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Blockchain ledger lays foundation for programmable economy

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by
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A programmable economy could reduce corruption, simplify supply chains, even render spam obsolete. The blockchain ledger is an essential ingredient. CIOs must pay mind.

In part one of this report, we examine the prospect of a new programmable economy, predicted by Gartner Inc. vice president David Furlonger. Here in part two, we look at what the programmable economy will look like in action, the technological environment -- including the blockchain ledger -- that will be required to enable it, as well as recommendations for CIOs to prepare for it.

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The programmable economy -- a new economic system based on autonomic, algorithmic decisions made by robotic services, including those associated with the Internet of Things (IoT) -- is opening the door to a range of technological innovation never before imagined.

This new economy -- and more specifically the concept of the blockchain and metacoin platforms that underpin it -- promises to be useful in improving an astonishingly varied number of issues: from reducing forgery and corruption to simplifying supply chain transactions to even greatly minimizing spam.

Furlonger laid out a vision for what the programmable economy will look like during a presentation at Gartner Symposium/ITxpo in October in Orlando, Fla. Ray Valdes, also a Gartner vice president, also spoke at the presentation.

Furlonger pointed to the use of a blockchain ledger, or decentralized transaction database, in Honduras as an example of the new paradigm. In

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that country, he said, the population struggles with land titles. That's because the country allegedly has a high level of corruption -- political and otherwise. And the country's land registry has been hacked in the past, purportedly allowing bureaucrats to alter land records and granting titles in exchange for paybacks. "Sixty percent of the property assets [in Honduras] are undocumented property assets. It's tremendously difficult for individuals in those parts of the world to avoid corruption," Furlonger said. "So you say you own a piece of land, you go to the land title office, and someone else has paid some money and you somehow lose the land that you think you own."

To combat that problem, the Honduran government is looking to technology from Factom Inc. to encode Honduran land titles into a blockchain ledger. "That blockchain ledger is encrypted and it's obviously time-stamped," Furlonger explained. "Anyone who wants to own a piece of land finds that information coded and time-stamped and secured in a distributed ledger. Everyone in Honduras will know who owns exactly what in Honduras. No one can corrupt anything."

Another example of the power of the blockchain lies in the diamond industry, shown in the work of a company called EverLedger. The company is creating electronic records of diamonds' unique characteristics that are then shared in a blockchain ledger. "Say every diamond on the planet has some uniqueness around the four Cs [cut, color, carat and clarity]. They're creating basically a distributed ledger that documents all of the serial numbers and all of the [four Cs] of the diamonds in the blockchain ledger," Furlonger said. "Which means it doesn't matter if the diamond got cut into 50,000 pieces, you would never be able to defraud it because you would [know] exactly what that diamond was."

Evolution to the programmable economy

Valdes explained the technical foundations of the blockchain ledger and the programmable economy. He described the programmable economy as an evolution of the API economy, in which businesses use APIs to connect their internal systems with external systems, which improves the

businesses' ability to make money but is limited by the fact that the systems are basically siloed from one another. The Web was the next step in the evolution toward the programmable economy, he said, because it represents a "global platform for programmable content. It was decentralized; it was a common set of standards. Anyone can put up a Web server and plug into this global fabric for content and eventually commerce and community."

The programmable economy, Valdes said, is enabled by "a global-scale distributed platform for value exchange. ... The only thing that's uncertain is what form it will take." Valdes pointed to Bitcoin, which uses blockchain ledger technology, as a prominent example of a "global-scale, peer-to-peer, decentralized platform for global exchange."

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Ray Valdes
vice president, Gartner

Valdes suggested that Bitcoin will ultimately fail because of technical limitations around scalability, company agility, transactions and governance. And, he said, perhaps 90% of blockchain-related initiatives launched this year will fail within two years. But the blockchain on which the Bitcoin currency -- and other cryptocurrencies, which he referred to as metacoin platforms -- is based represents real innovation. "It's a mechanism for the dynamic population of thousands of untrusted parties that are not really authenticated to get together to create a trusted, authoritative record that is irrevocable, that cannot be changed," Valdes said.

Other technologies in use in the programmable economy include public-key encryption, authentication, tokens and APIs, among others. "The key part of it is scripts. That's where the programmable part comes in. Every transaction can kick in, can trigger a script," Valdes said. "In the current incarnation of Bitcoin, it's a simple script that by design is limited. It's not

powerful because you want to control it. But it's also inflexible. So people are now looking at next-generation metacoin platforms that will have full programmability."

Valdes said in the programmable economy, scripting and programming will enable autonomous transactions and interactions among stores of value. "This is why we sometimes say the programmable economy is going to disrupt existing economies," he said.

And, Valdes said, metacoin platforms will support ancillary systems. For instance, he said, a spam-resistant email system could be built, through which metacoin micropayments are required by the recipient for sending email. That would change the cost of sending spam from nearly nothing to a definite cost -- and would change the economic equation for spammers, perhaps raising the cost of sending the spam beyond their expected monetary return from sending it.

The idea of programmability can be extended to the corporate structure, Valdes said. Today the rules of incorporation are fixed, and the corporation is represented by its employees and a board of directors. In the future, corporations could be "more granular, more dynamic and untethered from human control, and that can be scary and have obvious problems including malware and viruses," he said.

Valdes predicted that multiple metacoin platforms will emerge over the next five years. The platforms will need to interoperate with one another, which will be tricky to execute, he said, leading to attempts at formal standardization, which will fail. De facto standards will surface, though.

Smart contracts and IoT

Valdes also discussed the notion of smart contracts, in which a token of value has associated logic that can control behavior. "In one scenario, I can give my teenage son $20. If I give him cash I don't know what he's going to spend it on. In the future, that money would have rules associated with it: You can't buy fast food, you can only spend it on a movie, but you can't go to a movie during the day."

The insurance industry provides another example, Valdes said. "If I pay [a company] an insurance premium, I don't know if that company's going to be around 20 years from now [when I might need a payoff]. But there's already a payment allocated today that's conditional in that sense and it's not in the company. It's in the public decentralized ledger. I don't need to trust the servers at my insurance company. I don't need to trust the centralized servers at my bank," he said.

Valdes went on to describe how the IoT would participate in the programmable economy. "We're moving to a situation where agents that are programmable are inhabiting this world where anything can connect to anything else and transfer value. The Internet of Things can also interact with other entities. Not only can they interact and pay with value transfer, they can create and generate other entities," he said.

Furlonger pointed to a scenario in which an oil company could place sensors in its oil tankers to measure the evaporation rate as the oil is being transported from one country to another. Today oil companies make a guess about how much oil will arrive at its destination and that amount is used in the

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David Furlonger
vice president and research fellow, Gartner

contract that governs the transaction, which is set up before the oil is shipped. "Then the ship leaves and it gets to the other end and people run around changing the bill of lading and your trade finance contracts. Lots of manual stuff goes on," he said.

With sensors in place inside the oil tank, those uncertainties would fall away. "You can put monitors in the tanks to measure the evaporation, the sensors are connected to smart contracts, the contracts are changing as the ship is going, so you have this dynamic process that's taking place in the supply chain, constantly refreshing the economic conditions that surround it," Furlonger said.

Such a model introduces big governance and risk management issues for IT to sort through, he said.

Recommendations for CIOs

Furlonger called on CIOs to understand the various "value mechanisms" that will be emerging. "Who has access to them? Do they want to give those value points to you in exchange for something else? How do your systems accommodate that? What are the terms and conditions of doing business?" he said.

Sue Troy asks:

How might your organization make use of a metacoin platform?

0 Responses

Today's ERP systems are focused on a single medium of exchange, which means they aren't able to support the programmable economy, which will be problematic, Furlonger said. Businesses will also need to determine how to best use metacoin platforms, he said. "Is it really digitizing documents? Is that a valid use case? ... Or is it more about security and the use of encryption, being able to really ride a high level of encryption to reduce forging activity? Or is it about payments and taking away interchange fees?" Furlonger asked.

According to Furlonger, CIOs need to prepare their organizations for "significant disruption, whether you believe the hypothesis we put out or not. There is going to be massive disruption based on the current economic models. Your business model is being disintermediated while you sit here."

He also recommended that CIOs work on educating CEOs about the impact IoT and the programmable economy will have on business. Organizations of the future will need a different organizational model, he said. "You see society changing in a sharing, collaborative environment. Think about it being the same internally."

Finally, he said, IT shops need to start testing the technologies that underpin the programmable economy. "You're going to need to set up some kind of lab. You can't do this in your standard IT environment. ... Start developing those proofs of concept."

↘ Next Steps

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Another model would be the 'data custodian', an entity contracted by an individual/business to manage storage and retrieval of their shared data according to privacy/security rules. The individual declares which endpoints/roles may have access to the shared data. Data originators would post individual's data to the custodian's database.

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