HYPERLEDGER

BLOCKCHAIN TECHNOLOGIES FOR BUSINESS

Hyperledger Update

Lendit BlockFin
April 9, 2018

The Linux Foundation is Much More than Linux

Security

We are helping global privacy and security through a program to encrypt the entire internet.

Networking

We are creating ecosystems around networking to improve agility in the evolving software-defined datacenter.

Cloud

We are creating a portability layer for the cloud, driving de facto standards and developing the orchestration layer for all clouds.

Automotive

We are creating the platform for infotainment in the auto industry that can be expanded into instrument clusters and telematics systems.

Blockchain

We are creating a permanent, secure distributed ledger that makes it easier to create cost-efficient, decentralized business networks.

Web

We are providing the application development framework for next generation web, mobile, serverless, and IoT applications.

Let's Encrypt

ONAP
OPEN NETWORK AUTOMATION PLATFORM

CLOUD NATIVE COMPUTING FOUNDATION

AUTOMOTIVE GRADE LINUX

HYPERLEDGER

node JS

We are regularly adding projects; for the most up-to-date listing of all projects visit tlfprojects.org

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Hyperledger Momentum

2
years since launch

25k+
Commits

5
Tools

5
Frameworks

2
Production 1.0 Releases

235
Members (50+ in China)

12
Active Community Working Groups

100+
Meetup Communities Worldwide

28k+
Meetup Participants

1.5K+
Media Clips Per Month in 2018

Hyperledger Premier Members

Hyperledger General Members

1WorldBlockchain
8base
8Common
ABN Amro
Aetna
Agavon
AlphaPoint
Altoros Americas LLC
Aktsiaselts Eurostep Digital
AMIHAN Global
ANNE
ANZ
ArcBlock
B9lab
BBVA
Beijing Botuzongheng Science & Technology Co., Ltd.
Beijing RZXT Technology Development
Beijing Xiaomi Mobile Software
Belink Technologies
Bitmark
BitSE
Blockchain
Blockchain Training Alliance
BLOCKO Inc.
Bloq
BNP Paribas
Broadridge Financial Solutions
BTS
CA Technologies
Calastone
Capgemini
Centra Tech
Chain Connected
ChainNova
China Merchants Bank
China Minsheng Bank
CITIC
Clause, Inc
Cloudsoft Corporation Ltd.
CLS Bank International
CME Group
Cognition Foundry
Coinplug
CollectorIQ Inc.
Cuscal Limited
Data Deposit Box
Dealer Market Exchange
Deloitte Consulting LLP
Deutsche Börse Group
DLT Labs
Easy Visible Supply Chain Management
EBPI BV
Elementrem
Eli Lilly & Company
Embleema
Energy Blockchain Labs
Ernst & Young
Factom Foundation
Filament
FORFIRM
ForgeRock
FZG360 Network Co. Ltd
GameCredits
Gem
Gibraltar Stock Exchange (GSX)
Global Blockchain Technologies
Global Peersafe Technology Corp.
GM Financial
Guardtime
GXChain
Hangzhou Fuzamei Technology
Hashed Health
Huawei
Hyperchain Technologies
Information Builders
Inspur
IntellectEU
Kaiser Permanente
Korea Exchange
Korea Security Depository
Koscom
KrypC Corp
LedgerDomain
Libra
Loyyal Corporation
Lykke
MadHive
Majid Al Futtaim
Medicalchain
MetaX
MIRACL UK Limited
Monax Industries Limited
MonetaGo
Moscow Exchange
Murphy & McGonigle, P.C.
National Stock Exchange of India
New H3C Technologies
NEX Optimisation
Nexiot
Norbloc
NTT Data
Oracle
Orange Magic Cube
Patientory
Paxos
PetroBloq
PDX Technologies
Pravici
PwC
R3
RadarWin Cyber Technology
Red Hat
Revelry Labs
Robert Bosch
Samsung SDS
Sberbank
ScanTrust SA
Schroder Investment Management Limited
SecureKey Technologies
~sedna GmbH
Sempre IT
Shanghai Ginkoo Financial Technology
Shanghai Onechain Information Technology
Shenzhen Forms Syntron Information Shenzhen
Sinolending Ltd
Smart Block Laboratory
Smartchains
Smart Link Lab
Soramitsu
State Street
SWIFT
Swisscom AG
Tai Yi Yun
Tencent Cloud
Thales
Thomson Reuters
TMX Group Limited (TSX)
TradeIX Limited
Turkcell
United Traders
VitalHub Corp.
VMware
Wipro
Xinguodu Technology CO., LTD
YDreams Global
Yuphant Blockchain
Zhejiang Shuqin Technology
Beijing Smart Card Technology Research Institute
Ziggurat Technology

Hyperledger Associate Members

Public, Private, Permissioned and -less

Permissionless Public	**Permissionless Private**	**Permissioned Public**	**Permissioned Private**
Bitcoin, Ethereum	Public Polls	Land titles, University degrees	Medical records

Permissioned vs. Permissionless: Who can write to a blockchain (accessibility)
Public vs. Private: Who can read from a blockchain (visibility)

Hyperledger Modular Umbrella Approach

Infrastructure
Technical, Legal, Marketing, Organizational

Ecosystems that accelerate open development and commercial adoption

THE LINUX FOUNDATION

Cloud Foundry | Node.js | **Hyperledger** | Open Container Initiative

Frameworks
Meaningfully differentiated approaches to business blockchain frameworks developed by a growing community of communities

Hyperledger **Fabric** | Hyperledger **Sawtooth** | Hyperledger **Iroha** | Hyperledger **Indy** | Hyperledger **Burrow**

Tools
Enable accelerated dev and deployment of frameworks

Hyperledger **Composer** | Hyperledger **Cello** | Hyperledger **Explorer** | Hyperledger **Quilt** | Hyperledger **Caliper**

Hyperledger Fabric

Business Blockchain Framework

- 1.0 release July 2017; 1.1 release candidate available now.
- 100+ devs across 50+ companies contributing.
- Reports of 400+ customer PoCs, pilots and production.
- Ordering nodes can be separated from broader endorser/submitter nodes.
- Validation/business logic called “chaincode” written in Golang, Java (in test) and Javascript (in 1.1), and run in secure Docker containers.
- Private channels subset the ledger for groups of nodes, for confidentiality.

Use Case: Cross-Border Payments

Transferring money across international borders is still complicated, time consuming and expensive. Payments routed abroad can take several days to get settled. Existing money transfer systems suffer furthermore from long lines, exchange rate losses, counter-party risks, bureaucracy and extensive paperwork.

After months of work, a global team of developers have completed a cross-border POC built with Hyperledger Fabric. Designed to test whether moving member bank accounts to a distributed ledger could help the inter-bank payments platform Swift reconcile in real time, the blockchain trial is now ready for its next phase of testing with banks including ANZ, BNP Paribas, BNY Mellon and Wells Fargo.

Hyperledger Fabric enables real-time visibility on the liquidity of Nostro accounts, easing reconciliation and allowing liquidity savings while meeting key industry requirements such as governance, data privacy, standardisation, and identity.

SWIFT

ANZ

BNY MELLON

BNP PARIBAS

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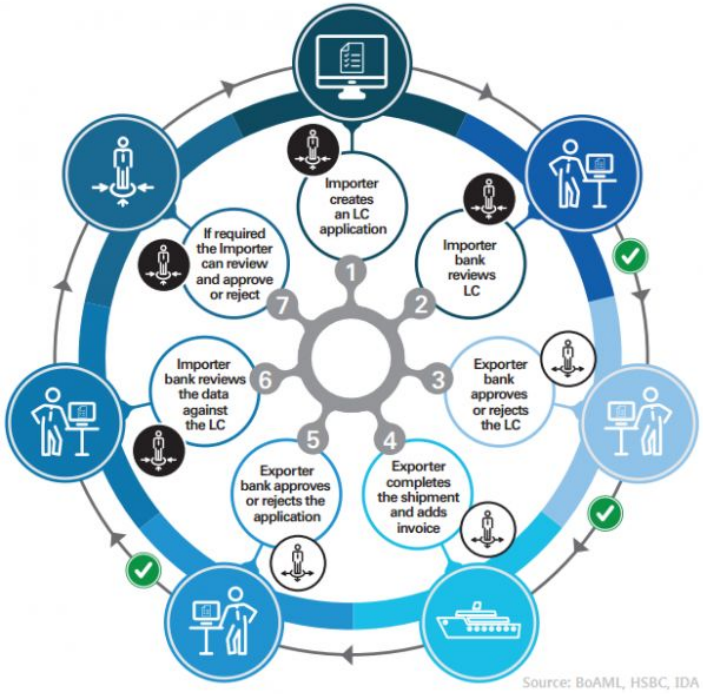
Use Case: Digital Trade Chain

we.trade is a blockchain-based international trading system for a consortium of major world banks including: **Deutsche Bank, HSBC, KBC, Natixis, Rabobank, Société Générale, Santander, UniCredit and Nordea**

- Enables accurate trading posture information, order to settlement control, risk coverage, track and trace options
- Near-real time exchange of information on a secure platform that digitizes transactional financing and other complex processes
- Continual business and compliance readiness in any regulatory environment
- Scalability that allows for rapid international expansion as business, regulatory, and security opportunities converge



Use Case: Diamond Supply Chain

In 2003, the Kimberley Process Certification Scheme (KPCS) was established to prevent conflict diamonds. Purchased diamonds now come with a certificate to prove the distributor did not obtain the diamond from rebels, that the mine has been audited, etc. The idea is that paperwork can confirm provenance; however, the process is lengthy and there is a history of fraud from missing paperwork.

To keep blood diamonds from entering the supply chain Hyperledger Premier members SAP Ariba and IBM are collaborating with Everledger to pilot a distributed ledger diamond track and trace system using Hyperledger Fabric v1.0 that everyone in the industry can write to from miners, to distributors, to retailers.

When a bag of diamonds changes hands in the supply chain, it forms two entries in the chain: the diamond IDs present upon sending and receipt. Once a diamond ID is tracked by the system, it provides integrity to any stakeholder who can then query and instantaneously verify a diamond's provenance.

SAP IBM everledger

Read about the Hyperledger Fabric pilot in *International Business Times.*

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Hyperledger Sawtooth

Business Blockchain Framework

- Hyperledger's second project, released as 1.0 in January 2018.
- Supports both permissioned and permissionless deployments.
- Includes a novel consensus algorithm, Proof of Elapsed Time (PoET), which aims for the public properties of proof of work without energy consumption.
- Uses the secure enclave on a chip to provide a random wait timer to each of the validators (nodes) on the network.
- Supports on-chain configuration tracking and consensus mechanism switch.
- Supports Solidity/EVM smart contracts by linking with Hyperledger Burrow.

Use Case: Seafood Tracking

Blockchain technologies are being used in the fishing industry to drive fish catch towards more ethical practices, obstructing pirate fishing fleets and keeping fish that are caught outside of legal fishing areas and international treaty quotasfrom being sold.

Intel is collaborating with the seafood industry to implement a modern approach to supply chain traceability. Leveraging the Hyperledger Sawtooth framework, provenance of fish can now be recorded from ocean to table.

IoT sensors can be attached to any object (like fish) for transport, with trackable ownership, possession, and telemetry parameters such as location, temperature, humidity, motion, shock and title. The final buyer can access a complete record of information and trust that the information is accurate and complete.

Intel has revealed a public demo that finds it showcasing how a seafood supply chain can be built using Hyperledger Sawtooth.

Watch the explainer video and read the full case study on the Hyperledger Sawtooth project page.

Read about the demo in CoinDesk.

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Use Case: Music and Media Rights

Dot Blockchain Media (dotBC) is building a music content rights registry that will help musicians express their rights and wishes for commercializing their art in an interoperable file format. Data is maintained across a distributed network that utilizes Hyperledger Sawtooth.

dotBC's blockchain implementation is a foundation for music and media rights expression into the works themselves. It creates a fair and transparent method for music composers, artists, publishers and rights holders to express their rights and wishes for commercializing their art into a modern and interoperable file format. dotBC maintains partnerships and connections in the music and wider media industries to enable seamless data exchanges between more than 63 million globally recorded works from independent and major label artists and the dotBC ecosystem.

“Hyperledger Sawtooth will enable us to scale rapidly and customize transaction processors specifically for ingesting rights data. We look forward to delivering a strong and lasting solution, anchored on a sophisticated and secure blockchain foundation, for the music and media industries with Intel.”

– Benji Rogers, dotBC CEO

dot blockchain media

dotBC is able to leverage the open source Hyperledger Sawtooth platform for recording its content rights registry for the media industries.

Read the full story in *Crypto Ninjas*.

Hyperledger Iroha

Business Blockchain Framework

- Co-developed by Soramitsu, Hitachi, NTT Data and Colu
- Very close to a 1.0 release
- Written in C++
- Primarily focused on raw DLT applications, currency-like deployments.
- Emphasis on mobile application development
- Provides both Android and iOS SDKs

Iroha Use Cases

National Bank of Cambodia

For inter-bank settlement.

Sompo Holdings

For a weather derivatives management system.

Hyperledger Indy

Blockchain Identity Framework

- Contributed originally by the Sovrin Foundation and Evernym
- Focuses on identities rooted on blockchains, by providing pairs of DID's (Distributed Identifiers) revealable only by the user, to fight correlateability.
- Utilizes zero-knowledge proofs to provide verifiable claims
- In production today on the Sovrin network, with credit unions and the GSA
- These verifiable claims can be used to prove something about the identity without providing access to the underlying data

Use Case: KYC/National ID

As of 2017, only 44% of Filipinos were utilizing bank accounts, a metric that is quickly increasing thanks to rapid economic growth in the Philippines, but is still hampered by inefficient mechanisms for checking the identity and history of new account applicants. “Know Your Customer” laws require asking for the same data over and over, much of which is not available in digital or verifiable form.

To solve this, the Bankers Association of the Philippines (BAP) in partnership with Hyperledger member and technology consulting company Amihan, and a coalition of major banks undertook a proof-of-concept exercise to build a prototype that implements self-sovereign identity using Hyperledger Indy.

The platform streamlines onboarding of new accounts, by allowing consumers to enter information once in a privacy-preserving way, and re-use that data for new account opening. The bank can trust that the history of that data is solid. If successful, this could serve as a test for a nation-wide self-sovereign ID system.

HYPERLEDGER INDY

AMIHAN

*Read more about the Amihan use case for the Hyperledger Indy framework in *The Manila Times.*

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Hyperledger Burrow

Business Blockchain Framework

- Initial contribution from Monax, now more companies and devs involved
- The first permissioned ledger with support for the Ethereum Virtual Machine (EVM)
- Only Apache-licensed EVM
- Uses Tendermint as its default consensus mechanism, but has also been ported to Sawtooth, and experimental support exists for Fabric

Hyperledger Composer

Business Blockchain Tool

- Initial contribution from IBM and Oxchains, now multiple developers
- 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 Quilt

Business Blockchain Tool

- 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

What does this mean for you?

All of these are examples of what people can do today without requiring tokens. You don’t need to do an ICO to launch a blockchain project!

However, many of these deployments will involved tokenization of real or virtual assets - for purposes of immediate settlement and better liquidity.

Atomic swaps of tokens across ledgers (e.g Quilt) will help manage complexity of many different tokens and ledgers.

Get started developing today! Run in production today!

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A primer to blockchain and distributed ledger technologies. Learn how to start building blockchain applications with Hyperledger frameworks.

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WHO WILL YOU
TRUST
WITH YOUR TRUST NETWORK?
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