Blockchain in Procurement:

What's Now, What's Next

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SIG Global Executive Summit

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About NelsonHall

NelsonHall is the leading global analyst firm dedicated to helping organizations understand the 'art of the possible' in IT and business services. Our IT services (ITS) research helps organizations understand, adopt, and optimize adaptive approaches to IT services that underpin and enable digital transformation within the enterprise. Our business process services (BPS) research helps organizations understand, adopt, and optimize the next generation of digital models for business processes.

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Notes:

All exchange rates within the report are based on NelsonHall standards: £1=$1.3 and €1=$1.2.

Figures within this report have been rounded where appropriate.

Vendor revenues, FTE (Full time employee), PTE (Part time employee) and employee numbers are estimates based on NelsonHall research.

This report analyzes the global blockchain BPO market as it stands at Q3 2018.

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1. Introduction

The State of Blockchain Technology, August 2018

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Blockchain Is No Longer a Speculative Technology

Distributed ledger technology (DLT) – commonly referred to as **blockchain**, although other technologies like **hashgraph** can also perform distributed ledger functions – has come of age in 2017-2018. Although the core technology has been available for a decade (largely in cryptocurrency), businesses are increasingly interested in the transparency, cost reduction, and process cycle time improvements that DLT offers.

The industry is still quite immature, with multiple competing technology standards in different applications of DLT, but is beginning to come into focus as we pass the midpoint of 2018. In particular, the past year has seen more projects move from pilot or proof-of-concept stages to commercial deployment, although the total number of blockchain commercial deployments remains small.

We expect the presence of an increasing number of successful commercial blockchain application deployments to accelerate the pipeline for new pilots and broaden the industrywide discussion of blockchain as a business problem-solving technology.

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The Blockchain Technology Picture: Competing Standards, and a Long Tail of Specialized Platforms

The technology architecture landscape is dominated by the **Ethereum** standard, which includes the legacy Ethereum cryptocurrency standard and its Quorum enterprise cousin, and the **Hyperledger** family of platforms, which includes the IBM-backed Fabric architecture. Hyperledger also offers the **Sawtooth**, **Iroha**, **Burrow**, and **Indy** platforms, each with its own unique focus.

Other technology architectures include R3's **Corda**, increasingly a popular choice for financial services firms; **Multichain**; **IOV42**; **IOTA**; **Ripple**; Symbiont **Assembly**; and **Openchain**.

With so many platforms competing to become the de facto industry standards, businesses have been understandably concerned to date with choosing incorrectly and investing in an architecture with a limited runway. However, as vendors have dedicated more resources to interoperability services and connectors, our research shows an ongoing decline in concern in this area.

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Platforms in the Blockchain services space can be categorized along axes of open to permissioned, and flexible to purpose-built

At the core of every blockchain solution built and deployed by a service provider is the specific distributed ledger technology (DLT) chosen to power that solution. Technology platforms differ along two axes.

One runs from **open** (anyone can participate as a buyer, as in cryptocurrency exchanges) to **permissioned** (only specific named and credentialed entities can participate, as in an enterprise supply chain).

The other runs from **flexible** (the platform is designed to handle any blockchain application from SCM to exchange to document management) to **purpose-built** (the platform was designed for one, or a small handful, of highly specific use cases.) Flexible platforms could be subdivided into achieving flexibility through modularity (Fabric) or breadth of base capability (Ethereum), but doing so complicates presentation.

This taxonomy lends itself to a **quadrant visualization** of the industry on the slide to follow.

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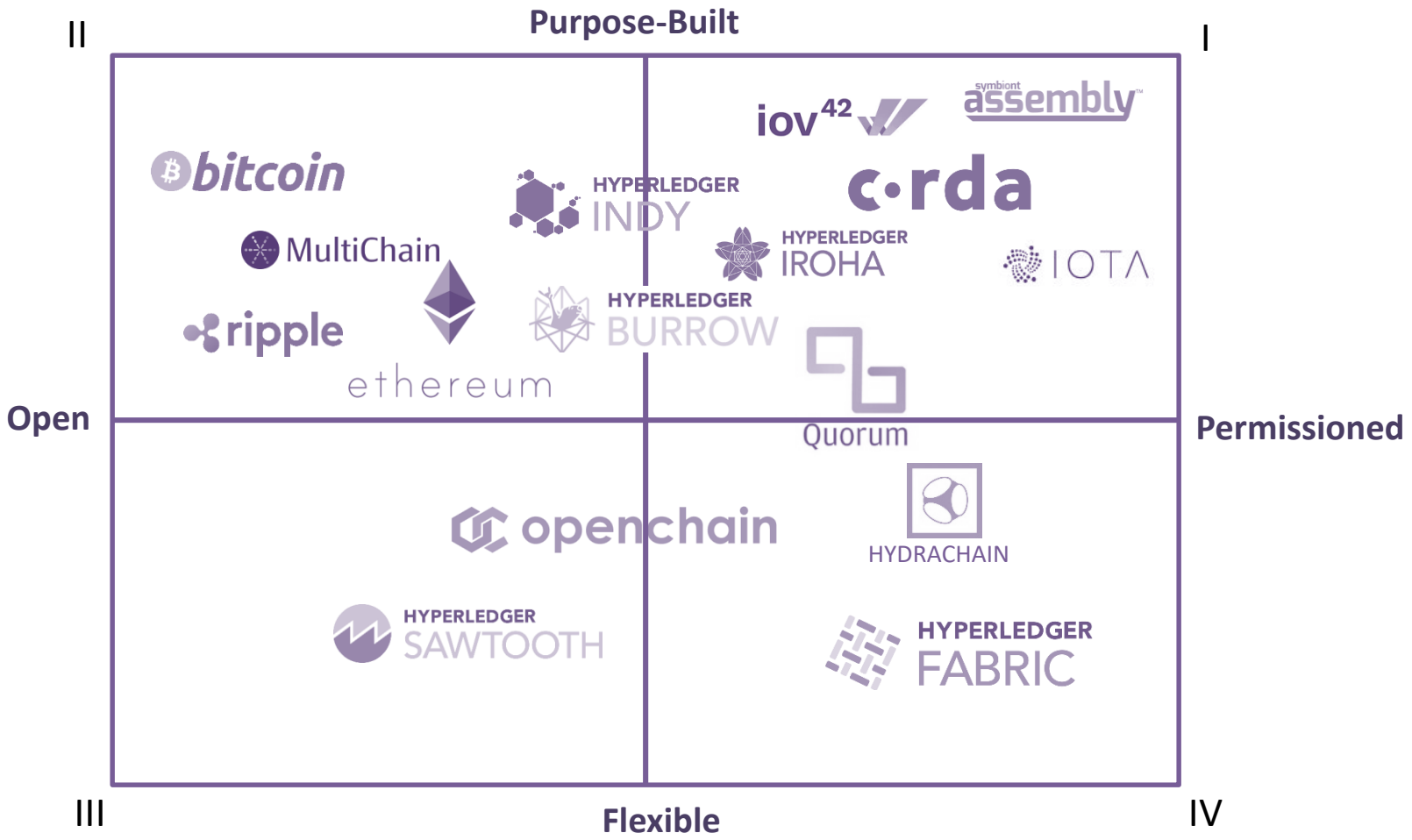
Blockchain technology can be classified into quadrants



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Quadrant I platforms are for secure, high-performance use cases

The permissioned, purpose-built platforms in Quadrant I are ideal for high-throughput environments with smaller numbers of credentialed participants. Examples include Symbiont's Assembly, a bespoke platform purpose-built for managing large volumes of financial trades occurring within specific asset classes; Corda, the platform from the R3 Consortium; IOV42; and Hyperledger Iroha.

Characteristics of Quadrant I blockchain platforms include:

- Design for speed and scale, rather than flexibility of approach
- Emphasis on security and transparency for regulators and participants
- Built to manage complex processes with multiple layers of oversight
- Generally engineered to withstand hostile node activity via BFT
- Smaller number of use cases to which existing technology can be expanded.

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Quadrant II platforms are generally cryptocurrency applications

The open, purpose-built platforms in Quadrant II include some of the oldest DLT platform technologies in the sector, many of which are either the original crypto exchange platforms – Bitcoin, most notably – or variants of those platforms, as Multichain is a variant of Bitcoin.

Characteristics of Quadrant I blockchain platforms include:

- Design for breadth of participation, rather than speed or solution scale
- Emphasis on platform access, opportunities to earn through support (mining)
- Built to manage simple exchange processes with large numbers of participants
- Generally engineered to withstand hostile node activity via BFT
- Larger number of use cases where existing technology can potentially be used but only in open applications.

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Quadrant III platforms are generally consumer noncoin applications

The open, generalized platforms in Quadrant III include the later evolutions of coin technology platforms that included more built-in design flexibility (Ethereum straddles Quadrants II and III in this respect) along with broader consumer Hyperledger projects like Sawtooth, and OpenChain, which straddles III and IV. This is the smallest of the quadrants by vendor count, in part because large-scale noncoin consumer-level applications are still in development.

Characteristics of Quadrant III blockchain platforms include:

- Design for breadth of participation, rather than speed or solution scale
- Emphasis on flexibility and ability to work as permissioned or open solution
- Built to manage more complex exchanges with larger numbers of participants
- Generally engineered to withstand hostile node activity via BFT
- Considerable number of use cases for which existing technology can be expanded.

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Quadrant IV platforms are enterprise blockchain breadth plays

The permissioned, generalized platforms in Quadrant IV are the workhorse platforms designed for flexibility in serving the needs of a broad slate of enterprise blockchain needs. Fabric, the modular architecture developed by IBM and Digital Asset, is here, as is Quorum and Hydrachain. These platforms are not built to be the fastest in any particular task, nor the best-suited for any one use case. They are built to bring networks of networks together across supply chains, financing applications, and more.

Characteristics of Quadrant III blockchain platforms include:

- Design for flexibility at scale, rather than speed or throughput volume
- Emphasis on the ability to act as infrastructure for a broad variety of applications
- Built for large volumes of simple exchanges with smaller numbers of participants
- Generally engineered to secure an honest internal blockchain from external threat
- Broadest number of use cases to which existing technology can potentially be expanded.

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2. Changing Shape of the Blockchain Market

Digital Operations Transformation Program, August 2018

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We are progressing from repurposing coin platforms for enterprise use to designing new architectures – and moving beyond blockchain.

THE NOW

THE NEXT

THE NEAR

Bitcoin

Original blockchain application was designed only for cryptocurrency trading, but has proved remarkably flexible in repurposing for other apps. Evolved variants like MultiChain.

Ethereum

Next-generation coin platform was designed with a broader array of use types in mind; has spawned variants like HydraChain

Hyperledger/ Enterprise DLT

Platforms designed for use beyond the coin environment. Hyperledger platform family is the best-known but other offerings include OpenChain, Quorum, Corda, and IOV42.

Bespoke DLT Platforms

Entities building DLT applications for specific use cases have sometimes found the need to go beyond what is publicly available and build bespoke DLT architectures, Symbiont Assembly being a notable case.

Hashgraph and Beyond

Cutting-edge organizations are already beginning to design DLT roadmaps including next-gen such as HashGraph.

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The current blockchain market is driven by cost and cycle time reduction, transparency and trust, and transaction audit security

CURRENT MARKET:

1. Primary drivers for blockchain deployment are **operational transparency, acceleration of business cycle times,** and **information security**
2. The current focus of blockchain initiatives is on contractual relationships between companies where multiple parties are involved in completing a transaction (banks, regulators and insurers, for instance, in addition to the buying and selling parties)
3. Deployments are being led by organizations in the banking and manufacturing verticals, where cross-border remittances have been a frequent focus task for the implementation of blockchain
4. Supply chain management – and in particular provenance of goods throughout the supply chain – is also a significant focus task for many vendors. This can take many forms, from tracking coffee throughout its growing, processing and distribution cycle to ensuring that drug products are kept at the correct temperature in cold-chain pharma distribution, but the end applications are similar.

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By 2024, blockchain will be not only replacing traditional intercompany commerce, but beginning to edge into legacy IT applications as well

FUTURE MARKET:

1. The global blockchain market is forecasted to grow to **$8.6bn** in 2024. By this point, supernormal growth that began from small numbers in 2017-2018 will cool to more mid-double digit growth
2. By this point, blockchain has been proven out over ~50 enterprise use cases; its implementation is commonplace, and startups involved in business ecosystems will make 'blockchain readiness' a normal component of the vendor, supplier, financier and regulator 'handshakes'
3. Primary drivers for blockchain deployment will have transitioned away from intra-organizational or vertical applications within the supply chain toward engaging with 'networks of networks' – so food provenance blockchain ecosystems will dock with waterborne cargo blockchain ecosystems and retail ERP blockchain ecosystems in a larger, more holistic environment
4. Deployments by industry will broaden to include more significant presence in energy, telecom, logistics, and public sector, although BFSI will continue to dominate the landscape
5. The United States, EU and Asia/Pacific will continue to be the principal demand geographies for blockchain solutions.

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Blockchain architecture and deployment process will change from a point solution to an ecosystem by 2022

Now (2017-2019)

- **Blockchain as a point solution** intended to address the specific process challenges and auditability concerns of a particular business process, such as SCM, cross-border remittance, or energy trading
- **Platform selection ambiguity** in the architecture process, with multiple competing platforms available for selection with overlapping value propositions and long-term runway profiles.
- **Intraconnection is the priority** in existing blockchain initiatives, with considerable parallel work taking place in the areas of digital transformation, Big Data utilization, and intelligent automation. The focus is on readying an individual organization for migration onto the blockchain.

Next (2020-2022)

- **Blockchain as an ecosystem,** in which multiple business processes within an organization are connected on a blockchain platform, and the organization itself is connected to vendors, partners and suppliers on blockchain as well.
- **The right platform for the job** becomes the norm as the platform picture clarifies through competitive attrition and corporate development activity
- **Interconnection becomes the priority** as more organizations mature in their ability to present a unified, digital presence to supply chain participants, business partners, and customers The focus is on ensuring that different blockchain platform architectures can interchange data seamlessly.

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The next jump (from point solution blockchain to ecosystem blockchain) will demand interoperability and business partnership

1. We expect the core blockchain architectures on offer to evolve by 2022, but Ethereum and Fabric will still be our projected market share leaders
2. Whilst there will be significant demand for interoperability solutions between and among the top platforms, integrating a broad landscape of enterprise blockchain platforms into the kind of 'network of networks' envisioned by organizations like IBM will require significant integration work
3. The most challenging interoperability gulfs lie between the permissionless platforms (and their operating derivatives) and the permissioned enterprise platforms – Ethereum/Bitcoin-powered blockchains docking with Fabric et al.
4. Digital transformation service providers should be considering blockchain infrastructure platform selection as a foundational component of planning the digital future for their clients
5. Enterprise organizations, in parallel, should be discussing blockchain platform selection within their operating units and among their supply chain partners.

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3. Blockchain Implementation Criteria

Digital Operations Transformation Program, August 2018

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Seven factors can encapsulate whether a process is a good candidate for blockchain implementation.

- Is it *transactional*? Blockchain excels at documenting the transfer of value or information, and fiscal gains tend to accumulate with greater volumes of handshakes. The higher the transaction count a given process task, the more relevant blockchain becomes.

- Is it *frictional*? Process friction can take many forms – from time delays in passing information from one party to the next, to per-message costs (such as SWIFT messaging expenses in financial services), to partner fatigue in disputing invoices or claims. The more time and expense accumulates within the process, the better a fit for blockchain technology a process is.

- Is it *low-volume* or *non-real time*? Speed is not currently a significant blockchain platform strength, so processes that need to happen in real-time at scale may be a poor fit for the technology in its current form.

- Is it *simple*? While blockchain smart contracts can follow relatively simple 'if-then' logic, complicated transactions with multiple forks and 'fuzzy' interpretation are beyond the current reach of most smart contract platforms.

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Seven factors can encapsulate whether a process is a good candidate for blockchain implementation.

- Is it *oppositional*? Transparency and trust are cornerstone components of an effective blockchain implementation, particularly so when there is an element of opposed goals in a process environment (payor versus payee being the most common such example).

- Is it *fragmented*? The real value is unlocked when a blockchain connects multiple parties operating in different domains – for example, in an ocean cargo management setting, exporters, banks, insurers, regulators, shipping providers, importers, and distributors. In such an environment, where responsibility and input are being passed among many organizations, the relevance of a blockchain solution increases considerably.

- Is it *risk-accumulative*? Corporate risk management is an accumulative function to begin with, as the audit task normally demands a large volume of signed and documented data – so the ability to produce the supporting documentation without significant organizational effort or data reconstruction is a vital task. Blockchain is a good fit for processes that accumulate large volumes of risk-relevant exchanges over time.

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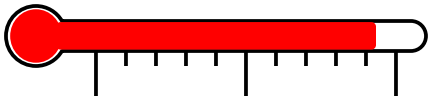
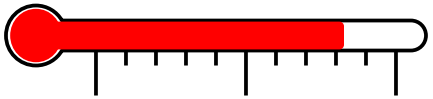
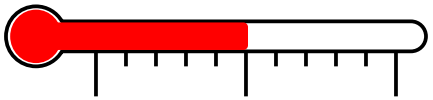
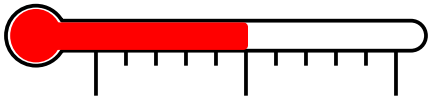
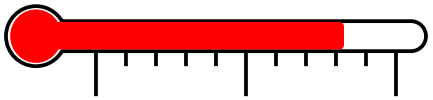
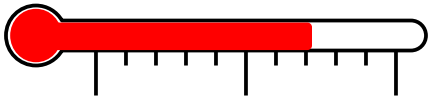
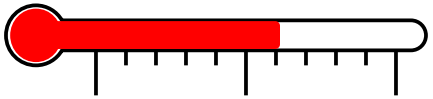
How does procurement score on this factor matrix?

TRANSACTIONAL		**High transaction volume**
FRICTIONAL		**Considerable process friction**
LOW-VOLUME/NON-REAL TIME		**Often real-time but not high volume**
SIMPLE		**Depends on the supply chain**
OPPOSITIONAL		**Oppositional in pay/ship**
FRAGMENTED		**Can be fragmented**
RISK-ACCUMULATIVE		**Audit important / relatively low risk**

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The benefits of blockchain in procurement

- **Smart contracts** can be designed to be self-executing for most procurement transactions, eliminating the wait time while humans sort through transactions and process paperwork in a traditional procurement system. The net effect of smart contracts is to squeeze out process wait time and ensure that contracts are consistently applied against preconfigured terms and conditions.

- **Visibility, transparency and trust** all improve in blockchain-based procurement environments, since all participants can see transactions occur within the system and can pinpoint products and payments in the supply chain.

- **Real-time settlement** according to contract terms assures all participants that the procurement process is working to peak efficiency. Contract terms and conditions are performed to the letter without unnecessary delays. Discounts, penalties and payments are all executed against without ambiguity or process friction.

- **Audit immutability** ensures that there is no potential for fraud within the transaction documentation base, since transactions are stamped by multiple authority nodes within a decentralized system.

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Some use cases of blockchain deployed in procurement

- **Sustainability and ethical sourcing** is a significant benefit of blockchain in procurement, as products can be tracked from source of origin to end user purchase with an unbroken document chain certifying the nature of production and distribution. De Beers is using a blockchain system to ensure transparency in the process of sourcing conflict-free diamonds.

- **Product recall management** is a strength of blockchain systems, since individual products can be tracked directly to their source of origin. A number of vendors are offering 'farm to fork' produce provenance for products like fruits, vegetables and coffee to ensure that a product recall can be performed only on relevant items.

- **Logistics management** can be improved considerably on a blockchain where smart contracts are in place to manage transitions of product from one conveyance (truck/rail) to another (ocean freight), where product moves from one nation to another, and where temperature or humidity conditions must be controlled for and documented at all points.

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Atos Designs, Deploys Food Traceability Solution for Bureau Veritas

Objectives

For Bureau Veritas, a provider of laboratory testing, inspection and certification services, Atos/ Worldline was tasked with the design and development of a blockchain-based food traceability solution. Bureau Veritas wished to implement a food industry branding program based around the Origin brand. Food carrying the Origin symbol can be traced by consumers from farm to table using a QR code on the packaging.

Objectives were:

1) **Provide transparency to consumers**
2) **Expedite food recalls and reduce related cost**
3) **Ease organic/fair-trade certification process**

Results

Vendor provided:

- Multichain-based farm-to-table food traceability solution
- Professional design and deployment services

Benefits realized:

- Origin branding improves food brand equity
- Recall testing shows significant cost reduction
- Planned implementation of multi-factor food certification for sustainability, organic/free-range, fair trade, and more

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Wipro Constructs Blockchain for Waterborne Commodity Trading

Objectives

Wipro was engaged to construct a blockchain-powered information clearinghouse for waterborne commodity trading. In the current state, banks and buyers lack data privacy between parties; buyers and shippers lack automated transaction settlement and data reconciliation; shippers and inspectors lack real-time tracking and authentication tools; and inspectors and banks lack standardized, smart contracts and fraud control.

Objectives were:

1) **Real-time visibility on shipping status**
2) **Transparency in regulatory auditing**
3) **Proof of performance for banking partners**

Results

Vendor provided:

- Hyperledger Fabric blockchain permissioned for banks, shipping agents, regulatory authorities, and importers/exporters
- Professional services

Benefits realized:

- Single source of truth for all parties involved
- Real-time updates to shipment tracking
- Cost reduction from elimination of significant proportion of paper documentation
- Regulatory approval transparency

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4. Vendor Offerings and Targeting

Digital Operations Transformation Program, August 2018

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Vendors are of three types in blockchain platform architecture: agnostic, monolithic, and bespoke

AGNOSTIC VENDORS

Utilize a variety of platforms for blockchain, and allow the client needs to dictate which platform is chosen
Often have 4-6 preferred architectures with clearly defined use case guidelines for deploying each
Participate in industry consortia and provide input regarding platform capabilities, but cannot steer dev
Examples: Wipro, Infosys, TCS, Tech Mahindra

MONOLITHIC VENDORS

Have focused their efforts on a single blockchain platform architecture and deploy it exclusively
Build their market vision around a strategy that fits the capability set of that architecture
Have a significant degree of influence in steering the development of the platform to suit their needs
Examples: IBM, Digital Asset (both on Hyperledger Fabric)

BESPOKE VENDORS

Have developed own proprietary platform for blockchain/DLT; are not dependent on public platforms
Usually serve not just a single market, but a single use case within that market, as a specialty provider
Have complete autonomy over the platform and can change anything about it to better suit client needs
Examples: Symbiont

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Blockchain will increasingly Transition from PoCs to Production Deployments during 2018

Service	YE2017 State	YE2018 State
DLT Consulting	Low volume of overall activity; primarily proofs of concept and pilots, with a limited slate of use cases	Uptick in PoC volume and the first major commercial deployments in BFSI, logistics and healthcare; use cases expand and evolve
DLT Platform Selection	'Wait and see' / safe bets on major platforms like Hyperledger and Ethereum	Broader slate of platforms considered and more design work being done on Corda, Quorum, Symbiont Assembly
DLT Connectivity	Little to no effort in interoperability as focus remains on intra-organizational build and test	Beginnings of broader focus on enabling larger blockchain networks to communicate across enterprise boundaries

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Ethereum/Quorum Dominate Use Case Infrastructure, But Hyperledger and Corda are Gaining Ground

- **Ethereum is still the most common DLT platform being used in PoCs and pilots**. In fact, combining Ethereum with its Quorum spinoff technology, this core accounts for more than half of use case architectures currently in place
- **The Hyperledger project family is gaining ground and Sawtooth could break into double digits in 2018.** But while Ethereum owns the market share, Hyperledger owns the momentum. Fabric is an emerging standard for modular development, and Sawtooth's arrival as a production-ready environment will mean significant gains
- **R3 Corda is carving out a defensible presence in BFSI.** Quorum will be the platform's major rival for business in banking and transactions.

Platform	Market Share 2018 (%)	Trend
Ethereum	44	↘
Hyperledger (Fabric)	21	↗
R3 Corda	12	↑
Quorum	10	↗
Hyperledger (Other)	5	↑
Hyperledger (Sawtooth)	4	↑
Ripple	2	↗
IOV42	1	↗
IOTA	1	↘
Symbiont Assembly	1	↗

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Ethereum and Hyperledger Fabric are the market share leaders for platforms in a long-tail market with many competitors.

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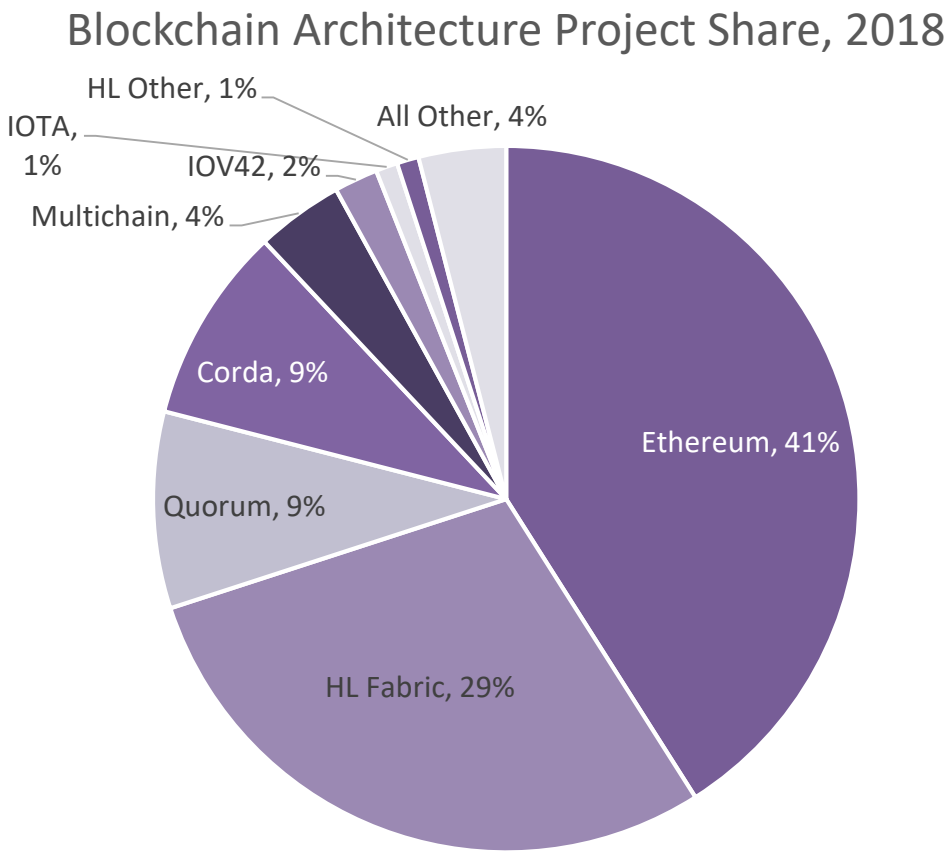

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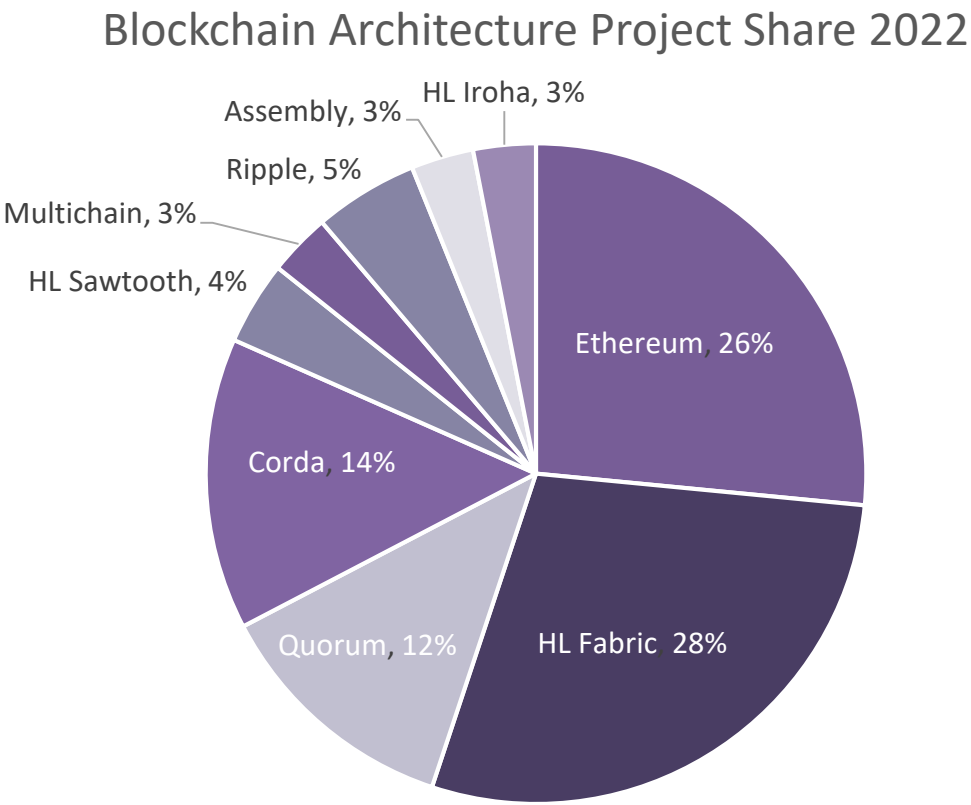
By 2022, we forecast a more clearly-defined set of use-specific platforms with the combined Hyperledger family of project architectures leading the way; Hashgraph becomes commercially viable.



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Market Sentiment increasingly favors Fabric, Corda, & Quorum Blockchain Platforms

Platform	Market Sentiment
Ethereum	Continued relevance for combined public/private applications - with concerns
Hyperledger (Fabric)	Modular architecture, IBM backing make Fabric a safe and flexible bet
R3 Corda	Emerging reliable standard for financial services DLT applications
Quorum	Adds enterprise scalability and security to proven Ethereum architecture
Hyperledger (Other)	Iroha intriguing for mobile applications; Burrow for multichain environments
Hyperledger (Sawtooth)	Proof of elapsed time (PoET) functionality ideal for IoT blockchain applications
Ripple	Gaining momentum as a secure payment and interbank transfer platform
IOV42	Scalability, interoperability, and native Zero Knowledge Proof drawing interest
IOTA	Concerns emerging that added complexity of implementation exceeds value
Symbiont Assembly	High-throughput, secure specialized environment for BFSI gaining momentum

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Presenter

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