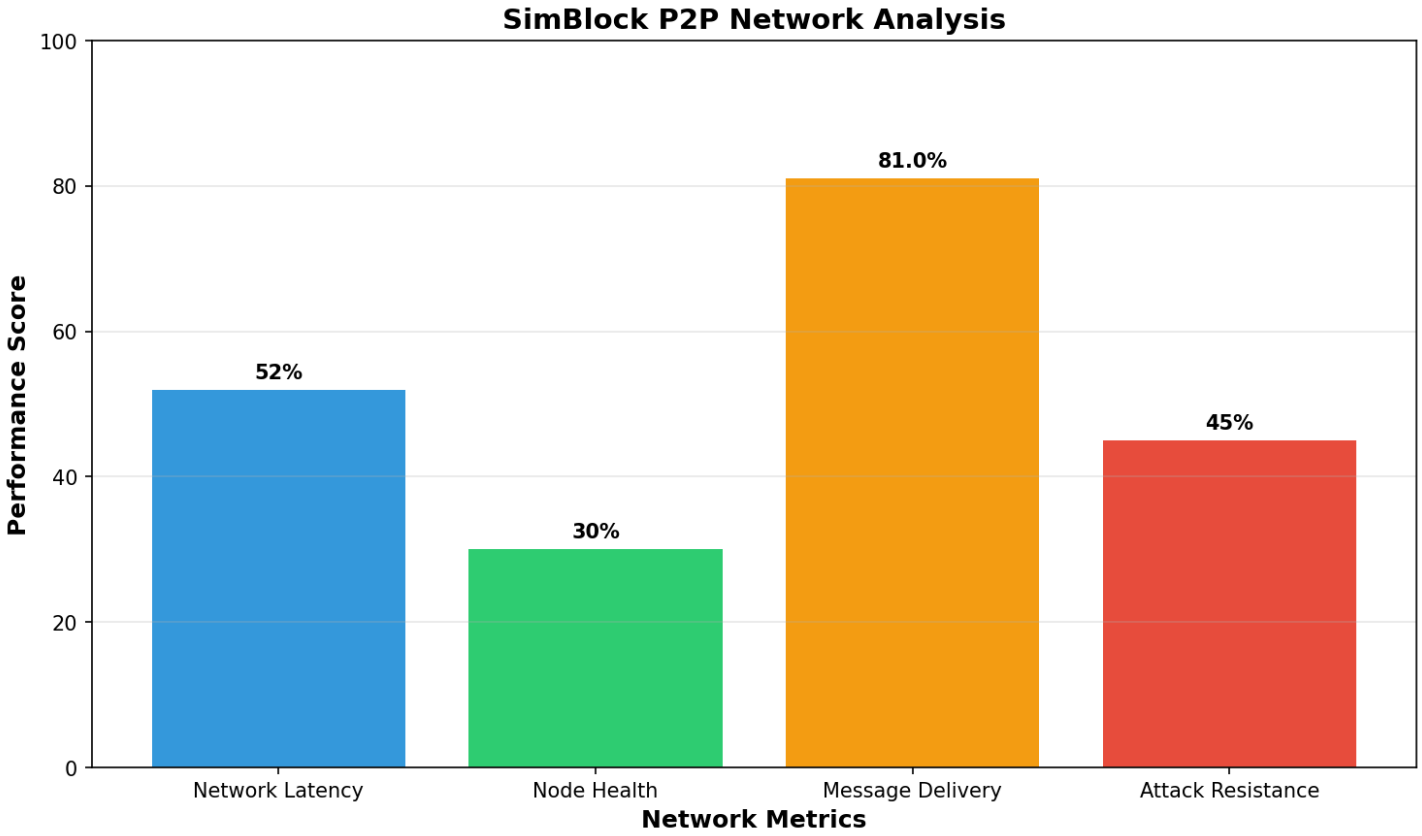
SimBlock Network Performance



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7. Double-Spending Attack Simulation

Attack Configuration

Metric	Value
Attacker	TestAttacker
Private Blocks Mined	1
Attack Amount	10.0 coins
Hash Power	40%
Success Probability	0.7%

Attack Outcome:

FAILED - Attack Prevented

Details: Double spending attack failed!

Attack Impact:

Attacker 'TestAttacker's attack failed - no coins stolen

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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

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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.

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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 - 2025-10-05 13:12