

# Next generation blockchain consortium

Combining enterprise blockchain with confidential computing



**Edmund To**  
GSBN



**Hart  
Montgomery**  
Hyperledger



**Dan Middleton**  
Confidential Computing  
Consortium



Moderator

**Daniela Barbosa**  
Hyperledger

**MEMBER IN DEPTH:**

**Wed 18th Jan**  
10am ET | 3pm UTC | 8:30pm IST



## Hyperledger (Hart - 15mins)



# Introducing the Hyperledger Foundation






## About Me

# Hart Montgomery

- Hyperledger Foundation CTO
- Previously worked in blockchain and cryptography research at Fujitsu Research where he helped lead Fujitsu's efforts in Hyperledger and also served on the Hyperledger TSC since 2016
- Ph.D. in cryptography at Stanford under Dan Boneh, where he was a Stanford Graduate Fellow.











































































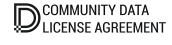






The Linux Foundation's goal is to create the greatest shared technology investment in history by enabling open collaboration across companies, developers and users.

We are the nonprofit organization of choice to build ecosystems that accelerate open source technology development and commercial adoption on a global scale.

# We are behind some of the most critical projects in the world

Security	 OpenSSF	 Falco	 ./rtp	 CONFIDENTIAL COMPUTING CONSORTIUM	 sel4 Security. Performance. Proof.	 OPEN SECURITY CONTROLLER			
Networking	 LFNWORKING	 ONAP	 OPEN DAYLIGHT	 io	 Anuket	 CLUSTER DUCK PROTOCOL	 DENT	 ODANOS	
Cloud	 CLOUD NATIVE COMPUTING FOUNDATION	 kubernetes	 argo	 envoy	 KUDO	 Crossplane	 CLOUD FOUNDRY		
Automotive	 AUTOMOTIVE GRADE LINUX	 ELISA ENABLING LINUX IN SAFETY APPLICATIONS	 KernelCI						
Blockchain	 HYPERLEDGER FOUNDATION	 HYPERLEDGER FABRIC	 HYPERLEDGER BESU	 HYPERLEDGER ARIES	 ACCORD PROJECT	 openIDL	 DIF		
Edge/IoT	 LFEDGE	 yocto PROJECT	 Zephyr	 ACRN	 Dronecode	 FLEDGE	 SOUND OPEN FIRMWARE	 OpenEEW	
Web	 node	 OpenJS Foundation	 GraphQL	 appium®	 jQuery	 REACTIVE FOUNDATION	 DOJO	 ESLint	
AI	 LFAI	 ONNX	 DELTA LAKE	 ForestFlow	 JanusGraph	 kepler.gl	 LWOWIG	 soda foundation	
Film	 ASWF ACADEMY SOFTWARE FOUNDATION	 OpenColorIO	 OpenVDB	 OpenEXR	 OpenTimelineIO	 OpenEXR	 Open Shading Language		
CI/CD	 cd CD FOUNDATION	 Jenkins	 Spinnaker	 TEKTON	 TERN	 StackStorm	 Vitess	 etcd	 SPIRE
Energy	 LFEENERGY	 RIAPS	 EM2	 POWSYBL	 GXF	 COMPAS	 OPENEEMETER	 OPERATORFABRIC	
Hardware	 RISC-V	 OpenPOWER™	 CHIPS ALLIANCE	 UNIMATRIX	 3MF CONSORTIUM				
Standards	 ALLIANCE FOR OPEN MEDIA	 OPENCHAIN	 COMMUNITY DATA LICENSE AGREEMENT	 JOINT DEVELOPMENT FOUNDATION	 CIM CLOUD INFORMATION MODEL	 CHAOS	 OPEN MANUFACTURING PLATFORM		



The Linux Foundation is a global organization committed to the free exchange of data, code, and innovation

**2500+**

Members From  
41 Countries

**100%**

of Fortune 100  
Tech & Telecom

**540K+**

Developers  
Contributing  
Code

**780+**

Critical Open  
Source  
Projects

**\$100B**

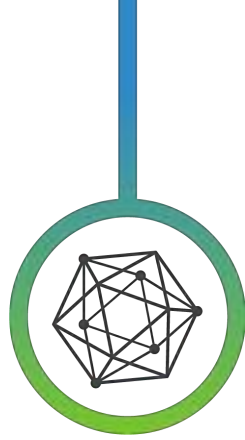
Shared  
Value

**2M**

Developers  
Trained



The Linux Foundation is a critical part of modern technology



## Hyperledger Foundation

A global, cross-industry consortium of communities collaborating and advancing business blockchain technologies.



# What is Hyperledger Foundation? What Makes it Unique?

An **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 blockchains **by business for business**

Hyperledger blockchain technologies emphasize key enterprise requirements:

- Support for differing levels of access
- Sub-universal validation
- Cross-chain transactions
- Modularity

# Hyperledger Foundation Background



## Blockchain Software, Not Blockchains

- We provide a community for blockchain software and tools
- We **do not** run blockchains as part of the Hyperledger
- Blockchains are run through separate entities or foundations



## A Global Team of Developers

- Our community builds code in the open
- We aim to be as diverse as possible in many respects—all are welcome!
- Anyone can join and contribute, and even assume a leadership role!



## Principles from The Linux Foundation

- We are always as transparent as possible
- Meetings, email lists, and other communities are almost always open
- No “pay to play.” Membership gets you community and marketing benefits, but anyone can contribute or use the software



# Hyperledger Momentum



~6.5

Years since launch



3

Libraries



5

Tools



5

Distributed Ledgers



6

Graduated Projects



Global

Enterprises, start-ups,  
academics & non-profits



16

Active Community  
Working Groups &  
Special Interest Groups



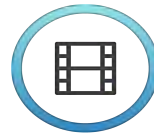
180+

Meetups  
Worldwide  
(80+ countries)



86K+

Meetup  
Participants



40K+

Subscribers to our mailing lists



**HYPERLEDGER**  
FOUNDATION

# Blockchain: *Decentralized* Trust

# What is *Decentralized Trust*?

A **database (or blockchain)** can be thought as a **store of records**.

Who gets to decide what records belong in the database?

One person/entity decides → centralized  
Many different entities decide → decentralized

Decentralized trust is a **continuum**,  
not a “yes or no”

Technically: the consensus algorithm (or lack thereof) of the distributed ledger is the most impactful design choice on decentralization.



# Why Decentralized Trust?

Several entities need to agree on some data, but no entity trusts any single other entity to be the “source of truth.”

The entity that would be the best official “source of truth” for some data doesn’t want to or cannot be responsible for the upkeep of the data.



A store of information needs to be made redundant in the case of compromise or attack by a hacker.

People responsible for maintaining a data set are dynamic and change quickly.

**“Do I need a distributed ledger?” == “Do I need a database with decentralized trust?”**






# What is a Distributed Ledger? *Blockchain vs. Distributed Ledger*

A **blockchain** is an **append-only system of record or transaction log**.

A **distributed ledger** is a **distributed database with decentralized trust**.

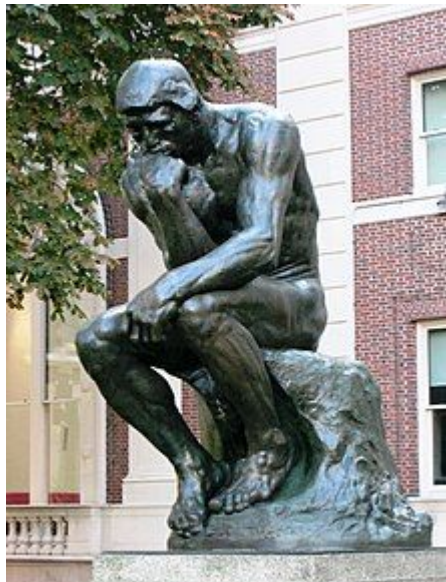
Most **popular blockchains are also distributed ledgers**, and **most popular distributed ledgers are also blockchains**.

## What are popular blockchain systems, abstractly?

 <b>bitcoin</b>	A distributed database for “money” with “fully” decentralized trust
	A distributed database for “programs” with “fully” decentralized trust
 <b>HYPERLEDGER FABRIC</b>	A distributed database for “programs” with “partially” decentralized trust

**“Do I need a distributed ledger?” ==**

**“Do I need a database with decentralized trust?”**



If there is one point to take away from my talk today, this is it!

Whenever you think about blockchains or whether you want to use a blockchain, you want to consider:

- What is the information being stored in the “database” (even if it is programmatic)?
- Why is having one centralized entity maintain this information a bad idea, or generally infeasible?

This will make it easy in the future to distinguish cases where distributed ledger use is just “hype” rather than necessary.



Foster and coordinate the premier community of developers building enterprise grade open source software, in the form of platforms, libraries, tools and solutions, for multiparty systems using blockchain, distributed ledger, and related technologies.

# Forbes

## Blockchain 50 2022



HYPERLEDGER  
BESU



HYPERLEDGER  
CACTUS



HYPERLEDGER  
FABRIC



HYPERLEDGER  
INDY

Allianz 

Anthem<sup>®</sup>

**BHP**

 **BOEING**

**DTCC**

Securing Today. Shaping Tomorrow.<sup>™</sup>

**FUJITSU**



**MAERSK**



**NORNICKEL**

**ORACLE<sup>®</sup>**

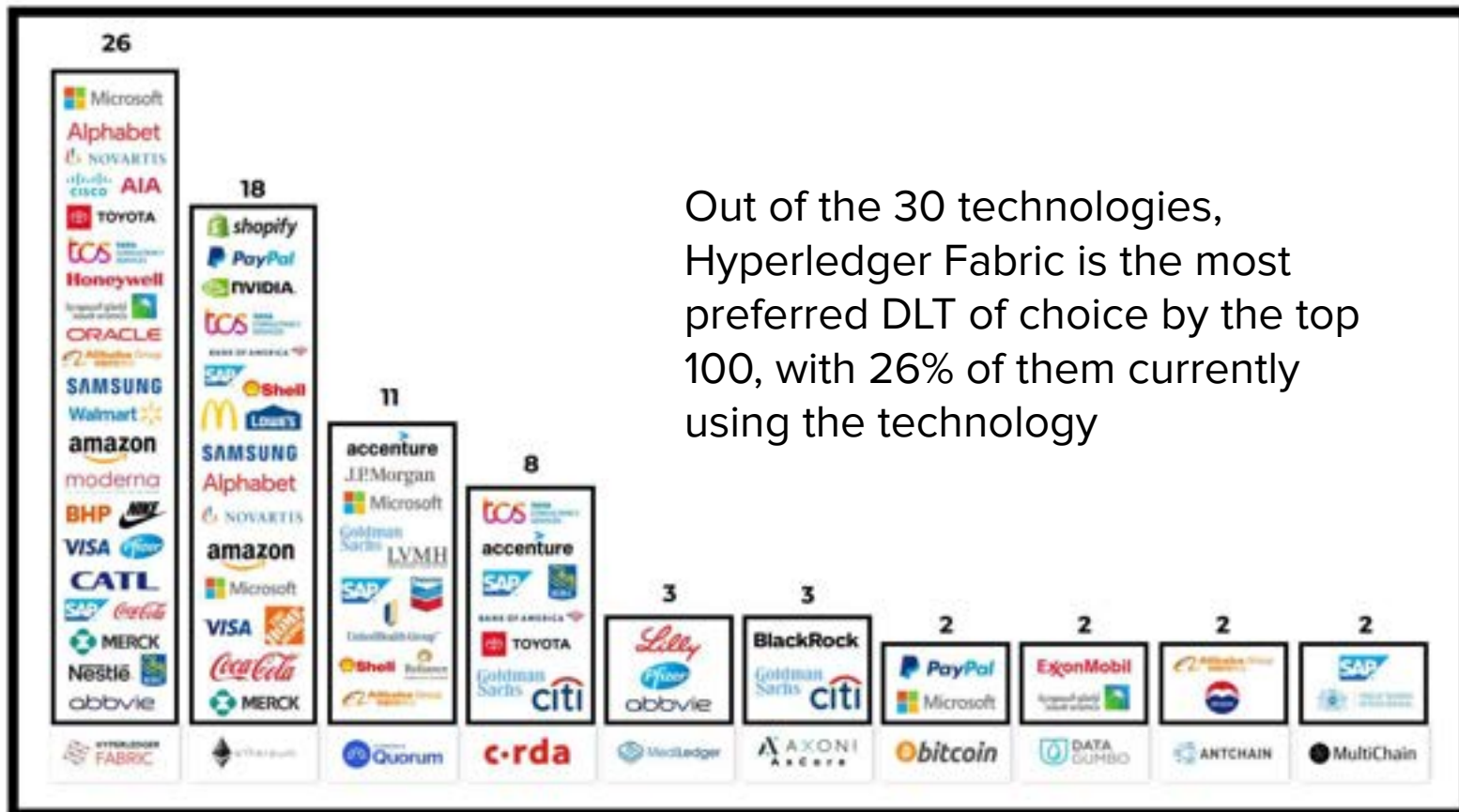


**RENAULT**

**Tech  
Mahindra**

**Tencent**  
腾讯

**Walmart** 





# Key Areas of Growth where Hyperledger technology is Active

## PAYMENTS & TRADE FINANCE

- Re-structuring the plumbing of the global financial system
- Opportunity for new instruments (Stablecoins, CBDCs)
- 86% of Central Banks exploring CBDC, 60% have pilots (BIS)
- Greater efficiency, fraud prevention, inclusion



**Global Shipping Business Network (GSBN)** is covering 1 in 3 containers in WW maritime shipping and being leveraged by 300 organizations built on **Hyperledger Fabric** using **Oracle Blockchain Platform** and Alibaba Cloud Fabric nodes.



**Bank of Cambodia's Project Bakong** is an interbank payment system officially launched in October 2020: currently **links 11 domestic commercial banks and payment processors**. Recorded 1.4 million transactions, amounting to a value of about \$500 million, in the first half of 2021. Built on Hyperledger Iroha with **Soramitsu**



**Eastern Caribbean Central Bank** launched its **live CBDC** called **DCash** which is built on Hyperledger Fabric.



The **Bank of Thailand's** Project Inthanon-Lion Rock is using **Hyperledger Besu** for its **pilot CBDC** network.

Source: <https://cbdctracker.org/>  
<https://www.bis.org/publ/bppdf/bispap114.pdf>



# Hyperledger in Action

Central Bank Digital Currencies

## Contents

- I. Introduction
- II. Hyperledger Foundation
- III. CBDCs and Open Source
- IV. Community Work with CBDCs
- V. Hyperledger CBDCs around the Globe
  - A. European Central Bank
  - B. Eastern Caribbean
  - C. France
  - D. Thailand
  - E. Project Inthanon-LionRock
  - F. Cambodia
  - G. Nigeria
  - H. Spain
  - I. Australia
  - J. Saudi Arabia & U.A.E.
- VI. CBDCs at Hyperledger Global Forum
- VII. Additional Resources and Readings
- VIII. Hyperledger Projects
- IX. About the Authors



# Banque de France

Banque de France completed a trial for a wholesale CBDC, partnering with HSBC, Hyperledger Foundation Premier Member IBM, and eight other organizations. This first stage of the experiment tested the interoperability between a CBDC blockchain network and a bond network using Hyperledger Fabric and R3 Corda, respectively, for the DLTs and Hyperledger Labs' Weaver as the interoperability tool.

"By achieving the transfer of debt and assets, as well as the exchange of assets across different blockchains in an atomic way, the Banque de France and HSBC have demonstrated the possibility of such interoperability, essential to ensure that the multiple environments, on which the efficient functioning of markets rely, can coexist." - Nathalie Auloyre, Director General of Financial Stability and Operations at the Banque de France.



# Spain's Smart Money

The Spanish financial sector completed the **Smart Money** experiment on the technical aspects of a digital euro's distribution, use, and design options. The initiative—led by Iberpay, 16 banks (CaixaBank, Santander, BBVA, ING, etc.), and with the Bank of Spain observing—aimed to test the technical features outlined in the European Central Bank's report for a digital euro. Using the **Red-i blockchain network, based on Hyperledger Besu**, Smart Money

tested the viability of a digital euro for the retail sector, including offline payments, and the two-tier infrastructure model as opposed to a centralized model. [Read the full](#)



# European Central Bank

ECB President Christine Lagarde has suggested that a digital euro can complement cash. Furthering the exploration of a digital euro, the European Central Bank released research on a desired approach to test how centralized systems could operate with distributed ledger technology. Several European banks participated including the central banks of Spain, Italy, France, Lithuania, Luxembourg, Belgium, and Austria. The research found that Hyperledger Besu and Hyperledger Fabric, amongst others, were "fully interoperable with existing fiat systems."

[Read the full report here.](#)



# Key Areas of Growth where Hyperledger technology is Active

## PROVENANCE & SUPPLY CHAIN

- Potential boost to global GDP by 2030 US\$962bn
- Verify and track the source of goods
- Prevent fraud and counterfeit of goods
- Customer loyalty through transparency
- Touches all industries



Blockchain-based Traceability-as-a-Service to **verify responsible sourcing, underpin effective recycling and improve efficiency.** Notable customers include **Volvo Cars, Polestar, Vulcan Energy Resources** and **BHP.**



Walmart and retailers and food companies such as Unilever, Nestlé and Dole, have created a **shared ledger accessible to each party in the supply chain, all food processing steps can be recorded and stored on the blockchain.**



Tencent  
Cloud

The supply chain financial system is empowered by **Tencent** TBaaS platform and **Hyperledger Fabric**, and integrates smart warehouse and IoT technologies. Through cooperation with various financial institutions, the system provides decentralized, trusted and efficient supply chain financial services. **Reporting 50% reduction** in warehousing document workload. Inventory check reduced from **10 people a day to 4 people a half day.**

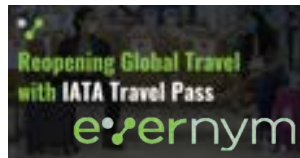


**Zuellig Pharma's eZTracker** is a blockchain based solution that provides pharmaceutical manufacturers visibility and traceability over their product's movements throughout the supply chain transforming patients' mobile devices into an instant verification tool, using Hyperledger Fabric.

# Key Areas of Growth where Hyperledger technology is Active

## IDENTITY

- Potential boost to global GDP by 2030 US\$224bn
- Safeguard valuable credentials
- Unlocks potential efficiencies and new capabilities in any industry
- Streamline onboarding, records exchange, prevent fraud
- 29% in Deloitte survey say digital identity will have the most impact in financial transactions



**MemberPass** is the **first global digital identity ecosystem for credit unions and their members**. Provides consumer identity while protecting personal information. Adopted by more than 7 credit unions and counting, 20,000+ credentials issued. Built on Hyperledger Indy.

**The International Air Transport Association IATA Travel Pass** is a mobile app that helps travelers to store and manage their verified certifications for COVID-19 tests or vaccines. It was built with Evernym using **Hyperledger Indy** and **Hyperledger Aries**.

**Aruba Secure Health Card**, a pilot for sharing health information in a privacy-preserving way using DLT that **SITA**, the world's leading specialist in air transport communications built with Indicio using **Hyperledger Indy** and **Aries**.

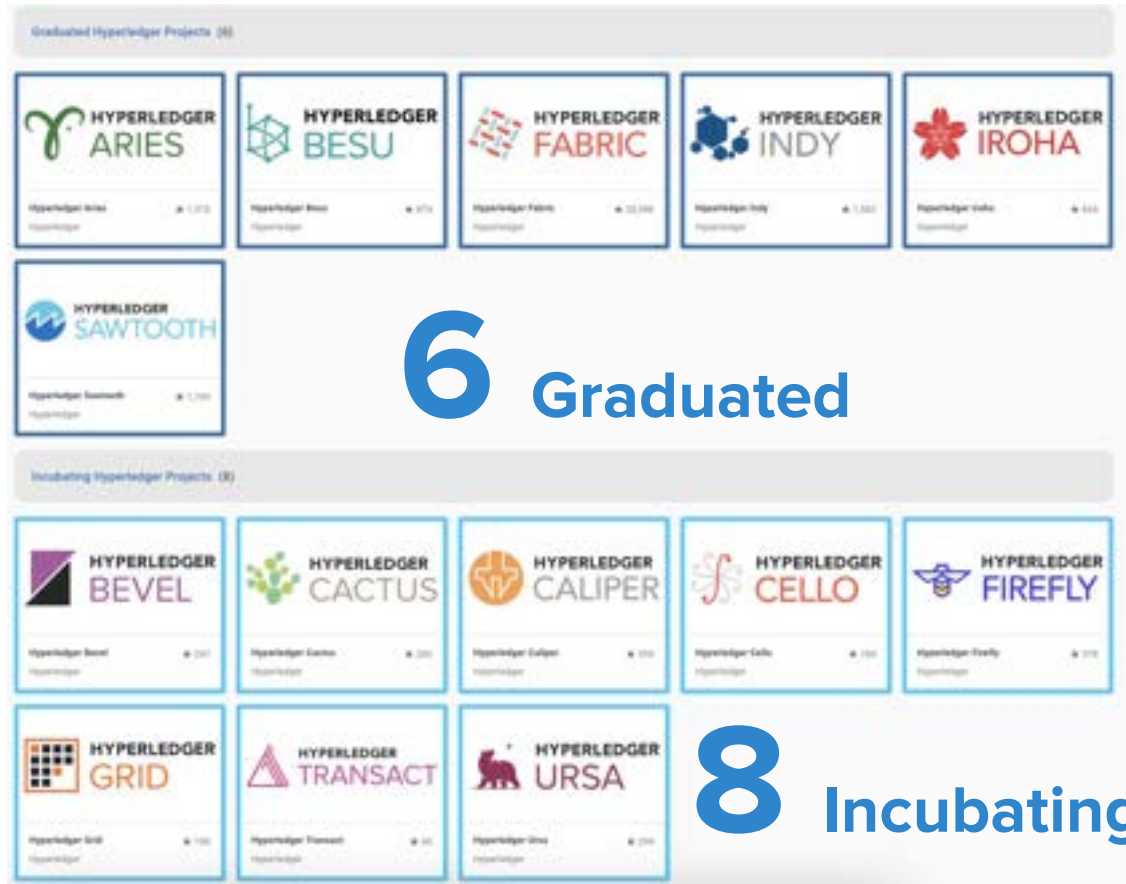
**IDUnion** has 39 cross-sector partners building **production-level infrastructure for verification of identity data in finance, manufacturing, public sector and healthcare**. Addressing demand for migrating centralized identity systems towards decentralized self-sovereign management of digital identities for people, organizations and machines. IDUnion has launched an **Hyperledger Indy** test network, built components for allocation, verification and management of digital identities and more.

**All of this is driving a host of new development priorities tied to modularity, interoperability, privacy, performance and more at the Hyperledger Foundation.**





# Project Landscape



# Hyperledger Blockchains/Distributed Ledgers

## Distributed Ledgers



**HYPERLEDGER**  
**BESU**



**HYPERLEDGER**  
**FABRIC**



**HYPERLEDGER**  
**INDY**



**HYPERLEDGER**  
**IROHA**



**HYPERLEDGER**  
**SAWTOOTH**



**HYPERLEDGER**  
FOUNDATION



# Hyperledger Blockchain Tools

Tools



**HYPERLEDGER**  
**BEVEL**



**HYPERLEDGER**  
**CACTUS**



**HYPERLEDGER**  
**CALIPER**



**HYPERLEDGER**  
**EXPLORER**



**HYPERLEDGER**  
**CELLO**



**HYPERLEDGER**  
**GRID**



**HYPERLEDGER**  
**FIREFLY**



**HYPERLEDGER**  
**FOUNDATION**

# Hyperledger Blockchain Libraries

Libraries





# Questions at the end! Thanks!



# Learn More & Join Us!

# Hyperledger Member Case Studies

## Case Studies

Browse various use cases powered by Hyperledger technologies



### Featured

How Tech Mahindra Deployed Hyperledger Fabric for the Digital Transformation of Abu Dhabi's Land Registry

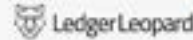
Industry: Government  
Topics: Land Registries, Blockchain  
Project: Hyperledger Fabric

Read more



How we.trade Helps Businesses Grow With Digital Smart Contracts Powered by Hyperledger Fabric

Industry: Finance  
Topics: Smart contracts, FinTech, Conventions/Blockchain  
Project: Hyperledger Fabric



RTI Blockchain & Ledger Leopard make tracking returnable transport items as easy as online banking with Hyperledger Besu

Industry: Local Center Management  
Topics: Supply chain, Online banking  
Project: Hyperledger Besu



Thales and Digicert team up to increase cybersecurity for Hyperledger Fabric

Industry: Cybersecurity  
Topics: Public Key Infrastructure  
Project: Fabric

# Hyperledger YouTube Channel

The screenshot displays the Hyperledger YouTube channel interface, organized into three main sections:

- Hyperledger Member Webinars:** A row of six video thumbnails. Each thumbnail includes a title, a duration timer, and a view count. The titles are variations of "Hyperledger in-depth: Demystifying NF-Ts..." and "Hyperledger in-depth: An hour with [Name]...".
- Hyperledger Meetups:** A row of six video thumbnails. Each thumbnail includes a title, a duration timer, and a view count. The titles include "Atomic cross chain swap between Hyperledger Fabric...", "Blockchain Employment Series: How to Market...", "Hyperledger India Chapter Celebrates its 3rd...", "Hyperledger Fabric Deployment on AWS, IBM...", "Introduction to Hyperledger projects and the Perun lab", and "Rapid Blockchain development with SIMS...".
- Hyperledger Special Interest Groups:** A row of six video thumbnails. Each thumbnail includes a title, a duration timer, and a view count. The titles are "Hyperledger Trade Finance SIG", "Hyperledger Telecom SIG", "Hyperledger Media & Entertainment SIG", "Hyperledger Social Impact SIG", "Hyperledger Climate Action & Accounting SIG", and "Hyperledger Capital Markets SIG".



# Join Us. Contribute. Share



Join a  
Community  
Call



Contribute to  
a Project or  
Lab

Grab a good first issue based on your level of  
experience/technical area(s) of expertise or interests:

- a. All Good First Issues
- b. Climate Action SIG Specific Good First Issues
- c. Level 100 - Introductory Good First Issues
- d. Level 200 - Intermediate Good First Issues
- e. Level 300 - Advanced Good First Issues
- f. Level 400 - Expert Good First Issues



Blog and  
Developer  
Showcase





# Community Special Interest Groups (SIGs)

Sector Groups are open to the public



**HYPERLEDGER**  
**Healthcare**  
SPECIAL INTEREST GROUP



**HYPERLEDGER**  
**Climate Action & Accounting**  
SPECIAL INTEREST GROUP



**HYPERLEDGER**  
**Capital Markets**  
SPECIAL INTEREST GROUP



**HYPERLEDGER**  
**Telecom**  
SPECIAL INTEREST GROUP



**HYPERLEDGER**  
**Media & Entertainment**  
SPECIAL INTEREST GROUP



**HYPERLEDGER**  
**Trade Finance**  
SPECIAL INTEREST GROUP



**HYPERLEDGER**  
**Public Sector**  
SPECIAL INTEREST GROUP



**HYPERLEDGER**  
**Governance, Risk, & Compliance**  
SPECIAL INTEREST GROUP



**HYPERLEDGER**  
**Supply Chain**  
SPECIAL INTEREST GROUP



**HYPERLEDGER**  
FOUNDATION

Visit: <https://wiki.hyperledger.org/display/HYP/Special+Interest+Groups>

# Get Trained and Certified!

Technical training courses and professional certifications to get everyone on your team up-to-speed on Hyperledger.

## Online Self Paced Training:



- Blockchain: Understanding Its Uses and Implications
- Introduction to Hyperledger Technologies
- Introduction to Hyperledger Sovereign Identity Blockchain Solutions: Indy, Aries & Ursa
- Hyperledger Fabric Fundamentals

# JOIN OUR DISCORD





# Thank you!

Hart Montgomery -  
[hmontgomery@linuxfoundation.org](mailto:hmontgomery@linuxfoundation.org)

‘

The background is a blue-tinted photograph of a large audience seated in a hall, facing a stage. A network diagram with teal lines and nodes is overlaid on the left side of the image.

# **Confidential Computing Consortium (Dan - 15mins)**



# Confidential Computing Consortium

*Dan Middleton (he/him)*  
*Intel Principal Engineer*  
*CCC TAC Chair*



CONFIDENTIAL COMPUTING  
CONSORTIUM



# The Confidential Computing Consortium


A community focused on open source licensed projects securing DATA IN USE & accelerating the adoption of Confidential Computing through open collaboration

Every member is welcome; every project meeting our criteria is welcome.  
We are a transparent, collaborative community.





We as members, contributors, and leaders pledge to make participation in our community a harassment-free experience for everyone.

# Inception



THE LINUX FOUNDATION

Q Projects Membership Events Training Resources Newsroom About



## Confidential Computing Consortium Establishes Formation with Founding Members and Open Governance Structure

By The Linux Foundation | October 17, 2019

*Industry's biggest technology leaders advance computational trust and security for next-generation cloud and edge computing*

SAN FRANCISCO, Calif., October 17, 2019 – The Confidential Computing Consortium, a Linux Foundation project and community dedicated to defining and accelerating the adoption of confidential computing, today announced the formalization of its organization with founding premiere members Alibaba, Arm, Google Cloud, Huawei, Intel, Microsoft and Red Hat. General members include Baidu, ByteDance, decentrig, Fortanix, Kindite, Oasis Labs, Swisscom, Tencent and VMware.

# Confidential Computing

The protection of **data in use**  
by performing computation in a  
**hardware-based,**  
**attested**  
Trusted Execution Environment.

# confidentialcomputing.io



[Learn](#) [Projects](#) [Get Involved](#) [About](#)

The Confidential Computing Consortium is a community focused on project use and accelerating the adoption of confidential computing through collaboration.

[End User Advisory Committee](#)

[Announcements](#)

[Webinars](#)

[In the News](#)

[Blog](#)

[White Papers and Reports](#)

[FAQ](#)



**Confidential Computing-**  
The Next Frontier  
in Data Security

**54 Billion**

Confidential Computing  
Market Could Reach  
USD 54 Billion in 2024



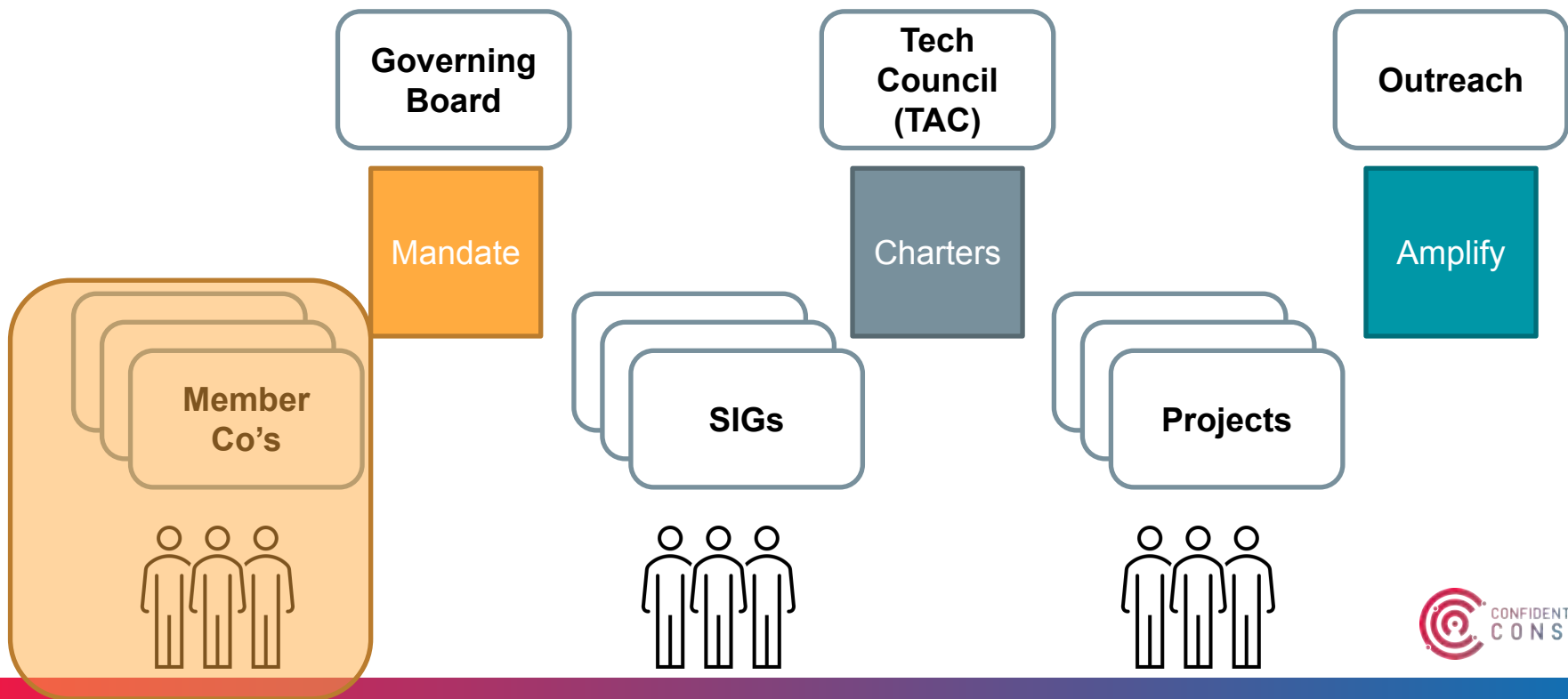
**A Technical Analysis  
of Confidential  
Computing**

A Publication of The Confidential Computing Consortium  
January 2021 v1.1

**Confidential  
Computing:  
Hardware-Based  
Trusted Execution for  
Applications and Data**

A Publication of The Confidential Computing Consortium  
July 2020

# Governance Structure



# 2020

## Premier Members



## General Members





March 18, 2021



Networking

## Why Cisco Joined the Confidential Computing Consortium

Eric Voit

<https://blogs.cisco.com/networking/why-cisco-joined-the-confidential-computing-consortium>

# 2021

## Premier Members

accenture



arm

facebook

AMD

AMPERE

anJUNA

Anclave

appliedblockchain

ByteDance

cisco

cosmion

Google



intel

Microsoft

CYSEC

DECENTRIQ

EDGELESS SYSTEMS

EN|VEIL

Red Hat

Fortanix

iExec

MADANA

NVIDIA

## Associate Members

IoTeX



OASIS LABS

PHALA NETWORK

Western Digital

r3

XILINX

swisscom

vmware

## General Members

# 2022

## Premier Members

accenture



arm

Google



intel

Meta

Microsoft



## Associate Members



## General Members



anjuna



ByteDance

CanaryBit



CRUST



DECENTRIO



ENVEIL



iExec



PHALA NETWORK

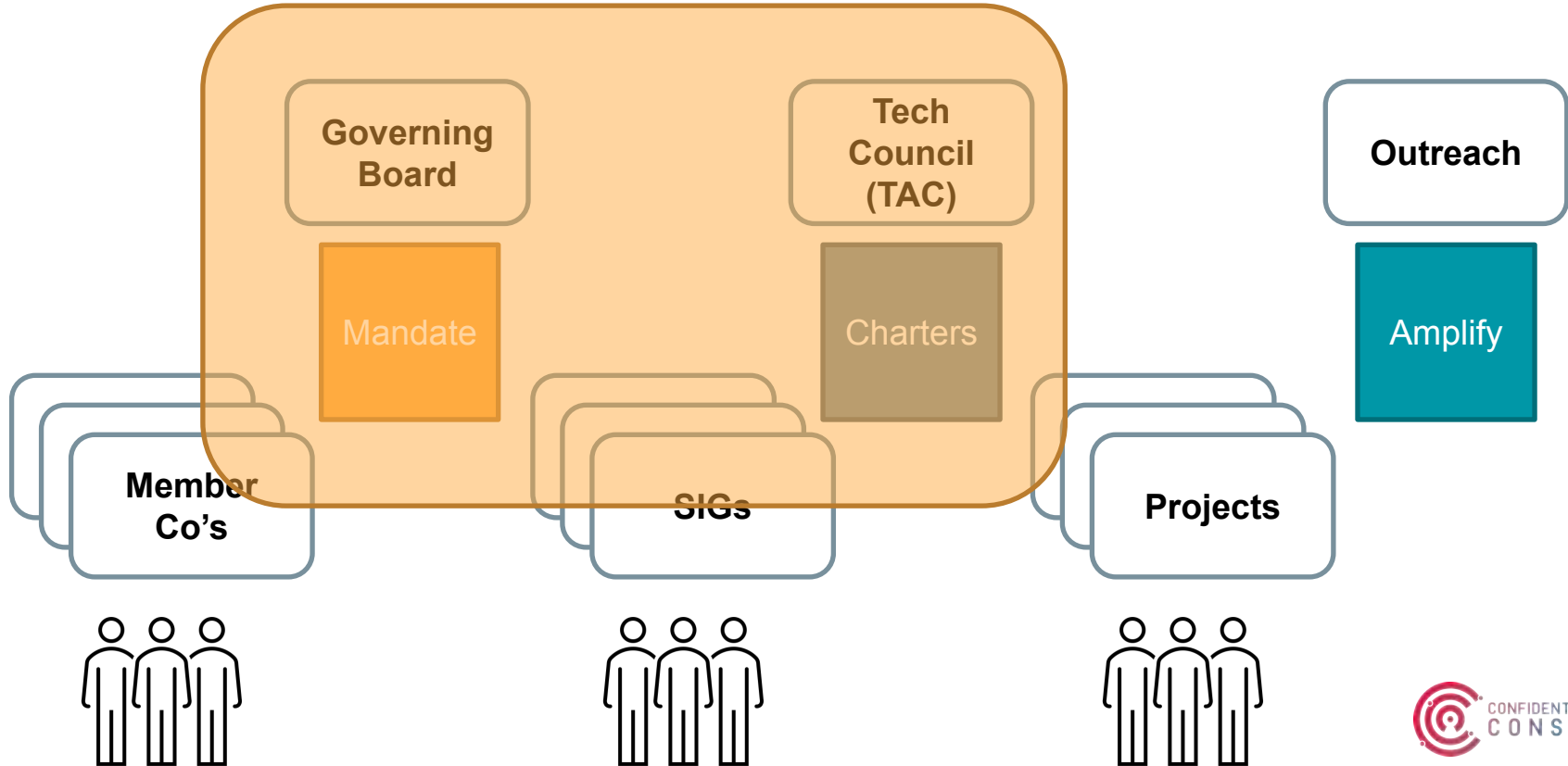
Profian



vmware

Western Digital

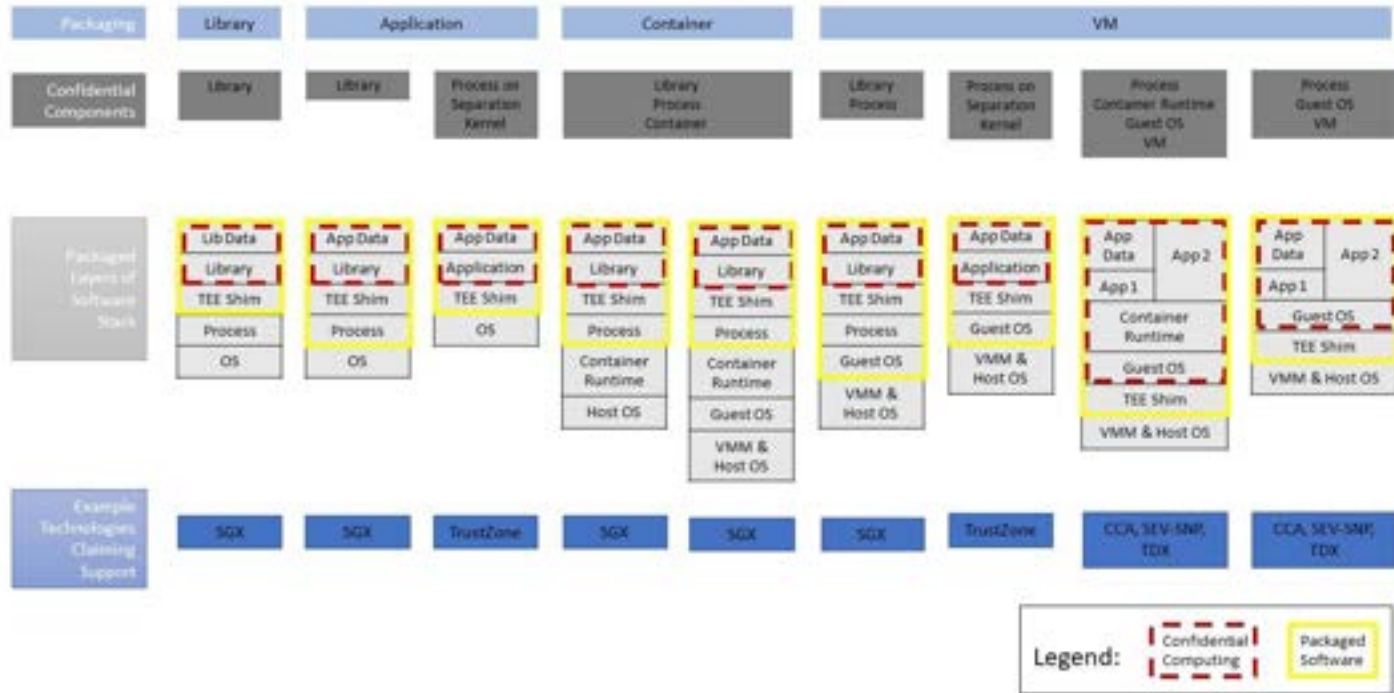
# Board & TAC



# Board & TAC 2022 Accomplishments

- Created **Governance, Risk, and Compliance SIG**
- Collateral
  - Updated Whitepaper: **Definition += Attestation**
  - Created Common Terminology Whitepaper v1
  - Submitted review comments to OSTP on [PETs](#)
- TAC **Tech Talk** series / Cross Org Coordination
  - RISC-V
  - MPC Alliance
  - IETF
  - TCG
  - CDCC
  - TrustedComputing.org
  - HomomorphicEncryption.org
  - PCI SIG WG
  - OCP Security SIG
- Approved Veraison
- (outreach webinars) Attestation SIG, Gramine
- Conference participation at ~6 conferences
  - Blackhat & Defcon
- Travel Funding approved for projects
- Test infrastructure budget increases and flexibility
  - LFX Security Tool availability
- **D&I (DCI)**
  - Project recommendations on LF diversity trainings for open source
  - Outreachy participation:
    - Veracruz, Enarx
  - Community best practices talk from **Tracy Kuhrt**

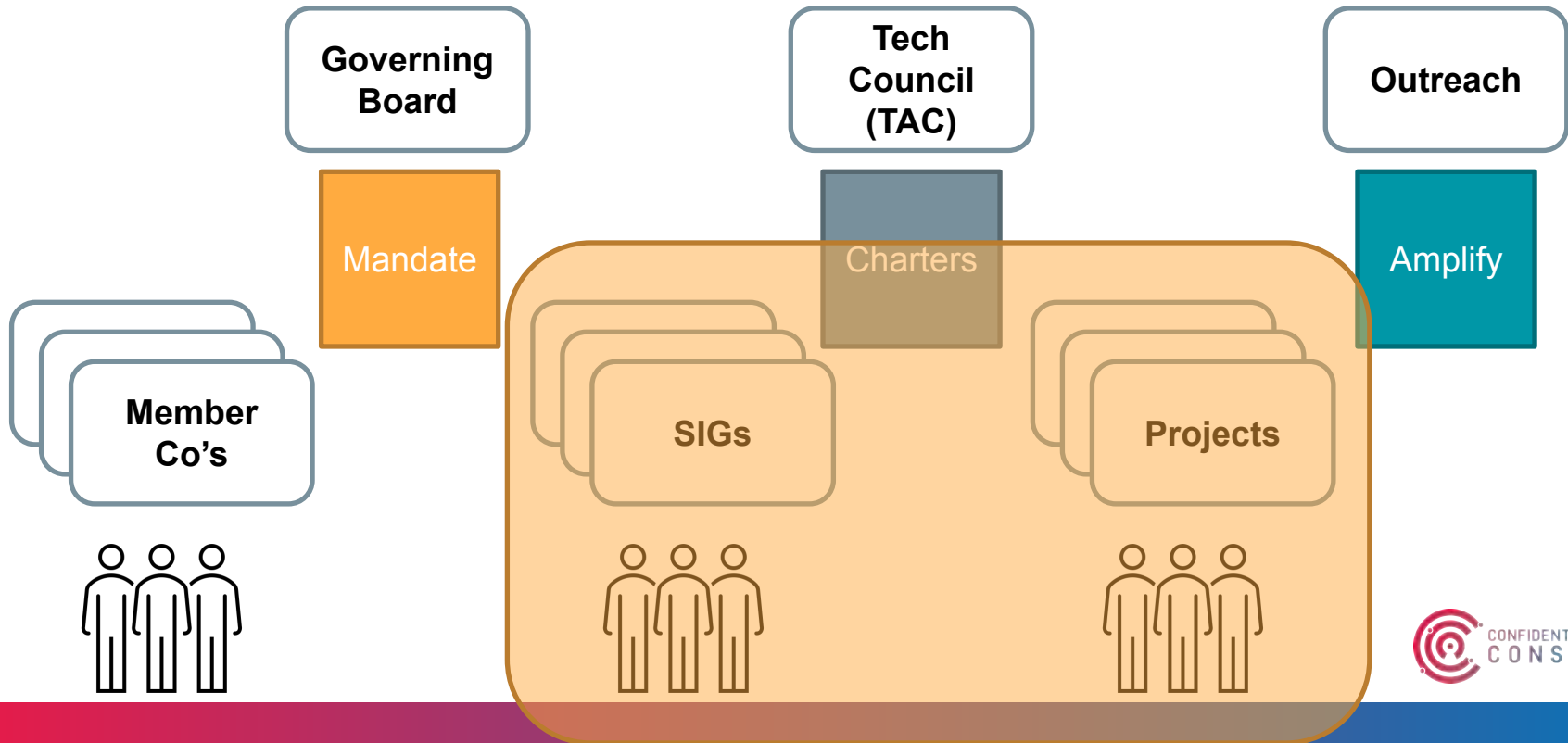
# Terminology Paper



- 1.confidential **library**: a library (e.g., an "enclave") that is executed inside a hardware-based, attested TEE, ...
- 2.confidential **process**: a process (e.g., a "Trusted Application") that is executed inside a hardware-based, attested TEE...
- 3.confidential **container**: the endpoint process of an Open Container Initiative (OCI)-compliant <sup>2</sup> container image ...
- 4.confidential **VM**: a virtual machine that is executed inside a hardware-based attested TEE...



# SIGs & Projects



# CCC Projects



**Enarx**



GRAMINE



Keystone



**Occlum**



OPEN ENCLAVE SDK



Veracruz



# CCC SIGs

## Attestation

- Attestation Technical Content
- Project interop
- Protocol discussion
- etc.

## Governance Risk and Compliance

- Support for the Creation of Effective Regulatory Frameworks
- Recommendations for Repeatable Patterns and Tooling

# Attestation SIG

<https://github.com/CCC-Attestation>

README.md

Meeting Materials

Meeting recordings [playlist](#).

Date	Track	Presentation	Presenter
2022-11-22	Information & data models for attestation	Device Identity Composition Engine (DICE)	Ned Smith (@nedsm)
2022-10-26	Information & data models for attestation	An EAT serialisation for AR4SI	Thomas Fossati (@thefossati)
2022-10-26	secure channel establishment	Attested TLS project proposal	Thomas Fossati (@thefossati)
2022-09-27	secure channel establishment	Attested TLS harmonisation	Thomas Fossati (@thefossati)
2022-08-30 and 2022-09-13	secure channel establishment	Interoperable Attested TLS	Shawel Can (@shawelcan)
2022-08-02	secure channel establishment	A TLS+CWT (v2) implementation in mbedtls	Ionut Mihalcea (@ionutarm) & Thomas Fossati (@thomas-fossati)
2022-06-21 and 2022-07-05	Information & data models for attestation	EAT in Microsoft Azure Attestation (MAA)	Greg Kistal (@GregKistal)
2022-	Information &		Thomas Fossati (@thomas-fossati)

CCC Attestation 2022-12-06

CCC Attestation 2022-11-22

CCC Attestation 2022-10-26

CCC Attestation 2022-09-27

CCC Attestation 2022-09-13

CCC Attestation 2022-08-30

CCC Attestation 2022-08-02

CCC Attestation 2022-07-18

CCC Attestation 2022-07-05

CCC-Attestation / interoperable-ra-tls

Code Issues Pull requests Actions Projects Security Insights

main 1 branch 0 tags

Go to file Add file + Code +

shawel Create Interoperable Attested TLS(interoperable-RA-TLS-SGX-TDX-evidence...) 3 hours ago 4 commits

docs Create Interoperable Attested TLS(interoperable-RA-TLS-SGX-TDX-evidence...) 3 hours ago

LICENSE Initial commit 2 weeks ago

README.md Update README.md 2 weeks ago

README.md

Based on the recent CCC Attestation SIG presentation on [Interoperable RA-TLS](#) and recommendations, design documents with detailed X.509 cert extension and evidence formats definition are being created. Efforts are in progress in the multiple RA-TLS projects ([Gramine RA-TLS](#), [RATS-TLS](#), [Open Enclave Attested TLS](#), [SGX SDK Attested TLS](#)) to add support of the proposed scheme.

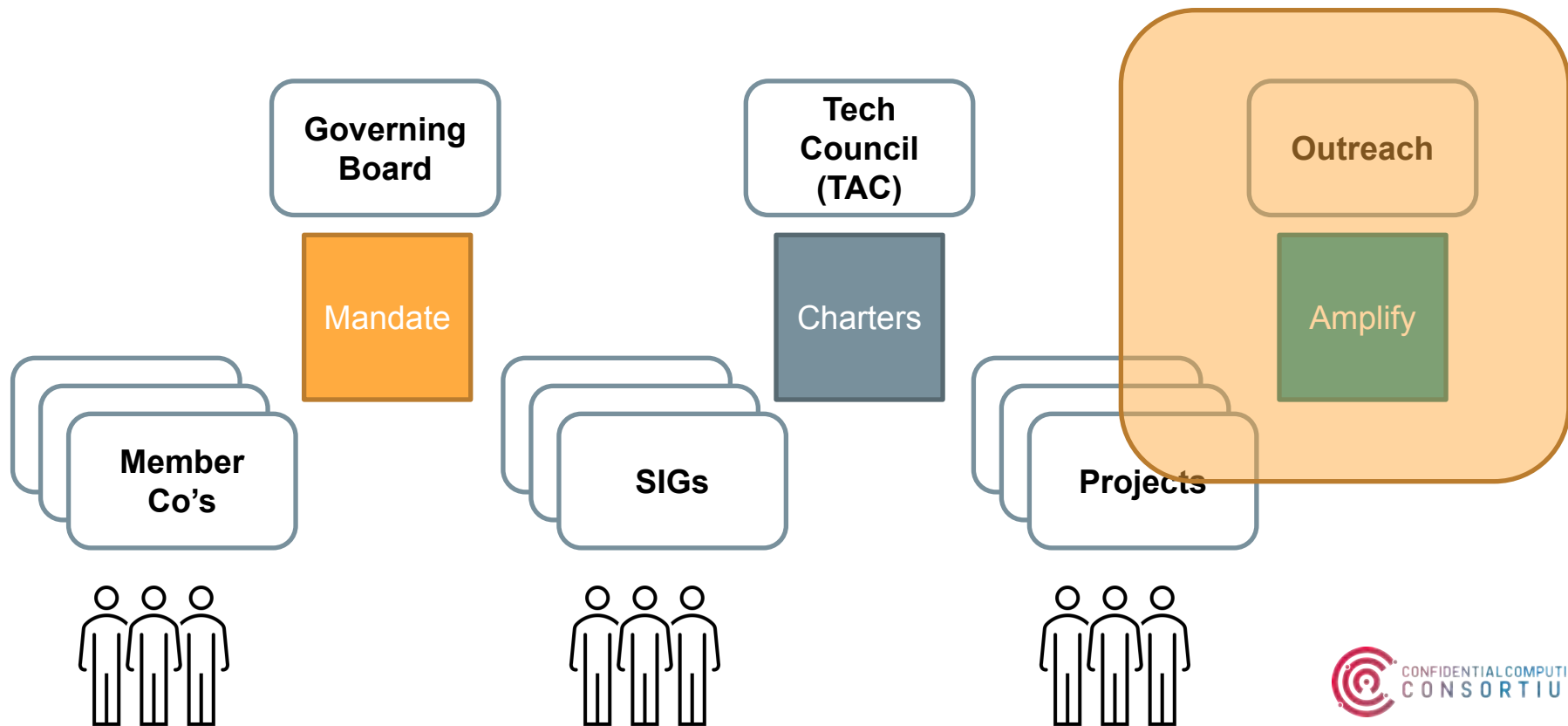
This project (interoperable-ra-tls) under the CCC Attestation SIG will host the design documents and interoperability tests.

The [Interoperable RA-TLS](#) presentation forms initial version of the proposed scheme, which will be further clarified and refined in the upcoming design documents. Though this presentation mentioned about IANA registration, the proposed scheme does not have restrictions on which registry must be used. Different registries could be suitable for evidence formats.

# GRC – Governance Risk & Compliance

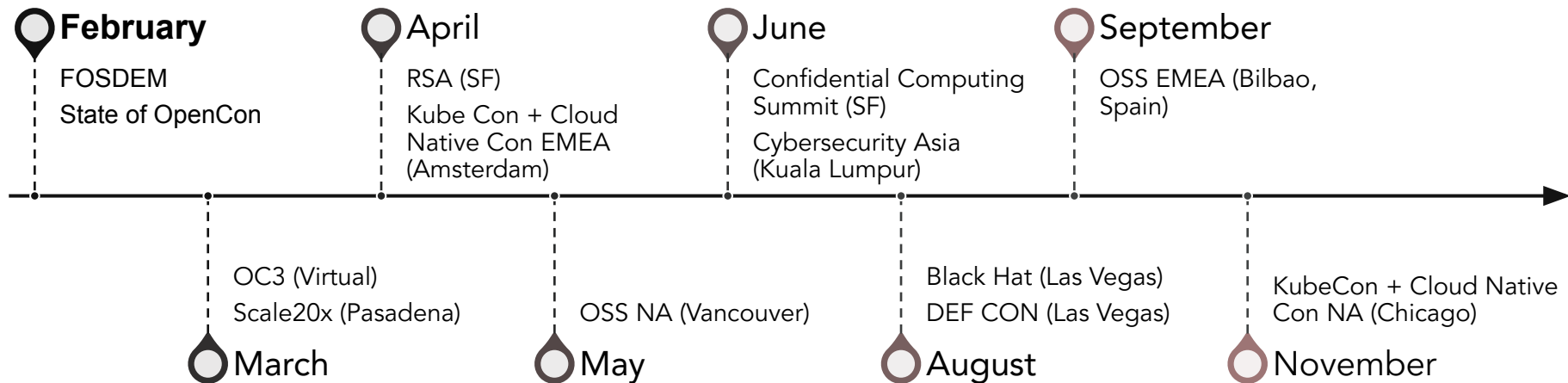
- Representatives from Meta, Microsoft, Intel, NVidia, ARM, CSA, JPMorgan Chase, Anjuna ...
- CSA:
  - Established a working relationship with the Cloud Security Alliance; a joint working group is getting underway
- NIST:
  - Connected with NIST; expecting to start ongoing interactions in January '23
- ICO:
  - Collectively working on a response to ICO request for comments, focused on the use of confidential computing in data privacy applications

# Outreach





# Events Timeline





# **GSBN (Edmund - 15mins)**

# Global Shipping Business Network (GSBN)

Hyperledger Webinar

18th Jan 2023

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# Agenda

1. About of GSBN
2. Technology Platform of GSBN
3. GSBN Use cases
  - a. Cargo Release
  - b. eBL
  - c. Trade Finance - Open Account
  - d. Trade Finance - Shipping Activities Insight
4. Demo
5. Let's speak

# About GSBN

# Founding Members of GSBN

- **Jul 2019** – the proposed Founding Members signed the GSBN Services Agreement for resource commitment and to obtain all necessary regulatory, competition, and antitrust approvals required for the establishment of the GSBN
- **Feb 2020** – with the signing of the shareholders' agreement, the proposed Founding Members further fortified their commitment to the proposed GSBN as well as the conclusion of an important step towards GSBN's official establishment (subject to obtaining all requisite regulatory approvals)
- **March 2021** – GSBN successfully incorporated after obtaining all requisite regulatory approvals





# GSBN is Here to Simplify Trade for All

## A Trade Data Utility Platform



Not-for-profit



Data platform



Open for (cross-)industry participation

## Powered by Blockchain



Network built on trusted and permissioned blockchain



GSBN does not have access to your data



Fit-for-purpose technology

## That Enables Solutions Across the Entire Supply Chain



Platform to enable products that creates value for all



Use-case driven



Create data driven global trade ecosystem

## Values (3 "C"s)

1

Connect the industry

2

Challenge the status quo

3

Co-create value for the entire supply chain



# Technology Platform of GSBN

# GSBN Overview

The mission of GSBN is to facilitate **data exchange** while maintaining the **integrity, privacy, security, and auditability of the data**. Through the use of latest technologies and the development of our own platform capabilities, we are enabled to collaborate with key stakeholders and other applications builders to unlock a variety of products and services.

## Products and Services

*Products and Services that solves specific problems for stakeholders, i.e.*

Cargo Release

IQAX eBL

Trade Finance -  
Open Account

Trade Finance - Shipping  
Activities Insight

## Platform Capabilities

*The core, generic capabilities that enabled multiple use cases, i.e.*

Workflow APIs

Consent

Identity  
Management

Data Clean Room

## Foundational Technology

*Ensuring data is tamper-proof and is only shared w/ permissioned parties throughout the data life cycle: at rest, in transit, in use, i.e.*

Blockchain

Encryption

Confidential Computing

## Products and Services

- With the platform capabilities, we collaborate with carriers, terminals and banks to build products and services that add the most value to the ecosystem.

## Platform Capabilities

- To facilitate data exchanges across different stakeholders, we've analyzed the current challenges and develop generic platform capabilities that help break the data silos.

## Foundational Technology

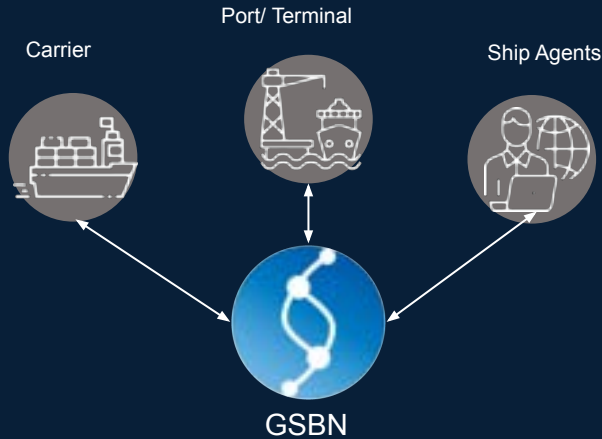
- The lack of "Trust" has always been the core challenge in data sharing. In GSBN, we enforce trust by design by making use of Blockchain, state of the art encryption protocols, and Confidential Computing so that data is only accessible by authorized parties.

# GSBN use cases

# Use Case 1 - Cargo Release

To release a cargo traditionally, it takes a couple of days to process and usually involves a lot of paper documents.

But with our blockchain solution, we've shortened the process from **2 to 3 days to only 1 to 2 hours**.



In the Cargo Release use case, GSBN provides a platform for the real time exchange of shipping documents, i.e. Sea Waybill/ Telex/ Delivery Order, and container events, i.e. Appointment, Gate in and Gate out etc. to optimize cargo release process.

Since 2021 July product launch, the port coverage is expanded to:

**4** Regions

**16** Ports

- 11 - China:** Wuhu, Jiujiang, Nanjing, Shanghai, Ningbo, Xiamen, Qingdao, Tianjin, Yantian, Nansha, Qinzhou
- 2 - SEA:** Singapore, Thailand (LCB)
- 1 - Europe:** Rotterdam
- 2 - Lat America :** Panama (Balboa), Mexico



# Use Case 2 - IQAX eBL

- The Bill of Lading, issued by carriers to acknowledge receipt of cargo from the shipper, is one of the most important trade documents required for shipping. By using blockchain technology, **the title owner and document holder are both recorded and logged on blockchain**, which is useful for in title transfers and surrendering. This ensures the **circulation is traceable and tamperproof**.
- Aside from helping cargo owners to streamline their operation, **Banks** can also make use of the **eBL in the Letter of Credit process**, which original bill of lading is required.

## Success Story and Pipelines

Since the P&I approval in June 2022, **a number of banks and consortiums** have showed interest to IQAX eBL.



Launch of IQAX eBL with Bank of China



Partnership with Contour

## What's Next?

1

### Bulk Bill of Lading

IQAX eBL would go beyond just container B/L to increase coverage and competitiveness. The Bulk B/L API is compatible with BIMCO standards.



2

### eBL Interoperability

Instead of being an isolated solution, IQAX eBL is doing interoperability PoC under the facilitation of DCSA with IQAX, CargoX, and Edox Online.



# Use Case 3 - Trade Finance - Open Account

- Shipping data is essential for banks to validate the genuineness of shipment in trade finance approval and cross border payment process. For years, Banks have settled with Paper B/L because they have no means to source data directly from the Carriers.
- The Consent App is to establish a channel to facilitate consent-based, secure transfer of data between Carriers and Banks.
- To ensure usability, the App covers the end to end flow of data sharing. Banks are able to make data request and collect consent in one single flow, and view the requested data directly on the portal. Carriers, upon receiving request, can also review and indicate its decision directly on the App.



## Success Story and Pipelines

We've successfully piloted with Hapag-Lloyd, Bank of China (HK), and a corporate on the Consent App.

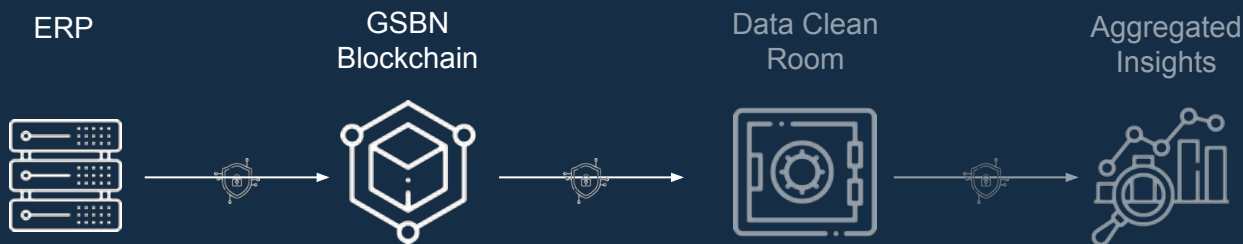




# Use Case 4 - Trade Finance - Shipping Activities Insight

- The need to validate the genuineness of transactions aside, banks need to conduct credit assessment and KYC in the facility setup stage. Shipping data, when aggregated, can add immense value by providing insights to the company's activity level and the business flows.
- While blockchain enables secure sharing of data, we also need to find a way to securely process the data so that the Carriers do not have to disclose more than necessary, and Banks do not have to develop additional tools to digest the data.
- Confidential Computing provide a Data Clean Room that enables isolation of sensitive data even when it is being processed. This technology can take in sensitive, encrypted raw data, process it and output non-sensitive insights.

## Confidential Computing - An Illustration



- When raw data is submitted to data clean room, it is encrypted and no one has access to the key to decrypt it.
- By having the data go through blockchain, not only does it add an extra layer of protection, it also ensures the input is immutable and auditable.
- Combining the two, we can now guarantee the full data life cycle with privacy control, security, auditability, and immutability.

**Demo**

# Shipping Activities Insight – Use Case

1. When Bank is structuring a trade finance facility, it needs to perform a **wholistic review on the customer's business model, profitability, and track record** so that they can provide a fit-for-purpose loan with the right amount of credit exposure.
2. Instead of looking at the shipment record one by one, what the Bank needs is a statistic of key indicators, such as **distribution of nature of goods, range of declared amount** etc. to understand the customer business and financial needs.
3. With confidential computing (“data clean room” in the demo), **carrier can easily upload the relevant data and the algorithm** (“computation” in the demo) will churn out the aggregated output for banks to enquire. That way, banks have what it needs without going through all the raw data. This significantly reduces the sensitivity in the sharing.
4. And, because the data clean room guarantees the secured and confidential processing of sensitive data, and that it offers granular permission settings in input and output, this enables different counterparties to collaborate in the same room. By extension, we can put **multiple Carriers in the same clean room**, thus enhancing the representation of the shipping insight.

For more information: <https://blog.decentriq.com/blockchain-and-data-clean-rooms-gsbn-and-decentriq-partner/>

# Shipping Activities Insight – Demo

The screenshot displays the GSBN Data Science Platform interface. On the left, a sidebar shows the project structure: 'GSDN' (workspace by DECENTRIO), 'DATA CLEAN ROOM', and '[Demo] Shipping Activities Insight'. Below this, there are links for 'DOCUMENTATION', 'SYSTEM TOOLS', 'END USER TOOLS', and 'CONTACT'. The main panel is titled '[Demo] Shipping Activities Insight' and has tabs for 'ACTIONS', 'OVERVIEW', and 'AUDIT LOG'. The 'OVERVIEW' tab is active, showing a 'Data' section with a table of datasets and a 'Computations' section with a table of jobs.

Data			
carrier1_bt_data	10 columns	100,000,000 rows (100 MB)	Delete dataset
carrier2_bt_data	10 columns	100,000,000 rows (100 MB)	Delete dataset
carrier3_bt_data	10 columns	100,000,000 rows (100 MB)	Download dataset
customer_bt_search	10 columns	100,000,000 rows (100 MB)	Download dataset

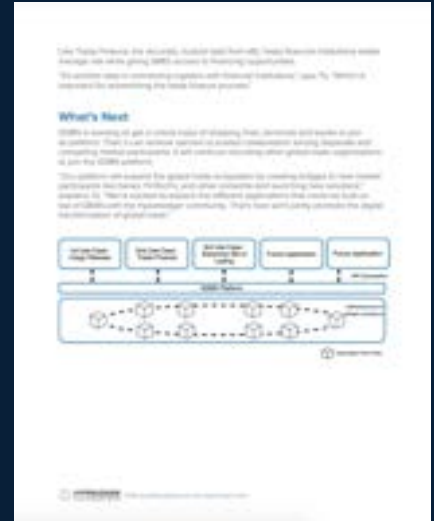
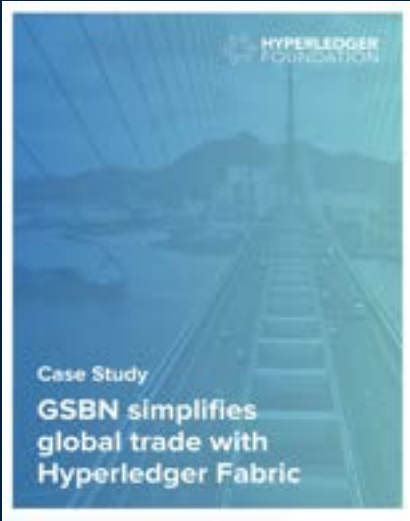
  

Computations			
union_and_shuffled_dataset	SQL	Run	Run
normalization_and_mapping	Python	Run	Run
shipping_activities_insight_data	Python	Run	Run
shipping_activities_insight_sql	Python	Run	Run
shipping_activities_insight_summary	Python	Run	Run

<https://youtu.be/7167NuBeaZl>

**Learn more about GSBN**

## Read our Hyperledger case study



Meet us at TPM 23 & TPM Tech in Long Beach, California





# Thank you



**Bertrand Chen**

Chief Executive Officer



**Alicia Lee**


Chief Operating Officer



**Edmund To**

Chief Technology Officer

 [info@gsbn.trade](mailto:info@gsbn.trade)



**Q&A (All - 15mins)**  
**Moderator Julian Gordon**  
**[jgordon@apac.linux.com](mailto:jgordon@apac.linux.com)**



Thank you



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