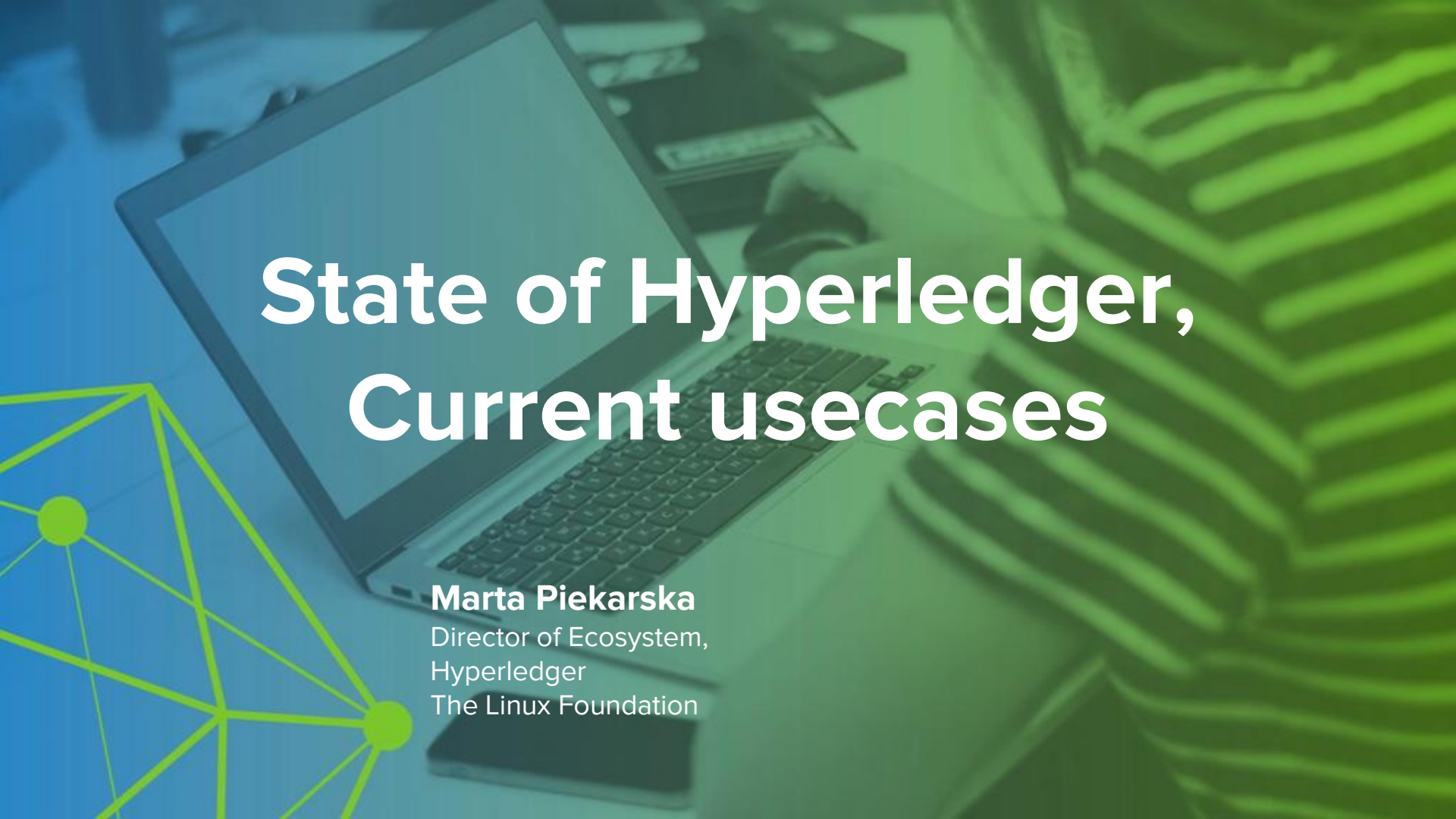


State of Hyperledger, Current usecases

Marta Piekarska
Director of Ecosystem,
Hyperledger
The Linux Foundation

Marta Piekarska

Directory of Ecosystem, Hyperledger, *The Linux Foundation*

PhD in User Informed Design of Privacy Tools

10 years of experience in technology companies, including Apple, Yahoo & Deutsche Telekom

4 years in Blockchain: Blockstream & Hyperledger

Agenda

Introduction to Blockchain Technologies

The Linux Foundation and Hyperledger

Sample Use Cases

What are Blockchain Technologies?

Encompasses both **distributed ledgers** and **smart contracts**.

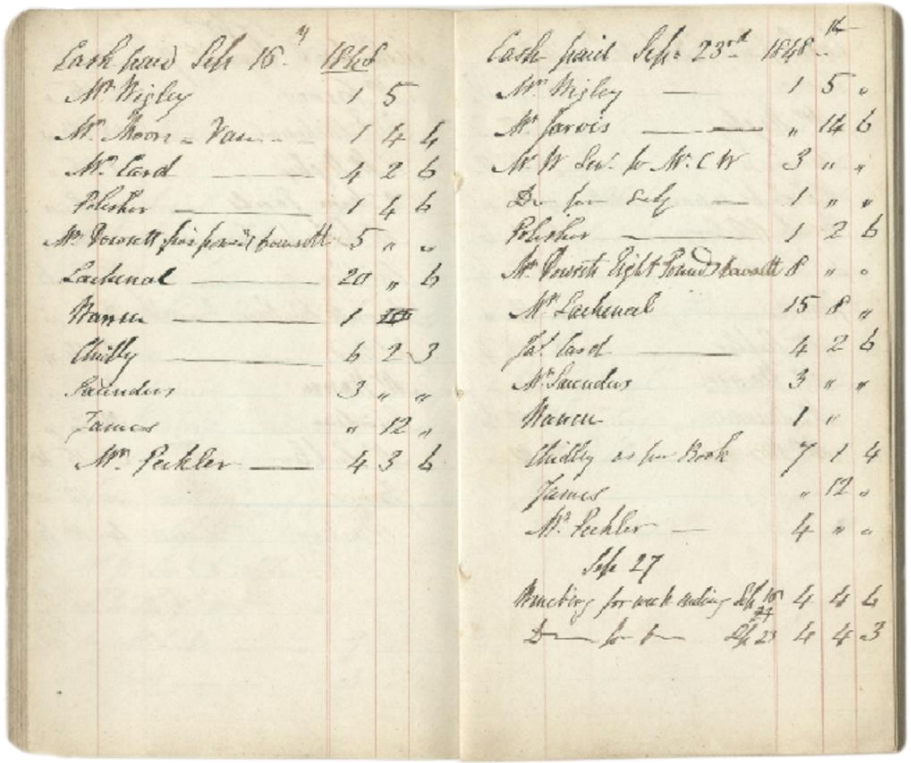
It’s all about money, money, money

The first long-distance trade occurred between Mesopotamia and indus valley in pakistan ~3000 b.C

How Do You Agree on Assets Balance?

How to track the value of exchanged goods?

Traditional Ledgers



Cash paid Sept 16th 1848

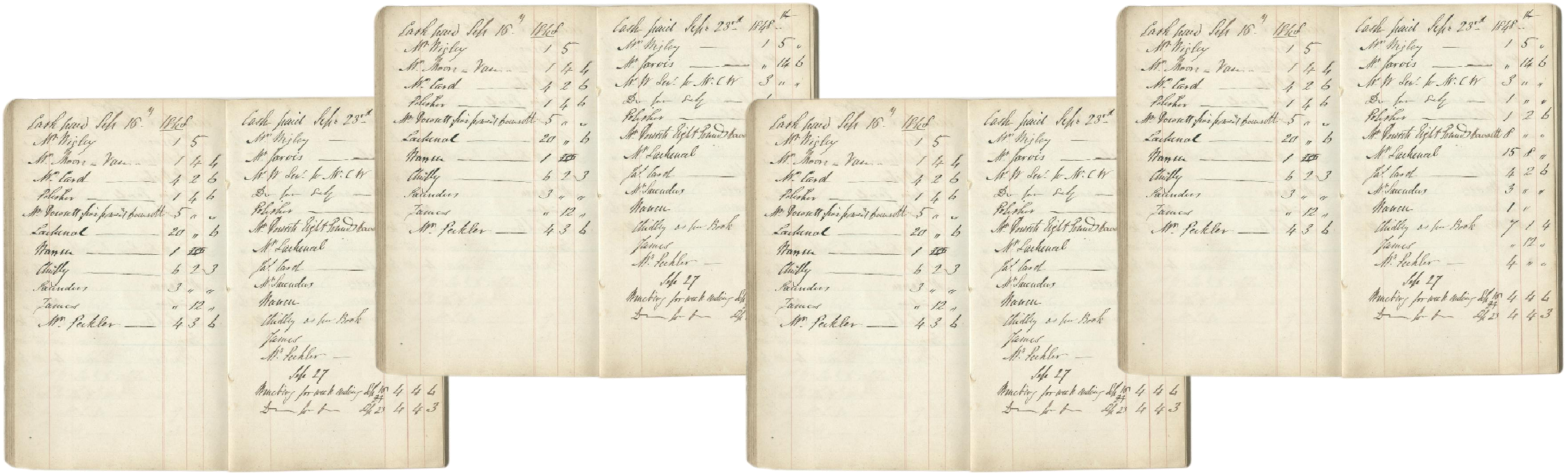
Mr Wigley	1	5	
Mr Moore – Van	1	4	4
Mr Card	4	2	6
Polisher	1	4	6
Mr Dowsett for pound bowsett	5	"	"
Lachenal	20	"	6
Warren	1	[illegible]	
Chidley	6	2	3
Saunders	3	"	"
James	"	12	"
Mr Peckler	4	3	6

Cash paid Sept 23rd 1848

Mr Wigley	1	5	"
Mr Jarvis	"	14	6
Mr W Sen. for Mr C W	3	"	"
Do for Sept	1	"	"
Polisher	1	2	6
Mr Dowsett Eight Pound bowsett	8	"	"
Mr Lachenal	15	8	"
Jas Card	4	2	6
Mr Saunders	3	"	"
Warren	1	"	
Chidley as per Book	7	1	4
James	"	12	"
Mr Peckler	4	"	"
Sept 27			
Wineberg for week ending Sept 16 24	4	4	6
Do for do Sept 23	4	4	3

Digital World

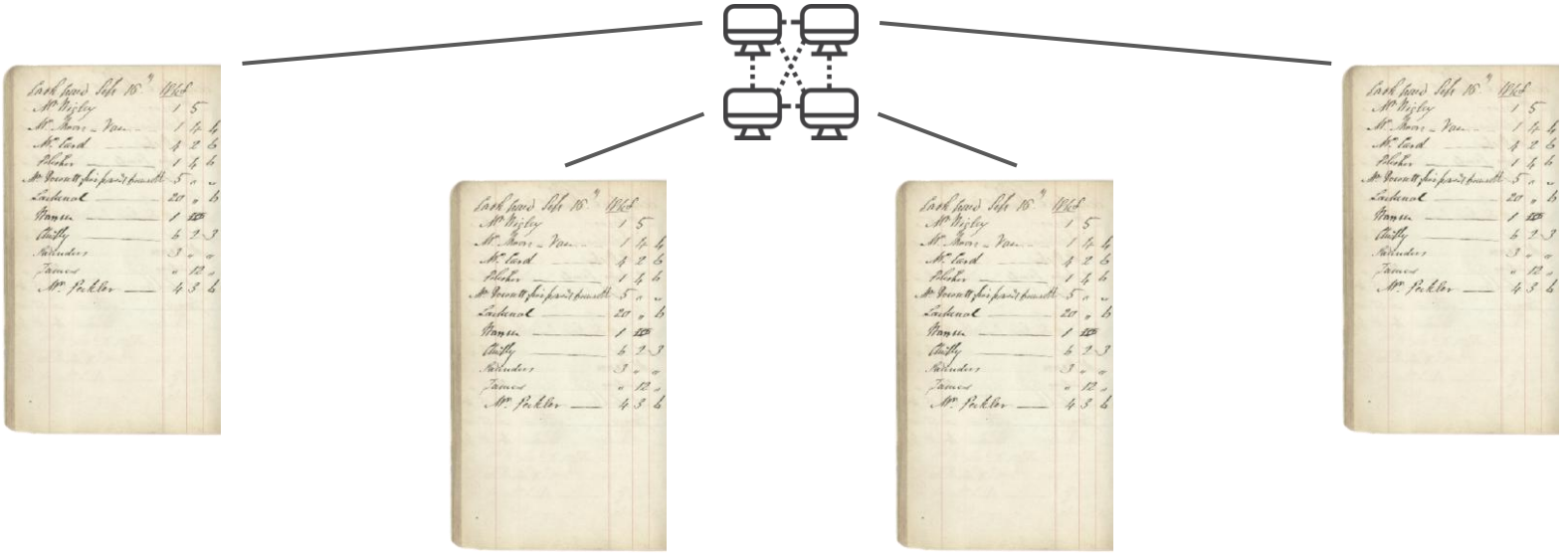
In the digital world there are many copies that may contain different versions. The challenge: which do you trust as a single source of truth?



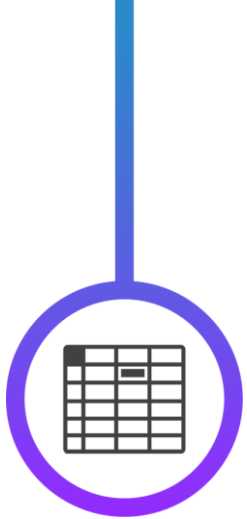
LET ME INTRODUCE YOU
Internet Connected
Reality
TO THE INTERNET

Potential of Peer to Peer Network

Now we can keep our ledgers in sync—provided we can agree

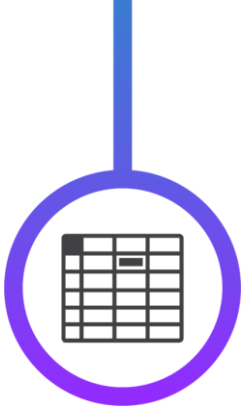


What is a
Distributed Ledger?



An **append-only system**
of record or log of transactions.

Distributed Ledgers
in Action



All businesses participating in a commercial ecosystem need a ledger to contain a record of transactions. **It is vitally important to know that your copy of the ledger is identical to others' in the network.**

Example Scenario

Everyone in a room has a book with the instructions to write down entries as they get called out.

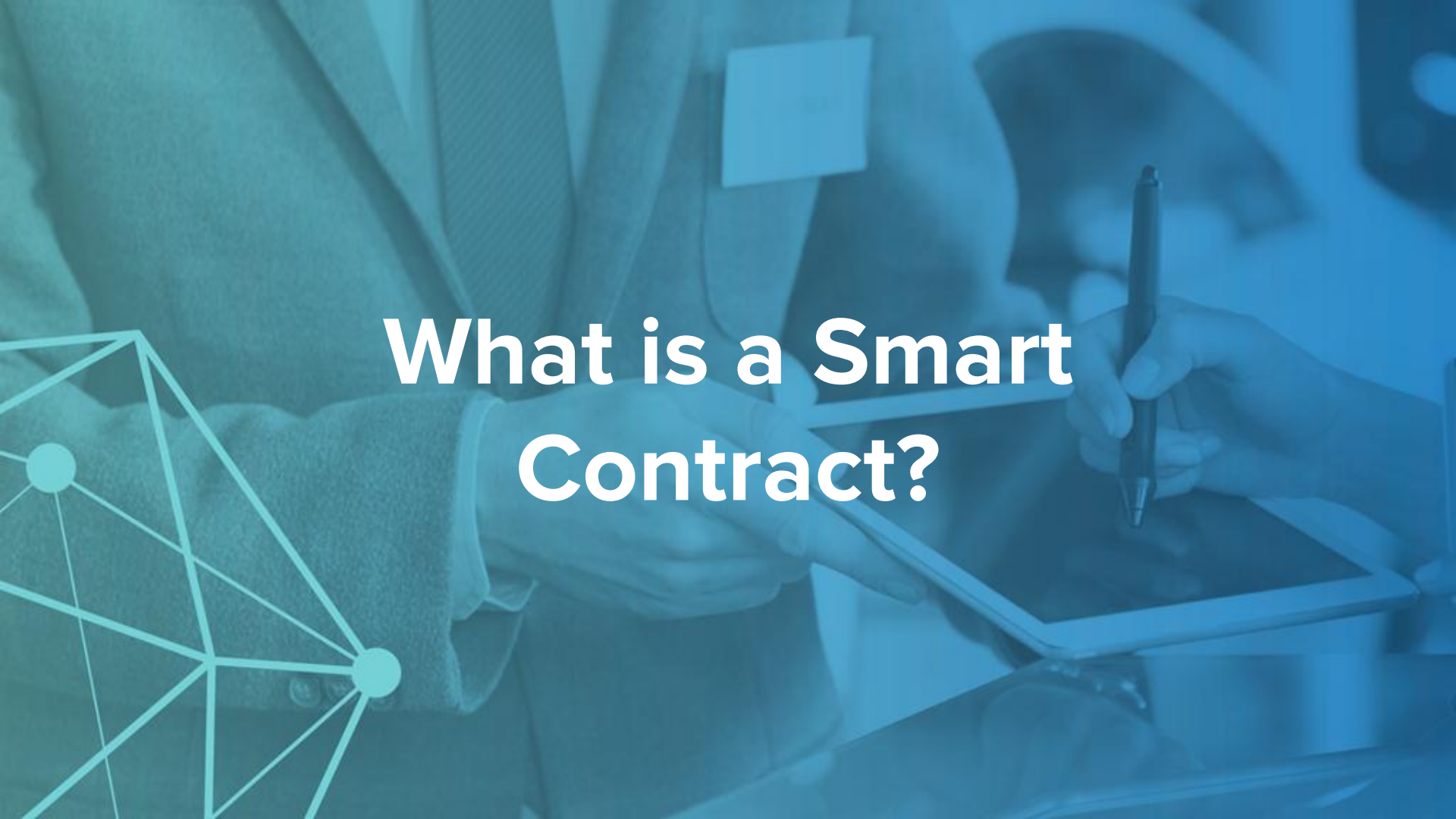
Someone calls out item number one and everyone writes it down.

Then two people call out item number two at the same time, but the item number differs.

There needs to be a process for who wins, and the loser gets to try to call out item number three.

When all agree on the outcome of an entry, the next link in that ledger can be written.

Whether this happens in a small scale or the size of the internet, that is the spectrum for how a distributed ledger can work.


What is a Smart Contract?

The code or any complex program stored and executed on a blockchain.

Smart Contracts
in Action

Imagine a farmer based in Sacramento, California buys an insurance agreement that protects them from extreme weather condition. If temperatures reach more than 100 degrees for 100 days, they get reimbursed 10,000 USD.

With today's ledgers, the insurer might find a way to back out of, procrastinate or dispute this agreement.

If a Smart Contract is in place, the script in the ledger would rule that on that 100th day of 100+ degrees, the 10,000 USD would be automatically withdrawn. With an automated process, like it or not, the insurer cannot back out.

Facets of distributed, shared ledgers

Network nodes both **generate their own data** and **verify data** generated by others

Contain historic record of verified transactions and **easily auditable**

Distributed Consensus eliminates costly and inefficient reconciliation processes

No central repository – each node stores identical copies of the ledger

Resilient due to network power and cryptographic integrity

Large economic **disincentive for malicious** actors

Google These Words

Consensus

PoW, PoS, POET, RaFT, BFT, PBFT

Crypto/Security

PKI, HASH, SHA-256, zk-SNARK, HE, ECC, EXDSA, SGX

Ledger Concepts

Mining, Blocks, Forks, Parents, Uncles, Merkle Trees

Platform Concepts

Nodes, Oracles, Notaries, Wallet, Smart Contracts

Agenda

Introduction to Blockchain Technologies

The Linux Foundation and Hyperledger

Sample Use Cases

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.

Web

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

Blockchain

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

Let's Encrypt

ONAP
OPEN NETWORK AUTOMATION PLATFORM

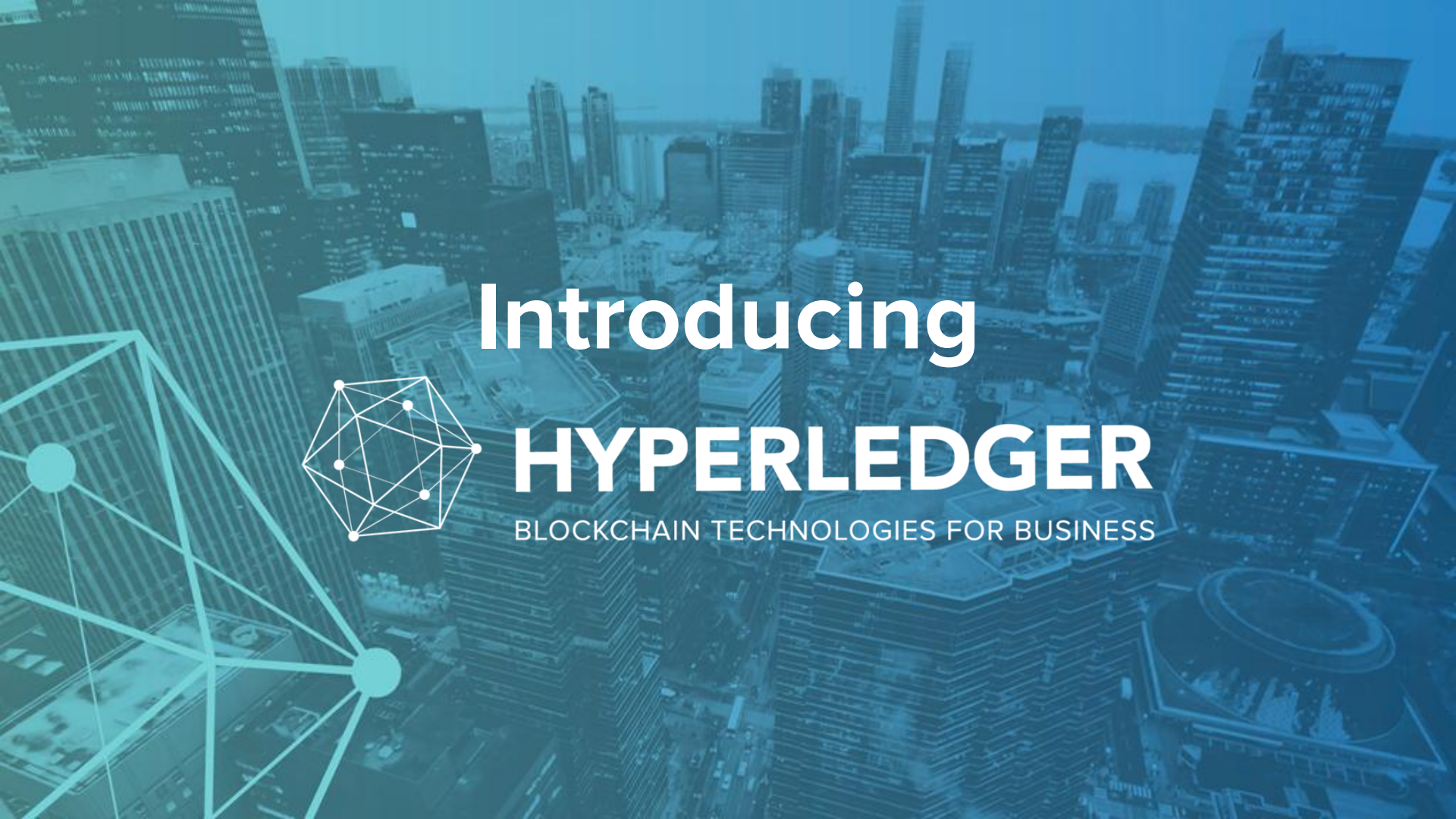
CLOUD NATIVE COMPUTING FOUNDATION

AUTOMOTIVE GRADE LINUX

node JS

HYPERLEDGER

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

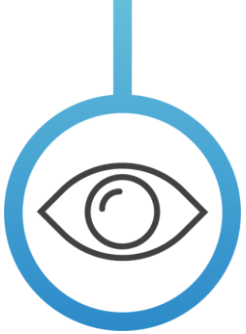

Introducing
HYPERLEDGER
BLOCKCHAIN TECHNOLOGIES FOR BUSINESS

Open source collaborative effort to advance cross-industry **blockchain technologies**

Hosted by **The Linux Foundation**, fastest-growing project in LF history

Global collaboration spanning finance, banking, IoT, supply chains, manufacturing and technology

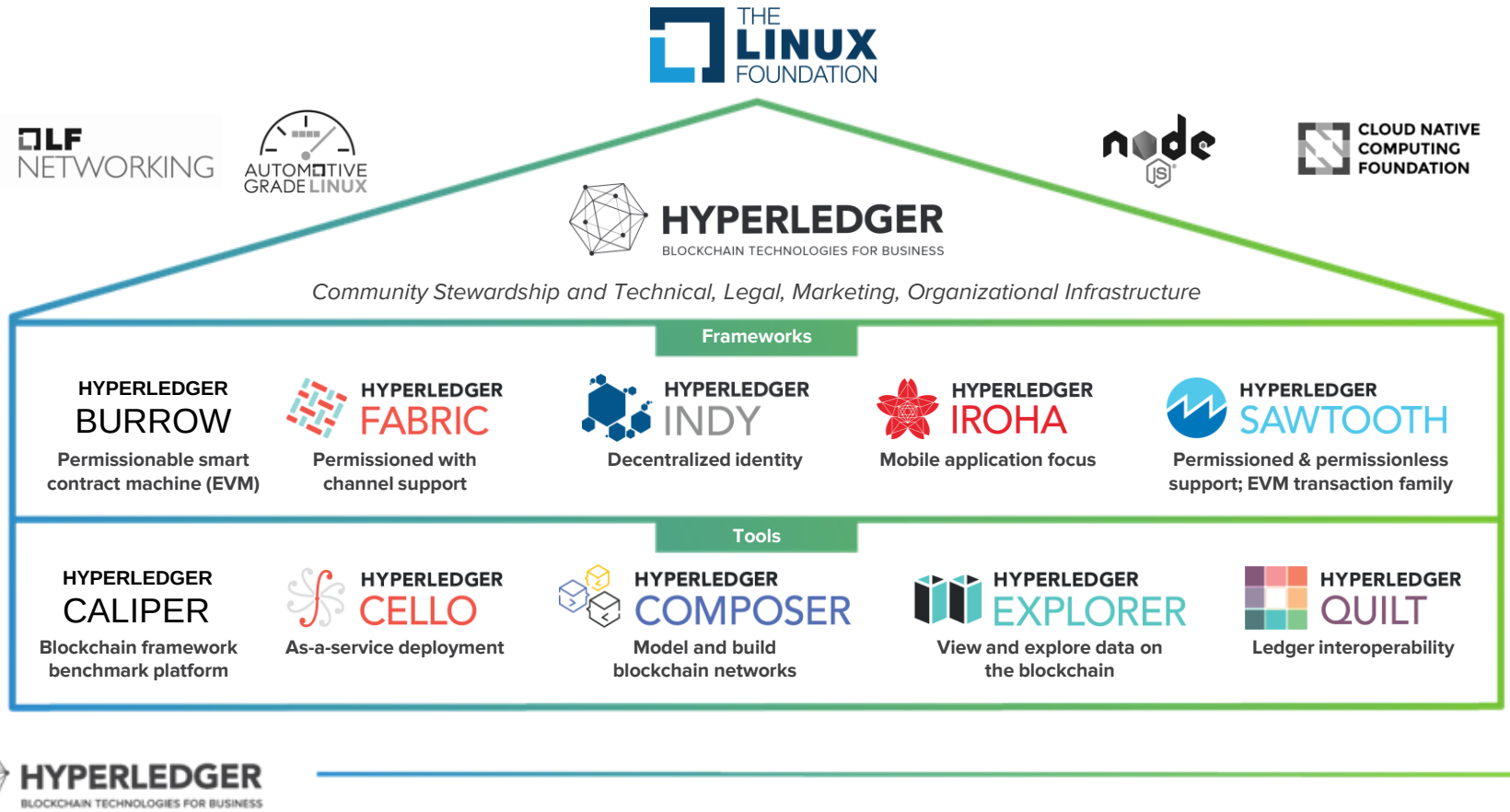
The Hyperledger Vision



Blockchain promises to change the way business is conducted and transactions are executed across industries. Precisely how, and the pace at which, each of these industries adopts blockchain will surely vary.

There will never be one global chain-of-all chains that all industries convert to.

Similar to The Linux Foundation, Hyperledger also has a modular approach to hosting projects. Think of Hyperledger as a **greenhouse** growing and sustaining business blockchain projects from seed to fruition. The Linux Foundation and Hyperledger provide the infrastructure for open development to occur among a diverse and thriving community.


THE LINUX FOUNDATION
LF NETWORKING
AUTOMOTIVE GRADE LINUX
node JS
CLOUD NATIVE COMPUTING FOUNDATION
HYPERLEDGER
BLOCKCHAIN TECHNOLOGIES FOR BUSINESS
Community Stewardship and Technical, Legal, Marketing, Organizational Infrastructure
Frameworks
HYPERLEDGER BURROW
Permissionable smart contract machine (EVM)
HYPERLEDGER FABRIC
Permissioned with channel support
HYPERLEDGER INDY
Decentralized identity
HYPERLEDGER IROHA
Mobile application focus
HYPERLEDGER SAWTOOTH
Permissioned & permissionless support; EVM transaction family
Tools
HYPERLEDGER CALIPER
Blockchain framework benchmark platform
HYPERLEDGER CELLO
As-a-service deployment
HYPERLEDGER COMPOSER
Model and build blockchain networks
HYPERLEDGER EXPLORER
View and explore data on the blockchain
HYPERLEDGER QUILT
Ledger interoperability

Hyperledger
Momentum

2

Years since launch

47K+

Commits

5

Tools

5

Frameworks

2

1.0 Production Releases

230+

Members
(50+ in China)

10

Active Community
Working Groups

110+

Meetups
Worldwide

21K

Meetup
Participants

1,500+

Media Clips Per Month
in 2017

Agenda

Introduction to Blockchain Technologies

The Linux Foundation and Hyperledger

Sample Use Cases

Why Business
Blockchain
Technologies

Spectrum of Blockchains

Permissioned vs. Permissionless: Who can write to a Blockchain (i.e., accessibility)
Public vs. Private: Who can read from a Blockchain (i.e., visibility)

Permissionless Public

Permissionless Private

Permissioned Public

Permissioned Private

Bitcoin, Ethereum

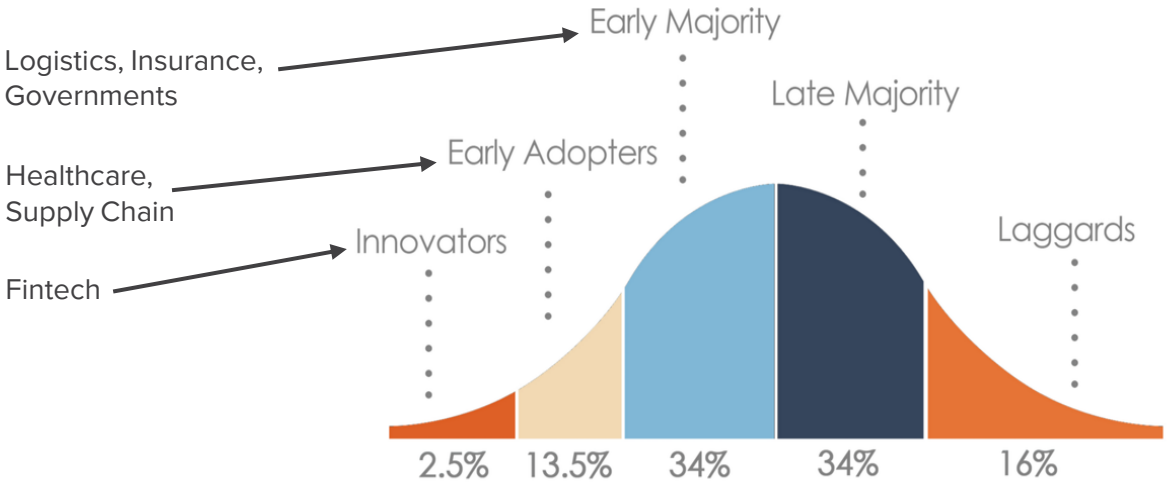
Public Polls

Land titles, University degrees

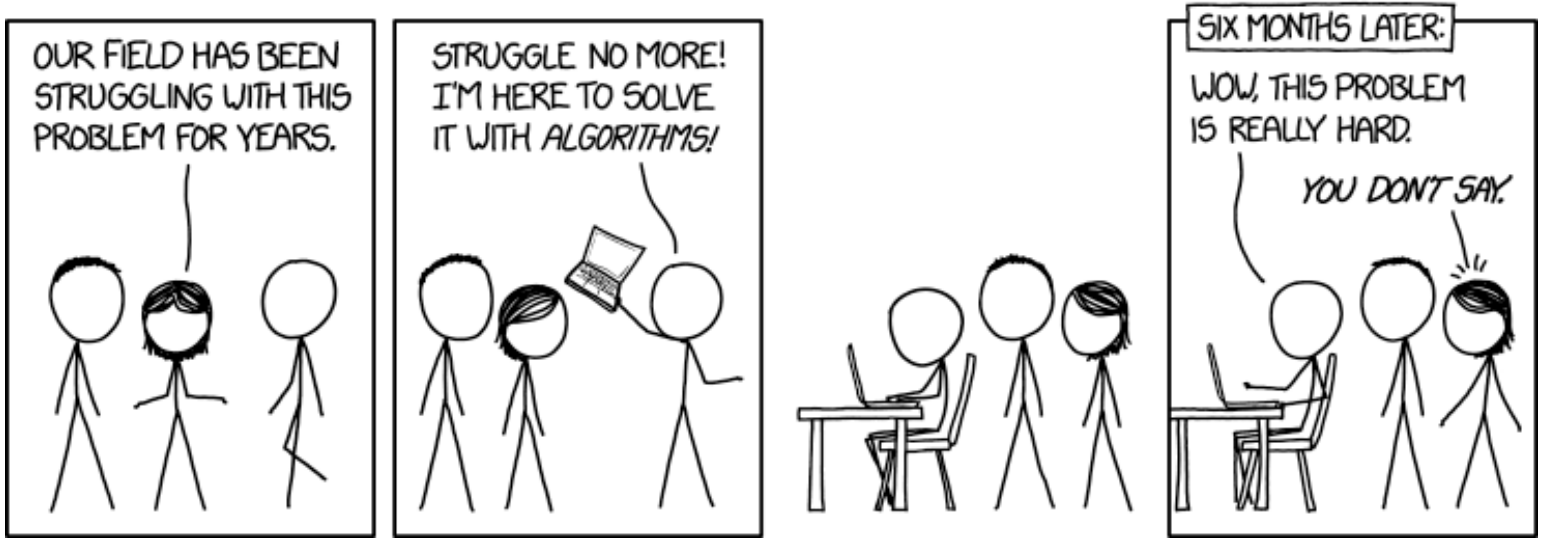
Medical records

Blockchain Industries Curve

Diffusion of Innovations Curve, by Everett Rogers



Not all problems can be solved with Blockchain



Deployments & Use Cases

Hyperledger embraces the full spectrum of industry use cases, especially enterprise scenarios with widely varied requirements for decentralization, trust, continuity and confirmation times. Each represents a potentially unique optimization point for the technology.

Interstate
Medical Licensing

Interstate Medical Licensing

The Challenge
Interstate medical licensing is complex, and the provider directories and claims adjudication processes need increased trust and transparency.

The Collaboration
Hyperledger members Hashed Health and the State of Illinois have implemented a pilot program to identify opportunities to improve the efficiency and accuracy of these processes in Illinois.

The Technology
A blockchain-based registry, built using Hyperledger Fabric, streamlines the sharing of smart contracts and medical credential data to automate workflow associated with interstate and multistate licensure.

HASHED HEALTH
HEALTHCARE BLOCKCHAIN INNOVATION

The Illinois BLOCKCHAIN Initiative

Digital Identity

Digital Identity

The Challenge
As of 2017, only 44% of Filipinos were utilizing bank accounts, hampered by inefficient "Know Your Customer" laws.

The Collaboration
The Bankers Association of Philippines (BAP), in partnership with Hyperledger member Amihan and a coalition of major banks, undertook a POC to test a nation-wide self-sovereign ID system.

The Technology
The POC used Hyperledger Indy to develop a platform that streamlines new account onboarding, allowing consumers to enter information once in a digital and privacy-preserving way.

HYPERLEDGER INDY

AMIHAN

Green Assets Management

Green Assets Management

The Challenge

Generating carbon assets more efficiently, helping to build a green, low-carbon and environmentally-friendly future in China.

The Collaboration

General Hyperledger member Energy Blockchain Labs partnered with Premier member IBM on the world's first blockchain-based green assets management platform, based on Hyperledger Fabric.

The Technology

Blockchain technology, like the use of Hyperledger Fabric here, is expected to become an important means for effective control of carbon emissions in China, the world's largest source of carbon emissions. Carbon asset development, is one of the most popular ways of encouraging enterprises to decrease emissions and use low carbon emission technology.

ENERGY BLOCKCHAIN LABS

IBM

Real Estate Transactions

Real Estate Transactions

The Challenge

In some cases of corruption, the move to government-owned centralized databases backfired, and digital histories of land titles were eradicated, properties seized and handed over to oil companies.

The Collaboration

The winning team at the Consensus 2017: Building Blocks Hackathon, built an online property banking and acquisition game utilizing Hyperledger Fabric with IBM Bluemix.

The Technology

HyperProperty shows that Hyperledger Fabric can be used to guarantee who owns what properties. Decentralizing databases and turning to DLTs track land titles could keep governments accountable and create a more trustworthy system, even in instances where the individual actors may not be trusted.

Letters of Credit

Letters of Credit

The Challenge

The LOC process is a difficult one to automate due to the sheer number of network participants involved.

The Collaboration

Institutions in Singapore, including Monetary Authority of Singapore, several banks and Standard Chartered, as well as China CITIC Bank and Minsheng bank have come together to use blockchain to create a LOC system. One of the first transactions of this kind in China saw a 100 million letter of credit transaction be completed without a hitch.

The Technology

Asian markets have been deploying and developing various solutions for LOC based on Hyperledger Fabric. Blockchain provides a common ledger for LOC and presents a modernized opportunity; the LOC is stored on the blockchain, and once spent, is marked as such so that the value of the letter cannot be spent again.

Digital Trade
Chain

Digital Trade Chain

The Challenge

Today, banks live in a competitive world. Small and mid-sized businesses generated 85% of employment growth in Europe in recent years, but only ~50% of them have access to formal credit. The Digital Trade Chain exemplifies how blockchain can bring the required trust and transparency to a new business network and associated business model.

The Collaboration

A consortium of major world banks including: Deutsche Bank, HSBC, KBC, Natixis, Rabobank, Société Générale, Santander, UniCredit and Nordea

The Technology

we.trade is a blockchain-based international trading system that enables accurate trading posture information, order to settlement control, risk coverage, track and trace options

we.trade
more trust. more trade.

HYPERLEDGER
BLOCKCHAIN TECHNOLOGIES FOR BUSINESS

Resources

edX Courses Programs Schools & Partners About Search:

Home > All Subjects > Business & Management > Blockchain for Business - An Introduction to Hyperledger Technologies

Blockchain for Business - An Introduction to Hyperledger Technologies

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

https://www.edx.org/course/blockchain-business-introduction-linuxfoundationx-lfs171x

You can help!

Report a Security Bug

security@hyperledger.org

We Have a Bug Bounty—Use It!

hackerone.com/hyperledger

Join a Working Group

wiki.hyperledger.org

Watch the Webinar Replay: Get Involved!

hyperledger.org/webinars/get-involved

https://events.linuxfoundation.org/events/hyperledger-global-forum-2018

Recommended Reading

Massive online
open-souce course
“Blockchain for Business”

Publications
hyperledger.org/resources

Comparison of
Hyperledger Frameworks

Collection of interesting
use cases for Blockchain technologies

On Bitcoin
bitcoin.org/en/faq

Just subscribe
MIT chainletter

Questions?

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mpiekarska@linuxfoundation.org