AMASS

An Infoholic Mouthpiece

BLOCK CHAIN

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Spotlight

Blockchain: The next generation path breaker

There has always been an attempt to organize and control uncertainty associated with various institutions by finding better and advanced alternatives. The banking system was one such breakthrough which showed direction to abolish informal economy.

Blockchain is expected to be another such path breaker. It creates a shared reality covering non-trusted entities using a network that records everything. The whole system works together using a form of technology known as cryptography which is used to ensure data does not get counterfeited.

The Future

The technology is gaining tremendous popularity among many governments and financial institutions. It is predicted to take a faster rate of adoption because of its ability to bring paradigm change in the economic world. With new technologies like Blockchain coming in time, it is time the world prepares for a distributed economic world with avenues like never before.

Image: Google.com

Management Corner

From the CEO

I welcome you all to the sixth edition of Infoholic's monthly newsletter 'Amass' which aims at providing an update on the latest technology trends covering diverse industry verticals. The newsletter addresses and highlights issues of major impact that correlates with different business environment. In this issue on 'Blockchain', we are pleased to speak with few industry veterans who has shared their perspective on the current Blockchain trends.

I hope you will have a good time reading this Newsletter.

We intend to offer more value to you over the upcoming editions.

Sreenivasan K R
CEO, Infoholic Research

Editor's Corner

Blockchain is an extremely promising and robust technology which will play a key role in increasing computing power and security. Both security and speed are automatically increased as it eliminates middlemen and creates transparency. In the years to come, large institutions like banks, insurance companies and other fin-tech organisations are planning to use this technology in big way. We expect to see a ripple in the market and hope that the future will indeed be promising. The disrupting potential of Blockchain is more apparent in the finance domain, though myths and misconceptions do surround in all entirety. Let us separate the real world from the imaginary world and read this issue to understand what is actually Blockchain and what implications is it bound to have in the future years.

Pavan Mudholkar
Editor, Infoholic Research

Tech Talk

Gowtham Kumar Sampath,
Senior Manager - ICT Practice, Infoholic Research

Blockchain - The Good, The Bad and The Ugly

With nearly a decade in existence, blockchain in the last 2 years has moved from being associated only with "cryptocurrency" to becoming the underlying architecture of a decentralized future of systems, functions and even the economy. In simple terms, blockchain is explained as a platform with distributed system of computing nodes, validating using consensus and adding new blocks of data across all nodes simultaneously. The new block contain some hashed data from the preceeding block, making it a chain and it is simultaneously available for newer blocks to be added - making it visible to all participating nodes. This underlying architectural concept makes it highly secure as it is un-editable, fixed and distributed across nodes eliminating options to hack, crack or corrupt the system.

The idea behind blockchain emerged from the need to enable transparent transactions without the need for a centralized governing authority or even a centralized IT system, culminating in the emergence of "Bitcoin". The phenomenal growth of Bitcoin served as the inspiration for many use cases and growing investment witnessed today, with nearly 6 out of 10 major companies spending millions of dollars researching blockchain technology. Though stemming from a decentralized architecture, the current platforms being designed on blockchain include the following:

• Permission-less - Bitcoin and other major cryptocurrencies where anyone can participate
• Permissioned - Voting systems, government-run citizen services
• Private Blockchains - Contract management, smart contracts
• Public Blockchains - Asset-backed cryptocurrencies
• Hybrid – Shared information like KYC among financial institutions

The Good:

Some of the key reasons for the increased attention toward blockchain include:
1. Increased transparency and trust
2. Elimination of intermediaries
3. Improved security
The market is flooding with global players and a host of start-ups working on both public and private blockchain applications to cater a range of use-cases across finance, agriculture, transportation and manufacturing among others. **Nearly 1.5 billion dollars have been invested in enterprise-grade blockchain applications in the last 6 months, with the majority centred on financial and payment services.**
Infoholic Research expects that, with increased enterprise focus and investment, blockchain platform providers and application developers will work towards interoperability and standardization to enable better governance and accountability.

The Bad:

While the initial premise of a distributed public ledger system is appealing, there are associated concerns arising from the:
1. Higher processing and storage capabilities
2. Increasing transaction costs over time
3. Complete dependence on peer to peer networks
The growing interest from enterprises has also loosened the core of what blockchain stands for - a decentralized transactional ledger, transparent with a clear notion and understanding of responsibilities and accountabilities. While the security and trust aspects of blockchain are alluring to enterprises, the applications deployed are likely to be centralized and access "Permissioned" depending on the organizational hierarchy.

The Ugly

As the network keeps getting larger with more nodes, there are expectations of uncertainties which could result in the complete failure due to:

1. Time taken to update all blocks as new data gets added
2. Inability to change or edit transaction – in case of errors
3. Platform inherently built on incentivizing participants
4. Issues leading to criminal intent, dark web and terror funding

The lack of regulations and governance raises serious concerns on the volatility and long-term viability of "permission less" and public blockchain applications. Experts are also of the opinion that blockchain will impact environmental cost, due to high energy consumption arising from large amount of computational power and non-stop running of networks.

The growing appetite for blockchain needs a pinch of salt in the form of regulation and with governments and enterprises taking efforts to standardize, blockchain could deliver transparent services - paving way for a decentralized future of systems and functions.

Image: Google.com

Analyst Zone

Shiladitya Chaterji, *Senior Research Analyst, ICT Practice, Infoholic Research*

Blockchain Technology – "Brings in highest degree of accountability for transactional process"

The blockchain technology, decentralizes a given computing system ("digital ledger"), suitable for managing records ("blocks"); consequently, making it an exceptionally resilient architecture. Subsequently, the enduring concerns over rudimentary transactional processes muffled with manipulation of records by private entities or corrupt intermediaries can be eliminated, as the data blocks fed in the systems are digitally crypted with a unique identification. Additionally, the data can never be deleted or altered without the consensus of the entire network and the succeeding alteration of all subsequent blocks.

Over a short span since its conceptualization in 2008, the technology has witnessed an exceptional progress, with almost 100% year-over-year growth of bitcoin-blockchain file size, in recent years. Blockchain applications such as "Smart Contract", with features that enable transactions to be carried with pre-requisite authentication criteria, is a further embodiment to the accountability and transparency of the architecture. The assured resilience of the blockchain technology architecture has catapulted technology vendors to invest into research and development of further value-added services on top of the underlying robust framework, thereby ensuing end-users across industry verticals to increasingly adopt services offered by blockchain vendors.

Financial sector, globally, has been the foremost beneficiary, with reduction in costs associated with training and allocation of resource for transactional services in remote locations, in addition to availability of highly secure network to manage currency flows. Earlier this year, Singapore-based technology firm, Locus Chain Foundation, announced the availability of the 'fourth-generation' blockchain technology, with promising features that enhances accountability and transactional speeds, irrespective of the connectivity speed.

The Blockchain technology has been around for just over a year since it started attracting enthusiasm and attention of investors, and already several institutions have started to flag

of their speculations over availability of proper regulations to govern the blockchain technology framework. "But isn't that the point – to keep an open architecture with highest level of accountability and visibility for the blockchain service users?" Government bodies, the world over, have started to warm-up, to accept the blockchain technology. Consequently, this has bolstered the intent of the players to increase their investments in the technology, which is being seen as the future that will shape up transactional flows within the financial markets, at least for now!

Blockchain business: Revenue Model

There are multiple ways by which blockchain businesses can make money, the primary source being the services offered which could include blockchain-as-a-service and the corresponding SLAs, professional services such as consulting services for blockchain systems, and centres for blockchain mining (utilizing powerful computing hardware). The annual global mining revenues over the last year is overwhelming with an estimated turnaround of about $4 to $5 billion (average cost% of the transaction volume around 1-1.5%) with just over a quarter of a million average daily transactions over blockchain network.

Is there a catch? "Points to be noted in prelude to it becoming a conventional technology"

Blockchain is an exciting proposition for the future, however the computing power needed to authenticate/ verify the transactions has been constantly escalating. The concern over the swelling power requirements of the blockchain networks for its computing needs has put an appalling pressure on this initiative. The approximate power requirement for each transaction is estimated to be the power consumption for 35 households in the US and an approximate CO_2 emission for powering up each transaction is almost close to a ton. This is a major roadblock with global warming being an enduring challenge for government bodies globally.

Additionally, the processing speeds for the transactions is a pinning issue as blocks in a chain are sent to distributed network nodes for validation. The time required for mining of each block cannot be anticipated as the miners need to make trillions of presumptions each second to find out the appropriate value of the next instance to make the block valid, and this could range from a few seconds to several hours. Taking an instance of a worst scenario, bitcoin transactions witnessed an average transaction time of close to 2 days, while Ethereum experienced an average block time of about 15 seconds which appears to be more efficient.

Conclusion: Investments in the blockchain technology market will certainly witness steep growth over the next few years with pouring investments from various technology vendors; however, challenges faced from excessive power requirements, could potentially deflate the hype and enthusiasm among blockchain technology vendors, with possible government regulations to regulate the expansion plans of blockchain technology, till the time alternative reliable and sustainable sources of energy is available.

Moreover, increasing cyber-crimes reported with unauthorized mining of cryptocurrencies, "Crypto-jacking" could create doubts among end users with already existing uproar over regulating blockchain technology. So, it becomes inevitable for end users to secure their systems (endpoint/ network nodes) with strong protective firewalls and anti-malware protective suites, to avoid the risk of their systems, from being hacked. So, the users should be very careful while accessing external links from the system that is used as blockchain network nodes for transactions. Overall, it can be stated that currently it's a huge gold mine for blockchain business including miners and other services providers, and the players are expected to make millions while the hype exists!

Image: Google.com

Blockchain in Healthcare

Victor Mukherjee, *AM (Healthcare),
Infoholic Research*

Blockchain is a distributed register that is used to keep track of the transactions happening in numerous machines. Every organization emphasizes on delivering high quality care to their clients. This requirement becomes even more important in the healthcare industry. However, the major challenge is that the devices/service providers and customers control the decisions, which lead to care-service delivery and its data. This is exactly where Blockchain comes into the picture to provide effective patient care.

Various applications of Blockchain technology in healthcare:
- Medical Data Management
- Billing and Claims Management
- Medical Research
- Data Security

Blockchain has the capability to address the following challenges in the Healthcare Industry:
- Fragmented Data
- Timely Access to Patient Data
- System Interoperability
- Data Security
- Cost Effectiveness
- Access and Data Inconsistency
- Patient Generated Data

Image: Google.com

MedicalChain

The first healthcare company using blockchain technology to facilitate the storage and utilization of electronic health records to deliver a complete telemedicine experience. They are real practicing doctors in the UK healthcare structure and want to change the system from within.

MedRec

MedRec uses blockchain to save time, money, and duplication in procedures between a variety of facilities and providers to give any medical provider secure access to patients' records. Patients could also grant access to their anonymous medical records to be used for research.

Nano Vision

Looking to catapult medical innovation away from traditional data silos and incompatible records systems, Nano Vision combines the power of blockchain with artificial intelligence (AI) to gather molecular-level data on Nano Tokens. AI then sifts through the data to find trends and analyse connections, which will lead to medical break-throughs.

Gem

With a goal to give patients control over their medical records and genomic data by using a blockchain solution, Gem has also partnered with Centers for Disease Control and Prevention to experiment with using blockchain to monitor infectious diseases.

SimplyVital Health

This platform sits on blockchain technology that empowers providers and patients to access, share and even move their healthcare data.

Expert Column

Girish Nuli,
Founder & CEO,
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Introduction

The future is exciting! Over the past few years, a wide range of interesting technologies have picked up steam and promise to change the way we think and work. Three technologies that have the potential to create significant impact on our lives are Internet of Things (IoT), Artificial Intelligence (AI) and Blockchain. Blockchain is a technology that has the potential to impact a lot of industry verticals by transforming processes that take significant time, effort and resources today. I have been exploring and working with Blockchain for over 3 years and would like to share some insights into where this technology is leading and what is expected in the future. Blockchain as a   technology has generated tremendous amount of hype in 2017 and this continues in 2018. This is due to many reasons - let's explore some of them here.

1. Crypto currency

Most of the hype and interest in Blockchain started in 2017 with the meteoric rise in the prices of crypto currencies like Bitcoin. Crypto currencies, especially Bitcoin, was founded as a means of enabling peer to peer (P2P) transactions without requiring a trusted third party like a bank. As more people got involved in crypto currencies, they started discovering new applications for the underlying

Image: Google.com

Blockchain technology. Interest in Blockchain shot up when the Ethereum blockchain launched. It allowed people to write smart contracts that eliminated middlemen and enabled use cases in different industries. Interest in Blockchain skyrocketed in 2017 when speculation drove the prices of crypto currencies to all time highs. With the dramatic increase in prices, the media started talking more about crypto currencies and more people became aware of it.

In 2018, the price of crypto currencies have fallen due to regulatory scrutiny and outright ban in some countries. There is also uncertainty in the market as many regulators are working on frameworks to tax and regulate crypto currencies. This uncertainty is expected to continue until there is more clarity on how various governments and regulators intend to treat crypto currency transactions and any tax implications on them.

2. Fund raising

With rising interest by investors in crypto currencies, many start-ups suddenly discovered that they could raise money and fund their   operations by offering tokens (a.k.a alt coins) in exchange for established crypto currencies like Bitcoin and Ether, or for fiat currencies like dollars. The advantage of this fund raising model was that a startup need not give up any equity in exchange for funds. All they did was offer a promise of multi-fold rise in the price of their tokens when their product launched. This type of fund raising came to be known as Initial Coin Offering (or ICO). At its peak, ICOs have allowed companies to raise billions of dollars in exchange for their tokens (e.g. Telegram and EOS have raised more than a billion dollars). With the promise of easy money, many bad actors launched ICOs that have turned out to be scams. This has given a bad name for ICOs and has pushed regulators like SEC to formulate regulations on how an ICO can be launched that is legally safe.

Going forward, it is expected that ICOs will become more regulated and make it difficult for bad actors to easily raise funds from the public. The SEC has started treating many ICOs as security offerings and this will lead to less number of ICOs launching in 2018.

3. Decentralised Applications and Permissioned Blockchains

This is an area that has generated maximum interest amongst enterprises. Decentralised applications, also known as DApps, promise to bring operational efficiencies and cost savings in existing business processes. Permissioned Blockchain platforms (and Distributed Ledger Technology, a.k.a DLT) enable companies to setup private or consortium Blockchain networks for their specific requirements, without having to depend on public networks like Ethereum or NEO. In 2017, many companies began experimenting with permissioned Blockchain applications. According to a study (https://www.juniperresearch.com/resources/infographics/-blockchain-enterprise-survey-august-2017) conducted in 2017, more than 56% of companies having more than 20000 employees are interested in exploring Blockchain technology, or have already begun the process of building proof of concept applications. Not to be left behind, cloud platform companies like Microsoft (Azure), Amazon (AWS), IBM and Google have all come out with Blockchain related offerings to simplify the deployment of permissioned Blockchain networks in their respective cloud datacenters.

In 2018 and beyond, the interest in Blockchain will continue to rise and many proof of concept applications will start going into production. With the adoption of Blockchain applications leading to positive results for organisations, the hype will turn into reality. This will lead to a large jump in demand for Blockchain application developers and engineers. Today, I consult for, and see many companies that are already upskilling their IT teams to handle Blockchain related projects.

4. Banking and Financial Transactions

One of the biggest impact of crypto currencies and Blockchain technology is expected to be on Banking and Financial domain. The threat of P2P transactions eliminating the need for third parties like banks have scrambled these organisations to explore how they can leverage Blockchain technology and stay relevant. Ripple, Stellar and R3 Corda are some of the Blockchain platforms that are being considered by banking and financial institutions to enable use cases like micro-payments, instant remittances and faster settlements that what is supported by todays technology. Many banks, financial institutions, and insurance companies are either forming or joining Blockchain consortiums to explore and integrate Blockchain into their existing processes, or to enable new use cases. Some of the consortiums in operation today are: https://b3i.tech/home.html - The Blockchain Insurance Industry Initiative that comprises of many European insurance companies to implement Blockchain based solutions https://www.r3.com/ - R3's global Blockchain network boasts of over 200 banks, financial services firms, central banks and regulators who are trying to leverage the open source R3 Corda Blockchain platform for finance and commerce.

The Blockchain landscape is still in its infancy. Every Blockchain platform is under going rapid development and it is expected to take some time before we see some stability, less breaking changes and backward compatibility with previous versions as new versions of a platform are released.

In 2018 and beyond, the uptake in Blockchain is expected to continue as new platforms and protocols like EOS and Ethereum Casper are launched. These new launches promise to address the present challenges of scalability and high cost in implementing Blockchain technology in public and private networks. With higher performance and scalability, more use cases will become eligible to be implemented using Blockchain technology.

Image: Google.com

Phani Arega,
Senior Vice President,
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Blockchain Benefits & Recent Trends

Blockchain is a distributed ledger where each constituent node holds entire data, trail of transactions and also executes transactions. All nodes stay in sync thru consensus. Both the data and programs (aka Smart Contracts) on blockchain are immutable and tamper proof. This immutability along with transparency makes software implementations on blockchain (aka Decentralized applications or Dapps) a well trusted intermediary among business transaction participants. This eliminates need for a trusted 3rd party escrow for transactions between participants without mutual trust in turn reducing operational costs and turnaround times significantly. Per Gartner, the business value-add of blockchain will grow to over USD176 billion by 2025, and will exceed USD3.1 trillion by 2030

Though the first application of blockchain was for money transfer (bitcoin), there is lot of scope for non-currency applications. In banking industry, blockchain has use cases like data tampering prevention, 'Know your Customer'(KYC) sharing, securities trading, payments processing. Use cases of Subrogation, Provenance, Claims' management exist for insurance industry. Following industries also have use cases for blockchain: Supply Chain, retail, healthcare, telecom, manufacturing, logistics, government. Per Gartner's study BFSI sector is dominating the blockchain market with more than 60% revenue share in 2017.

Idea of blockchain was published in 2008 and Bitcoin started in 2009. Refinements followed but major breakthrough of Smart contracts occurred around 2014 with Ethereum project. This facilitated Dapps. Gradually other platforms like *Hypderledger fabric, Hyperlegder Sawtooth, R3 Corda, Ripple, Quorum, EOS* came up.

Initial public blockchain platforms like Bitcoin, Ethereum do have some technical limitations: Throughput of Bitcoin and Ethereum are within 9 and 25 transactions per second(tps) respectively; which are grossly insufficient for enterprise grade applications. Search (query) based on functional field values is a problem due to limited/no indexing support. Several security vulnerabilities were uncovered on the Ethereum public blockchain. Anonymity provided by these blockchains made them a haven for malicious people transferring money for illegal activities. Bitcoin became infamous for this.

Per analyst firm 'Market Reports Center' (MRC), after first 8 years, blockchain's global market in 2017 is only around USD708 million which is low in this age of internet and open-source software. Technical limitations discussed above and blockchain technology being in the shadow of Bitcoin for a while are some of the causes.

Major corporates have formed consortiums to explore blockchain usage in their business. In 2015, BFSI companies Barclays, BBVA, Commonwealth Bank of Australia, Credit Suisse, Goldman Sachs, J.P. Morgan, Royal Bank of Scotland, State Street, and UBS formed a consortium. In 2017 pharma companies Genentech (Roche Group), Pfizer, AmerisourceBergen, and McKesson Corporation formed working group for 'Mediledger' project. In India, State Bank of India, ICICI Bank, DCB Bank, Kotak Mahindra Bank, Federal Bank, Deutsche Bank and UAE Exchange are members of 'Bankchain' formed in 2017.

Among blockchain solutions vendors, startups dominate so far with more than 60% market share in 2017 per analyst firm 'Global Market Insights'. However, MNC giants like IBM, Microsoft, Hewlett Packard Enterprise, SAP, Amazon Web Services also had entered the blockchain space. Mergers and acquisitions are likely going forward.
Above mentioned participation of large vendor and

consumer Organizations and technological improvements to the platform by vendors, make future very promising. Per analyst firm 'Report Buyer', during 2017-22 blockchain market sees a Compound Annual Growth Rate (CAGR) around 79.6% and will grow to USD7.6billion by 2022. MRC forecasts blockchain market to reach 60.7 billion by 2024. Analyst firm 'Grand View Research' expects a CAGR around 37.2% during 2015-24 taking the blockchain market to USD7.59 billion by 2024.

Lack of clarity on regulations has been hindering blockchain adoption. Always Innovation and resulting disruption precede regulation (changes). Blockchain is at that stage of regulation catching up. Governments across the world framing their blockchain policies.

Indian central and state governments encourage blockchain technology. Indian Prime minister's tweet on 19Feb18 about blockchain and State of Andhra Pradesh going live with blockchain storage for land registry of its capital region are some examples.

Image: Google.com