Enterprise Blockchain Adoption:

What Can We Expect for 2018 and Beyond?

HfS Research
Saurabh Gupta
Chief Strategy Officer
Enterprise Blockchain Adoption: What Can We Expect for 2018 and Beyond?

SIG Global Summit 2018 | Washington D.C.

March 28, 2018

Saurabh Gupta
Chief Strategy Officer
Saurabh.gupta@hfsresearch.com
Saurabh Gupta, Chief Strategy Officer, HfS Research

Overview:
- Oversees HfS’ global research function managing the global team of analysts across US, Europe, and Asia-Pac
- Works closely with the CEO to set the strategic research focus and agenda for HfS Research
- Leads HfS’ research in business services (e.g., finance, procurement, HR & payroll, and industry-specific) and horizon 3 change agents (e.g., blockchain)
- 15+ years’ in the global IT and business process outsourcing and shared services industry spanning analyst, consulting, service provider, and client roles
- Authored over 125 research reports, is a frequent speaker, and advises digital operations executives

Career Experience:
- Led strategy for Genpact’s CFO and transformation services
- Shape the Business Process Services (BPS) strategy for AbbVie
- Managed Everest Group’s global BPS practice
- Worked as a techno-functional consultant at Infosys

Education:
- MBA (Gold medalist) from IIT Bombay
- Mechanical Engineer from Delhi College of Engineering
The HfS Mission & Vision: Deconstructing Business Operations

- HfS’ mission is to provide visionary insight into the major innovations impacting business operations: automation, artificial intelligence, blockchain, Internet of Things, digital business models and smart analytics. We focus on the future of operations across key industries.

- We influence the strategies of enterprise customers to develop operational backbones to stay competitive and partner with capable services providers, technology suppliers, and third party advisors.
Which statement best describes your current level of expertise with Blockchain?

A. I am unfamiliar with Blockchains

B. I have a basic awareness of Blockchains

C. I have some experience with Blockchains

D. I am a Blockchain expert
I volunteer!
Welcome to the fantasyland of Blockchain!

Price to Sales (PSR) ratios as we enter 2018
(PSR = Market capitalization / revenues)

S&P 500 (record all-time high historically!)  
Global Service Providers (IBM, Accenture, Capgemini)  
India-heritage Service providers (TCS, Cognizant, Wipro, Infosys)  
RPA providers  
Enterprise blockchain

Price to Sales (PSR) ratios:
- S&P 500: 2.27
- Global Service Providers: 1.99
- India-heritage Service Providers: 3.53
- RPA providers: 25-50
- Enterprise blockchain: >500

Reality
Fantasy?

Sources of information:
- S&P 500 PSR: multipl.com
- Global and India Heritage Service Providers: Y Charts and financial reports
- RPA providers: HfS estimates
- Enterprise blockchain: Coinmarketcap.com and HfS estimates
The nascent Enterprise Blockchain Services will grow by 100%+ in 2018 to cross $1 Billion

Crypto-currency market cap\(^1\)

US$397 Billion

Enterprise Blockchain Services Market Size\(^2\), 2017 (*Estimated*)

US$500-600 Million

Enterprise Blockchain Services Market Growth\(^2\), 2017-2018 (*Expected*)

100%+

Enterprise Blockchain Services Market Size, 2018 (*Expected*)

US$1 Billion+

---

1. Coinmarketcap.com as of Mar 8, 2018 1:29 PM UTC
2. HfS estimates based on 2017 headcount assessment of 20+ leading blockchain service providers
Have you heard of the Byzantine Generals Problem?

ARMY 1

CITY

ARMY 2

Let's attack at 7PM

Sounds good. Let's do this

The Byzantine Generals’ Problem
Distributed ledgers, blockchain, and smart contracts are interrelated, but different

A distributed ledger is replicated, shared, and synchronized digital data geographically spread across multiple sites, countries, or institutions.

*Distributed Ledgers do not have a central administrator. They are based on peer-to-peer networks with a consensus algorithms*

Blockchain is a distributed ledger used to maintain a continuously growing list of records, called blocks. Each block contains a timestamp and a link to a previous block. By definition, blockchains are inherently resistant to modification of the data. Once recorded, the data in any given block cannot be altered retroactively without the alteration of all subsequent blocks and a collusion of the network majority.

*All blockchains are distributed ledgers, but not vice versa*

Smart contracts are computer protocols that facilitate, verify, or enforce the negotiation or performance of a contract, or that obviate the need for a contractual clause.

*Not all blockchain frameworks support smart contracts*
The blockchain ecosystem has multiple sets of players

Blockchain provider ecosystem

- **Blockchain Solution Providers**
- **Blockchain Tools and Software Providers**
- **Blockchain Platforms and Frameworks**

**Service Providers**
- Accenture
- IBM
- LT1
- NTT Data
- PwC
- EY

**Consulting Firms**
- Deloitte
- KPMG
- PwC
- EY

**Consortiums**
- B3i
- R3
- L3T
- Hyperledger

**Startups**
- Swisscom
- ANOUR
- BTL
- Skuchain
- Mirror
- Coinbase
- Bitfury

**Academia, regulators, and not-for profits**
- Singularity University
- Onyx
- MIT
- Blockstream
- Ethereum
- Hyperledger
- MultiChain
- Monax
- CorDac
- IC3

Illustrative, not comprehensive
A blockchain is a continuously growing list of records which are linked and secured using cryptography.

The Blockchain “Six-Pack”

- **Distributed shared data** over peer-to-peer (P2P) network reduces single points of failure
- **Consensus-driven trust** cuts out the middle-man
- **Immutable transactions** ensure trust
- **Hashing-based data** ensures integrity and security
- **Automated smart contracts** promote touchless interactions across process chains
- **Permissioned and permissionless flavors** give enterprise users flexibility
To separate the reality from the hype, we conducted some real research. We assessed over 20 leading blockchain providers, 200+ blockchain engagements, and interviewed multiple clients.

20+ leading blockchain solution providers assessed:

- Accenture
- Capgemini
- Cognizant
- Deloitte
- DXC.technology
- EY
- HCL
- IBM
- Infosys
- KPMG
- LTI
- Luxoft
- NTT Data
- Persistent
- PwC
- Tata Consultancy Services
- ThoughtWorks
- Virtusa
- Wipro
- Mahindra

Sources include clients, providers, and advisors and influencers of blockchain services:

- **Data on 200+ blockchain engagements** was collected via RFIs, interviews, briefings, and publicly available information sources Q3 2017.

- **Tales from the Trenches:** Interviews with buyers who have evaluated service providers and experienced their services.

- **Sell-Side Executive Briefings:** Structured discussions with service providers regarding their vision, strategy, capability, and examples of innovation and execution.

- **Publicly Available Information:** Thought leadership, investor analyst materials, website information, etc.
The market is witnessing an explosion in blockchain PoCs and pilots but in-production solution are few and far between

1. Strategic advisory
   - Identifying blockchain-based use cases, creating business cases, or selecting a platform
   - 30%-40%

2. Prototype development
   - About 35%-40% of engagements are at the PoC stage while 15%-20% of engagements have progressed to pilots
   - 50%-60%

3. Production build
   - Only a handful of successful pilots progress to production. Almost all engagements at this stage are parallel or shadow production environments
   - 5%-10%

4. System Integration
   - There are negligible blockchain solutions that have been completely integrated with clients’ existing process and systems landscape
   - No credible evidence

N = ~200 blockchain engagements across 20 service providers
Enterprise blockchain adoption is going through the “90-9-1” set of challenges

- Overall nascency of blockchain solutions
- Lack of understanding in distributed ledger technologies and use cases
- Lack of maturity of blockchain platforms
- Lack of success stories in the market
- Internal stakeholder buy-in around business model changes and threat of disruption
  - Consortia-related challenges (set-up, management, and governance)
- Difficulty in quantifying the benefits (ROI)
- Lack of clarity on technical architecture
- Permissioned versus permissionless decision
- Security and privacy concerns
  - Uncertainty and lack of formal regulations
  - Lack of talent availability
  - Lack of market standards, inter-operability issues
  - Integration issues with legacy
  - Cultural change management (internal and external)
  - Latency or throughput issues in production
  - Service support for blockchain largely undefined
Financial services lead blockchain adoption; however, credible use cases across almost all industries are emerging.

Enterprise blockchain adoption heatmap by industry

<table>
<thead>
<tr>
<th>Financial Services</th>
<th>Insurance</th>
<th>Manufacturing / CPG / Retail</th>
<th>Professional Services*</th>
<th>Public sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy &amp; utilities</td>
<td>Healthcare</td>
<td>Life Sciences</td>
<td>Telecom &amp; Media</td>
<td>Travel &amp; hospitality</td>
</tr>
</tbody>
</table>

*Professional services industry coverage includes auditing, accounting, legal, real-estate, etc.

Based on assessment of 200+ enterprise blockchain engagements across 20+ solution providers.
Beyond FS use-cases (payments, trade finance, wallets), identity and provenance management are some of the hottest blockchain use-cases.

### Heatmap of most promising enterprise blockchain use-cases

<table>
<thead>
<tr>
<th>Financial Services Use-cases</th>
<th>Non-Financial Services Use-cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payments / settlements</td>
<td>Identity / track and trace</td>
</tr>
<tr>
<td>Trade finance</td>
<td>Provenance processing and payment</td>
</tr>
<tr>
<td>Wallets / KYC</td>
<td>Claims processing and payment</td>
</tr>
<tr>
<td>Trading</td>
<td>Title records / Ownership recording</td>
</tr>
<tr>
<td>Asset mgmt.</td>
<td>Anti counterfeiting</td>
</tr>
<tr>
<td>Compliance</td>
<td>Security</td>
</tr>
<tr>
<td>Lending</td>
<td>Loyalty / Voting</td>
</tr>
<tr>
<td>Auditing</td>
<td>Health records</td>
</tr>
<tr>
<td>Investing / Transfer pricing</td>
<td>Master patient index</td>
</tr>
<tr>
<td>Micro-finance</td>
<td>Clinical trials</td>
</tr>
</tbody>
</table>

**Based on assessment of 200+ enterprise blockchain engagements across 20+ solution providers**
Ethereum accounts for nearly half of the enterprise use cases. Adoption of Hyperledger Fabric is expected to pick-up.

% service providers with experience

- Ethereum: 93%
- Hyperledger Fabric: 93%
- R3 Corda: 60%
- Ripple: 33%
- Quorum: 27%
- Multichain: 27%
- BigChainDB: 19%
- Chain: 7%
- Others: 21%

% blockchain engagements

- Ethereum: 52%
- Hyperledger Fabric: 12%
- R3 Corda: 13%
- Ripple: 4%
- Quorum: 10%
- Multichain: 2%
- BigChainDB: 6%
- Chain: 10%
- Others: 12%

- Most mature with proven smart contract framework; prevalent across industry use cases
- Designed for enterprises; production-ready version recently released – adoption expected to pick-up
- Prevalent in banking industry
- Prevalent for payments use cases
- Enhanced speed and security features
- For asset-based use cases
- Includes Bitcoin, Monax, Factom, IPFS, and Stellar

N = 15 service providers
N = 52 engagements
<table>
<thead>
<tr>
<th>Feature</th>
<th>Ethereum</th>
<th>Hyperledger Fabric</th>
<th>R3 Corda</th>
<th>Ripple</th>
<th>Quorum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry focus</td>
<td>Cross industry</td>
<td>Cross industry</td>
<td>Financial services</td>
<td>Financial services</td>
<td>Cross industry</td>
</tr>
<tr>
<td>Founding year</td>
<td>2015</td>
<td>2016</td>
<td>2015</td>
<td>2012 (Opencoin)</td>
<td>2015</td>
</tr>
<tr>
<td>Governance</td>
<td>Ethereum developers</td>
<td>Linux Foundation</td>
<td>R3 Consortium</td>
<td>Ripple Labs</td>
<td>Ethereum developers and J.P. Morgan Chase</td>
</tr>
<tr>
<td>Ledger type</td>
<td>Permissionless</td>
<td>Permissioned</td>
<td>Permissioned</td>
<td>Permissioned</td>
<td>Permissioned</td>
</tr>
<tr>
<td>Cryptocurrency</td>
<td>Ether (ETH)</td>
<td>None</td>
<td>None</td>
<td>Ripple (XRP)</td>
<td>None</td>
</tr>
<tr>
<td>% providers with experience&lt;sup&gt;1&lt;/sup&gt;</td>
<td>93%</td>
<td>93%</td>
<td>60%</td>
<td>33%</td>
<td>27%</td>
</tr>
<tr>
<td>% share of engagements&lt;sup&gt;2&lt;/sup&gt;</td>
<td>52%</td>
<td>12%</td>
<td>13%</td>
<td>4%</td>
<td>10%</td>
</tr>
<tr>
<td>Coin market cap&lt;sup&gt;3&lt;/sup&gt;</td>
<td>$91.5 B (18%)</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>$43.9 B (9%)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Consensus algorithm</td>
<td>Proof of work (PoW)</td>
<td>Pluggable framework</td>
<td>Pluggable framework</td>
<td>Probabilistic voting</td>
<td>Majority voting</td>
</tr>
<tr>
<td>Smart contract functionality</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

1. Based on responses from 15 leading blockchain service providers
2. Based on a random sample of set of 50 enterprise blockchain engagements across multiple industries
3. Coinmarketcap.com as of Feb 20, 2018, 6:20 PM UTC
Blockchain initiatives are starting to get woven with other emerging technologies especially IoT and AI

- Identity and security are major issues in the IoT space today and centralized solutions for both are not proving to be adequate
- IoT can make use of blockchain to alleviate scalability, privacy, and reliability concerns
- Since the blockchain is tamper-proof, customers will see a reduced risk of their personal data being leaked via a security breach
- Blockchain can be used in tracking billions of connected devices, enable the processing of transactions and coordination between devices

- AI and blockchain technologies will intersect as the sources of this data become more diverse and more sensitive, governance, quality, and integrity become even more important
- There is a latent need for sophisticated AI-driven analytics as blockchain adoption increases and more complex and critical data is stored in distributed ledgers

- As blockchain solutions become production-ready, there is a strong market for system integration across blockchains and existing legacy and ERP technology
- Service providers are already starting to build a variety of integration tools and methodologies to support this
Despite the challenges, 2018 promises to be a break-through year for enterprise blockchain adoption

- The Enterprise Ethereum Alliance (EEA) reaches 200 members
- Hyperledger recruited 183 diverse organizations to back Linux Foundation’s open blockchain consortium

Progressive ecosystem emerging

Solving latency and throughput issues

- Proof of Stake (PoS) and hybrid algorithms gaining prominence
- Next General Proof of Work (PoW) promise to be much faster

Emergence of production ready platforms

- Production ready Hyperledger Fabric 1.0 released
- IBM launches enterprise ready blockchain platform
- Oracle announces Blockchain Cloud Service

Standards are coming

Notable market developments in 2017 (not exhaustive)

- ISO/TC 307 continues to work on developing standards for blockchain and DLT
- The Blockchain Interoperability Alliance emerged to collaborate on researching interchain transactions and communications

Market regulators getting serious

- Australia started to treat Bitcoin as money
- EU expanded its efforts to support more DLT projects
- LedgerX became the first federally regulated digital currency options exchange
- At least eight US states passed DLT related legislation

Hyperledger recruited 183 diverse organizations to back Linux Foundation’s open blockchain consortium
Research references

• HfS Blueprint: Enterprise Blockchain Services

• Webinar: Blockchain in BFS - Client Experience and War Stories

• The Blockchain Reality Check: Where Are We and What Can We Expect in 2018?

• Who’s Winning the Battle of Enterprise Blockchain Platforms?

• Webinar: The Most Promising Use-Cases of Enterprise Blockchain Adoption

• The Spectacular Volatility of Cryptocurrencies and the Role of Blockchain
Evaluation How-to:

Why?
- Your feedback drives SIG Event content
- By signing and submitting your evaluation, you are automatically entered into a prize drawing

How?
From the App
1. Select Sessions
2. Select Day
3. Select Session S20
4. Click on Clipboard Icon

COMPLETE & SUBMIT EVAL
Session # 20

Enterprise Blockchain Adoption: What Can We Expect for 2018 and Beyond?

HfS Research
Saurabh Gupta
saurabh.gupta@hfsresearch.com

Download the App: sig.org/app
Tweet: #SIGspring18
Are You a Winner?

Thoughtonomy
Engage with SIG on Twitter during the Summit!
Follow @SIGinsights
Mention #SIGspring18 in your tweets!

All Tweeters will be entered to win a $50 Gift Card.
The winner will be announced Thursday, March 29, 2018
Have an idea or want to present?

If yes, please take a moment and submit your name and idea here:

www.sig.org/present

Thank you!