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BLOCKCHAIN IN ENTERPRISE PART I:
Has the ship sailed for Ethereum?

Executive summary

With the rise in trade wars, tariffs and populist politics supply chains in all industries face disruption in the years ahead. To protect trade routes and customer bases built upon decades of free trade agreements, multinational corporations (MNCs) are exploring new technology and governance models that will define a new era of globalization.

A growing governance trend among MNCs is to organize in industry consortia, and on a supranational level through bodies like The World Economic Forum. Blockchain technology is being used to band companies together in this consortium model which is described by proponents as a 'team sport'; the most recent and prominent is Libra, but it is just one of many industrial alliances built around blockchain.

Enterprise is perhaps the biggest addressable market for any blockchain or crypto asset and in this report we look at the blockchain platforms best suited to enterprise use. Ethereum, the leading blockchain platform, is still struggling to scale and hampered in decision-making by its governance model. With many competing platforms offering improvements (including governance) will Ethereum lose relevance in enterprise, especially with new technology coming to market such as Hedera Hashgraph?

Several of the world's largest companies have joined or are leading blockchain projects in their industry: IBM in IT; JPMorgan in banking; Maersk in logistics; Walmart in retail; and Facebook in media and tech. Enterprise consortia's use of permissioned and private blockchains combines the benefits of 'co-opetition' (cooperative competition) among rival companies with privileged access to data previously kept in walled gardens, creating new streams of data for AI development.

In global governance, multilateral trade agreements between nation-states are having a diminishing effect as politics gets in the way of decision-making. More effective governance is needed to guide future enterprise and blockchain may provide a framework for industries to work more cooperatively on the direction of globalization in a way that nation-states simply cannot.

This report is the first of a two-part series that looks at the current enterprise competitor landscape, while Part II, addresses the rise of the blockchain consortium model such as the Libra Association in defining future global governance.

Just as blockchain and cryptocurrencies are being used to reorganize the traditional structures *within corporations* they are also leading to new forms of governance *between corporations* as industry leaders steer future globalization and global governance.

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The enterprise blockchain landscape

Introduction: The growing complexity of supply chains

Supply chains have grown in complexity and interconnectedness over years of globalization to form 'global factories' wherein manufacturing of a single product is orchestrated among dozens of actors across geographies and industries. This is in part due to the 'offshoring' of manufacturing from the rich West to the East, while the former focuses on handling the more intangible aspects of the business such as branding, IP etc.

However, legacy methods of storing supply chain data is fragmented between the spreadsheets and ledgers of competing companies - creating considerable administrative complexity relating to managing globally distributed supply chains with a multitude of involved parties. Furthermore, customers are also demanding higher standards of transparency and provenance of their goods with a premium on goods that can prove ethical or sustainable practice. However, it is unlikely blockchain will be a silver bullet in provenance as it will not completely remove human contact points as inputs of data to the blockchain.

Blockchain, combined with internet-of-things (IOT) sensors, is being proposed as a part of a major overhaul of the legacy supply chain - offering real-time tracking, global trade identity and provenance - and shifting the balance of trust among suppliers to trust in the technology itself.
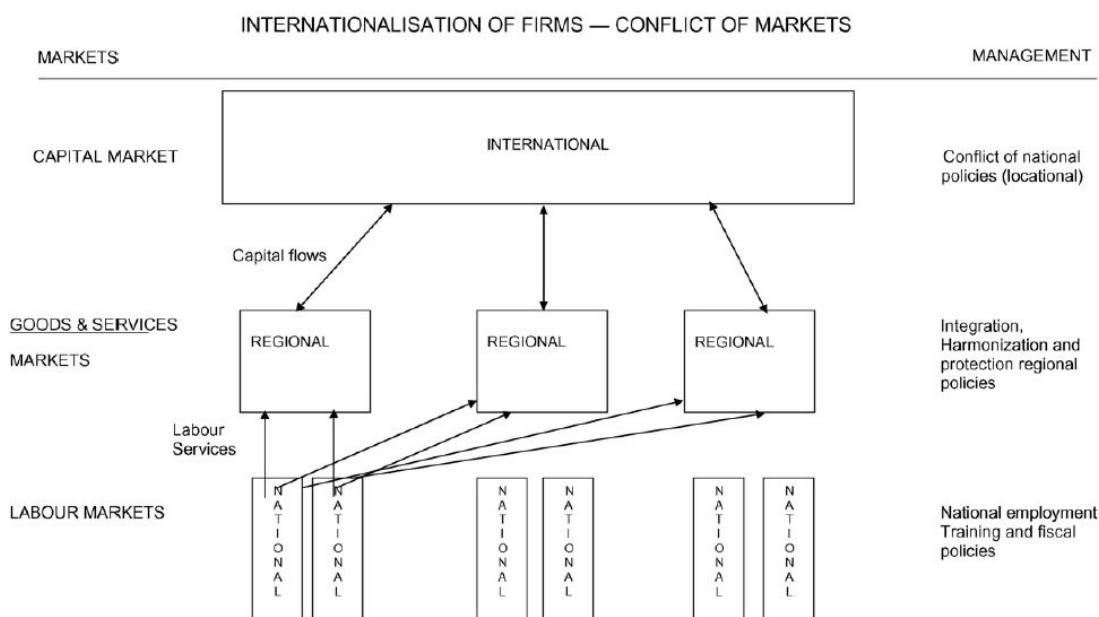

Fig. 1. Internationalisation of firms – conflict of markets.

Source: Peter J Buckley

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The 'internationalization' of firms has also created conflicts of interests along the supply chain: the outsourcing of manufacturing from developed to developing countries has gifted capital markets with large returns on investments and raised national GDP but to the detriment of the regional environment and citizens' health.

There are also conflicts between the political ambitions of developing nations and the demands of the developed as the global factory model makes it difficult for developing countries to move up the value chain from being suppliers of labour intensive manufacturing to consumers of goods produced. This is playing out most obviously between the US and China, afflicting national markets with high tariffs and consumers with more costly goods.

How blockchain can be used in enterprise

Another use case, apart from the supply chain, that companies exploring new technology and particularly blockchain for is shared risk-taking and data-sharing among peers in the same industry. One example is the collaboration among traditional carmakers to share research and data to further the development of autonomous vehicles, which is an AI endeavour currently led by technology companies such as Tesla and Alphabet's Waymo.

Companies that grasp the concept of this new technology early on can capture its benefits before competitors do, realizing "cost savings or increases in profitability first, which they can use to pull further ahead of the pack", suggests the World Economic Forum.

Private, permissioned or public?

The needs of innovators in cryptocurrency blockchain projects are very different to those of the industrial incumbents they are trying to disrupt. Companies traditionally keep their transactions and IP private and their data in silos, this forms a defensive moat around the business. Whereas putting data and transactions on a permissionless public ledger jars with their business model using a different configuration of blockchain, a company may even fortify its business model and market position.

Four possible configurations for enterprise blockchain

Permissioned - Private	Permissioned - Consortium
- a centralized party defines network rules at the protocol level - controls roles and requirements for participation in consensus and on the network generally - access permissions such as reading or transacting on the network may or may not be private	- two or more organizations or individuals have some collective authority over defining network rules at the protocol level - usually control roles and requirements for participation in consensus and network generally - access permissions such as reading or transacting on the network may or may not be private
Permissionless - Public	**Permissioned - Public**
- a group of two or more organizations or individuals have some collective authority over defining network rules at the protocol level - anyone may participate in consensus provided they have the resources required to do so - access permissions such as reading or transacting on the network are open to the public	- a permissioned ledger with rules set by central entities - however, transactions confirmed using consensus layer of a public decentralized protocol - used in Blockchain as a Service (BaaS) platforms e.g. The Hedera Consensus Service secures Hyperlegder permissioned networks with Hashgraph's public consensus layer

A workable compromise for businesses can be achieved with private and permissioned blockchains which enable them to retain control and special privilege rights over their database, while at the same time having some of the advantages of distributed ledger technology such as security and streamlined processes.

A private network is the direct opposite of a permissionless network like Bitcoin; it is set up by a single entity to be used only by members defined by that entity (and/or selected members outside) - although the invited members will usually have no permission to view or read other transactions in the network. Permissioned blockchains are usually created by two or more entities, with a view to inviting more members, which gives the founding members, as nodes, special permissions to read, write or transact.

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The interest among enterprises for blockchain appears to be growing. A Deloitte blockchain survey in August claims 83% of respondents said their organizations see compelling use cases for blockchain, and 53% reported it as a critical priority for their organization, however, a 2018 Gartner blockchain adoption survey showed only 1% of responding CIOs indicated any kind of blockchain adoption and only 8% have it in their short-term planning. The reality may be somewhere between the two.
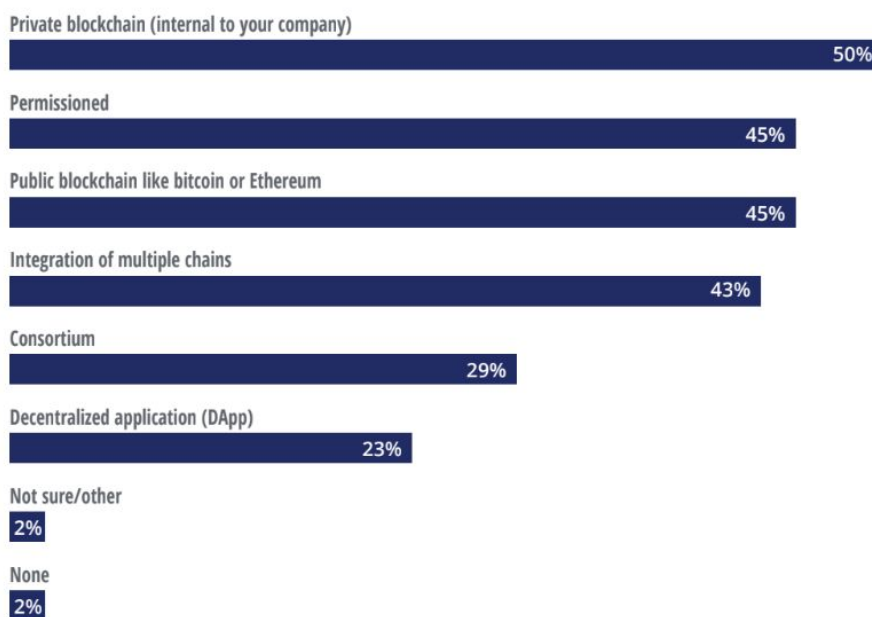
The preferred platforms for enterprise

Since Ethereum launched in 2017 it has spawned many blockchain platform rivals built on the same premise (so-called 'Ethereum killers') such as NEO, Komodo, Tron, EOS, NEM, Ontology, all of which claim to support enterprise use cases. While it is beyond the scope of this report to analyze all competing platforms, suffice to say there isn't yet a consensus on which platform is best suited for enterprise use.

Blockchain models

The market hasn't yet settled on any one architecture or approach

Survey question: On which blockchain model is your organization or project focusing its activities? (Percentage of respondents citing that blockchain model as an area of focus)

Private blockchain (internal to your company)
50%

Permissioned
45%

Public blockchain like bitcoin or Ethereum
45%

Integration of multiple chains
43%

Consortium
29%

Decentralized application (DApp)
23%

Not sure/other
2%

None
2%

Source: Deloitte

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What this Deloitte survey suggests - a poll of 1,386 senior executives in a dozen countries - is that there is almost as much interest in permissioned and private networks as there is in public permissionless networks.

This suggests there is a big market for a crossover of both - the 'permissioned-public' configuration in the previous table, which falls under 'blockchain as a service', including the Hedera Consensus Service, and Microsoft's Azure Blockchain Service which powers the JP Morgan Quorum platform built on Ethereum.

Criteria for blockchain to perform at scale in industry:

- **Throughput** - The number of transactions per second (tps) a network is capable of - the Visa network is capable of handling 24,000tps. Low latency is also important

- **Privacy** - The option of private transactions are important in businesses, as all financial or data transactions to be visible to competitors

- **Security** - Proven and tested infrastructure that is more secure than legacy centralized database/servers

- **Know your customer compliance** - KYC is a universal regulatory requirement

- **Interoperability** - The ability to transfer data between blockchain platforms and even integrate with existing CRM and ERP software

- **Smart contracts** - automated programmable contracts that self-execute when their parameters are met

The main use-cases for smart contracts by enterprises are:

- **Validating data** - that triggers the start of other processes off-chain

- **Automation processes** - If x happens then take y action

- **Smart legal contracts** - legally binding smart contracts in settlement

Current Use Case for Platform Blockchains

SOURCE: BRAVENEWCOIN.COM
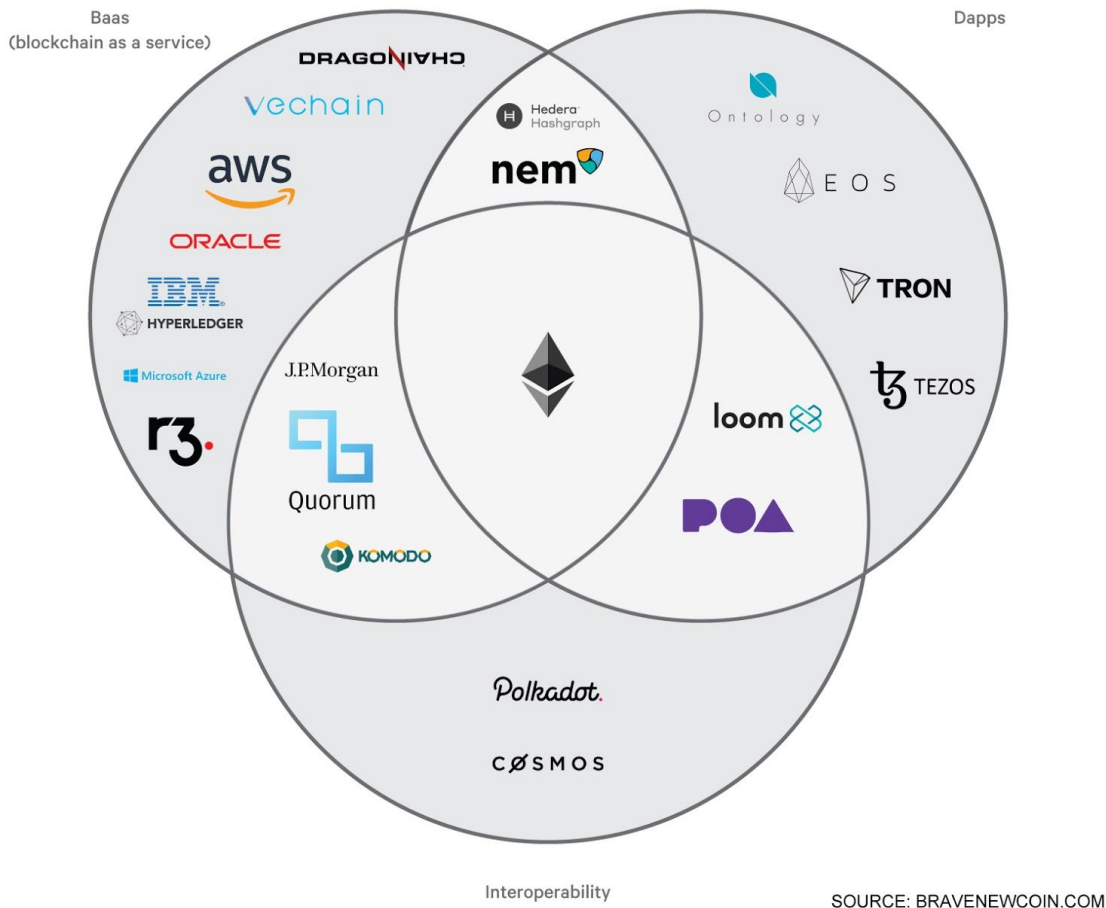
What constitutes a 'platform blockchain' is a network that uses functional coding language that allows for the creation of smart contracts and complex tasks, as opposed to a blockchain with a simple coding language like Bitcoin that functions purely as a store of value/payments network. Ethereum was the first iteration and it has maintained the most network effects. However, since its launch in 2017 many imitators and competitors have emerged, pivoting to enterprise solutions.

NEO, NEM, and Tron are some of the blockchain platforms competing with Ethereum and also pivoting to enterprise, while Polkadot, Loom and POA are focused on interoperability between Ethereum and other platform blockchains.

While most crypto assets reside on their native blockchains and functioning across other blockchains requires cumbersome tech-heavy processes such as atomic swaps or 'wrapping' them

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in another token, interoperability is a solution that would enable the seamless movement of assets between public blockchains while still retaining data on the original blockchain's ledger.

Interoperability is key to scalability and creating specialized blockchains rather than the 'do-it-all' platforms they are now. The most established technology is Polkadot, created by Ethereum co-founder Gavin Woods' company Parity in 2016. Polkadot connects a range of blockchains, from general to app-specific, to create a platform that enables more advanced applications. Some examples that harness cross-chain interoperability:

● Oracle service that puts real-world data on-chain
● Identity management system to link user identity in multiple apps
● Decentralized exchange order books and escrow
● IoT network that receives messages from other networks or controllers
● Cross-chain smart contract calls
● Message passing between private and public chains

While the cryptocurrency and decentralized communities have been hampered by growing pains - not least around scaling and governance - major corporations and consulting firms have been gaining traction with permissioned, private and consortium blockchains.

Blockchain as a Service (BaaS)

Just as software-as-a-service (SaaS) simplified and brought down the cost of upgrading technology in business, BaaS could simplify the deployment and configuration of blockchains within businesses small and large.

BaaS providers are also the world's reputable cloud providers: Amazon AWS, Microsoft Azure, Oracle, IBM, and others already offer platforms that handle the setup, maintenance, and support of the blockchain infrastructure. The service can be added to a client's existing cloud services and subscription fee. Hyperledger, in its many variations, powers much cloud-based BaaS.

As well as removing the hassle of setting up nodes and providing templated smart contracts, other advantages of BaaS providers include:

- Fast provisioning

- Ease to configure

- Quick on-boarding of members

- Embedded identity management

- Enhanced security and confidentiality

- Efficient development and testing

- Enhanced integration with processes and applications

- Better performance and scalability

- High availability and operational resilience

- Excellent scalability

- Decouples infrastructure from the customer's primary task of developing smart contracts and applications

- Allows customers to explore the magnitude of possibilities with their legacy applications and business processes.

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BaaS use cases

While the focus has been primarily on blockchain in enterprise and supply chain, BaaS expands the use cases for blockchain to smaller and diverse industries. Some proposed use cases for BaaS are:

Industry	Ledger	BaaS Use cases
Education and profession	*Ledger of prowess*	accomplishments can act as a single source of truth for certificates, assessments, skills. Ownership of the asset gives full authority over certificates, transcripts, skills and evidence. Verification of individual's certificates, skills for employers
Supply chain	*Ledger of supply*	for asset management, procurement, product life cycle management, logistics, provenance, fraud detection etc. It can go beyond the provenance (tracking of products) to a full life cycle of supply chain management on blockchain
Government	*Ledger of identity Ledger of trust*	Blockchain's public repository, along with hashing, cryptography, and other proven technologies, can protect against hacking, data modifications, loss of citizen information on a ledger of trust that can take care of citizen rights, votes, donations. A ledger of unique identity (UID) can digitize citizen ID much like the original vision of the Aadhaar Card system in India.
Real estate	*Ledger of ownership*	A ledger of ownership can act as a single source of truth for the ownership of properties, ease the listing of properties, remove intermediaries in settlement and enable the transfer of ownership in minutes.
Healthcare	*Ledger of wellness*	To track patient and doctor information This will protect against drug counterfeits, facilitating secure and controlled exchange of information of prescriptions and medical history. It could even allow patients to monetize their medical records for research.
Insurance	*ledger of assurance*	From policy sales to settlement, which includes sale of a policy, maintenance of a policy (renewals, terminations, adjustments, and so on), claims, evaluation and evidence. It reduces third-party involvement and allows for faster settlements.
Intellectual properties	*Ledger of IP*	Source for patents and trademarking of IP; it reduces IP abuse, ensures IP owners receive credits and monetary benefits for their IP and royalties.
Fintech	*Ledger of affluence*	Base for cross-border payments and faster B2B transactions. It eliminates reconciliations, infuses trust among traders, and so on. It can also be used for clearing and settlements, trade finance, KYC, and AML.

Ethereum, the enterprise world computer?

Heading into the latter part of 2019, Ethereum finds itself at a crossroads. Despite its 'world computer that powers the decentralized internet' narrative, there has been little mainstream adoption of real-world, enterprise-grade solutions powered by Ethereum.

While Ethereum still has the largest network effect of development and applications of any public platform blockchain, and even secures some permissioned and private networks, its governance and future vision are considerations of due diligence for any business planning to integrate blockchain or launch a token.

The Ethereum Enterprise Alliance is one of the longest-running and most diverse blockchain consortiums with a charter to "develop open blockchain specifications" for Ethereum in business. However, its success is dependent on the technology scaling from the current 15 transactions per second to the ~10,000-100,000tps required for enterprise. This is being addressed in Ethereum 2.0.

Disagreements in scaling Ethereum 2.0

The run-up to Ethereum 2.0 is becoming bipartisan. Vitalik Buterin has proposed a new main chain 'beacon chain', that would coordinate hundreds of other Ethereum shards ('sub-chains'), including the current Ethereum chain. A competing part of the Ethereum community would prefer that Ethereum 1.0 remain its own separate chain. The end-goal for Ethereum's scaling solution is to move from a proof-of-work (PoW) consensus to a proof-of-stake (PoS).

This migration started with the Casper protocol upgrade, which introduced a hybrid of PoW/PoS. As far back as 2015, developers tried to incentivize miners to switch to PoS by ramping up the mining difficulty rate of PoW (the so-called "difficulty bomb") which lead to far higher costs for miners and negated their rewards - but this was reversed, and the migration to PoS has been pushed back on several occasions since.

Sharding Ethereum 2.0 (Possibility)
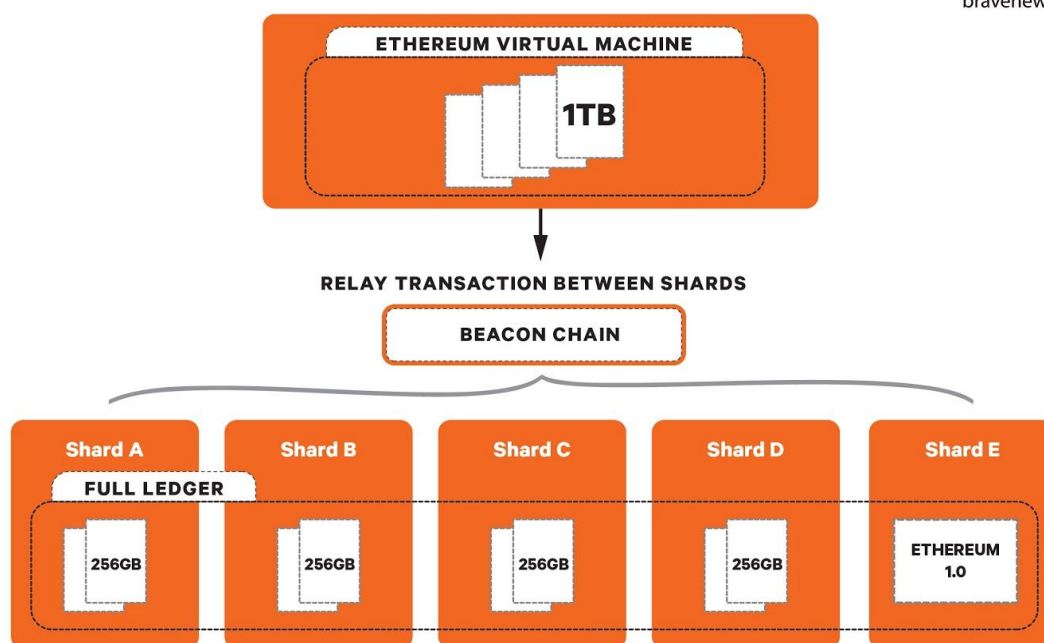
One possibility for ETH 2.0 is to have the Ethereum 1.0 chain as a shard among many thousands of shards that all share the same main ledger.

Sharding the Ethereum network is a scaling solution that has been in the pipeline for several years. It was suggested in the Plasma whitepaper authored by Buterin and Joseph Poon in 2017 (Poon is the co-creator of Bitcoin's Lightning Network).

"Sharding" describes breaking a blockchain's ledger into smaller fragments that are spread across the network's nodes so all nodes don't have to maintain a copy of the entire ledger at all times, but rather only those shards most relevant to their network.

Some of the benefits touted include reduced finality times and higher throughput of transactions per second. Buterin first suggested the beacon chain over a year ago.

A brief history of Ethereum's governance issues

Ethereum's governance is not dissimilar to that of Bitcoin, involving similar stakeholders. However, Ethereum has an added complication in that its ERC20 token forms the foundation of a whole other ecosystem of decentralized applications (Dapp) and cryptocurrencies, whereas Bitcoin has a basic protocol layer on which only a few applications are built.

Its first governance debacle occurred in 2016 when a venture capital fund application built on top of Ethereum, known as The DAO, was hacked of ~$150m in ETH at the time. The Ethereum Foundation held a community vote on whether to reverse the attack and the ETH stolen by way of forking the network onto a new chain, essentially creating a new version of transaction history. It was accepted in a contentious decision (and low voting turnout) which cleft the community in two. Those opposed to the decision stayed mining on the original Ethereum chain which still exists today known as Ethereum Classic (ETC) and the Ethereum Foundation supported the new chain, what we know today as ETH 1.0.

The ideological direction for the Ethereum Foundation, the non-profit organization behind the project, can be traced back to the North American Bitcoin Conference in January 2014 when the core developers unveiled their project to the world. After this, the fledgling Ethereum team had to decide whether the venture was going to be, as founding member Charles Hoskinson puts it, "crypto Mozilla" (non-profit) or "crypto Google" (for profit).

The vote was a unanimous 8-0 in favor of crypto Google. The team went to Zug, known as the 'Crypto Valley' of Switzerland, and learned the intricacies of establishing the non-profit Ethereum Foundation to raise funds for the for-profit venture.

> *"[The Ethereum Foundation] is a nonpartisan industry body, made up of [a cross-section of] industry players. It [is intended to] make sure the Ethereum infrastructure works fairly and independently... like ICANN for the Internet."*
>
> *- Joe Lubin, founding Ethereum developer*

However, in June 2014, the decision was reversed by Buterin to go down the Mozilla route and establish the Ethereum project as an entirely non-profit venture. Disputes followed, with some of the core developers leaving the project, including Charles Hoskinson who described his departure as a "boardroom brawl."

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Fragmentation of the Ethereum vision

The early fundamental disagreement and split among core developers persists to this day and is a key factor in the fragmented vision of Ethereum 2.0.

Hoskinson went on to establish IOHK, an engineering company that builds cryptocurrencies and blockchains for corporations and institutions, with Jeremy Wood, who was another early member of Ethereum that left the Foundation. Hoskinson's main project is Cardano (ADA) a smart contract platform which attempts to solve Ethereum's scaling and governance issues with a self-described "third-generation blockchain." Although it hasn't launched its mainnet it considered a serious Ethereum rival.

Among other early influential developers that split from the Ethereum Foundation to pursue their own vision is Gavin Wood, who went on to establish Parity, a blockchain infrastructure company that focuses on interoperability, and Polkadot, a blockchain interoperability platform, with wallet, client and bridging solutions for Ethereum. Parity is pushing ahead with its own vision of blockchain interoperability and sharding through Polkadot and Substrate.

Another founding member, Joe Lubin left the Foundation and established Consensys in 2014, a global business building decentralized apps and platforms on Ethereum and it also leads the Enterprise Ethereum Alliance for use cases in the real world. Consensys appears to be mostly aligned with the original Ethereum vision.

ChainSafe is another major stakeholder in the ecosystem, born from the community of Ethereum developers in Toronto (Buterin's hometown) and a major contributor to its development including testnets and software developer kits. It appears both ChainSafe and Parity are of the view that there is no need for two chains to coexist (ETH 2.0 and ETH 1.0) and that all ETH 1.0 projects should migrate to the upgraded chain. As such, both parties are pushing ahead with developing ETH 2.0 according to their own vision.

Besides differences among founding members, there are also signs of mutiny from the Ethereum Foundation's core developers. One, Lane Rettig, recently criticized its governance as having no shared values, mission or principles and is highly critical of its scaling roadmap.

"The things we need to solve are more complex. The coordination problem is getting harder. There are more people involved, more organizations, more software."

*- **Lane Rettig, Ethereum developer***

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Vitalik Buterin remains at the Ethereum Foundation and is trying to reconcile the interests of his community with the competing visions of founding members (including Ethereum Classic) for ETH 2.0. The primary forum for Ethereum governance participation and campaigning is currently social media - Reddit, Twitter and YouTube.

Ethereum 2.0: The path to Serenity

As covered in a previous BNC report, Ethereum is at a crossroads regarding scaling solutions and its future direction. This is complicated by the fractured nature of its governance.

Ethereum's governance is similar to that of Bitcoin which has been forked on several occasions, not least the contentious chain split in 2017 over Segwit2x that resulted in Bitcoin Cash. Ethereum currently also has two primary chains, Ethereum, and Ethereum Classic, and its upcoming protocol update, Istanbul, could result in a third chain, as there are several competing visions among stakeholders of what Ethereum 2.0 should look like.

Stakeholders in Ethereum's governance						
Miners	Validators	Developers	Coin holders/ investors	Ethereum Foundation	Dapp & ERC20 ecosystem	Chipmaker companies

One of the evolving themes of Ethereum and many other decentralized crypto projects is how to manage network governance. Crypto networks are becoming an experimental sandbox for a new form of decentralized governance, to incentivize cooperation among stakeholders on a global scale, with the end-goal being to avoid community schisms (hard forks).

On-chain governance is the value proposition of Tezos, a platform blockchain that 'self-amends' its codebase to reflect changes voted in by Tezos stakeholders around governance issues. This concept, if successful, creates a form of decentralized autonomous organization (DAO).

Other DLT projects such as Hedera Hashgraph and Libra have approached governance in a different way by starting off with a permissioned network governed by a council of multinational corporations that operate all the network nodes and changes to the codebase. Although both projects describe this as 'decentralized governance' it is really a new form of global multi-stakeholder corporate governance.

Like Bitcoin, Ethereum's governance relies on agreement between a core group of developers (the Foundation) and major ETH stakeholders such as Consensys, Chainspace, and the wider Dapp network.

Is the competition catching up with Ethereum?

As general public use cases for cryptocurrency and Dapps have stalled, it appears the first mainstream adoption of blockchain will be for enterprise. While Ethereum is still the most prevalent platform being used and experimented with in enterprise (JP Morgan's Quorum, the Azure Blockchain Service), development of the 'decentralized world computer' is struggling with technical issues that have hampered it for years.
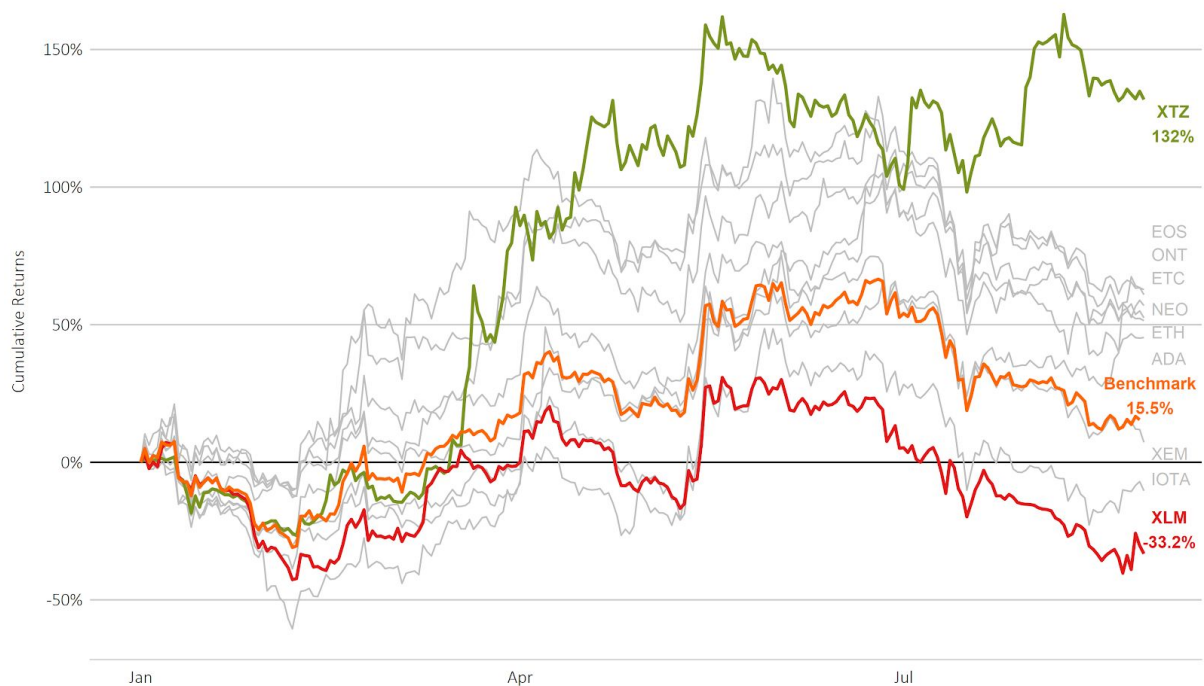
Year to date percentage returns through to September 2019.

New enterprise solutions and alliances have flourished over the past two years. Tezos, NEM, NEO, and Hedera Hashgraph are similar smart-contract-compatible blockchain platforms that are focused on enterprise use.

NEM (XEM) is approaching a major upgrade to its protocol to further align itself as a blockchain for enterprise. The Catapult upgrade paves the way for scaling and atomic cross-chain swaps to power private and public blockchains.

Atomic cross-chain swaps will allow companies to run private chains and create new transaction types that can then be reconciled to separate public chains. Potential examples would be patient health data, retail energy trading, which would be stored on private chains and the public chain used for settling transactions and account record-keeping.

Hedera Hashgraph (instigated as a permissioned network) is a direct competitor to Ethereum in enterprise (we cover in-depth its governance structure later in the report), and perhaps even a challenger to Libra. It is scheduled to launch its mainnet on September 16th.

Hedera Hashgraph technology was built from the ground up with enterprise and global trade in mind. It's a proprietary distributed ledger technology not built on a blockchain structure, but on another variation of a graph, and in testing has a throughput of 10,000 transactions per second, runs smart contracts, decentralized apps, and is governed by consortium.

The ideology behind Hedera Hashgraph is antithetical to Bitcoin and Ethereum. It is built to be compliant with regulators and governments. The initial offering of its native HBAR token was only offered to accredited investors and it requires KYC/AML verification before users can earn HBAR in a wallet. It is yet unclear where HBAR will be listed on public exchanges.

The 'Hashgraph:' The technology behind the 'blockchain killer'

If it delivers as promised, Hedera Hashgraph could be a 'do it all' platform for enterprise use that utilizes cryptocurrency, smart contracts, and file services. Hedera Hashgraph's claim for throughput up to tens of thousands of transactions per second is the grandest credible claim made by any such project to date.

	Bitcoin	Ethereum	Hashgraph
Tx per second	3+ tps	12+ tps	10,000+ tps
Average fee	$0.20c	$0.13c	$0.0001
Tx confirmation	10-60 minutes	10-20 seconds	3-5 seconds

Source: Hedera Hashgraph

However, the exact definition of 'transactions per second' that Hedera uses to claim such outstanding numbers has faced scrutiny and debate in the blockchain community.

Hedera Hashgraph's focus on a public ledger with massive scalability and microtransactions is in preparation for the Internet of Things. The technologies behind this self-styled 'blockchain killer' are reiterations of two thirty-year-old computer science algorithms, the gossip and voting protocols, which Hashgraph has reinvented as "gossip about gossip" and "virtual voting". Put simply, the way these protocols are implemented allows users to propagate messages across the network and confirm others at the same time — in contrast to a traditional blockchain where a user has to wait until their transaction is confirmed before they can perform another action.

Transactions in a Blockchain vs Hashgraph
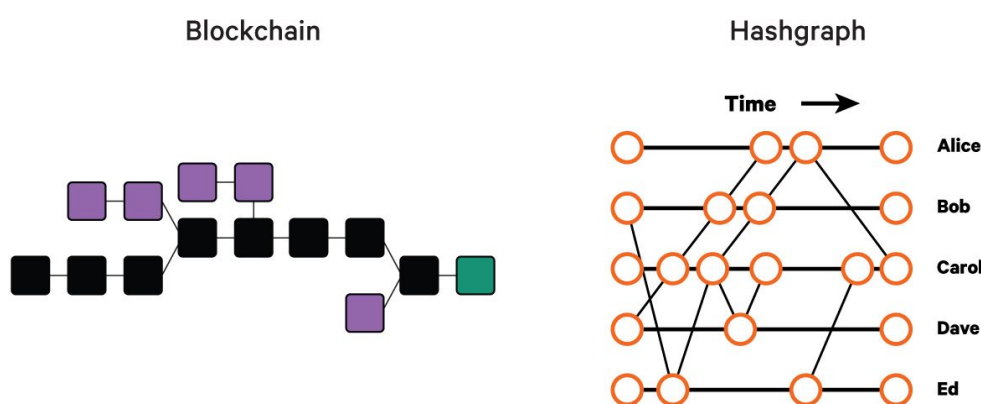
SOURCE: BRAVENEWCOIN.COM

Sending, receiving and confirming transactions on Hashgraph happen in synchronicity as opposed to a blockchain, which must be done in sequence.

Hedera Hashgraph has a native cryptocurrency and it also supports smart contracts for Dapps and tokens written in Ethereum's Solidity language. As such, the Hashgraph team sees itself as a successor and indeed improvement on Ethereum as a smart contract and Dapp platform.

Tezos, a coordinated alternative to Ethereum in enterprise?

Tezos is an ecosystem similar to the Ethereum network in that both are designed to support smart contracts and decentralized applications.

However, the value-add of Tezos over Ethereum is its on-chain governance voting system which is designed to minimize the effect of disruptive hard forks by amending the base layer protocol as changes are passed. This is opposed to the informal, governance-by-fork style used by networks such as Ethereum and Bitcoin which have each had contentious hard forks that split the community into two or three chains.

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The two projects that offer Turing-complete smart contract languages and a variation on Proof-of-Stake consensus. XTZ, like ETH, is used for powering computations on the blockchain.

> *"Tezos' true potential lies in putting the stakeholders in charge of deciding on a protocol that they feel best serves them."*
> *- Tezos Whitepaper*

Tezos aims to always coordinate discussions around the one chain, implementing the highest quality updates for it as they become available. Making changes to the Tezos network is implemented via a multi-stage voting process that takes three months to complete.

Appeal to enterprise and corporations

Tezos offers institutional-grade coding solutions and has recently attracted security token offerings (STO). BTG Pactual, Brazil's fifth-largest bank, is planning an STO worth $1 billion on Tezos led by Dubai-based Dalma Capital of tokenized property and other assets.

The stakeholder community in Tezos is more streamlined than Ethereum, and the incentives appear more aligned. Its governance is similar to representative democracy in that small XTZ holders can delegate their voting power to larger representatives, or delegates, except that the coin holders as end-users (the electorate) are incentivized to vote on governance issues with passive income rewards on their stake of XTZ when they do.

Stakeholder community in Tezos			
Bakers	**Endorsers**	**Delegation service**	**XTZ coin holders**
Miners	Validators	Representatives	Electorate

In his account of the Tezos story for Wired, Gideon Lewis-Kraus brings to life what Tezos envisioned in the real world:

> *"Tezos was designed at least in part for enterprises… that might want to operate on a larger scale, or for larger entities that might seek to generate public credibility by outsourcing their accounting to a clear, auditable blockchain."*

A blockchain with mainstream potential is not defined by layers of complex protocols or a premise that can only be grasped by technology savants. Instead, it is defined by its potential to simplify real-world actions with tangible benefits to the layperson.

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With a high bar to directly participate in Tezos governance currently around 8,000XTZ - and a lack of public and developer adoption (except, of course, from Tezos core developers) there is no real-world use case yet for Tezos. The high staking requirement keeps Tezos governance largely out of reach of the layperson and more appealing to major equity and venture capital firms which have setup or invested in staking services for XTZ.

Tezos has also yet to gain traction within the wider Dapp and smart contract developer and user communities. Platform blockchains like Ethereum, EOS, and Tron have a deeper base of projects and users.

The pitfalls and complications of on-chain governance

Although there is much room for improvement in corporate governance models, it is unlikely that the first iterations of on-chain governance blockchains will be the silver bullet.

Despite its on-chain governance value proposition over Ethereum and other blockchains to mitigate against hard-forks, the Tezos stakeholder community is facing a split. The is the result of a schism between the project's leaders and the company that developed Tezos, OCaml Labs, who claim to have written 90% of the Tezos codebase. This is reminiscent of Ethereum's hard-fork after The DAO hack.

The new chain, Dune Network, its developers claim is not a hard-fork of the Tezos ledger but started with its own genesis block that uses an extended version of Tezos' open-source software as a basis to create a new platform. Its Dune (DUN) token will be airdropped on Tezos token holders with a balance of 100 XTZ or greater. Dune Network will also be focused on enterprise and allows for private blockchains setups with on-chain governance, very similar to Tezos, so it will be interesting to see which chain the community focuses on.

> *"[On-chain governance] It's too hopelessly a broad term. It can be made to mean anything, its use doesn't shed any light on the actual residual human decision making that is needed."*
>
> *- Nick Szabo, creator of the smart contract*

On-chain voting can also be exclusive to small cadres within governance projects. Last year EOS was caught up in controversy when evidence was leaked of collusion among its block producers voting quid pro quo for each other.

On-chain voting turnouts have also been lackluster in other governance projects such as Aragon (ANT), and election results are prone to being swung by plutocracy at the last minute.

Conclusion

Much progress has been made over the past two years with permissioned and private blockchain networks and consortia. So much so that enterprise may become the first mainstream use case for blockchain, even before retail point-of-sale.

Governance is proving to be the next obstacle to overcome for Ethereum and other decentralized networks before they can scale. In the meantime, consortium models may provide a more logical and cohesive form of governance, and may even obviate some public blockchains if they can't scale. Cloud providers are templating the setup of permissioned and private blockchains as a service which could open up the technology to broader, less technical industries and audiences. These permissioned networks generally operate without a native crypto asset as it isn't required to secure the network.

Enterprise is a massive market opportunity for any public blockchain and the price of its native crypto asset would benefit greatly from the added utility and transaction activity. Tezos has made significant gains in market capitalization this year, and XTZ's outperformance of every other platform crypto asset may reflect the market valuing the idea of coordinated governance.

Hedera Hashgraph is another wild card that will enter the platform market this September which could change the game for Ethereum and blockchain in general. Its ambitions and governance design pit it against Facebook's proposed Libra Association a model, as we cover in the next report, which could change the way business and global trade is governed in future.

We would be delighted to hear your feedback on how we can improve BNC Research and provide the most value to our readers. Please take a moment to complete this short anonymous survey.

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