Hyperledger Besu: An Overview

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Grace Hartley, ConsenSys

Introductions

Grace Hartley

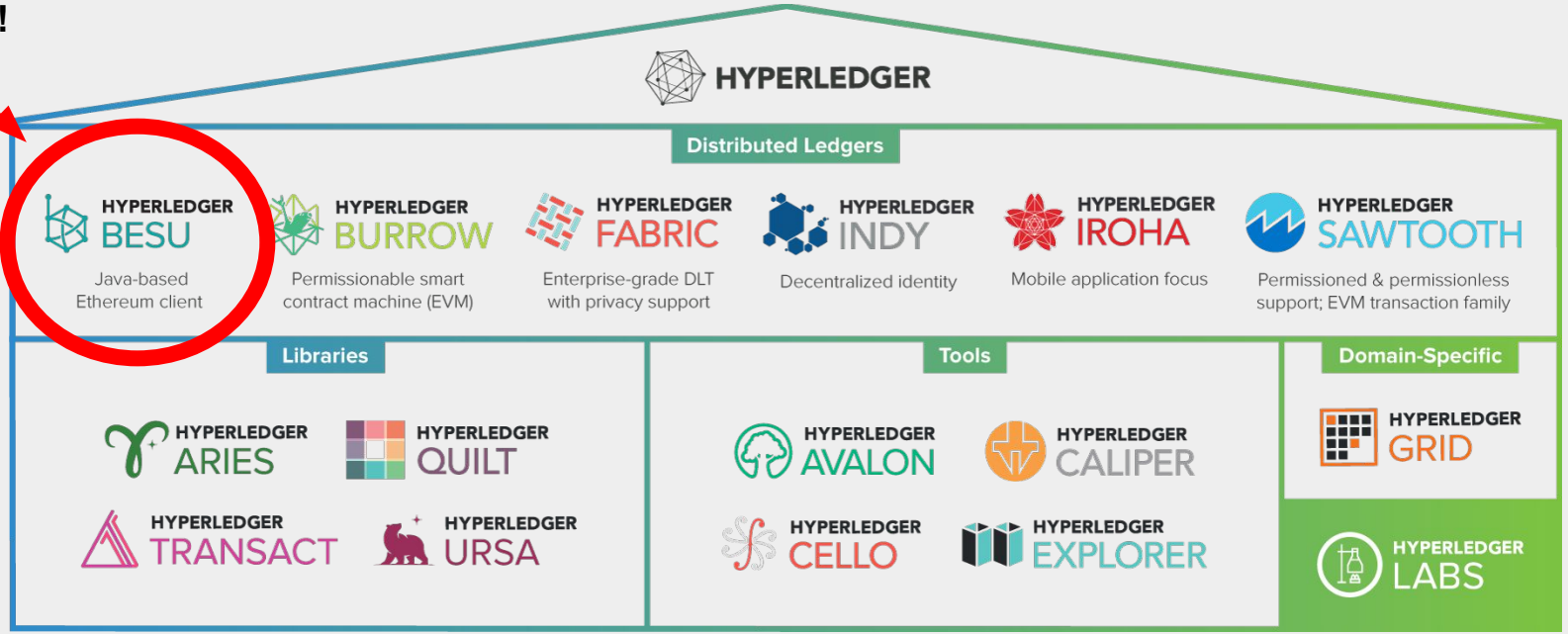
ConsenSys
Strategy & Operations Associate, PegaSys

PegaSys
The protocol engineering team at ConsenSys. PegaSys' mission is to make Ethereum enterprise-ready.

KPMG
Management consultant in the Financial Services practice

Hyperledger Greenhouse

Hello!!!



Hyperledger Besu

Agenda

Ethereum & Hyperledger History

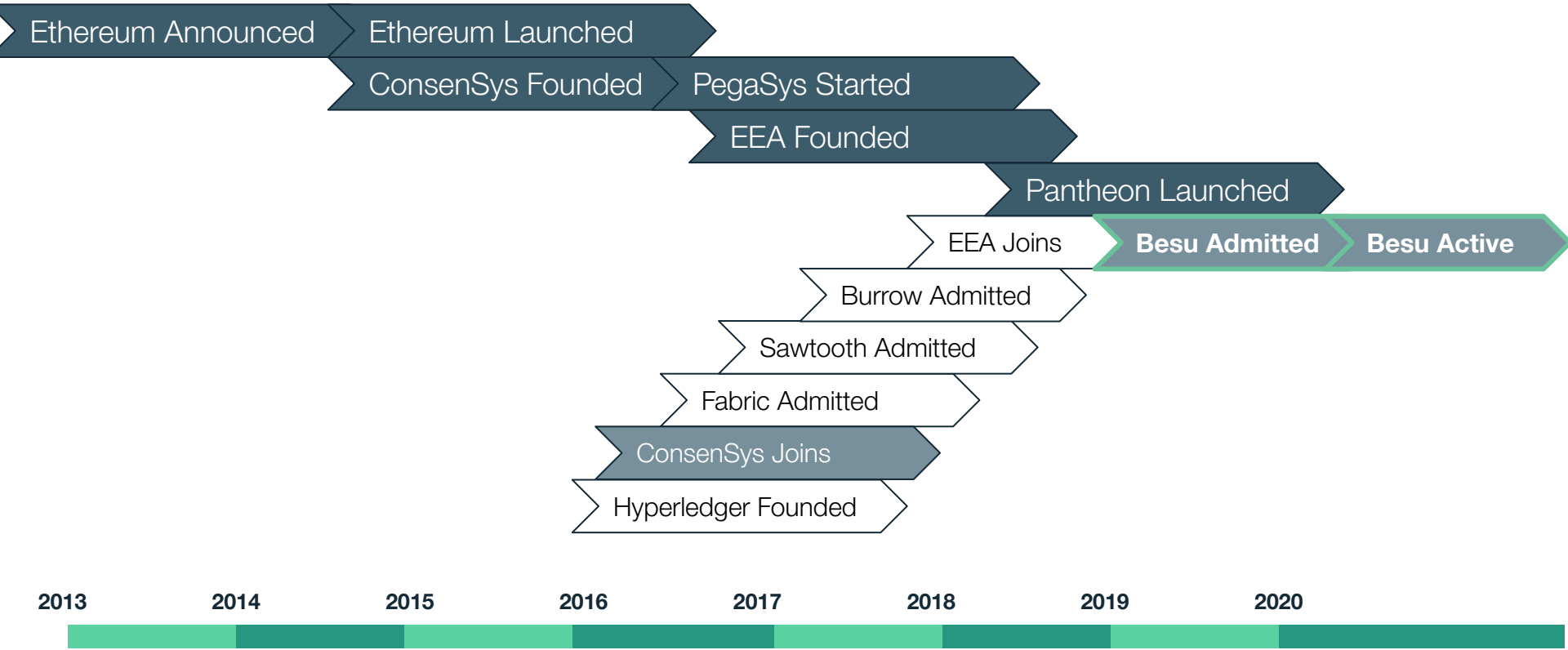
Hyperledger Besu: A Brief Look Back

Hyperledger Besu Feature Deep Dlve

Hyperledger Besu 1.5 Release

Use Cases

A History of Ethereum and Hyperledger



Hyperledger Besu highlights since joining Hyperledger in August 2019

- Had 40 releases this past year with 4 minor version updates (1.2, 1.3, 1.4 & 1.5)
- 60+ contributors to the codebase
- Presented at and attended our first Hyperledger Global Forum
- Launched new features, including PlugIn framework,GraphQL interface, fast sync, pruncing, TLS communication, events and logging….
- Gained Active Status in March 2020
- Created a transparent and open maintainer process

Enterprise Needs

High-performance enterprises have very different needs from individual users on a peer-to-peer network.

They need to: manage sensitive data in high volume, track quality, and hold themselves accountable to safety and regulatory standards in their industries.

Enterprise needs ultimately fall into 4 categories when it comes to blockchain technology:

- **Permissioning**
- **Privacy**
- **Performance**
- **Finality**

Feature Deep Dive

HYPERLEDGER
BESU

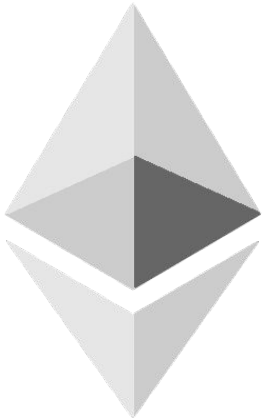
- Public Chain
- Finality
- Privacy
- Monitoring
- Permissioning
- Deployment

Public Chain

Hyperledger Besu is a full implementation of the Ethereum protocol, and is currently used to run many nodes on the Ethereum mainnet.

Benefits of the Public Chain:

- Network effects of mainnet community
- Most robust security guarantees - and testing!
- Cutting-edge innovation



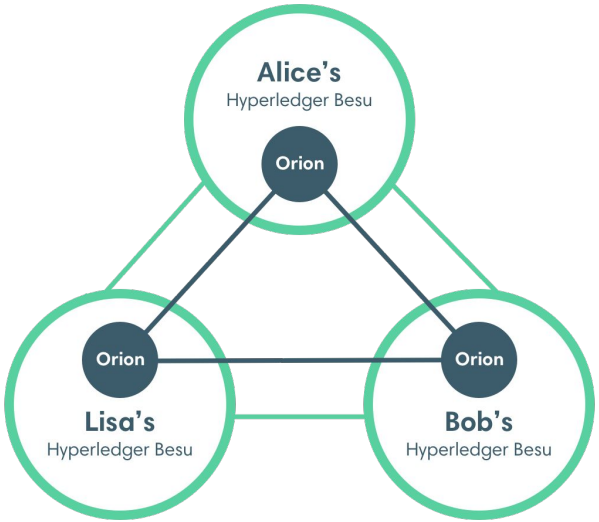
Privacy

Privacy in Besu keeps transactions private between the involved participants. Other participants cannot access the transaction content or list of participants.

PegaSys' private transaction manager, Orion, is an implementation of the Enterprise Ethereum Alliance (EEA) privacy standard.

Orion uses off-chain communication and embeds a hash of the private transaction on-chain.

PegaSys have built a new capability called Privacy Groups in Orion to allow multi-company access to a shared private state.

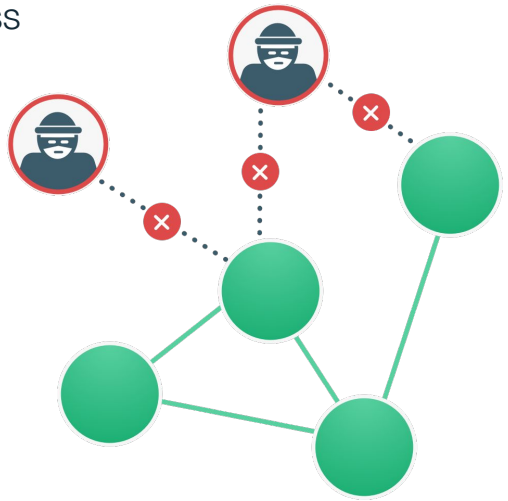


Permissioning

Permissioning in Besu increases the security of your network by allowing you to define access at node or account level.

The permissioning feature is smart contract based to simplify consistency across the network, and can be managed with an easy-to-use dapp.

- Node Permissioning
- Account Permissioning



Finality

Besu implements a number of consensus protocols, which enable it to run on the Ethereum public network, private and consortium networks, and multi-client test networks such as Rinkeby, Ropsten, and Görli.

IBFT 2.0 (Proof of Authority)

- A robust and stable consensus algorithm suitable for enterprise use cases in a private network. IBFT 2.0 grants immediate finality.

Ethash (Proof of Work)

- The consensus protocol of mainnet Ethereum and the Ropsten testnet. Resource-intensive with probabilistic finality.

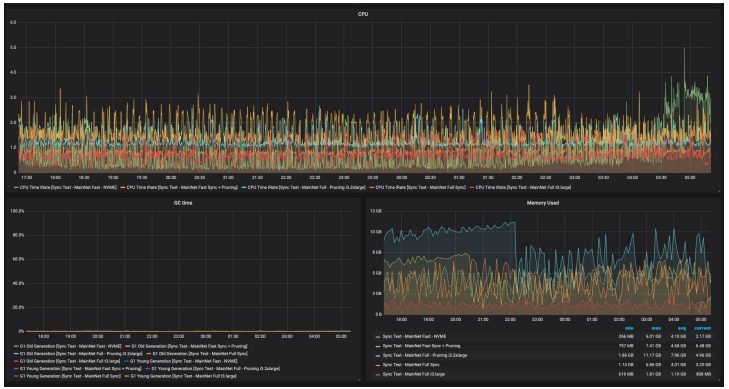
Clique (Proof of Authority)

- A fast, cross-client capable consensus protocol with high fault-tolerance but without immediate Finality.

Monitoring

Advanced tooling for monitoring node and network health and performance

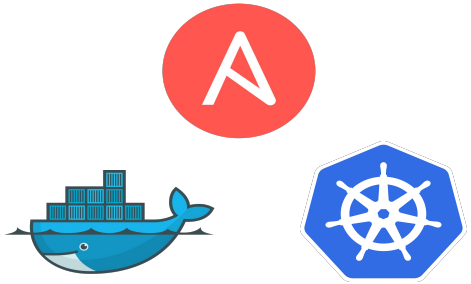
- Besu offers Prometheus monitoring and alerting service to access detailed node and network metrics. You can also visualize the collected data using Grafana dashboards.
- These work well for public and private chains.



Deployment

We offer several different deployment options to make deployment of Hyperledger Besu nodes as fast and as simple as possible.

We offer ready-to-use scripts to enable production-ready, highly available networks.



- Ansible
- Docker
- Kubernetes
- Terraform

Blockchain networks require different types of nodes – validators, bootnodes, and normal network nodes, so you can configure those arrangements easily for your cluster.

Hyperledger Besu 1.5 Release

The Besu team released the 1.5 version on July 16th. A few highlights include:

Privacy

The most recent set of privacy enhancements include:

- Ability to add and remove members from privacy groups.
- Filters and subscriptions for private contracts.
- Web3j and web3js support for private transactions and filters.

Performance

- Added native encryption libraries to provide optimization optionality
- EVM execution improvements
- Improved logs querying performance
- Improved transactions per second (TPS) performance by 33%

Example Use Cases

Hyperledger Besu is industry-agnostic with validated use cases in Financial Services, Supply Chain and Healthcare.

Payments

ZARX / Computershare — **Distributed settlement system for unit trusts.**

ioBUILDERS — B2B platform for Euro-based payments settled on Ethereum

Capital Markets

Global Top 10 Bank — Municipal bonds trading platform

LiquidShare — **Capital markets platform for SME equity shares**

RE NT — Debt capital markets issuance and tracking for real estate

Supply Chain

Platform 6 — Modular middleware for transaction-based enterprise blockchain applications

TREUM — A business process engine that models and tracks supply chains

How to work with the Besu Team

How to engage with Hyperledger Besu

1. Check out Hyperledger Besu on Github or chat.hyperledger.org
2. Contribute to Besu! Go to GitHub Issues to find good first issues
3. Run the Besu Quickstart to get it up and running

Thank You

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