



## Vendor Profile

# IBM Wants to Make 2017 the Year of Blockchain Enterprise Deployment

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### IDC OPINION

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2017 is the year that will make or break the case for viable enterprise adoption of blockchain, one of the newest and potentially groundbreaking transformative technologies. This IDC Vendor Profile explores the blockchain story of IBM, a player that very much stands out in the quickly forming blockchain environment.

IBM currently finds itself in a good position in an emerging enterprise blockchain market due to a well-formulated and well-communicated blockchain strategy. This strategy is an initiative of IBM Bluemix Garage, which includes multidisciplinary blockchain teams, and a strategic decision to move into the blockchain space very early on (in 2014) and assert itself as one of the leaders in the Hyperledger Project. Key insights into IBM's blockchain strategy include:

- IBM's goal for blockchain is to develop enterprise-ready solutions that overcome existing limitations of the technology in terms of privacy, confidentiality, auditability, performance, and scalability. This involves primarily increasing speed and security of blockchain operations to meet enterprise requirements, and developing platforms for permissioned networks to enable proper enterprise governance models and networks in which members with specified information access are not only permissioned but are also private.
- IBM has launched the first production of its large-enterprise blockchain, which solves transaction disputes in the IBM Global Financing (IGF) program. Thanks to a comprehensive view of operational data from purchase orders to remittances consolidated and distributed to all parties in the transactional ledger, IBM estimates it will decrease the amount in dispute from \$100 million a year to \$30 million and reduce average dispute resolution time from 44 to 10 days.
- IBM has announced multiple enterprise deployments within as well as outside the financial services sectors for 2017. This includes CLSNet, a bilateral payment netting solution for CLS Group's foreign exchange market products and currencies, and a smart contracts solution for the Bank of Tokyo-Mitsubishi UFJ. Notable proofs of concept (POCs) were announced recently, including a know-your-customer (KYC) identity management solution for Crédit Mutuel Arkéa; an end-to-end food traceability system for Walmart; transaction management among a network of shippers, freight forwarders, ocean carriers, ports, and customs authorities working with Maersk; and consumer digital identity with SecureKey. IDC suggests that IBM capitalize on its successful blockchain take-off by establishing conversations with regulators to see whether it could be possible to mandate the use of blockchain in areas that would benefit from it.

## IN THIS VENDOR PROFILE

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This IDC Vendor Profile discusses IBM's blockchain strategy, existing portfolio around this technology, and specific use cases. The first section briefly defines blockchain and outlines its benefits and current limitations. The second section describes IBM's engagement with the technology since 2014 and its current offering, and the third section outlines IBM's blockchain strategy. This IDC Vendor Profile contains several enterprise use cases with a focus on those scheduled for deployment in 2017, and concludes with several points of guidance.

## SITUATION OVERVIEW

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Blockchain is a ledger with an algorithm that enables a distributed network of nodes to continuously reach consensus on the content of blocks of data. When this algorithm is deployed, the blocks are ordered to form a constantly growing linear chain, in which each block is linked to a previous block and can only be appended to the end of the chain. This gives rise to an immutable append-only log of operations that take place during the deployment.

In the past two to three years, Blockchain has sparked interest outside a community of digital currency users in which it had originated, and it is now a hot topic among innovative technologies due to a unique combination of its properties and the huge opportunities it presents. As a consensus-reaching mechanism, blockchain is very secure because it is based on a distributed network — there is no privileged node that handles verification and therefore must be heavily protected, and overwhelming a whole network can relatively easily be rendered technically, if not statistically, impossible.

Blockchain also gives rise to a ledger with a very useful property of immutability, because all nodes have an identical copy of the ledger and are constantly checking these copies against each other as they work on new blocks. Rewriting the content of one block would therefore require changing it across all the copies, which would have to happen while the nodes work on other blocks and produce new copies of the ledger.

Blockchain therefore produces "one version of truth" that cannot be easily tampered with and which is constantly being distributed across the network to all parties. The ledger is suitable for generating a reliable body of evidence about a set of data, a process, or an environment. This makes many types of interactions between two parties safe to occur without third-party oversight so that overhead costs of intermediaries can be removed. Moreover, distributive networks and even individual nodes can be easily created, destroyed, and scaled as required, and in principle, can be deployed in several environments across technologies.

Until recently, blockchain has been associated with digital currencies, but there is a wide range of potential applications outside managing and logging the flow of money. Notable non-currency applications include bank-to-bank and business-to-business transactions involving stock market shares and other assets, securely sharing patients' health records between medical facilities, facilitating an immutable national ledger of drug trials, or enabling distributed source code management in which instead of relying on one centralized code repository (e.g., GitHub), coders maintain a distributed ledger of commits and pull requests.

Blockchain is currently at the very beginning of its adoption curve. Significant technological constraints that need to be overcome include limited throughput of existing architectures, generally slow transaction confirmations, and lack of proven solutions that enable provisioned networks and settlement finality. A lack of skills is another major inhibitor.

## Company Overview

The inception of IBM's current blockchain offering was in 2014, when it started overhauling existing solutions. At the time, they were all open source and were tied to cryptocurrencies, including the two most popular platforms — Bitcoin and Ethereum. In 2015, IBM put forward its own open source initiative called Open Bitcoin. In line with the general trend of changing roles that open source communities play in IT recently, IBM claims that the open source paradigm is critical for Bitcoin development because:

- It is potentially a highly disruptive technology.
- It is designed to be used by multiple parties, thus a widely recognized set of vendor-agnostic standards is critical.
- Due to its disruptive potential, it should be controlled and monetized by no single party, much like the internet.

In December 2015, the Linux Foundation launched the Hyperledger Project with IBM and 29 other partners with the stated goal of developing a framework, specifically an enterprise blockchain deployment. Since then, the project has gained significant traction with over 100 paying members onboarding in the first 10 months. The members include established IT vendors and large financial services players, which started investigating blockchain opportunities around the time (e.g., JPMorgan Chase, DTCC, and the CME Group). It is the most successful Linux Foundation project to date in terms of membership growth.

IBM currently offers blockchain as a service (BaaS) built on top of the Hyperledger deliverables in its IBM Bluemix cloud environment. It is a part of its long-term investment in the so-called Strategic Imperatives technologies, which include IBM's Watson cognitive computing or software-defined and all-flash storage. According to IBM's 4Q16 earnings call, cloud as a service — under which blockchain falls — reached \$8.6 billion in FY16 with a year-over-year (YoY) growth rate of 63%.

Given the low level of blockchain maturity in general, as well as specific IBM blockchain projects (more on these in the succeeding sections) being in their initial stages, it is too early to assess revenue from specific solutions. However, given the traction that IBM's cloud-as-a-service offering seems to be getting with over 400 client engagements, blockchain has the potential to become one of the fastest-growing sources of revenue starting in 2017, when many of the first IBM enterprise applications are scheduled to roll out.

IBM itself reports widespread investment plans across industries. For example, its survey of healthcare enterprises shows that blockchain adoption in this vertical can surpass that in financial services, which is the vertical that blockchain has been most closely associated with.

IBM's BaaS offering is highly customized. There are no pricing lists available, but an isolated single-tenant environment of high-security business network of four nodes and a certification authority running on the Fabric v1.0 platform in the Bluemix environment is in beta, with pricing to be announced. As such, this is primarily meant to be used for exploration and testing.

It is also notable that IBM itself currently runs what it claims to be one of the largest blockchain enterprise deployments — a custom solution based on the Fabric v0.6 released in IGF. IGF provides working capital to 4,000+ customers, distributors, and partners to purchase IBM solutions. It involves \$48 billion worth of financing a year. IBM deployed its blockchain solution to manage disputes in the program, and is gradually increasing the number of members that are participating in their dispute resolution blockchain network.

Prior to its deployment, there were about 25,000 disputes a year with an average amount of \$31,000 in dispute and approximately \$100 million in dispute at any given time, which amounted to about 1% of all transactions. Thanks to a comprehensive view of operational data from purchase orders to remittances consolidated and distributed to all parties in the transactional ledger, IBM reports it is able to decrease the amount in dispute to \$30 million and reduce an average dispute resolution time from 44 to 10 days.

## Company Strategy

IBM's blockchain story is relatively well developed and well communicated, especially compared with some of the other large and traditional IT vendors that have only recently started to craft their blockchain stories. This is arguably because IBM decided to move into the blockchain space and started exploring opportunities of the technology relatively early on.

A list of the Hyperledger Project's founding members suggests that this was relatively unusual among established IT vendors, and that most of the players that were active early on had a strong vertical focus on financial services and dealt with blockchain based on that. This is likely to prove to be a critical advantage for IBM, especially when it comes to capturing initial interest in the technology.

Also, IBM is in a relatively good position in the blockchain market that is soon to emerge because of its continuing investments in its Strategic Imperatives technologies and blockchain, specifically in terms of internal operations, high-demand in-house skills, several strategic acquisitions, and an ecosystem of innovation-focused partners.

IBM's stated goal is to develop enterprise-ready blockchain solutions that overcome existing limitations of the technology in terms of privacy, confidentiality, auditability, performance, and scalability. These limitations stem from the fact that the largest deployment of blockchain to date (Bitcoin) occurs mostly outside the enterprise space and existing solutions, therefore falls short of a viable enterprise deployment in many significant ways. This entails primarily the following:

- **Increasing speed of blockchain operations to meet enterprise requirements.** Existing blockchain platforms designed to handle Bitcoin typically process 7–10 transactions per second on a typical permissionless network and usually take over 10 minutes to add a block to a chain. This is obviously far from the minimal speed needed for most enterprise use cases, which might routinely involve up to thousands of operations per second, and in some cases (e.g., in Internet of Things or IoT) much more.
- **Developing platforms for permissioned networks to enable enterprise governance models.** Almost all existing blockchain solutions are free for individual actors to join. In many use cases, this is crucial for the intended purpose. A part of the Bitcoin business model is that anyone can set up a mining operation. Enterprise blockchain deployments, however, require tools of network membership management so that the network can only involve trusted members who operate under a legal agreement.
- **Enabling private networks.** Most blockchain solutions are about anonymity and not about privacy. For example, in a Bitcoin transaction, both parties advertise their private account keys to each other, making this information a part of the transaction ledger — although the identities of players behind the accounts might, of course, be unknown. In an enterprise setting, this arrangement is undesirable under many conditions (e.g., for banks).

As part of its cloud strategy, IBM has set up Bluemix Garages in major population and financial centers to facilitate collaboration with prospects around the Bluemix portfolio. Four out of nine of these garages include dedicated blockchain teams (i.e., New York, London, Singapore, and Tokyo). IBM also offers a pop-up blockchain garage on-premise.

The garages are aimed at remote or face-to-face conversations on the blockchain technology, analyzing customers' business models and exploring a blockchain application demo. This is offered free of charge. On top of that, IBM organizes Design Thinking workshops to define a minimum viable product, actual development of a pilot project, enterprise and systems integration (SI), business reengineering, and scaling up of the pilot.

The garages are generally a good way to approach a technology in very early stages of adoption, especially when they involve focusing on not just the technology itself but also on its potential impacts on internal operations and a business model of a potential customer, and when they involve multidisciplinary teams. IBM also reports that the garages do not necessarily push for a blockchain solution, and most often, potential customers that come to the garages end up finding a much simpler solution that also meets their needs.

## FUTURE OUTLOOK

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2017 is the year when IBM plans to deploy several of its enterprise blockchain solutions. This section presents them together with several projects that are not expected to leave the POC stage this year. It is noteworthy that these use cases involve not only the flow of money but also the flow of physical assets and/or information.

There is nothing inherent in blockchain as a technology that would limit its development and adoption in financial services, and as mentioned earlier, blockchain is appealing to enterprises in many verticals with some preliminary evidence suggesting comparable or even higher adoption plans in areas outside financial services. Seeing specific use cases outside financial services so early in the maturity cycle is relatively promising.

Notable enterprises constituting IBM's use of Hyperledger Fabric blockchain use cases include:

- **Crédit Mutuel Arkéa.** This French bank and IBM have developed a POC of a KYC identity management solution. It is aimed at solving problems of multiple business units within the bank working with different slices of information about end customers and the difficulties of keeping these snapshots of data synchronized across the institution. In the future, the solution can be expanded to a management tool used across multiple financial institutions.
- **CLS Group.** Its CLSNet solution based on the Fabric v1.0 platform is scheduled to be deployed to production in 2017. It is a bilateral payment netting solution for six types of CLS Group's foreign exchange (FX) market products and 24 currencies. It will be used for buy-side and sell-side institutions' FX trades that are settled outside CLS Group's settlement service and will deliver a standardized suite of post-trade and risk mitigation services for the entire FX market. It is designed to overcome the current lack of standardized payment netting process for trades not settled within the current CLS environment and inconsistent netting approaches, resulting in higher costs and increased intra-day liquidity demands in the global market. The IBM solution is particularly interesting because not all members of the network must run a complete copy of the ledger. Some banks can join in via a proxy blockchain node, which is run by the CLS Group. This makes it much easier for members to enter and leave the network and provides a more sophisticated enterprise governance model.
- **The Bank of Tokyo-Mitsubishi UFJ (BTMU).** This is a smart contracts solution scheduled for production in 2017 and is an important use case outside the financial services sector. It leverages blockchain to manage the life cycles of complex contracts that involve many projects, service-level agreements (SLAs), payments, penalties, and so forth, under one master service agreement (MSA). This solution increases efficiency of dispute resolutions and ideally prevents disputes by providing a clear body of evidence that is kept synchronized among all parties in the network.

- **Japan Exchange Group (JPX).** Its POC involves low-liquidity security trading and is focused on post-trade clearing and settlement process. It aims to reduce risks, costs, and trade settlement time by automating end-to-end multiparty interactions for low liquidity trading via all relevant players (i.e., investors, banks, stock exchange) establishing nodes in a permissioned blockchain network.
- **China UnionPay.** This POC revolves around a peer-to-peer loyalty reward point trading system among banks, credit card users, and gift shops. Currently, every bank has its own mechanism of redeeming points for clients (e.g., in gift shops). The solution aims at enabling seamless exchange of points among multiple institutions, both online and in physical stores using quick response (QR) codes to request a transaction via a handheld device. A process of consolidating loyalty points of different values is not dissimilar from a payment netting solution developed for the CLS Group. The POC has the potential to be expanded to include other types of players such as airlines, supermarkets, hotels, car rentals, or restaurants.
- **Walmart.** This project on food provenance is about building an end-to-end food traceability system that provides a single view of purchase order life cycle across the supply chain and pinpoints sources of compromised food, which reduces the need for broad recalls and makes regulation changes easier to implement. It can serve as an important blueprint for the industry of physical assets management in which Blockchain is particularly suitable for addressing several notorious pain points, such as low efficiency, lack of automation, or manual and error-prone workflows.

On top of these specific use cases, IBM has repeatedly identified healthcare as a crucial vertical for blockchain adoption, although no use cases have been announced yet. Potential vantage points include enabling health data exchange, patient consent management across the health ecosystem, audit trailing of electronic medical records, claims and fraud management, and pharmaceutical supply chain provenance.

IBM announced a collaboration with the U.S. Food and Drug Administration in January to explore the exchange of owner mediated data from several sources, such as electronic medical records, clinical trials, genomic data, and health data from mobile devices, wearables, and IoT.

2017 and 2018 will be critical in determining the viability of (not only) IBM's enterprise blockchain solutions, gauging the appetites of the markets once people sober up after the initial hype, and judging IBM's success in moving into this emerging market. As such, IBM warrants close examination in these two years, even from enterprises that currently do not see how blockchain might fit into their business.

### Advice for IBM

IBM is quickly emerging as a strong candidate for a leader in blockchain enterprise adoption. Based on an analysis of its existing strategy, IDC offers the following guidance:

- **Lobby the regulators to make blockchain mandatory.** Enterprise blockchain adoption will likely hit several critical inhibitors, especially insufficient networking infrastructure and its inefficient usage. This might very well create a typical Catch-22 situation in which many promising technologies have found themselves in — technology adoption cannot progress unless enough pressure is applied to overcome its inhibitors, but at the same time, the inhibitors are not overcome if the technology's adoption is not sufficiently broad. A simple way out of this vicious circle is through extra-market forces, namely the regulators stepping in and mandating the technology to be used. The benefits of blockchain are palpable, and the existing efforts of IBM and others toward viable enterprise deployments are extremely promising. There is no reason not to be bold and to move in to shape public governance accordingly.
- **Capitalize on a market emerging around General Data Protection Regulation (GDPR) compliance.** GDPR compliance will become a major pain point for (not only) EU enterprises from 2017 onward. IDC has repeatedly found out that even high-level executives in large enterprises are still unclear as to what exactly GDPR entails and how it will impact them, let alone having a solution ready to deal with, for example, compliance of their cloud operations. It is likely that many of enterprises will come to IBM looking for a blockchain-enabled solution. Thus, IBM should have a story ready around this and actively spread knowledge around how blockchain can be used for data management and policy compliance in complex IT environments.
- **Ensure that Hyperledger Project sticks to the technology's core and be modest with release frequency.** Given the momentum of the Hyperledger Project, it goes without saying that IBM will maintain its leadership involvement. As to where the project should go, wisdom could be gained from examining existing ambitious open source projects (e.g., OpenStack), which often spread themselves too thin by developing many peripheral tools and solutions. Also, enterprise users often complain about very short release cycles that they eventually do not even bother to keep up. IBM should advocate for the Hyperledger Project to maintain its original intent of focusing on its technology core and a well-defined set of standards.

### Related Research

- *Blockchain to Accelerate the Energy Transition: What, Why, and How According to Alliander* (IDC #EMEA42261217, February 2017)
- *Blockchain – Seizing the Opportunities in Distributed Ledgers and Smart Contracts* (IDC #DR2017\_T3\_BF, February 2017)
- *Security Strengthens as a Use Case for Blockchain – What Are the European Implications?* (IDC #lcEMEA42260117, January 2017)
- *Perspective: The Movement to Blockchain in Energy Trading – Slowly But Surely* (IDC #US41987516, December 2016)
- *Business Strategy: Smart Contracts – Blockchain Connected Smart Contracts in Financial Services* (IDC #US41733316, September 2016)
- *Blockchain and Data Integrity: Approach Could Solve Supply Chain Instability and Gain Visibility of High-Value Goods and Hazardous Materials* (IDC #lcUS41605716, July 2016)
- *Blockchain Technology: Disruptive Forces in Financial Services, According to IDC* (IDC #prUS41537516, June 2016)
- *Maturity in the Blockchain Community – IBM, Accenture, and Linux Foundation* (IDC #lcUS41053116, February 2016)
- *Perspective: The Industry Implications of Blockchain Technology* (IDC #US40883716, January 2016)



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