

Lab Session: Block Explorer Analysis

BSc Blockchain, Crypto Economy & NFTs

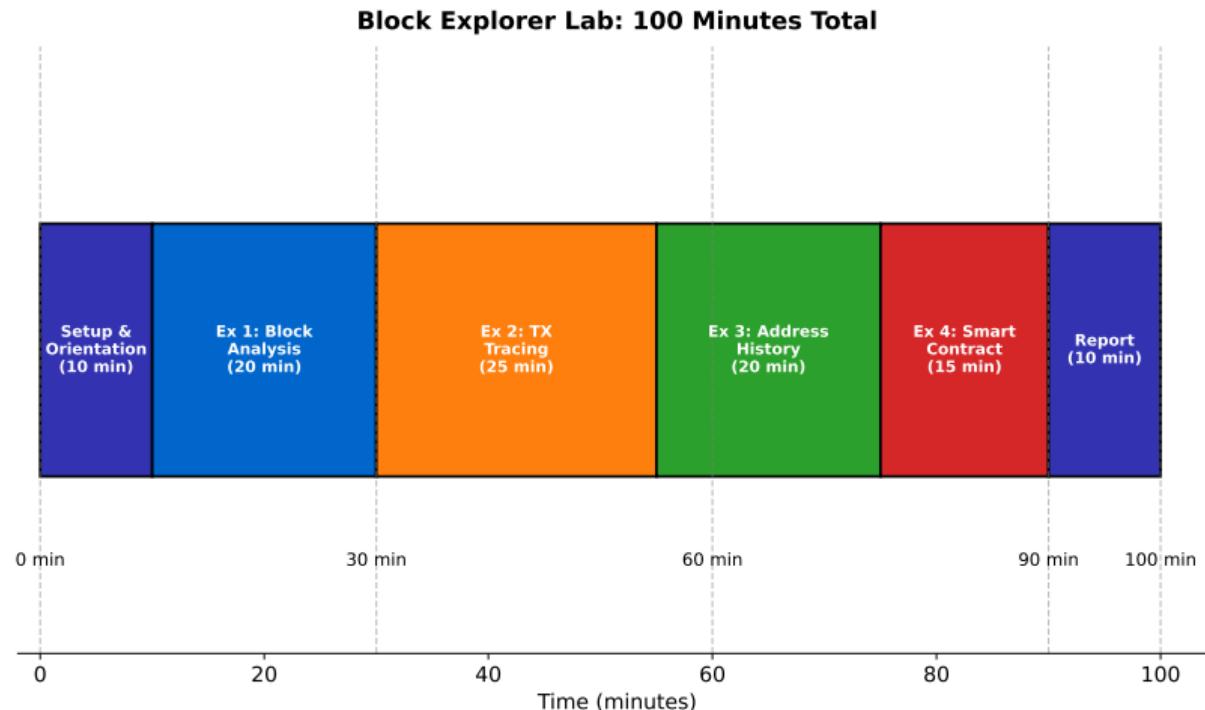
Course Instructor

Module A: Blockchain Foundations

By the end of this lab session, you will be able to:

- Navigate Etherscan and Blockstream block explorers
- Analyze transaction details: inputs, outputs, fees
- Trace transaction lifecycle from broadcast to confirmation
- Examine block structure and validator information
- Investigate address activity and transaction history
- Conduct basic blockchain forensic analysis

Lab Session Structure



Total duration: 100 minutes with 4 main exercises

What is a Block Explorer?

Definition:

- Web-based interface to query blockchain data
- Provides human-readable view of blocks, transactions, addresses
- Free and publicly accessible

Major Block Explorers:

Bitcoin:

- Blockstream.info
- Blockchain.com
- Mempool.space

Ethereum:

- Etherscan.io
- Blockscout.com
- Ethplorer.io

Transaction Anatomy

Transaction Anatomy: Key Fields to Analyze

TRANSACTION			
TX Hash:	0x7f9...3ab	Block:	18,234,567
From:	0xSender...	Gas Used:	21,000
To:	0xReceiver...	Gas Price:	25 Gwei
Value:	1.5 ETH	Status:	Success

Understanding these fields is essential for analyzing any blockchain transaction

Exercise 1: Analyzing Bitcoin Transactions

Instructions:

- ① Visit: <https://blockstream.info>
- ② Search for the first-ever Bitcoin transaction:
f4184fc596403b9d638783cf57adfe4c75c605f6356fbc91338530e9831e9e16
- ③ Examine: inputs, outputs, fee, block number, confirmations

Key Observations:

- **Inputs:** Reference to previous transaction output
- **Outputs:** New UTXOs with amounts and addresses
- **Fee:** Difference between input sum and output sum
- **Confirmations:** Blocks built on top of this transaction

Exercise 2: Analyzing Ethereum Transactions

Instructions:

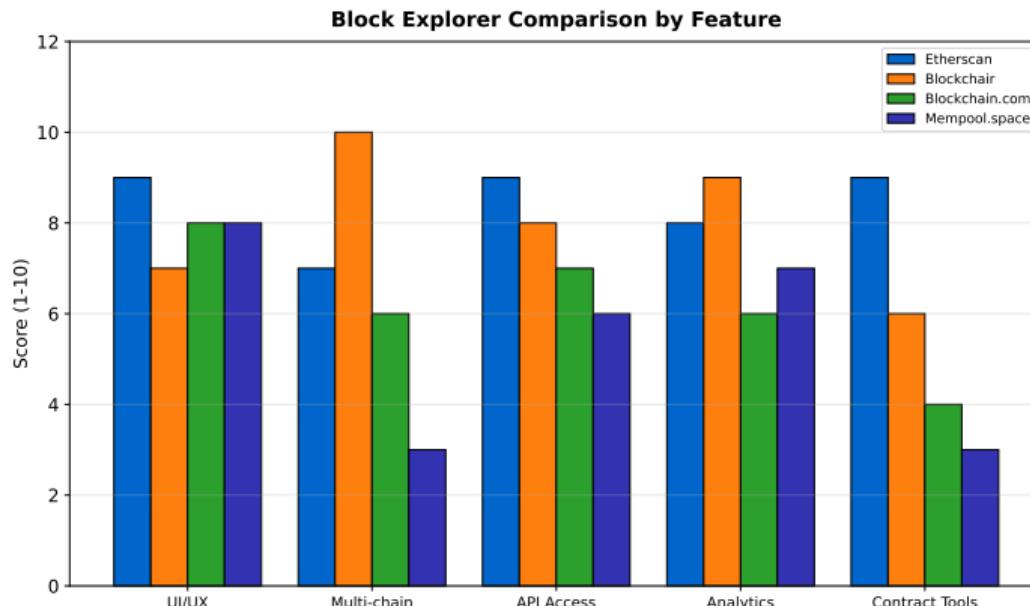
- ① Visit: <https://etherscan.io>
- ② Select a recent transaction from homepage
- ③ Examine: hash, status, block, from, to, value, gas

Gas Mechanics:

- Gas Limit: Maximum gas user willing to pay
- Gas Used: Actual gas consumed
- Gas Price: Price per unit (in gwei)
- Transaction Fee: Gas Used × Gas Price

Example: 21,000 gas × 32 gwei = 0.000672 ETH

Block Explorer Comparison



Etherscan excels for Ethereum; Blockchair for multi-chain research

Exercise 3: Address Investigation

Entity Types to Analyze:

- ① **Exchange Address:** High volume, large balances, labeled
- ② **Smart Contract:** "Contract" label, receives interactions
- ③ **Individual User:** Low volume, smaller balances

Sample Addresses:

- Binance: 0x28C6c06298d514Db089934071355E5743bf21d60
- Uniswap: 0xE592427A0AEce92De3Edee1F18E0157C05861564
- Your MetaMask address (from Lab 8)

Exercise 4: Forensic Case Study

Scenario: Tracking fund flows

Investigation Steps:

- ① Confirm source transaction
- ② Click on destination address
- ③ View subsequent transactions
- ④ Follow the chain of transfers
- ⑤ Document path with transaction hashes

Privacy Techniques to Recognize:

- Mixers/Tumblers (e.g., Tornado Cash)
- CoinJoin transactions
- Exchange deposits (off-chain after deposit)

Submit the following:

① Transaction Analysis Report (2-3 pages):

- Bitcoin transaction: hash, inputs/outputs, fee
- Ethereum transaction: hash, gas breakdown
- Three addresses with entity type identification

② Screenshots:

- Bitcoin and Ethereum transaction details
- Block details page
- Address activity page

Submission Deadline: One week from lab session

Key Takeaways

- Block explorers provide transparency into all blockchain activity
- Bitcoin uses UTXO model; Ethereum uses account model
- Gas fees vary based on network congestion
- Addresses can be identified by transaction patterns
- Blockchain forensics is powerful but faces privacy challenges
- Verified smart contracts allow code auditing

Real-World Applications:

- Auditing and compliance
- Fraud investigation
- Market analysis (whale watching)