Open Source @ IBM

Hyperledger Community Update

Christopher Ferris, IBM CTO Open Technology
@christo4ferris
February, 2018
Today's Agenda

• What is Hyperledger?
• How was Hyperledger created?
• Hyperledger Projects
• What is next for the Hyperledger community?
• Hyperledger and IBM
• Getting Started
• Call to Action
• Additional Resources
• Q&A
What is Hyperledger?

Open source organization for enterprise blockchain technology

Open Source not-for-profit accelerating the development and adoption of business blockchain technologies. Businesses with the most stringent blockchain requirements Trust Hyperledger because:

Hosted by The Linux Foundation, the experts at accelerating open technology development and commercial adoption

Neutral and collaborative, Hyperledger will always:
- be open to all who wish to participate
- produce open source technologies
- remain immune to the commercial interests of any single company

Industry-standard blockchain technology by business for business
Hyperledger blockchain technologies emphasize key enterprise requirements:
- Support for differing levels of access
- Sub-universal validation
- Cross-chain transactions
- Modularity
How was Hyperledger created?

IBM initiated effort at LF to host “blockchain for the enterprise”
Hyperledger Momentum

2 years since launch

25k+ Commits

4 Tools

5 Frameworks

2 Production Releases
Hyperledger Fabric v1.0
Sawtooth v1.0

200+ Members (30+ in China)

12 Active Community Working Groups

80+ Meetups Worldwide

20k+ Meetup Participants

600+ Media Clips Per Month

developer.ibm.com/code
Note on Enterprise Ethereum Alliance

- Led by Microsoft and Consensys (also a Hyperledger member)
- Focused on making Ethereum relevant to enterprise use
- Claims to be the largest blockchain org
- Focused on development of standards for Ethereum, not developing open source
  - Though will deliver a “reference implementation”
- In the year or so since it was launched, it has undergone some organizational churn and has accomplished little of substance
- Should not be considered “competitor” to Hyperledger
- Hyperledger actually has Ethereum projects and if EEA develops standards, Hyperledger will implement where appropriate
Hyperledger Fabric
Business Blockchain Framework

- First project that was contributed to Hyperledger
- Contributed by Digital Asset and IBM
- Smart contracts called “chaincode” are written in Golang (and with 1.1 Javascript) and run in secure Docker containers
- Channels ensure that only the participants involved in a transaction see the transaction
Hyperledger Fabric

First project incubated, first to graduate, first to reach 1.0

**Hyperledger Fabric 1.0**

- **27 organizations**
- **159 developers**
- **3,500 change sets**

- **Channels** for sharing confidential information
- **Ordering Service** delivers transactions consistently to peers in the network
- **Endorsement policies** for transactions
- **CouchDB** world state supports wide range of queries
- Bring-your-own **Membership Service Provider (MSP)**
Hyperledger Sawtooth
Business Blockchain Framework

- Hyperledger’s second project contributed by Intel
- Second project to reach 1.0 maturity
- Supports both permissioned and permissionless deployments
- Includes a novel consensus algorithm, Proof of Elapsed Time (PoET), which mimics proof of work without the high energy consumption
- Uses the secure enclave on an Intel chip to provide a random wait timer to each of the validators (nodes) on the network
- First validator whose timer expires generates the next block
- Supports the EVM through a collaboration with the Hyperledger Burrow community
Hyperledger Iroha
Business Blockchain Framework

- Contributed by Soramitsu, Hitachi, NTT Data and Colu
- Written in C++
- Emphasis on mobile application development
- Provides both Android and iOS SDKs
Contributed by the Sovrin Foundation
Focuses on identities rooted on blockchains
Utilizes zero-knowledge proofs to provide verifiable claims
These verifiable claims can be used to prove something about the identity without providing access to the underlying data
Hyperledger Burrow
Business Blockchain Framework

- Contributed by Monax
- The first permissioned ledger with support for the Ethereum Virtual Machine (EVM)
- Originally named ErisDB
- Uses Tendermint as its consensus mechanism
Hyperledger Composer
Business Blockchain Tool

- Contributed by IBM and Oxchains
- Suite of tools to quickly develop your blockchain business networks
- Modeling language allows you to have your business people specify the participants, assets, and transactions
- Developers write transaction logic in JavaScript
- Ability to generate a REST API and Angular application from the model
Hyperledger Cello
Business Blockchain Tool

- Contributed by IBM, with sponsors from Soramitsu, Huawei and Intel
- Used for DevOps
- Allows you to quickly deploy your blockchain networks
- Provides the ability to monitor your blockchain networks
- Blockchain network can be deployed on baremetal, virtual machine, or cloud
Hyperledger Explorer
Business Blockchain Tool

- Originally contributed by IBM, Intel and DTCC. Recent release contributed by OneChain
- Allows you to visualize the blockchain
  - Blocks
  - Transactions
  - Network information
  - Chaincodes or Transaction families
Contributed by NTT Data and Ripple
Java implementation of the Interledger protocol
Interledger protocol provides:
- atomic swaps between ledgers (even non-blockchain or distributed ledgers)
- a single account namespace for accounts within each ledger
Hyperledger Fabric: Technical Overview

Modular, permissioned blockchain platform for enterprise

**Confidentiality**

**Partitioned execution**
Optimize network performance by separating chaincode execution and transaction ordering

**Permissioned membership**
Operate a trusted blockchain network with known participants and regulatory oversight

**Channels**
Enable multi-party transactions with the privacy and confidentiality needed for regulated industries

**Production workloads**

**Transaction history**
Searchable transaction history for efficient auditing and dispute resolution

**Network tools**
IBM provides tools for monitoring, logging, and for compliance reasons backup/restore

**Modularity**
Select preferences for number of peers, consensus, identity management, and encryption to dynamically grow a business network
What's next for the Hyperledger Fabric community?

Managing Growth

• Hyperledger is the fastest growing project at the LF
• Hyperledger Fabric
  • Rapid growth (code & community) – 27 companies and 159+ devs
  • Finds itself needing to "slow down" at times to ensure stability
    • Publishing periodic stable releases (quarterly is the plan)
    • Working through various development workflow approaches
    • Toolchain consistency between various adjacent projects is an issue
• Working towards Hyperledger Composer 1.0 release in 1Q 2018
• Working towards Hyperledger Fabric 1.1 release in 1Q 2018
• Integration across projects (Burrow, Indy, Sawtooth)
• Architecture WG and Performance and Scale WG deliverables
## Hyperledger Roadmap 2018

Roadmap focus on developer experience and active network acceleration with common services

<table>
<thead>
<tr>
<th>Hyperledger Fabric</th>
<th>1Q</th>
<th>2Q</th>
<th>3Q</th>
<th>4Q</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Version 1.0 fixpacks</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Version 1.1</strong> Javascript chaincode</td>
<td><strong>Version 1.2 Fixpacks</strong> Chaincode Lifecycle</td>
<td><strong>Version 1.2 Fixpacks</strong> Performance and Scale improvements</td>
<td><strong>Version 1.4</strong> Technical Debt Reduction</td>
<td></td>
</tr>
<tr>
<td>Connection Profile</td>
<td>UX Improvements</td>
<td>Service Discovery</td>
<td>Zero Knowledge Proof</td>
<td></td>
</tr>
<tr>
<td>Performance and Scale improvements</td>
<td>Service Discovery</td>
<td>Ledger Archive and Pruning</td>
<td>RAFT Consensus</td>
<td></td>
</tr>
<tr>
<td>Technical Preview: Private channel data, Identity Mixer, Service Discovery (no SDK) support</td>
<td></td>
<td></td>
<td>BFT Consensus?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Identity Mixer</td>
<td></td>
</tr>
</tbody>
</table>

| **Technical Previews**: Private channel data, Identity Mixer, Service Discovery (no SDK) support |

<table>
<thead>
<tr>
<th>Hyperledger Composer</th>
<th>1Q</th>
<th>2Q</th>
<th>3Q</th>
<th>4Q</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Version 1.0</strong> Links</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Version 1.1</strong> Account Services GA</td>
<td><strong>Version 1.2</strong> Industry Samples (unsupported support Pac)</td>
<td><strong>Version 1.3</strong> Operational Console</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Requires</td>
<td>Extended Platform support for Windows developers and z/OS</td>
<td>Extended Platform support for OPEN Linux</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Account Services (preview)</td>
<td>PBSA Integration – MMO GA</td>
<td>PBSA Integration – SDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBSA Integration – MMO (preview)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hyperledger Indy</th>
<th>1Q</th>
<th>2Q</th>
<th>3Q</th>
<th>4Q</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Version 0.8</strong> Ansible provisioning with Kubernetes support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Version 0.9</strong> Kubernetes Fabric deployment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hyperledger Indy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revocation</td>
</tr>
<tr>
<td>GPG support</td>
</tr>
<tr>
<td>INDY reference Agent</td>
</tr>
<tr>
<td>Extensible Agent APIs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hyperledger Composer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revocation</td>
</tr>
<tr>
<td>GPG support</td>
</tr>
<tr>
<td>INDY reference Agent</td>
</tr>
<tr>
<td>Extensible Agent APIs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hyperledger Composer</th>
</tr>
</thead>
<tbody>
<tr>
<td>DID Auth</td>
</tr>
<tr>
<td>Verifiable Claims support</td>
</tr>
<tr>
<td>Schema Enhancement</td>
</tr>
<tr>
<td>Shared Crypto Library</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hyperledger Indy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issuer Discovery</td>
</tr>
<tr>
<td>TLS DID requests</td>
</tr>
<tr>
<td>Proof request</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hyperledger Indy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issuer Discovery</td>
</tr>
<tr>
<td>TLS DID requests</td>
</tr>
<tr>
<td>Proof request</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hyperledger Cello</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ansible provisioning with Kubernetes support</td>
</tr>
<tr>
<td>Kubernetes Fabric deployment</td>
</tr>
</tbody>
</table>
Hyperledger at IBM

The Foundation for IBM Blockchain Platform & Solutions

• IBM is a founding Premier member with a seat on the Governing Board
• IBM’s Chris Ferris chairs the Technical Steering Committee (TSC). IBM’s Arnaud Le Hors is the other elected member of the TSC
• IBM actively participates in most of the active WGs and Board committees of Hyperledger.
• Hyperledger projects (Fabric and Composer) are the preferred platform for all IBM blockchain offerings and solutions, though we do work with customers on alternate platforms when requested
Hyperledger Fabric and Composer: Let's Get Started

**• Development Guide**
- [Getting Started Guide](#) and tutorials for Hyperledger Fabric
- [Getting Started Guide](#) for Hyperledger Composer
- Help: Ask on the appropriate [email](#) or [RocketChat](#) channel, or on StackOverflow ([hyperledger](#), [hyperledger-fabric](#), [hyperledger-composer](#))

**• Looking for work:**
- Backlog of issues in [JIRA](#) – many many open issues
- Contributor experience, testing, "process" related activities
- Find us on our [RocketChat](#) channel and ask questions!

**• Journeys & Education**
- Journeys - [https://developer.ibm.com/code/journey/category/blockchain/](#)
- developerWorks [Blockchain Developer Center](#)
- IBM Blockchain - [https://www.ibm.com/blockchain/](#)
Call to Action

Ensure the strength and longevity of a core technology to your business.

Publicly proclaim your leadership in the blockchain space.

Work with other blockchain leaders to develop on and promote Hyperledger projects.

• Get involved
• Meet up communities
• Conferences
• Membership
• Read the research paper: https://arxiv.org/abs/1801.10228v1
More Resources

Resource Center
Custom content developed to help guide your journey with Hyperledger technologies
Where is the Hyperledger community?

• GitHub
  • https://github.com/hyperledger/

• Communications
  • http://hyperledger.org/community

• Mailing list:
  • https://lists.hyperledger.org/mailman/listinfo
  • Weekly Technical Steering Committee Meeting
  • Conferences (SIBOS, Consensus, various others)

• Social Media
  • @hyperledger

• Lots of WGs and SIGs (special interest groups)
  • Each with their own RocketChat channel, mailing lists, regular calls, ...
Thank you!
@christo4ferris
Q & A