Blockchain Basics and Crypto Asset Tracing

3-Day Training Course

West Fargo Police Department
800 4th Ave. E.
Fargo, North Dakota

February 16-18, 2026

Daily Schedule: 8:30 AM - 4:30 PM
$550 fee per attendee
Speaker: Jesse Gossman, Co-Founder The Block Audit

Course Overview

This intensive three-day course provides law enforcement officers and financial crimes investigators with comprehensive training in cryptocurrency fundamentals, blockchain analysis, and crypto asset tracing techniques. Through a combination of lecture, demonstration, and extensive hands-on exercises, participants will develop practical skills for investigating cryptocurrency-related crimes.

The course progresses from foundational concepts through advanced tracing methodologies, culminating in a team-based mock investigation that integrates all learned skills. Participants will work with real cryptocurrency on live blockchains, providing authentic experience with wallet creation, transactions, and tracing.

Target Audience

- Law enforcement officers investigating financial crimes
- Federal agents working cryptocurrency cases
- Prosecutors handling crypto-related matters
- Financial crimes analysts and compliance investigators

No prior cryptocurrency experience required. Basic computer literacy and investigative background assumed.

Learning Objectives

Upon successful completion of this course, participants will be able to:

Foundational Knowledge

- Explain blockchain technology, consensus mechanisms, and cryptocurrency fundamentals
- Differentiate between UTXO-based (Bitcoin) and account-based (Ethereum) blockchain models
- Identify wallet types, address formats, and the role of private keys and seed phrases
- Describe the function of stablecoins, smart contracts, and decentralized exchanges

Practical Skills

- Create and recover cryptocurrency wallets using seed phrases
- Execute and analyze cryptocurrency transactions on live blockchains
- Navigate block explorers to trace transaction flows and identify patterns
- Use commercial forensic tools for attribution and clustering analysis

Investigative Techniques

- Apply tracing heuristics for both UTXO and account-based blockchains
- Recognize common transaction patterns: mixing, consolidation, exchange deposits
- Interpret exchange records and correlate on-chain/off-chain data
- Identify money laundering typologies in cryptocurrency transactions

Operational Knowledge

• Execute cryptocurrency seizures from hosted and unhosted wallets
• Establish and maintain secure government custody of seized assets
• Document cryptocurrency evidence for prosecution and asset forfeiture
• Conduct a complete cryptocurrency investigation from initial lead to case presentation

Detailed Course Content

Day 1: Introduction to Cryptocurrency

Day 1 establishes the foundational knowledge required for cryptocurrency investigations. Participants learn core concepts through lecture and immediately apply them through hands-on exercises with real cryptocurrency.

Module 1.1: Introduction (30 min)

• Brief history of digital currencies and Bitcoin's emergence
• Decentralized vs distributed systems
• Why cryptocurrency matters for law enforcement

Module 1.2: Blockchain Basics (45 min)

• Cryptographic hashing and its role in blockchain
• Consensus mechanisms: Proof of Work vs Proof of Stake
• Block structure and the mining/validation process
• Immutability and what it means for investigations

Module 1.3: Blockchain Types (45 min)

• UTXO model: Bitcoin, Litecoin - transaction mechanics
• Account model: Ethereum - how balances work differently
• Investigative implications of each model

Module 1.4: Wallet Fundamentals (45 min)

• Public keys, private keys, and addresses
• Address formats: recognizing Bitcoin, Ethereum, TRON
• How wallets generate and manage keys

Module 1.5: Wallet Types Deep Dive (45 min)

• Hosted vs unhosted wallets - investigative differences
• Hardware wallets, software wallets, paper wallets
• Recovery seeds: BIP-39 standard and common formats
• Exchange wallets and custodial relationships

Module 1.6: PRACTICAL - Wallet Creation (75 min)

• Students create Bitcoin and Ethereum wallets
• Proper seed phrase recording and security
• Receive live cryptocurrency from instructor
• Document wallet addresses for Day 2 exercises

Module 1.7: PRACTICAL - Blockchain Simulation (45 min)

• Interactive exercise demonstrating blockchain mechanics
• Students role-play as miners, nodes, and users
• Visualize transaction flow and confirmation process

Module 1.8: PRACTICAL - Block Explorers (90 min)

• Introduction to Blockchair, Mempool.space, Etherscan
• Locate and analyze deposit transactions from wallet exercise
• Compare Bitcoin vs Ethereum confirmation times
• Reading transaction details: inputs, outputs, fees

Day 2: Tracing Transactions and On-Chain Activity

Day 2 focuses on transaction tracing methodologies. Students apply theoretical concepts immediately through practical exercises that mirror real investigation scenarios, culminating in a complete money flow exercise.

Module 2.1: PRACTICAL - Wallet Swaps & Recovery (90 min)

- Students exchange seed phrases with partners
- Recover partner's wallet using seed phrase
- Execute transactions returning funds to original owner
- Experience the investigative significance of seed phrase seizure

Module 2.2: UTXO Tracing Theory (30 min)

- UTXO mechanics and change addresses
- Common input ownership heuristic (co-spending)
- Change address identification techniques
- Round number and unnecessary input heuristics

Module 2.3: UTXO Tracing Hands-On (30 min)

- Trace Day 1 Bitcoin transactions using open-source tools
- Practice with Blockchair and Mempool.space
- Identify and document transaction patterns

Module 2.4: Account-Based Tracing Theory (30 min)

- How Ethereum tracing differs from Bitcoin
- Accounting methodologies: FIFO, LIFO, specific identification
- Documenting methodology for court presentation

Module 2.5: Account Tracing Hands-On (30 min)

- Trace Day 1 Ethereum transactions using Etherscan
- Compare tracing approaches between blockchain types

Module 2.6: PRACTICAL - Wallet Consolidation (75 min)

- Teams consolidate all BTC to designated collection wallet
- Teams consolidate all ETH to designated collection wallet
- Creates complex transaction patterns for later analysis
- Simulates money laundering layering techniques

Module 2.7: Stablecoins Overview (30 min)

- USDT, USDC - issuers, networks, and use cases
- Why criminals prefer stablecoins
- Tracing stablecoins across different networks

Module 2.8: Smart Contracts & DEX (30 min)

- Smart contract fundamentals
- Decentralized exchanges and liquidity pools
- Cross-chain bridges and tracing challenges

Module 2.9: PRACTICAL - DEX & Smart Contracts (45 min)

- Execute cross-chain swap using THORSwap
- Convert consolidated crypto to USDT
- Return funds to instructor - complete the laundering cycle

Module 2.10: Open Source Tracing Exercise (30 min)

- Students trace their own Day 1-2 transaction flow
- Document placement → layering → integration
- Prepare for Day 3 commercial tool comparison

Day 3: Advanced Tracing, Forensics & Mock Investigation

Day 3 introduces commercial forensic tools, advanced investigative concepts, and seizure procedures. The course culminates with a team-based mock investigation that integrates all learned skills into a realistic case scenario.

Module 3.1: Commercial Forensic Tools (60 min)

- Overview of Chainalysis, Qlue, and other platforms
- Entity clustering and attribution databases
- Risk scoring and compliance applications
- When to use commercial vs open-source tools

Module 3.2: PRACTICAL - Rework Day 2 Traces (60 min)

- Re-analyze Day 2 transactions using commercial tools
- Compare results with open-source analysis
- Build labeled timelines and visualizations

Module 3.3: Exchange Records & KYC (30 min)

- Types of records exchanges maintain
- Reading and interpreting exchange data
- Correlating on-chain and off-chain evidence

Module 3.4: Transaction Behaviors & Patterns (30 min)

- Mixing services and CoinJoin transactions
- Peel chains and batching patterns
- Exchange deposit/withdrawal patterns
- Bridge and cross-chain movement indicators

Module 3.5: Money Laundering Networks (30 min)

- Common cryptocurrency money laundering typologies
- Mule networks and their blockchain signatures
- Red flags and patterns from Days 1-2 exercises

Module 3.6: Seizure & Custody Management (30 min)

- Legal authorities for cryptocurrency seizure
- Seizing from hosted wallets (exchanges)
- Seizing from unhosted wallets (devices, seed phrases)
- Government wallet options and security considerations
- Documentation and chain of custody

Module 3.7: Mock Investigation (120 min)

- Teams receive case file with seed phrase and background
- Investigate funding sources and destinations
- Identify on/off ramps and attribution points
- Prepare 1-page summary and 3-slide presentation

Module 3.8: Team Presentations (45 min)

- Teams present findings, methodology, and conclusions
- Compare approaches and discuss alternatives

Module 3.9: Instructor Walkthrough & Wrap-Up (15 min)

- Review solution set and optimal tracing approach
- Three-day course summary and key takeaways
- Resources for continued learning

Day 1 Schedule

Theme: Introduction to Cryptocurrency

Time	Topic / Activity	Notes
8:30 - 9:00 AM	Introduction	Brief history of digital currencies, Decentralized vs Distributed
9:00 - 9:40 AM	Blockchain Basics	Hashing, consensus mechanisms, block structure, mining
9:40 - 9:50 AM	BREAK	---
9:50 - 10:30 AM	Blockchain Types	Compare Bitcoin UTXO vs Ethereum account model
10:30 - 11:10 AM	Wallet Fundamentals	Wallet applications, addresses, composition
11:10 - 11:20 AM	BREAK	---
11:20 - 12:00 PM	Wallet Types Deep Dive	Paper, hardware, software, hosted vs unhosted, recovery seeds
12:00 - 1:00 PM	LUNCH BREAK	---
1:00 - 2:00 PM	⭐ **PRACTICAL: Wallet Creation**	Students create wallets, record seed phrases, receive crypto [WORKSHEET: Day1_Wallet_Creation.docx]
2:00 - 2:10 PM	BREAK	---
2:10 - 2:50 PM	⭐ **PRACTICAL: Blockchain Simulation**	Interactive blockchain simulation [WORKSHEET: Miner Instructions, Node Worksheet]
2:50 - 3:00 PM	BREAK	---
3:00 - 4:30 PM	⭐ **PRACTICAL: Block Explorers**	Locate deposits on explorers, review confirmations; observe BTC vs ETH confirmation times

Day 2 Schedule

Theme: Tracing Transactions and On-Chain Activity

Time	Topic / Activity	Notes
8:30 - 9:50 AM	⭐ **PRACTICAL: Wallet Swaps & Recovery**	Students swap worksheets, recover wallets, send crypto back [WORKSHEET: Day2_Morning_Swap_Recovery.docx]
9:50 - 10:00 AM	BREAK	---
10:00 - 10:25 AM	UTXO Tracing Theory	Considerations and mechanics of UTXO tracing, heuristics
10:25 - 10:50 AM	UTXO Tracing Hands-On	Blockchair, Mempool.space - Trace Day 1 Bitcoin transactions
10:50 - 11:00 AM	BREAK	---
11:00 - 11:25 AM	Account-Based Tracing Theory	Considerations and mechanics of account-based tracing
11:25 - 12:00 PM	Account Tracing Hands-On	Etherscan - Trace Day 1 Ethereum transactions
12:00 - 1:00 PM	LUNCH BREAK	---
1:00 - 2:00 PM	⭐ **PRACTICAL: Wallet Consolidation**	All BTC to Team 5, All ETH to Team 1 [WORKSHEET: Day2_Afternoon_Consolidation.docx]
2:00 - 2:10 PM	BREAK	---
2:10 - 2:35 PM	Stablecoins Overview	USDT, USDC, DAI - role, use cases, tracing considerations
2:35 - 3:00 PM	Smart Contracts & DEX	Smart contract fundamentals, DeFi mechanics, decentralized exchanges
3:00 - 3:10 PM	BREAK	---
3:10 - 3:50 PM	⭐ **PRACTICAL: DEX & Smart Contracts**	THORSwap: Teams swap to USDT, return to instructor [WORKSHEET: Day2_Late_DEX_Exchange.docx]
3:50 - 4:30 PM	Open Source Tracing Exercise	Students trace complete flow from Days 1-2: placement to layering to integration

Day 3 Schedule

Theme: Advanced Tracing, Forensics & Mock Investigation

Time	Topic / Activity	Notes
8:30 - 9:20 AM	Commercial Forensic Tools	Overview of commercial platforms (Chainalysis, Qlue), entity clustering, risk scoring
9:20 - 9:30 AM	BREAK	---
9:30 - 10:20 AM	⭐ **PRACTICAL: Rework Day 2 Traces**	Students revisit Day 2 transactions using commercial tools, improve labeling
10:20 - 10:30 AM	BREAK	---
10:30 - 10:55 AM	Exchange Records & KYC	How to read/interpret exchange records, match on-chain data
10:55 - 11:20 AM	Transaction Behaviors & Patterns	Mixing, batching, exchanges, bridges - behavioral heuristics
11:20 - 12:00 PM	Money Laundering Networks	Patterns, typologies, red flags; Days 1-2 exercise review
12:00 - 1:00 PM	LUNCH BREAK	---
1:00 - 1:25 PM	Seizure & Custody Management	Seizure tactics, custody models, government wallets, risks
1:25 - 1:50 PM	Mock Investigation Prep	Form teams, assign roles, distribute datasets
1:50 - 2:00 PM	BREAK	---
2:00 - 3:20 PM	⭐ **Mock Investigation**	Teams run investigations, analyze traces, produce findings (1-page + 3-slide summary)
3:20 - 3:30 PM	BREAK	---
3:30 - 4:10 PM	⭐ **Team Presentations**	Teams present timelines, evidence, conclusions; compare strategies
4:10 - 4:30 PM	Instructor Walkthrough & Wrap-Up	Review solution set, key tracing logic; course summary, resources

PRACTICAL EXERCISE WORKSHEETS

1. Day1_Worksheet_Wallet_Creation.docx

Distribute: Day 1, 1:00 PM | Content: Wallet selection, creation, seed phrase recording, addresses, explorer intro. Students keep for Day 2.

2. Day2_Morning_Worksheet_Swap_Recovery.docx

Distribute: Day 2, 8:30 AM | Content: Swap pairings, wallet recovery instructions, sending instructions, fee analysis.

3. Day2_Afternoon_Worksheet_Consolidation.docx

Distribute: Day 2, 1:00 PM | Content: Consolidation concept, team instructions, investigation analysis.

4. Day2_Late_Worksheet_DEX_Exchange.docx

Distribute: Day 2, 3:10 PM | Content: DEX explanation, THORSwap instructions, troubleshooting, AML cycle analysis.