Building on the Blockchain

Nasdaq's Vision of Innovation

While the future of the digital currency Bitcoin is still fraught with skepticism, enthusiasm is steadily building for "blockchain," the cryptographic technology underlying Bitcoin. Although still in its infancy, blockchain technology has people and companies worldwide clamoring to be among the first to identify how blockchain can help their cause. Currently, Nasdaq is one of the companies leading the pack.

> "We've taken it upon ourselves to be a leader in terms of encouraging people and companies to explore this technology and understand it better,"
>
> says Fredrik Voss, Vice President of Blockchain Innovation at Nasdaq.

In simple terms, blockchain is a database—but not your average database. The Bitcoin blockchain—technically a distributed public ledger—is an unalterable record of peer-to-peer transactions (often over 200,000 per day) that is transparent to all, and not reliant on a third party for management. Instead, a distributed transaction processing community (people referred to as "miners") keep the system honest and do the intensive computing needed to "mine" Bitcoin and maintain the ledger.

However, the realization that there are other applications—beyond currency and simple cash transactions—for blockchain technology has inspired people everywhere to take another look at this technology.

Politicians in Greece and Honduras are looking to blockchain technology to solve land registry problems, while banks are exploring how blockchain can overhaul financial markets. Blockchain is also making an appearance on Wall Street: In October, Nasdaq unveiled Linq, a solution enabling private companies to digitally represent share ownership using blockchain-based technology.

WHAT BLOCKCHAIN BRINGS /

On the surface, Linq's ability to work as a secure and complex database is intriguing, but the capability and potential that lies beneath the surface is even more impressive. According to Alex Zinder, Director of Global Software Development at Nasdaq, blockchain technology can potentially play a significant role in improving information distribution.

> "The current state of alternative markets, where securities are not publicly traded, is loosely defined, with even larger variability in how information is distributed,"
>
> says Alex Zinder, Director of Global Software Development at Nasdaq

However, he believes that there are several attributes of blockchain technology that are noteworthy for private markets, including the powerful cryptographic hashing algorithms and the distributed nature of the protocol. These attributes have been validated by the public Bitcoin network, but the opportunity now lies in making these attributes useful for private markets.

> "There is a wide range of emerging technologies in this space being developed to accommodate distributed 'private' networks, including the work that Nasdaq is doing with Linq,"

says Zinder.

> "[The goal is] to introduce interoperability between existing networks, and remove significant friction in hand-offs of information."

BEYOND THE LAUNCH OF LINQ /

Nasdaq has been quite deliberate in how Linq is being introduced within their private market, according to Voss. "[Linq] is a useful solution, and we're putting it out there with a group of pilot customers. Most of these companies are actually involved with blockchain technology, so our interests are aligned." The first participants to use Linq will include Chain.com, ChangeTip, PeerNova, Synack, Tango and Vera.

While the initial enthusiasm and participation of these companies is encouraging, the transition to offering Linq as a complete solution may take some time.

> "With technology, that journey takes a little bit of time, and we want to start by affecting people's attitudes toward that technology,"

Voss says.

"Your competitor may use it, or another part of your company may use it, or someone that you think makes good decisions–and that's how we start the process of changing attitudes," Voss says. "Over time, we hope that it leads to a desire and acceptance of the technology."

Since the inception of Bitcoin's blockchain, the notable underpinning of this technology has been trust, since it is not controlled by any single user. However, with Linq being a private distributed ledger (as opposed to Bitcoin's open, public blockchain), Nasdaq is expecting efficiency and transparency to be the foremost virtues of their blockchain technology.

According to Voss, "When you have a trusted party, and, of course, Nasdaq is a trusted party, then you don't really need the concept of mining."

With trust in place, Nasdaq expects the benefits of Linq to include increased auditability and improved issuance governance and transfer-of-ownership capabilities.

LINQ AS A BUILDING BLOCK /

Looking forward, Linq has been built with the option to eventually become a distributed ledger. Voss expects Linq to proceed through a number of steps, and not necessarily go straight from one writer to a totally permission-less environment; he suggests that the next step would be to transform Linq into a federated solution with an agreement as to who is allowed to write transactions to the ledger.

While a current function of Linq, and all Nasdaq applications using blockchain technology, is to improve efficiency, Voss sees three phases applying to the development of blockchain technology in the future. Right now, this new technology is working simply to make existing solutions more efficient. However, in the next phase, applications of blockchain technology will be expected to satisfy needs that cannot be met with today's technology.

The third phase, according to Voss, is definitely the most exciting. "In the future, there will be needs that society and capital markets don't yet realize that they have," Voss says. "It's like asking someone 10 years ago, 'Do you need Uber?' No one needed that then. That was a need we didn't know we had." Voss believes that blockchain technology will be there to solve those yet-to-be-identified needs.

LOOKING BEYOND LINQ /

Nasdaq recognizes that the scope of blockchain technology is in its infancy, and is not solely focused on Linq as the only application. One area of interest is the ability to control the level of information being distributed when implementing blockchain technology. According to Zinder, emerging concepts include "tokenization being leveraged on top of blockchain networks, and other innovative technologies that allow validation of data at scale without disclosing the information to validating parties."

> "At Nasdaq, we are closely observing this space and working with multiple technology innovators, as well as building our own solutions to harness this technological innovation and process,"
>
> Zinder says.

Nasdaq's ideas for blockchain technology range from customized business solutions based on the Linq platform to market changes in smaller countries. Nasdaq has been quick to recognize the needs and opportunities available, and has already begun the process of exploring the implementation of solutions worldwide.

Voss believes that Nasdaq's stature as a leading supplier of technology solutions to capital markets, along with its early adoption of blockchain, makes it a natural resource for companies looking to utilize this technology. "We already have had discussions with clients about compatible distributed ledger versions of some of the products in our technology portfolio," says Voss.

In Estonia, where Nasdaq owns the Tallinn Stock Exchange, Estonia's only regulated secondary securities market, as well as the Estonia Central Securities Depository (ECSD), Nasdaq is developing distributed ledger technology that could be used to improve proxy voting, company registration and public-pension registration. Voss explains that with blockchain, Nasdaq is quite particular about which use cases it chooses to focus resources on implementing.

"Early on in technical innovation, you don't want to have projects that are too large and risky. You want to deploy it in an ecosystem that you are comfortable with," Voss says. "[Estonia] provides an environment where we are comfortable that many of the components necessary to build this use case are in place."

Voss' reasoning for using a simple, safe environment goes far beyond ensuring success. He sees the implementation of any new technology as a learning process, and learning in a smaller, controlled environment will propel the technology to mainstream use sooner.

"All of these challenges and experiences build on the library of understanding and competency,"

Voss explains.

"Then, at some point in time, we will be able to mix in more commercial and significant opportunities. There is quite a deliberate way of thinking about this as an innovation process."

THE BLOCKCHAIN PICTURE /

When it comes to distributed ledger technology, the process of innovation is happening well beyond Nasdaq, a prospect that clearly excites Voss. With the recent partnership of 30 banks and the blockchain startup R3 CEV, the banking industry is working toward the implementation of blockchain technology to improve all aspects of their business.

"We are very, very positive to see that there is more brainpower being put into analyzing and understanding the technology, and at some point, there will be a need for a standardization discussion," Voss says. "This is a technology that only works at its full potential in a network. You need to have a complete ecosystem on the blockchain for it to offer maximum value to all its participants, including us."

According to Voss, once the technology is proven, is widely adopted and does what Nasdaq believes it can do, the potential for savings, especially within the banking industry, could be huge.

THE FUTURE OF BLOCKCHAIN /

Over the course of the technological revolution, changes and innovation continue to come quickly, and blockchain technology is no exception. Voss hopes that in the future, blockchain will become a core, foundational technology, but believes a lot of that success hinges on what happens in the next two years.

"I think that in 2016, we're going to see more cases of [blockchain technology] deployed outside of laboratories," Voss says. "That's when we're really going to test it in the real world to some confined cases. If it works, if it does what we think it will do, the really interesting year will be 2017, when I think we will see some deployment of the technology for large-scale use cases where there's significant value involved."

Voss believes that how the technology works and what reception it gets in the near future will greatly impact how blockchain technology performs in five years' time.

"We don't think it's ever going to be said and done,"

Voss added,

"because it will be innovation on innovation as society continues to change."

For more information

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