HYPERLEDGER
SAWTOOTH

Frequently Asked Questions

What is Hyperledger?

Hyperledger is a collaborative effort, hosted by The Linux Foundation, created to advance blockchain technology by identifying and addressing important features for a cross-industry open standard for distributed ledger technologies(DLTs) that will transform the way business transactions are conducted globally. Hyperledger consists of several projects.

Find out more regarding all the Hyperledger projects **here.**

What is Hyperledger Sawtooth?

Hyperledger Sawtooth is an enterprise blockchain platform for building distributed ledger applications and networks. The design philosophy targets keeping ledgers *distributed* and making smart contracts *safe*, particularly for enterprise use.

Sawtooth simplifies blockchain application development by separating the core system from the application domain. Application developers can specify the business rules appropriate for their application, using the language of their choice, without needing to know the underlying design of the core system.

Sawtooth is also highly modular. This modularity enables enterprises and consortia to make policy decisions that they are best equipped to make. Sawtooth's core design allows applications to choose the transaction rules, permissioning, and consensus algorithms that support their unique business needs.

Sawtooth was donated to The Linux Foundation by Intel in April 2016.

Who has contributed to Hyperledger Sawtooth?

54 engineers including both individual contributors and 18 organizations have contributed to Hyperledger Sawtooth.

The current project maintainers are Shawn Amundson, Tom Barnes, Ryan Beck-Buysse, Richard Berg, Anne Chenette, Nick Drozd, Zac Delventhal, Andrea Gunderson, Feihu "Flying Tiger" Jiang, Boyd Johnson, Adam Ludvik, Darian Plumb, Dan Middleton, James Mitchell, Cian Montgomery, Kelly Olson, and Peter Schwarz.

What is the significance of Hyperledger Sawtooth 1.0?

Since Hyperledger focuses on enterprise grade blockchain technologies and is recognized as one of the leaders (rather than focusing on cryptocurrency), this is a milestone moment as the Hyperledger technical community has determined Sawtooth is now ready for production deployments. This is also the second active project under Hyperledger to hit 1.0 production level, coming on the heels of Hyperledger Fabric 1.0 in July 2017.

What is the difference between Hyperledger Sawtooth 1.0 and Hyperledger Fabric 1.0?

Hyperledger Sawtooth 1.0 and Hyperledger Fabric 1.0 are both stable frameworks hosted by The Linux Foundation.

Hyperledger Sawtooth's design philosophy targets keeping distributed ledgers distributed and making smart contracts safe - particularly for enterprise use.

Sawtooth is the first project to release with Byzantine Fault Tolerance options. This is a higher level of robustness than Crash Fault Tolerance. Further consensus in Sawtooth is not just pluggable (deployment time) but dynamic (changeable in runtime).

Sawtooth also uniquely offers "global state agreement," an assurance that each node has cryptographically identical copies of the blockchain database.

A few of the features included in Hyperledger Sawtooth v1.0 include:

- **On-chain governance –** Utilize smart contracts to vote on blockchain configuration settings such as the allowed participants and smart contracts.

- **Advanced transaction execution engine –** Process transactions in parallel to accelerate block creation and validation.

- **Support for Ethereum –** Run solidity smart contracts and integrate with Ethereum tooling.

- **Dynamic consensus –** Upgrade or swap the blockchain consensus protocol on the fly as your network grows, enabling the integration of more scalable algorithms as they are available.

- **Broad language support –** Program smart contracts in your preferred language, with support including Go, JavaScript, Python and more.

What consensus algorithms does Hyperledger Sawtooth support?

Hyperledger Sawtooth provides three consensus implementations, with a forth under active development:

- **Dev_mode:** a simplified random leader algorithm that is useful for developers and test networks that require only crash fault tolerance.

- **PoET:** short for "Proof of Elapsed Time", PoET is a Nakamoto-style consensus algorithm. It is designed to be a production-grade protocol capable of supporting

large network populations that include byzantine actors. More information can be found about the PoET algorithm here - **PoET 1.0 Specification**.

- **PoET-Simulator:** Sawtooth includes an implementation of PoET that simulates the secure instructions. This mechanism enables large-scale consensus populations, but forgoes Byzantine fault tolerance.

- **RAFT (Under Development):** The RAFT consensus protocol is a crash-fault tolerant 'voting'-style consensus algorithm. It is designed for high throughput, low latency transactions.

Is Hyperledger Sawtooth interoperable with any other Hyperledger technologies?

Yes, in August, an initial proof-of-concept integration between the Hyperledger Sawtooth and Hyperledger Burrow projects was completed. As a result of this integration, "simple" EVM smart contracts can be deployed to Hyperledger Sawtooth using the "Seth" (Sawtooth Ethereum) Transaction Family. You can learn more about the integration **here**.

What are some POCs/use cases with Hyperledger Sawtooth and what companies are using it?

dotBlockchain Media - Building a platform powered by Hyperledger Sawtooth to track their music recording content rights registry.

State Bank of India - Building a platform powered by Hyperledger Sawtooth to manage their mandatory Know Your Customer (KYC) details in their system.

PokitDok - Using Hyperledger Sawtooth as its premier platform for recording DokChain healthcare transactions.

The **Open Music Initiative** is using Hyperledger Sawtooth as the foundational technology for a distributed ledger to facilitate transparent and seamless payment flows for fair compensation to artists and other right holders.

Using Hyperledger Sawtooth as a platform, **T-Mobile** has created Sawtooth Hyper Directory as an Identity and Access Management (IAM) solution.

Wind River is using the Hyperledger Sawtooth 1.0 platform to provide the missing infrastructure piece enabling them to deliver an open commercial grade software components ledger for IoT devices.

Are there any marketing assets to collateral that explain more about Hyperledger Sawtooth 1.0?

Yes, please visit the **Hyperledger Sawtooth project page** to see more details and resources including demos on how Hyperledger Sawtooth can be utilized for tracking the

seafood industry supply chain, securing bond settlement across financial institutions and managing digital asset ownership.

What access to Hyperledger Sawtooth code do Hyperledger members have that non-members do not?

Hyperledger Sawtooth is completely open source. This means that anyone, regardless of membership, has the ability to download, use, and modify Hyperledger Sawtooth.

Where do I learn more about the design of the Hyperledger Sawtooth 1.0?

You can read more about Hyperledger Sawtooth's design **here** via the documentation.

How do I get started with Hyperledger Sawtooth?

Read Hyperledger Sawtooth's **Introduction** for a project overview, then go hands-on with by working through the **Application Developer's Guide**.

Hyperledger Sawtooth's community page has resources for developers to connect with Sawtooth developers, such as on **Rocket.chat** channels and **Mailing lists**, as well as information on contributing.

Example application **demos** are also available.

How do I interact with the Hyperledger Sawtooth community?

Key communication vehicles:

Rocket.chat for group and 1 on 1 communications. The **#sawtooth** channel is used by the Hyperledger Sawtooth community.

Rocket.chat **channel** guide, giving descriptions, so you can find what you are most interested in following.

Mailing lists to subscribe to conversations and participate.

"Working groups" - There are several active **working groups** that tackle big items such as the technical steering committee, requirements gathering and definition of use cases, identity, and documentation, etc.

Where can I find information on Hyperledger Sawtooth architecture?

See Hyperledger Sawtooth's **architecture explained document**.

How do I know Hyperledger Sawtooth 1.0 is secure?

Hyperledger Sawtooth has been developed in the open with the source code available to anybody. Many developers have contributed to its development. Not only was Hyperledger Sawtooth developed using the best practices for software engineering, but it has also been audited by an outside security auditing firm and will soon be part of the Hyperledger bug bounty program. The Hyperledger community is doing all it can to ensure that it is trustworthy and as bug-free as possible.

I think I found a bug in Hyperledger Sawtooth, what should I do?

Hyperledger Sawtooth is an open source project and therefore relies on the community to help spot and fix bugs. If possible, you should file a new bug report in the **JIRA bug tracking system**. If you cannot do that, please send a description of the bug in an email to **hyperledger-stl@lists.hyperledger.org**.

I think I found a security vulnerability in Hyperledger Sawtooth, what should I do?

Security vulnerabilities should be reported to **security@hyperledger.org**.