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A blockchain for the enterprise – a technical perspective.

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A blockchain for the enterprise – a technical perspective.

This post is long overdue, but better late than never. In my last post I discussed facets of blockchain technology and their potential benefits to enterprises. In this post I would like to dig a bit deeper and discuss the technology fundamentals. In the past few years since Bitcoin blockchain, the currency has been radicalized. The blockchain framework behind it became part of the general consciousness, driven primarily by the financial services sector, which has shifted from ignoring it to considering it a potential game changer. So let us discuss the components and try to understand the potential of this revolutionary technology.

At a very basic level any proposed blockchain solution has 4 building blocks:

1. **Shared Ledger** – Append only the distributed transaction record. While the intended design of Bitcoin blockchain was to democratize visibility, in an enterprise blockchain this would have to be reconsidered due to regulations surrounding consumer data. Append only or immutability as a technology requirement can also be achieved by any SQL or noSQL distributed database.

2. **Cryptography** – Ensures authentication and verifiable transactions. The design imperative regarding the inclusion of cryptography is focused on the computational hardness assumption and making it harder to break by any adversarial process in the distributed system. The economic incentive and the system design of bitcoin blockchain makes this interesting, and the cryptographic considerations change when translated into a less democratic or permissioned ledger network.

3. **Trust Systems or Consensus** – Uses the power of the network to verify the transaction. I consider this as central to any blockchain system where this is the heart of any blockchain application. *Trust system* is the preferred term, as not all validation is done via the consensus system. This the foundational element and will dictate the overall design and investment into any blockchain infrastructure. I am also of the opinion that it is the trust system that is being modified by the many new entrants in the blockchain space, forming variants that offer a specialization for a specific use case where a blockchain is being applied. It is the trust model that makes blockchains real and delivers the staples of blockchain technology, which are trust, trade, and ownership. The trust system is the primary driver of the transaction system that blockchains aim to displace. If ONLY trade and ownership were to be addressed by distributed/shared ledgers, then the plurality could be addressed with an array of database solutions – including those emerging to solve scale and mobile use cases. I also think much work is needed to define an optimized trust system of various use cases, such as a P2p and sharing economy models with B2B models. (I do plan to expend time and energy on this topic in the days to come).

4. **Business Rules or Contracts** – These are business terms embedded in a transaction database and executed with transactions. This is a rules component, as needed by any business to define the flow of value and state of a transaction.

These four building blocks of technology promises to change the landscape of financial services and many such industries –independently, they have all existed

for decades. With the exception of evolutionary changes, the core principles are well understood and accepted.

So why blockchain? And why now? What makes this technology so special that it has attracted massive investment and forced the likes of the financial industry to rethink its business models under the guise of disruption?

In my opinion the answer lies in the Bitcoin Blockchain system, which I think is the only functional evidence of a peer-to-peer (P2P) permissionless network. While the Bitcoin Blockchain system cannot be directly adopted into an enterprise model, there is much to be learned from the Bitcoin world that can be applied to a successful blockchain for enterprise.

Bitcoin has gained notoriety for being a radical and unregulated rogue (cyber) currency, causing any regulated entity to distance itself from the concept. Instead, many see the virtues of using a blockchain as a technology alternative that is permissioned and conforms to all the regulatory platforms that have evolved over time. The promise is to solve longstanding industry concerns such as modernizing the financial and trade system and speed up securities and trade settlement.

While the industry sees a clear separation, I see a disconnect in understanding the technology trust system that makes a blockchain so attractive. The tenets of Bitcoin are driven by the economic incentive (rewards system for upkeep, longevity, high availability, and system maintenance), cryptography (to ensure order in a chaotic, permissionless world), and specialized computational power (massive clusters and hardware dedicated to solutions for Bitcoins). Bitcoins signify that a trust currency can either be earned or bought, essentially representing the value of the invested economic resources (people, power, and time).

When we apply these tenets to a permissioned ledger/network sought by regulated industries, the rules of engagement change, and the radicalized trust currency needs to be morphed into a viable trust system – which one can choose to ignore or adopt as a foundation of parts of incentive economics based on the trust system of consensus models. As discussed earlier much work needs to be done in this field, as there is not a single consensus model (e.g., Byzantine Fault Tolerant [BFT] or Practical Byzantine Fault Tolerant [pBFT], RAFT, Paxos, etc.) that will address all use cases. An enterprise needs to understand these. They will

also drive investment into the underlying resources – people, power, and time.

Resource consideration is important for an enterprise. This is another principle we have learned from Bitcoin Blockchain world, which is now dominated by specialized hardware, adding to growing resource requirements. I call it a perfect storm where data structure (a shared ledger), cryptography, encryption, and very high I/O (input/output) – due to shared ledger replication, consensus, and other network group services – will place extraordinary demands on underlying resources. This makes an interesting discussion, especially when an enterprise has just become comfortable with cloud deployments of enterprise applications.

So what else does a **blockchain for an enterprise need to consider to make the blockchain a consumable technology? I have listed a few of these below, and it is by no means an exhaustive list.**

A blockchain value-add for enterprise:

1. **Auditing and logging** – This is a must to satisfy regulations regarding regulated systems for purposes of non-repudiation, technology root cause analysis, fraud analysis, and other enterprise systems.

2. **Enterprise integration** - This includes:
   1. *Integration with Incumbent System of Record (SoR)* – This is important to support existing and incumbent systems such as CRM, business intelligence, reporting and analytics, etc.

   2. *The blockchain as a transaction processing system* will preserve the SoR as an interim approach to adopt a blockchain.

   3. *Design Intent to Include* – The path of least disruption will accelerate the enterprise adoption.

3. **Monitoring** – This is a must, again to satisfy regulations and generally accepted IT practices for purposes of high availability, capacity planning, pattern recognition, and fault identification.

4. **Reporting and regulatory requirements** – This is by far the most important step, even for the interim adoption of a blockchain as a transaction processing system. It is hence advisable to create connectors to existing SoR to offload the reporting and regulatory requirements until the blockchain is enterprise aware, or rather, the enterprise software is blockchain aware.

5. **Enterprise AAA (Authentication, Authorization, and Accounting)** requirements – Unlike the permissionless world of Bitcoin blockchain, in a permissioned enterprise world all participants are to be identified and tracked and roles defined to play a part in the blockchain ecosystem.

Conclusion:

Blockchain has tremendous potential, and collectively they do differentiate themselves from core components when measured individually. Enterprise blockchain provides a design avenue where transaction data, value, and state are inherently close to the business logic, and the security of the execution of business transactions is validated by a secure community process, enabling a foundation of trust and the robust processing of transactions. There are virtues of using a blockchain as a technology alternative that is permissioned and conforms to all the regulatory platforms that have evolved over time. The blockchain promise is to solve longstanding industry concerns such as modernizing the financial and trade system and speeding up securities and trade settlements.

Thoughts?

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A good read and I find myself agreeing that enterprise adoption of block chain technology will be as much about integration of it with existing systems and enabling existing management and regulatory reporting as it will be in actually deploying the shared ledger and the mechanisms for consensus.

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Paris is just the beginning: America's future in the fight against climate change

Dec 1, 2015 | 417 views   👍 16 Likes   💬 0 Comments | in f 🐦

Leaders from over 140 nations gather this week in Paris to try to reach a new global agreement to limit greenhouse gas emissions. If they are successful in forging a new and ambitious international climate pact—with all countries participating—we will have made a huge leap forward to avert the devastating effects of climate change

Thanks to President Obama's leadership, the United States enters these complex multilateral negotiations on a very strong footing. We are leading the world with ambitious domestic carbon pollution reduction and clean energy goals—and we're already backing these pledges with action.

Hillary Clinton's work as Secretary of State was pivotal to many of the diplomatic breakthroughs that paved the road to Paris. As Secretary of State, Hillary made the fight against climate change a top-tier diplomatic priority. She led an international effort to launch the Climate and Clean Air Coalition and appointed the first high-level special envoy for climate change. She helped build new coalitions to reduce methane emissions and phase down the use of super-polluting Hydroflourocarbons, and launched a clean cookstove initiative to improve the health of communities and our planet.

In her first trip to Beijing, Hillary put climate change squarely on the agenda for the first time, making bilateral climate action a pivotal element of our relationship with China. At the Copenhagen Summit in 2009, Hillary worked with President Obama to hammer out the diplomatic breakthrough that led to the Copenhagen Accord, which was the first international agreement in which all of the major economies—including China—committed to reducing their greenhouse gas pollution.

Her efforts to establish a climate dialogue with the Chinese helped lay the foundation for last year's historic U.S.–China joint announcement of new post-2020 emissions reduction targets. This agreement puts us on the path to successful talks in Paris today.

And we cannot afford to wait. Globally, 9 of the 10 warmest years on record have occurred this century. This October was the warmest in recorded history. Polluted air, erratic storms, raging wildfires, and rising oceans are already wreaking havoc in the United States and around the world.

We cannot leave our children and grandchildren to bear the burden of our inaction. The time has come. We simply cannot wait any longer. Millions of people in the U.S. and billions more around the world are looking to their leaders in Paris to fight for the world we all want—for our children, our planet, and our societies.

But an agreement in Paris must only be the beginning. A deal alone cannot stem the tide of global warming.

As President, Hillary will continue fighting to ensure that climate change remains a priority on the international stage. She will seek to forge a new North American

Climate Compact between the United States, Canada, and Mexico to build a clean energy future for our continent.

Hillary has also ambitious plan to build on President Obama's domestic climate action by installing 500 million solar panels by the end of her first term, and generating enough renewable electricity to power every home in America within 10 years.

And she will continue to act on climate here in the U.S., so countries worldwide can rest assured that the U.S. will make good on the mitigation commitments that we pledge in Paris and after.

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Written by
John Podesta

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