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3 Major Consortia and their Distributed Ledger Endeavors

EXECUTIVE SUMMARY

This report is the second in a series of industry reports on current enterprise distributed ledger projects. This installment focuses on three of the most important consortia in the blockchain space at the moment: Hyperledger, R3, and the Enterprise Ethereum Alliance (EEA).

Hyperledger was created by The Linux Foundation to foster collaboration on blockchain projects between the tech industry and the finance industry. This consortia's membership base includes IBM, Intel, State Street Bank, J.P. Morgan Chase, CME Group, and others.

R3 is a consortium made up of over two hundred firms specializing in distributed ledger technology for business use-cases, including Barclays, Bank of America, and Citigroup.

The EEA is a consortium devoted to exploring potential use-cases for the Ethereum platform in the business world. It spans many industries, from finance and insurance to healthcare to telecommunications. Notable members include Microsoft, Banco Santander, MasterCard, and J.P. Morgan Chase.

CONSORTIA:

Hyperledger

The Linux Foundation created the Hyperledger Project in 2015 to foster cross-industry collaboration around the development of various blockchains for industrial, financial, and technological use cases.

"The consortium's membership base is a veritable who's who of technology and finance. The list includes IBM, Hitachi, Intel, Cisco, BNY Mellon, CME Group, The Depository Trust & Clearing Corporation, J.P. Morgan, State Street, SWIFT, and Wells Fargo. The Hyperledger Project is subdivided into five groups: Hyperledger Sawtooth, Hyperledger Iroha, Hyperledger Fabric, Hyperledger Burrow, and Hyperledger Indy."

Hyperledger Sawtooth is a modular platform designed for the construction and operation of distributed ledger systems for enterprise use-cases. The Sawtooth platform utilizes Proof-of-Elapsed-Time (PoET) as its consensus algorithm. Proof of Elapsed Time, is unique among consensus algorithms, as it was created by a corporation--Intel. In PoET, block validators are chosen based on a provably fair lottery system, without having do the work involved in Proof-of-Work. Basically, in PoET, each node competing to validate the next block waits a random amount of time determined by the network. The first node to complete its time-out gets to validate the next block and claim the block reward.

Intel designed PoET to work within their provably secure CPU instruction set, Software Guard Extensions (SGX), to ensure that no bad actor could rig the system to always give them the shortest time-out. A PoET-based blockchain requires special CPU instruction like SGX to preserve the randomness of the wait time allotments.

This, of course, has the drawback that the entire system requires a high level of trust in Intel. However, PoET was not designed as an alternative to Proof-of-Work, Proof-of-Stake, or any consensus algorithm underpinning a permissionless blockchain. Rather, PoET is designed for permissioned blockchains, secure databases in the form of distributed ledgers that are created and maintained by and for a certain firm. In the context of creating a system for a private organization, having to trust the code of an established technology company is not necessarily a big security risk. However, in the crypto-space, there is significant distrust of any system that centralized distributed ledger technology to any degree.

Hyperledger Fabric is a permissioned blockchain originally designed by IBM to create a secure, scalable, and modular network for industrial uses. Fabric was the first Hyperledger project to move to active status within the consortium.

Fabric is a permissioned network, meaning only authorized parties may participate--this is opposed to a public blockchain, like the ones underpinning most digital currency networks. Fabric supports confidential transactions between parties on the network, as well as a pluggable architecture which allows the distributed ledger to be tailored to participant's needs.

The other Hyperledger projects are not at such an advanced stage of development. Burrow, a permissioned smart contract application engine, was developed by digitized agreements company Monax and Intel. Burrow provides a modular blockchain client with a smart contract interpreter. Currently, the project is still in the incubation stage.

Iroha is an active Hyperledger platform designed to be easily incorporated into projects that require distributed ledger technology. Iroha focuses on mobile application development primarily. The platform was initially developed by Soramitsu, a Japanese digital identity startup, in partnership with Hitachi, NTT Data, and Colu.

Indy, a Hyperledger project still in the incubation stage, is a distributed ledger designed for the creation and management of digital identities located on blockchains. Hyperledger Indy has developed the specifications and terminology for the creation of decentralized digital identities.

R3

R3 is a blockchain consortium composed of more than two hundred firms that are researching and developing distributed ledger technology for business use-cases.

The consortium has created an open-source blockchain, Corda, for enterprise use. Corda aims to reduce expensive friction in business transactions by enabling direct transactions between firms via smart contract. Corda was built by and for financial services firms, but its creators hope that it will be applicable in any form of commerce.

R3 began in September of 2015. The consortium was started by nine financial institutions--Barclays, BBVA, Credit Suisse, J.P. Morgan, Goldman Sachs, Royal Bank of Scotland, UBS, State Street, and the Commonwealth Bank of Australia.

Later that same month, another thirteen financial institutions joined the consortium--Bank of America, BNY Mellon, Citigroup, Deutsche Bank, Mitsubishi UFJ Financial Group, Royal Bank of Canada, Société Générale, Toronto-Dominion Bank, National Australia Bank, Skandinaviska Enskilda Banken, Morgan Stanley, Commerzbank, and HSBC.

In 2016, several member institutions including Goldman Sachs, Banco Santander, Morgan Stanley, and J.P. Morgan Chase left the consortium.

In 2017, Amazon Web Services (AWS) partnered with R3 to deploy decentralized applications (DApps) on the AWS platform. In March of 2018, Credit Suisse and ING completed the first securities lending transaction via distributed ledger, using technology built on Corda.

Enterprise Ethereum Alliance

The Enterprise Ethereum Alliance (EEA) is a consortium focused on promoting the Ethereum platform for business use. The EEA was created in March of 2017, and by July had over 150 member institutions, including CME Group, ConsenSys, Cornell University, Toyota, Samsung, Intel, Microsoft, Deloitte, BNY Mellon, Banco Santander, National Bank of Canada, MasterCard, Cisco Systems, and J.P. Morgan.

The EEA is divided into nineteen different Working Groups that each focus on a specific application of the Ethereum platform. The groups are as follows: Advertising/Media, Analytics, AI and Blockchain, Banking, Blockchain Airspace, Communications Protocol, Digital Identity, Energy, Healthcare, Insurance, Integration and Tools, Legal Industry, Multiplatform, Off-Chain Computing-Services, Quorum, Research and Education, Security, Supply Chain, and Telecommunications.

The Advertising/Media Group focuses on using the Ethereum platform to address issues facing the advertising industry such as advertising fraud and supply chain integrity. This Working Group is open to any EEA member firms in the ad industry, including publishers, vendors, suppliers, and consumers.

The Analytics Working Group promotes transparency of the Ethereum blockchain and developments within the Ethereum ecosystem, engages potential partners interested in understanding the market's capabilities, and discusses present and future challenges to analytics market participants. One of the main goals of this group is the development of set standards with regards to analytics to increase the visibility of the Ethereum ecosystem.

The AI and Blockchain Working Group explores potential applications for distributed ledger technology within the field of Artificial Intelligence. The group's ambitious goal is to spur the development of new, decentralized computing paradigms within traditional IT, IoT, Web 3.0, and Semantic Web technologies.

The Banking Working Group ensures that the financial services industry's need are properly met by the EEA. This group is also building a library of smart contracts for use within financial services, and ensures that all regulatory and legal queries are heard and properly addressed.

The Blockchain Airspace Working Group aims to develop a unified protocol standard for autonomous aerial vehicle communications and mesh networks around the world. This group engages and educates partners on current developments in the blockchain airspace, and works to solve potential regulatory challenges.

The Communications Protocol Working Group creates standards for managing regulated communication so that service providers can supply the required metadata and media data that surrounds a given communication. The group also defines how this data will be stored and managed.

The Digital Identity Working Group aims at establishing a taxonomy for identity on the Ethereum platform and determining the role of identity in the EEA technology stack.

The Energy Working Group seeks to integrate the Ethereum platform within the oil and gas, mining, and refining industries, as well as in trading, utilities, and grid construction.

The Healthcare Working Group integrates distributed ledger technology with the existing healthcare infrastructure. The group has identified use-cases for distributed ledger technology in the areas of research, production, delivery, usage, service management, and support to increase transparency in the healthcare system. The group hopes to use the Ethereum platform to ensure data privacy, general reliability, and safety of patients in the healthcare system.

The Insurance Working Group encourages the development of a standardized, open, and free to use protocol for decentralized insurance coverage. Their goal is to enable business processes which cover the entire value chain of the insurance industry.

The Integration and Tools Working Group finds opportunities for integration between existing enterprise software systems and the Ethereum platform. This includes the facilitation of collaborative tools, libraries, demos, and documentation.

The Legal Industry Working Group has two objectives--first, to educate law professionals about how their profession can benefit from distributed ledger technology. Second, to develop and standardize core Ethereum-enabled technology. This group is made up of large, worldwide law firms and corporate in-house counsels.

The Multiplatform Working Group attempts to make the Ethereum platform available on multiple operating systems and multiple different kinds of hardware.

The Off-Chain Computing-Services Working Group provides off-chain computing solutions on the Ethereum network and addresses scalability concerns.

The Quorum Working Group serves to facilitate interactions between EEA members on J.P. Morgan's Quorum blockchain and coordinate EEA member contributions to the Quorum roadmap.
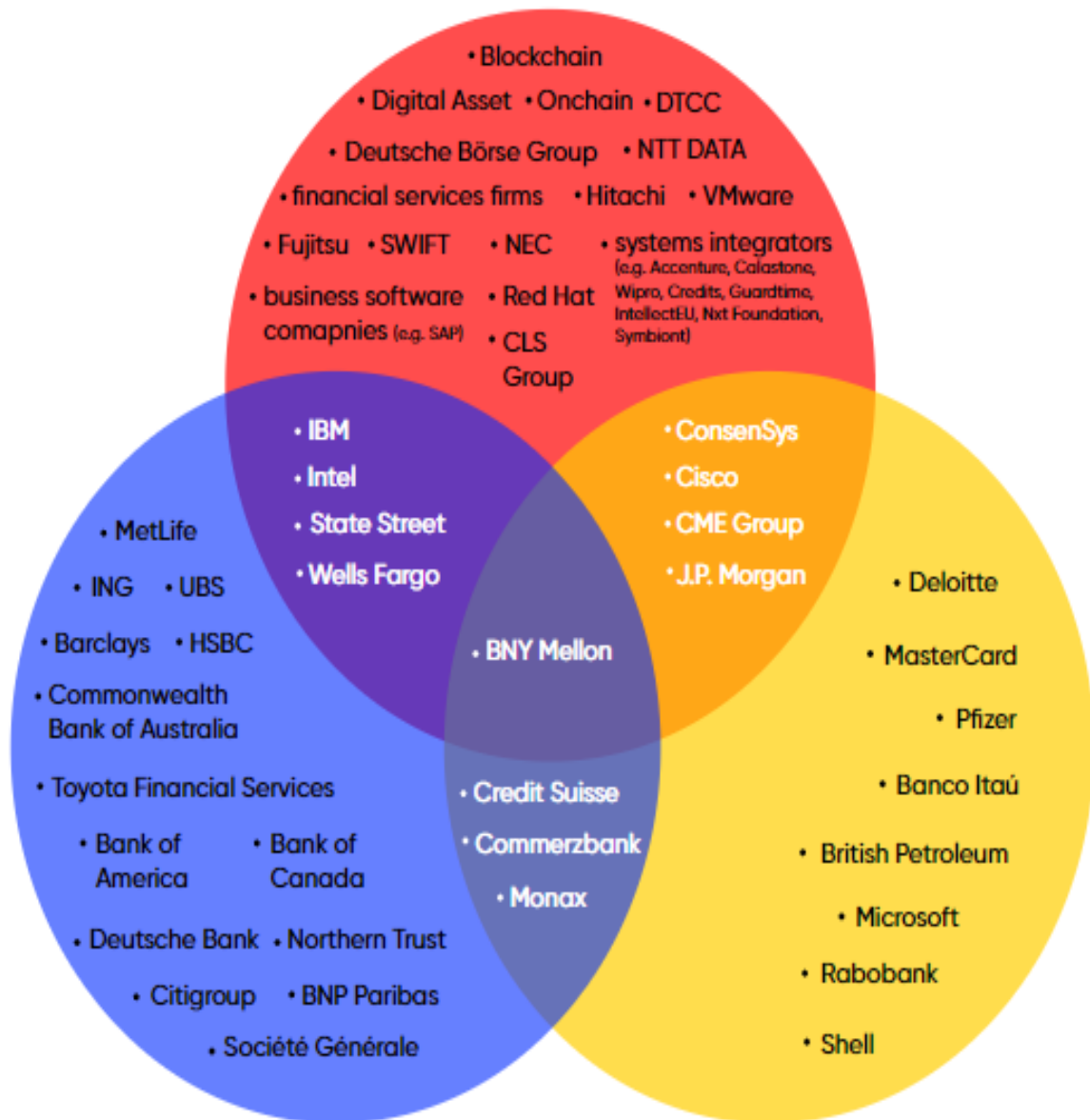
The Research and Education Working Group attempts to produce evidence-based, impactful blockchain applications, foster research into distributed ledger systems, and find applications for blockchain technology in academia.

The Security Working Group aims to gather and promote knowledge that encourages the secure development of smart contracts and facilitate the identification and elimination of vulnerabilities in smart contracts.

Supply chain management is an often-touted potential application of distributed ledger technology in the real world. The Supply Chain Working Group focuses on finding ways to solve problems within existing supply chains using blockchain solutions.

Lastly, the Telecommunications Working Group attempts to find ways that the Ethereum platform can be used to increase efficiency and explore new capabilities within the telecom industry.

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Hyperledger

- Blockchain
- Digital Asset • Onchain • DTCC
- Deutsche Börse Group • NTT DATA
- financial services firms • Hitachi • VMware
- Fujitsu • SWIFT • NEC • systems integrators (e.g. Accenture, Calastone, Wipro, Credits, Guardtime, IntellectEU, Nxt Foundation, Symbiont)
- business software comapnies (e.g. SAP) • Red Hat
- CLS Group

- IBM
- Intel
- State Street
- Wells Fargo

- ConsenSys
- Cisco
- CME Group
- J.P. Morgan

- MetLife
- ING • UBS
- Barclays • HSBC
- Commonwealth Bank of Australia
- Toyota Financial Services
- Bank of America • Bank of Canada
- Deutsche Bank • Northern Trust
- Citigroup • BNP Paribas
- Société Générale

- BNY Mellon

- Credit Suisse
- Commerzbank
- Monax

- Deloitte
- MasterCard
- Pfizer
- Banco Itaú
- British Petroleum
- Microsoft
- Rabobank
- Shell

R3

Enterprise Ethereum Alliance

CONCLUSION

This report is the second in a series of industry reports on enterprise blockchain projects. The first report focused on ten major financial institutions and their distributed ledger R&D projects, while this one focused on three major consortia working with blockchain right now.

It is worthwhile to note that there is a lot of overlap between the two reports. Many financial institutions exploring blockchain are doing so as members of various consortia, while others are pursuing their endeavors separately. Despite the fact that this report has been divided into two segments, it would be most helpful to think of the two segments of this report as mutually necessary pieces to understand the highest-level activity in the blockchain space.

ABOUT THE AUTHOR

Cameron Carpenter is a Financial Research Associate at Blockmatics and student of economics and computer science at Sarah Lawrence College in Bronxville, New York. He is the President and Portfolio Manager of Gryphon Capital Management, a student-run investment firm. In his spare time, Cameron enjoys reading and playing chess.

ABOUT blockmatics

Blockmatics is a blockchain education company, offering comprehensive training, research and consulting services to businesses and professionals around the world. We provide the fundamental knowledge required to understand blockchain technology, its use cases and implementations from an independent perspective. Whether through our online and in-person interactive training programs or customized research and consulting services, Blockmatics expertise lies in furthering the ideas of decentralized systems. Founded in 2014, Blockmatics grew out of market demand into a global resource for blockchain education.