

# Ethereum Development with Web3j and Java: A Hands-on Workshop

Conor Svensson  
Founder, Web3 Labs

George Tebrean  
Blockchain Dev

Nischal Sharma  
Blockchain Dev

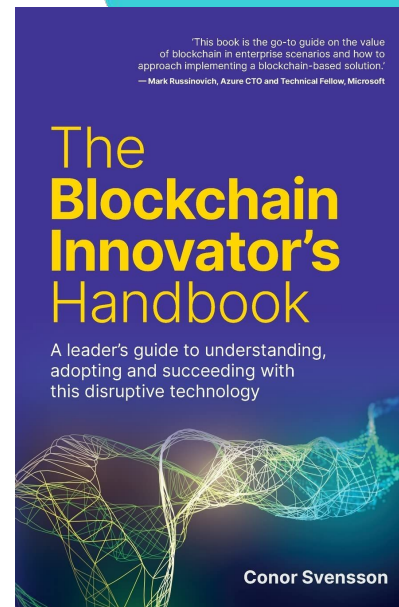
March 2024

# Agenda

- Intro
  - Why Web3J?
  - Roadmap
  - Getting Involved
  - Architectural Overview
  - Hands-on demo
  - Summary
- 

# Who Am I

- Institutional finance technology since 2003
  - Equities and Fixed Income market connectivity (UBS, Deutsche Bank)
  - OTC regulatory reporting, securitisation reporting (ANZ)
- Blockchain since 2016
  - Authored Web3j Java integration library
  - Founded Web3 Labs (2017)
- Chair, Technical Specification WG @ Enterprise Ethereum Alliance (2017-2020)
  - Creation of Enterprise Ethereum Client Specification
- Author, The Blockchain Innovator's Handbook
- Host, Web3 Innovator's Podcast



# About the Speakers

**George Tebreaan**



Senior Java Software Engineer with 7+ years of experience. Currently serving Blockchain Developer in Web3 Labs and Maintainer of Web3j

**Nischal Sharma**



Seasoned Backend Developer with 3+ years of focused expertise in the Ethereum ecosystem. Currently serving as Blockchain Developer in Web3 Labs and Maintainer of Web3j

# Web3 Labs

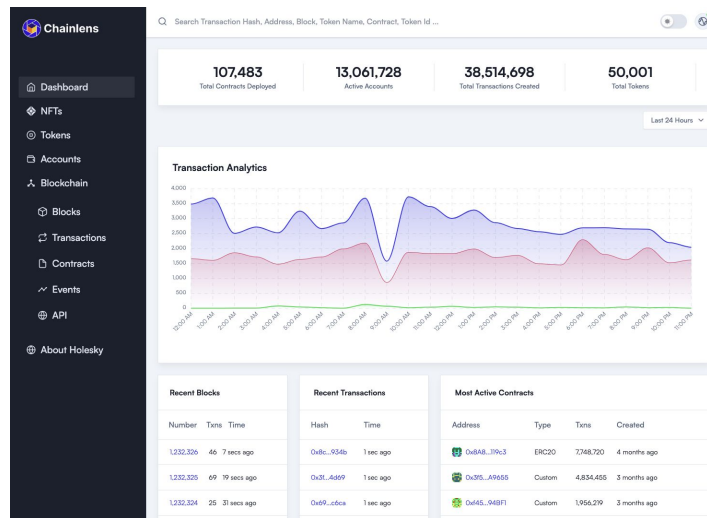
## Decentralised infrastructure solutions provider

- UK headquarters,
- Staff in Europe, Asia and Africa

## Products and services

- **Chainlens** blockchain explorer and analytics
- **Web3j** Ethereum Integration Library
- **Hyperledger Besu** support

## Customers



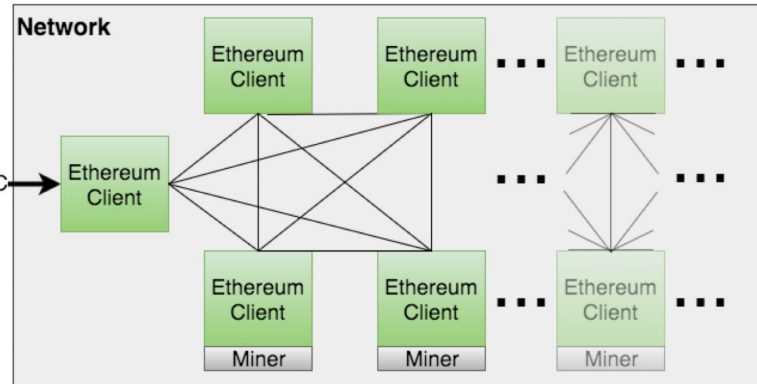
Microsoft J.P.Morgan



# Web3j

Web3j is the Java integration library for Ethereum

- Implements the JSON-RPC protocol for communicating with Ethereum nodes
- Performs type conversion for deploying, transacting with and reading data from smart contracts
- Wallet and key abstractions for transacting with Ethereum networks



# Why Web3j?

- 20+ years of infrastructure has been built in enterprise on the JVM platform
- Heavily scrutinised and battle tested by Ethereum community during past 7 years
- Type safe mappings from native EVM types to JVM and OpenAPI
- Robust testing capabilities — embedded production EVM and flexible integration testing capabilities
- Modular — use what you need
- Full Besu specific API and privacy support (sole implementation of this)

# Roadmap

- Updating web3j-android
- Enhance IntelliJ Web3j Solidity Debugger
- Support for Account Abstraction (ERC-4337)
- Generic struct functionality - struct without having a corresponding Java class
- Release web3j 5.x



# Getting Involved

Did you find a bug?

Did you write a patch that fixes a bug? **\*\*Any contribution is welcome (even small typo fix or readme/comment changes)**

Do you intend to add a new feature or change an existing one?

Do you have questions or want to discuss about the source code ?



[Discord Link](#)



[Github Link](#)



(\*First Join [Hyperledger Server](#) -> #Web3j Channel)

# Web3j Hyperledger Community

Join us in the Hyperledger Web3j community space!



[Community link](#)



Join us in the Hyperledger Web3j community calls!



[Calendar call invite](#)



# Web3 Labs

Web3 Labs is a leading blockchain strategy and technology company specialising in decentralised infrastructure solutions.

Their Chainlens platform provides data and analytics for EVM blockchains and appchains.

They also provide commercial support for Hyperledger Besu and Quorum.



[web3labs.com](https://web3labs.com)



[@web3labs](https://twitter.com/web3labs)



[hi@web3labs.com](mailto:hi@web3labs.com)



[linkedin.com/company/web3labs](https://linkedin.com/company/web3labs)



[youtube.com/c/Web3Labs](https://youtube.com/c/Web3Labs)



[github.com/web3labs](https://github.com/web3labs)

# Web3j Architecture

- Modular architecture
- Import specific modules based on needs

```
dependencies {  
    implementation org.web3j: <module-name\> : <version\>  
}
```

- **utils** - Minimal set of utility classes
- **rlp** - Recursive Length Prefix (RLP) encoders
- **abi** - Application Binary Interface (ABI) encoders
- **crypto** - cryptographic library for transaction signing and key/wallet management in Ethereum
- **tuples** - Simple tuples library
- **core** - Much like the previous web3j core artifact without the code generators
- **codegen** - code generators
- **console** - command-line tools


# Web3j Components

- web3j-unit - Junit 5 extension to streamline the creation of Ethereum contract tests
  - <https://github.com/web3j/web3j-unit>
- web3j-vm - an embedded freestanding Ethereum EVM and ledger running within a Java process
  - <https://github.com/web3j/web3j-vm>

Hands-on demo!



# Summary Workshop

1. Web3J Architecture
  2. Created ERC-20 and ERC-721 contract wrappers and projects
  3. Deployment of the smart contracts on the EVM networks.
  4. Interacted with the deployed smart contracts.
  5. Native test of the smart contracts wrappers using web3j-unit
  6. Executed and explored EIP-155, 1559, 4844 transactions.
- 

**Thank You!!!**  
**Questions?**