A Summary of Enterprise Blockchain

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It is important to be able to weed through the hype of the blockchain and focus on the space in its entirety. While Bitcoin may have paved the way for the newest phase of technological disruption, the blockchain technology of Bitcoin was not created with the intent of serving the needs of enterprise networks. Bitcoin's blockchain is permissionless, expensive to maintain, and battling a scalability problem. To meet the needs of enterprise business networks, the new systems must fundamentally provide speed, scalability, regulatory access, privacy, security, data governance, and integration into existing systems (amongst others).

The biggest names vying for the enterprise blockchain market are Ethereum, IBM Blockchain, Eris, and Corda. Each has a unique value proposition, though neither one has enterprise systems in production. These blockchain competitors were selected for their lack of use case-specific architectures, lending themselves to be customized for almost any industry.

- Ethereum is the brainchild of Vitalik Buterin, who forsaw the inherent restrictions that Bitcoin suffered from and decided to build a better platform. Ethereum is the next logical step from Bitcoin in that it is public but allows users to create their own complex logic for which to interact with the blockchain. This complex logic has often been referred to as *smart contracts* and gives users the ability to rely on the Ethereum network to guarantee their application code will execute. Ethereum still relies on much of the groundbreaking technology of Bitcoin e.g., the network is

incentivized by a Proof of Work consensus algorithm to maintain the same world-state. These algorithms are inherent in each blockchain that relies on tokens to transact on the network. Ethereum is built on the concept of **accounts** to store the state of the network; in comparison to Bitcoin which has unspent transaction outputs (**UTXOs**). Ethereum already has a number of **dapps**, or distributed apps running autonomously on the Ethereum network, and the platform has a large number of developers actively building more. While Ethereum is permissionless, there are many startups looking to leverage the network and meet the needs of enterprise clients.

- IBM's blockchain is designed with enterprise in mind. There are no inherent tokens to interact with the network, and participants must be approved to join. The IBM Blockchain was crafted to be pluggable which lends itself to customization depending on the needs of the participants. In contrast with the public, permissionless construct of Ethereum, IBM Blockchain considered the possibility of regulatory bodies requiring insight into the trades between parties on the blockchain and provides ways for securely viewing the metadata of transactions. IBM Blockchain uses smart contracts which can be programmed in a few popular languages, and are replicated across the **validating nodes** who execute the logic in secure virtual machines. Interacting with the smart contract to change its state constitutes a transaction that is distributed for validation across the network. To achieve the same world-state, each full participant on the network agrees to use a consensus algorithm such as *PBFT* or *Sieve*. These consensus algorithms are pluggable; each algorithm provides benefits and tradeoffs in speed and security, but should be chosen based on the use case (figure 1). Anyone can craft their own algorithm for agreement and use it with other participants. IBM has donated it's openblockchain fabric to the Hyperledger project of which it is a member.

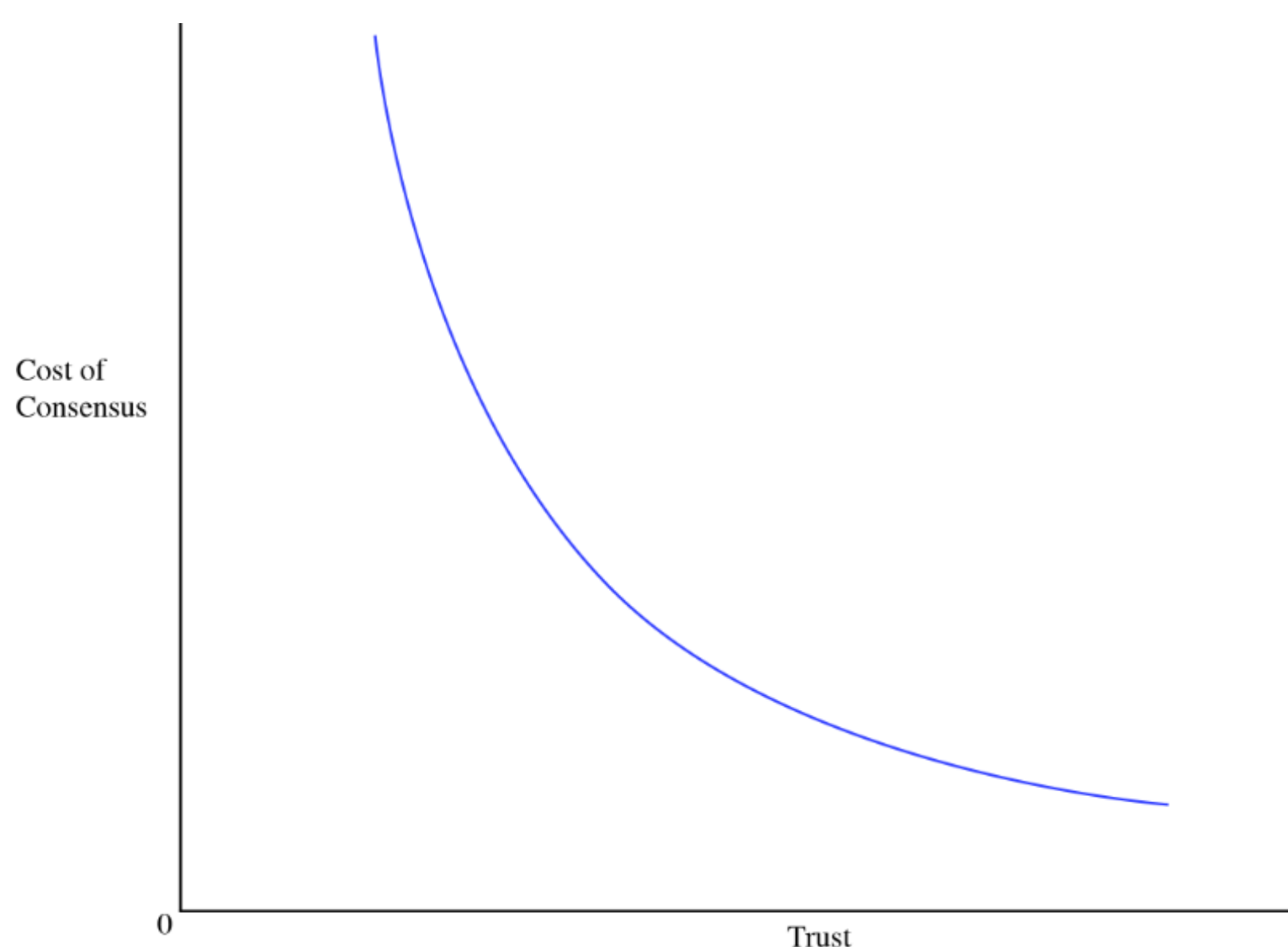

Figure 1: Consensus method tradeoff. If trust increases in a network, consensus costs decrease.

- **Eris** industries set out to make enterprise integration as straightforward as possible. Eris still offers the traditional blockchain models which make use of tokens for transactions, but are distinguished in their ability to eliminate tokens for smart contracts. Their primary algorithm is the *Tendermint* consensus engine, and claims an improved speed and certainty over proof of work. Eris leveraged the work of the Ethereum project for its designs, including the *Ethereum Virtual Machine* in which Eris runs its nodes. Users can spin up environments which have built in access controls for the underlying smart contracts. Access is given on a key-pair bases to permissions like send transactions, create contract, create account, and add role.

- **Corda** is decidedly not a blockchain, but distinguishes itself as a distributed ledger for financial services. The product, still to be released by the R3 CEV, features a tokenless, pluggable platform for financial industry clients. Corda focused on the myriad use cases in the financial industry and has made design decisions that address their needs. Corda will include built-in observer nodes for the regulators of the system, methods for plugging in consensus mechanisms, and an "explicit link between human-language legal prose documents and smart contract code." Corda specifies that consensus does not need to occur across the system, but instead between the parties in a contract. The network need not see all of the details of a transaction; the shared fact needs only be viewable by those who have vested interest in its legitimacy. Corda plans to release a product that will meet the needs of the consortium of member banks who back R3.

In conclusion, each player mentioned proposes something unique. They have examined the needs of their clients and crafted a design that they believe will establish the future of exchange networks. Time will tell which solution will become ubiquitous.

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Brian Astrove   ⋯ 2mo
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Enjoyed the clear analysis on the differentiation among the big players. Thanks for sharing Sloane !

One question on your last sentence: Do you think there will be "one ubiquitous" solution?

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I've got a lot of my eggs in the IBM basket. It's tough to say without full access into the competitors - corda might come up with something great. We just don't know yet given the nascency of the technology.
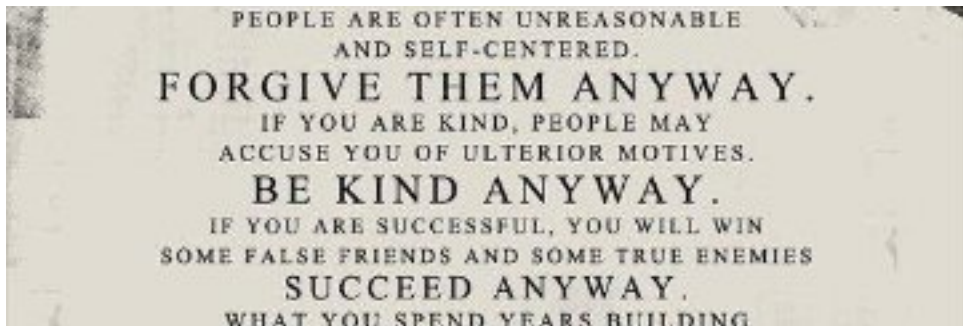
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