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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	6
Total Transactions	10
Pending Transactions	0
Current Difficulty	3
Mining Reward	2.0 coins
Connected Peers	1

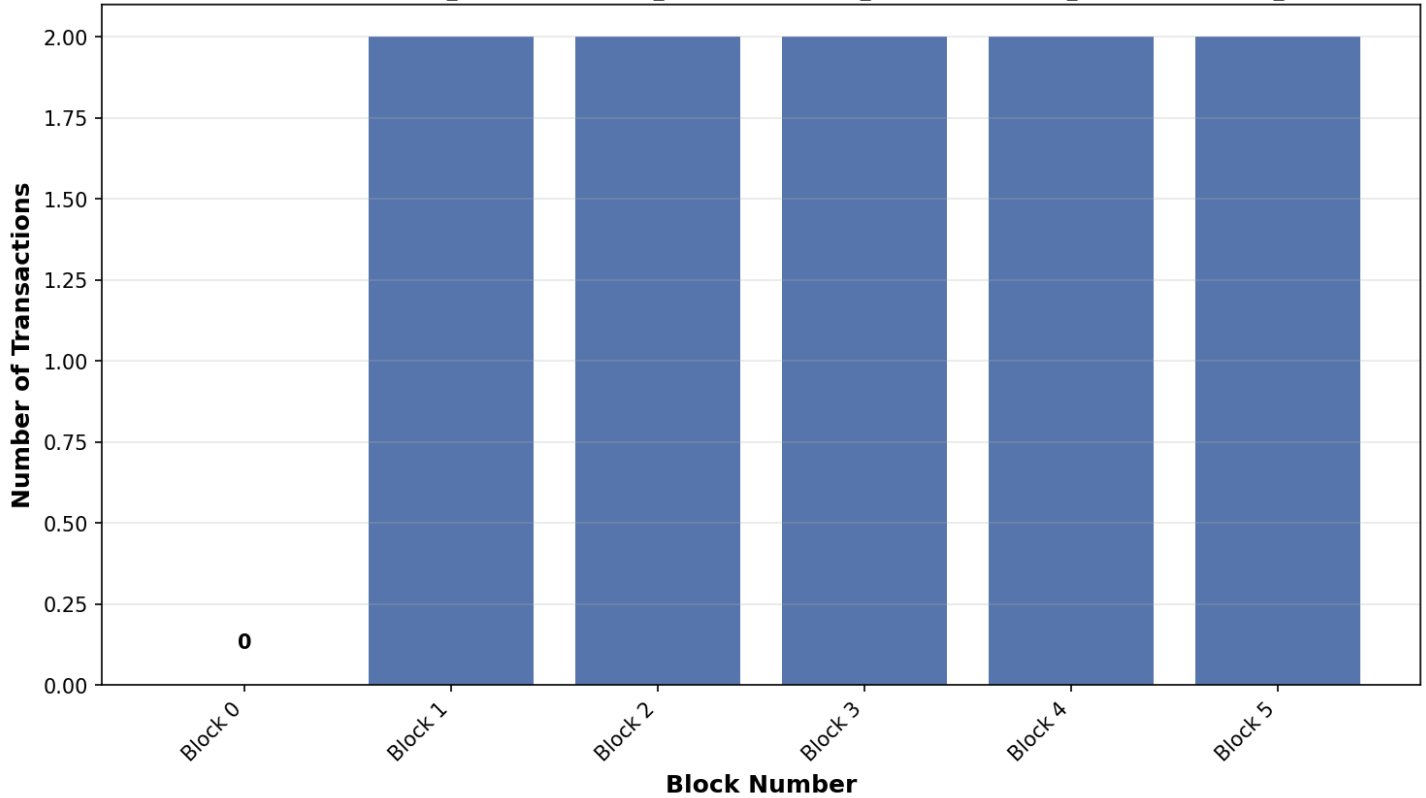
### Blockchain Growth Chart



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Blockchain Growth - Transactions per Block



### 3. Transaction Analysis

#### Recent Transactions:

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

### 4. Wallet Balances

#### Current Wallet Balances

Metric	Value
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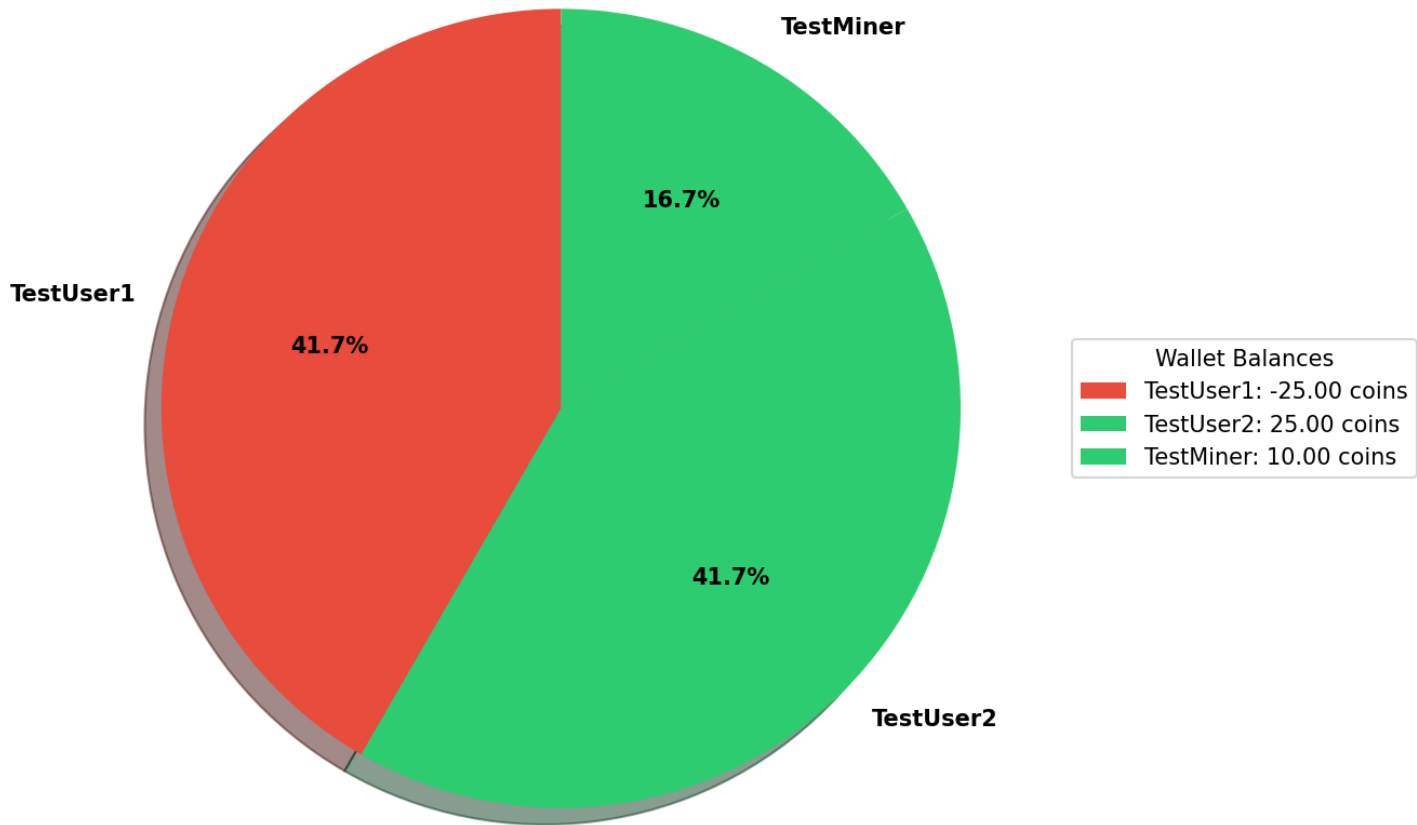
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TestUser1	-25.00 coins
TestUser2	25.00 coins
TestMiner	10.00 coins
TestAttacker	0.00 coins

Balance Distribution Chart

Wallet Balance Distribution (All Active Wallets)



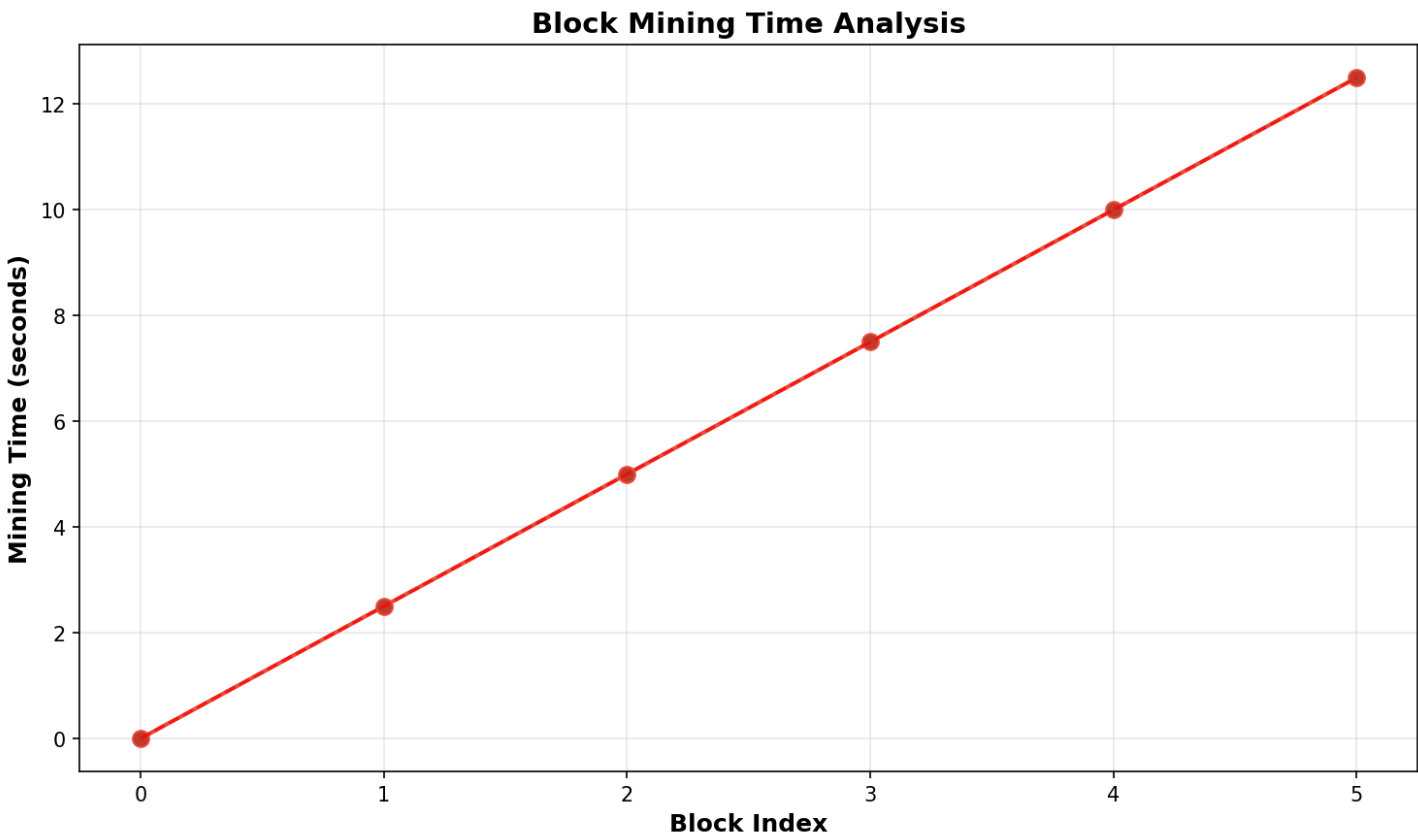


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### 5. Mining Analysis

#### Mining Time Analysis Chart



#### Mining Statistics

Metric	Value
Total Blocks Mined	6
Average Transactions per Block	1.7
Genesis Block	0005749dc912e969ecb2...
Latest Block	00090dd8e2db65e33d02...



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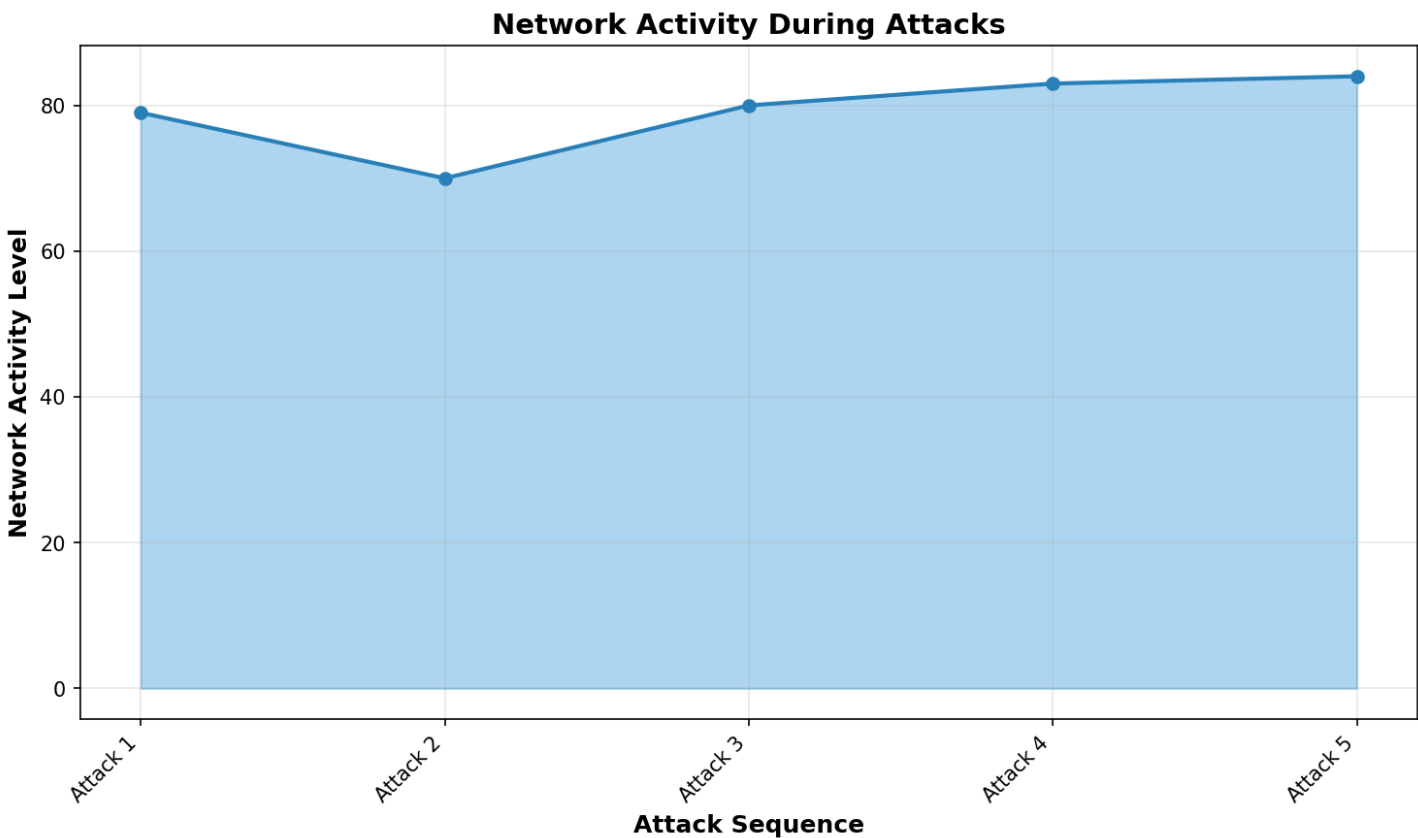
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### 6. SimBlock P2P Network Analysis

#### 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

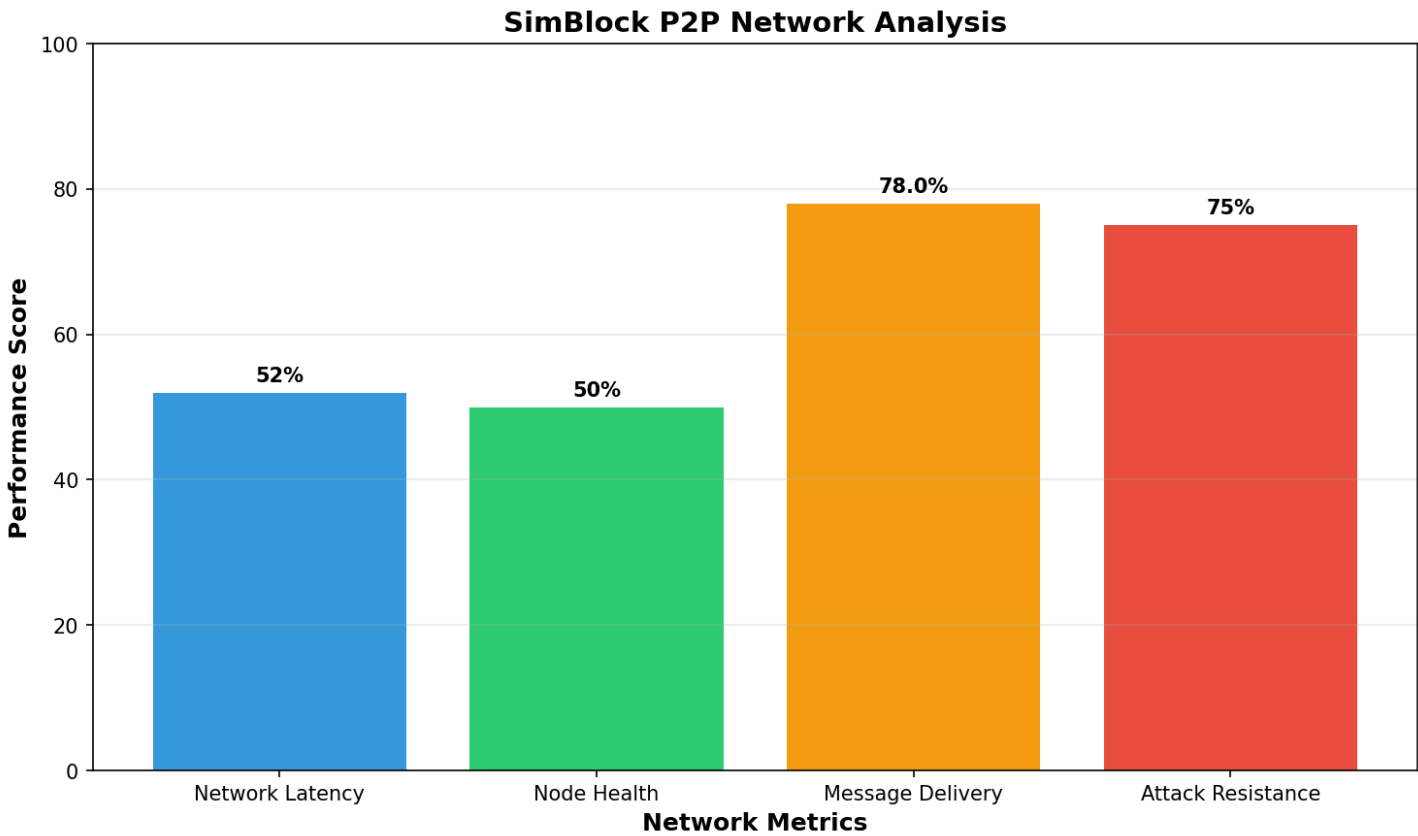




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### SimBlock Network Performance





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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



# Blockchain Anomaly Detection System

## Comprehensive Analysis Report

Generated on: 2025-10-05 13:14:23



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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 13:14