

# Hyperledger Besu Workshop for Financial Services

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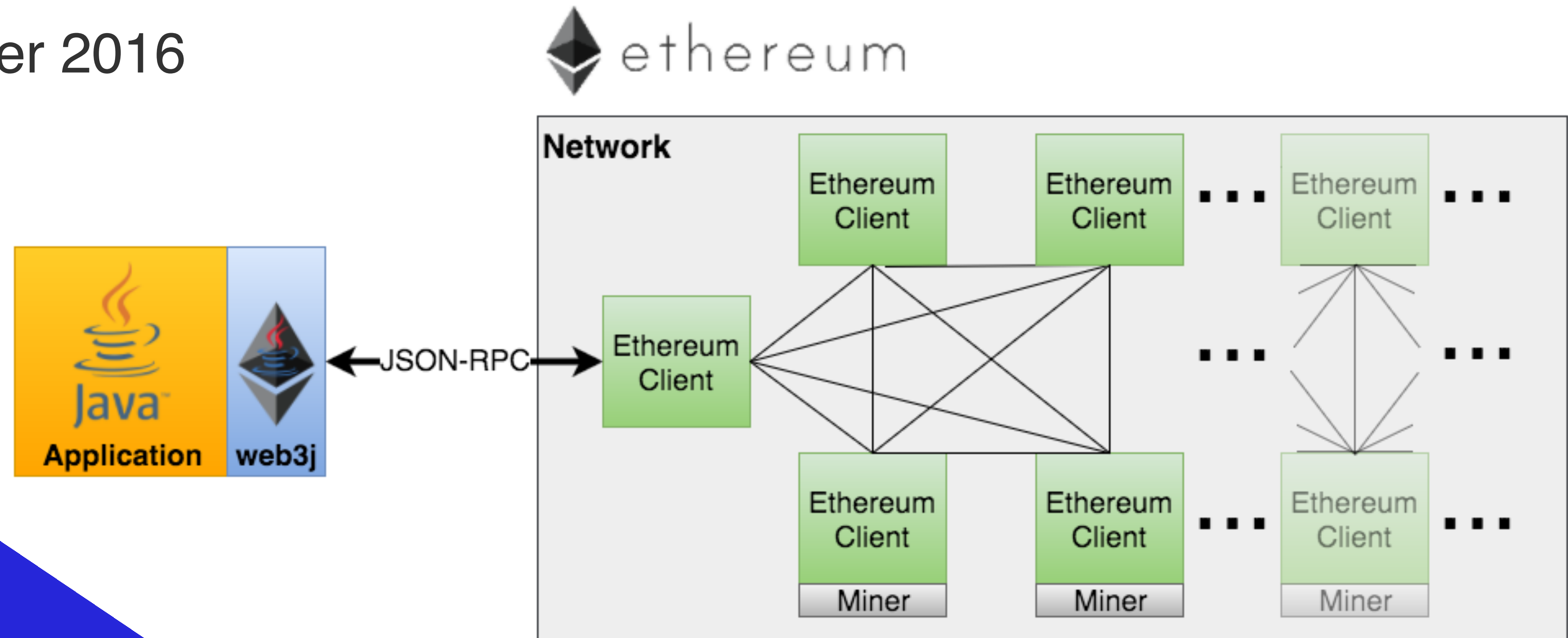
November 2023

# JVM development on Ethereum

Web3j and Besu

# Web3j

- Leading open-source developer library for Ethereum
- Over 2 million downloads
- Created: September 2016
- GitHub stars: 4.5k



# Corporate users

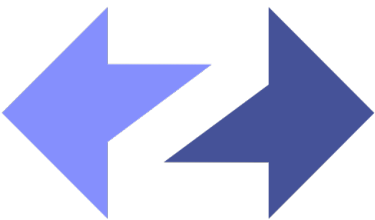
vmware®



# Web3 users



**Magic**



**zkSync**



# Components

## Core library

- JSON-RPC, wallets, smart contract wrappers

## Build tools

- Gradle and Maven plugins
- **Embedded EVM (Hyperledger Besu)**
- Embedded Solc + version manager
- Testing framework
- IntelliJ debugger

## CLI

- Project scaffolding

# Web3j and Besu

## Besu

- Acceptance tests

## Web3j

- Besu module
- Besu EVM
- Transaction handling
- Besu privacy support

The screenshot shows the Web3j documentation website. The top navigation bar includes the Web3j logo, the version number '4.10.0', and a search bar. The left sidebar contains a navigation menu with the following items: Web3j, Quickstart, Getting Started, Smart Contracts, Transactions, Web3j Eth2 Client, Web3j OpenAPI, Web3j Unit, Web3j EVM, Web3j Sock, Build Plugins, Privacy & Permissioning (expanded to show Besu Quickstart, Privacy with Hyperledger Besu, and Privacy Support in Web3j), Advanced, Command Line Tools, Use Cases, References, and Javadoc. The main content area displays the article 'Privacy with Hyperledger Besu'. The article text states: 'The Besu module in Web3j provides support for creating private transactions and privacy groups on Hyperledger Besu. For information as to how privacy is implemented in Besu, please see the [Besu privacy documentation](#). Privacy in Besu refers to the ability to keep transactions private between the involved participants. Other participants cannot access the transaction content or list of participants. Besu uses Orion, a separate software component, to manage private transactions. Orion is able to maintain public/private keypair, store privacy group details, and discover other Orion nodes on a network. A privacy group is a group of nodes identified by a unique privacy group ID in Orion. Each private transaction is stored in Orion and is associated with the privacy group ID. The Besu nodes maintain the public world state for the blockchain and a private state for each privacy group. The private states contain data that is not shared in the globally replicated public world state. Private transactions have additional attributes to public Ethereum transactions: 

- `privateFrom` - Orion public key of transaction sender
- `privacyGroupId` - Privacy group to receive transaction

# Alternatives

## Web3j

- ✓ Up to date
- ✓ Supports GoQuorum and Besu JSON-RPC API
- ✓ Create and send private transactions
- ✓ Privacy group management
- ✓ Java direct interaction with Besu

## Web3js-Quorum

- ~~✗ Outdated ✗~~
- ~~✗ Supports GoQuorum and Besu JSON-RPC API~~
- ✓ Create and send private transactions
- ✓ Privacy group management
- ~~✗ Java direct interaction with Besu~~




# Web3 Labs started to contribute to Besu development

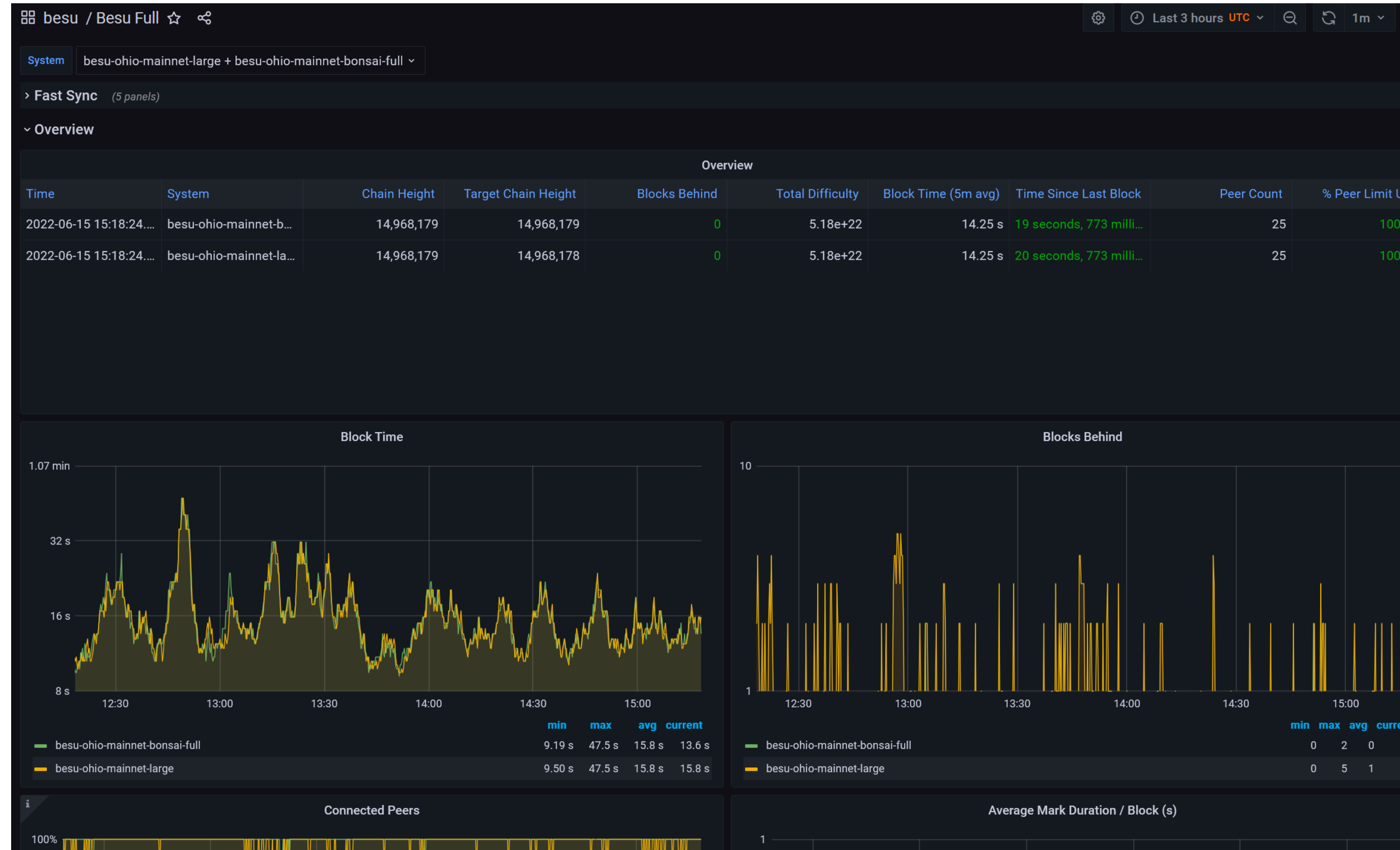
- ✓ Actively submitting pull requests to main Besu repository
- ✓ Participate and sharing ideas in Besu contributors community
- ✓ Engaging as mentor in different Hyperledger programs
- ✓ Keeping Web3j compatible with Besu needs
- ✓ Supporting multiple production deployments in enterprises



# Besu Monitoring Solutions

## Operational metrics

- Prometheus/Grafana
-  Node health scenarios
-  Normalise on-chain data
-  Network health scenarios



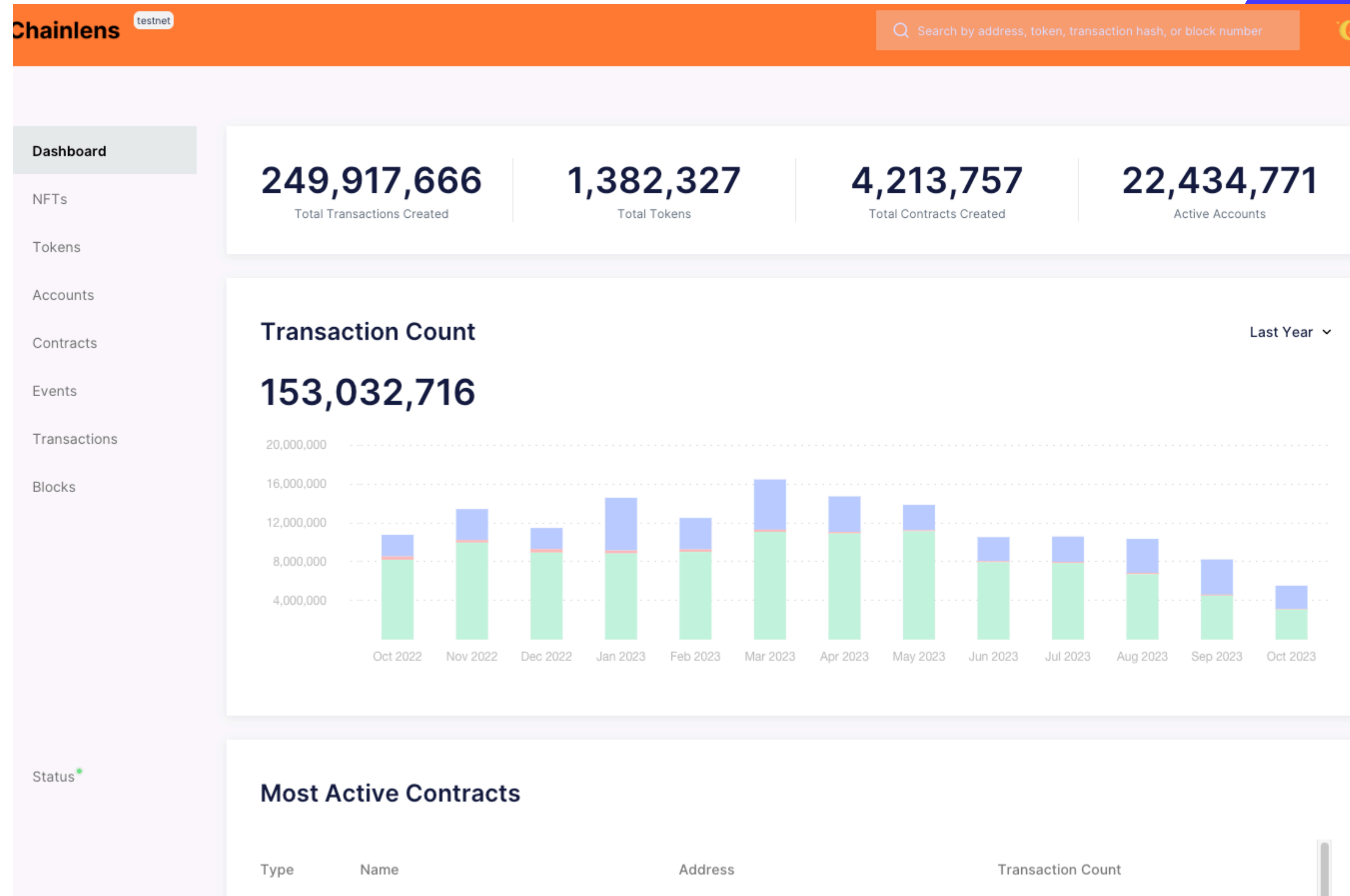
# Chainlens

## On-chain metrics

- Token, account and contract activity
- Events, transactions, blocks

## Reporting

- Robust API
- Advanced search, filter and sort



# Takeaways

Web3j 🤝 Besu

- Active support for Besu development
- Private transaction handling for Besu permissioned networks
- Monitor Besu networks via Chainlens
- Web3 Labs is actively engaged in the Hyperledger Besu contributors community and supports a number of enterprises in production with Besu.

# 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.



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