

Blockchain seen as promising tool in fight against counterfeit parts

The track and trace capability of blockchain will provide a permanent, unchangeable record of components as they are sold in the supply chain

Counterfeit parts have long been a thorn in the side to electronics purchasers, especially during times of shortages when many buyers venture into the open market to purchase components from unauthorized distributors and brokers.

In many cases, buyers purchase components from reliable independent distributors that have invested in test and inspection equipment that help determine if a part is genuine or counterfeit. However, in some cases, buyers end up purchasing bogus parts from unauthorized sources that are not as diligent about the authenticity of parts.

While so far there has been no panacea to solve the counterfeit part problem in electronics, some analysts say blockchain technology will go a long way in stopping the proliferation of counterfeit components. Blockchain allows components to be tracked from the manufacturer to distributors and to OEMs and electronics manufacturing services (EMS) providers. The technology provides complete traceability of the part no matter where it is in the supply chain.

Blockchain is a distributed digital ledger technology that records various transactions

involving a component from the time it is manufactured to when it goes end of life. Blockchain works with other technologies such as QR codes and RFID tags. Blockchain uses cryptography and timestamps that provides a permanent, unchangeable record of all transactions involving the component as it moves through the supply chain. When a component manufacturer builds a part, a blockchain is originated for the component.

Blockchains can be public or private. With a public block chain, there are no restrictions. Anyone with an Internet connection can participate in it. A private block chain is permission based and a person needs to be invited by network administrators join it. In electronics, it is likely blockchain would be private and permission based.

With a blockchain, when a component “comes off a manufacturing line, it gets entered into a ledger process,” said Don Elario, vice president of industry practices for the Electronic Components Industry Association (ECIA). It’s the beginning of the life journey of the part,” he said. “The ledger provides an immutable record of every transaction concerning the part, including where and

when it was sold and where it was shipped. So, if a manufacturer sells the part to a distributor and then the distributor sells the part to an OEM or EMS provider, each transaction would have a time stamped record.

If an OEM or EMS provider decided to sell the part to an independent distributor and that distributor offered the part for sale, a buyer could see every prior transaction involving the part and trace the part back to the component manufacturer. “If I’m a buyer and a member of the blockchain of the electronic component industry and I’m going to buy a component, I will go on that ledger and look up the history of that part before I buy it,” said Elario.

All the data in the block chain will be stored in a data warehouse. The information is in a barcode and is loaded when the component is scanned. “Once the information is in the ledger, it is immutable,” said Elario. “It cannot be changed.” New information is added when the part travels through the supply chain as it is sold.

“It is obviously very important to get information in the ledger correctly” each time the part is sold, said Elario. If a company that is not part



Don Tait, senior analyst blockchain and financial technology for **IHS Markit**



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of the block chain buys the part, the traceability of the component is compromised.

Traceability is key

Many in the electronics industry say the transaction data resulting from the track and trace capability of block chain would be key to thwarting the proliferation of counterfeit parts.

Don Tait, senior analyst blockchain and financial technology with researcher IHS Markit, said the digital ledger of blockchain is the linchpin to anti-counterfeit efforts. With the ledger, a buyer not only sees previous transactions for the part within the supply chain but can see real time data if the part is being shipped across the globe or is at a port. "Any technology that shows that up to date, real-time information will certainly help reduce the number of counterfeit products on the global market just by the nature of its immutability," said Tait.

Blockchain technology was created about 10 years ago years but is still being developed for use in the electronics industry. "Blockchain is in its infancy," said Elario. "There are a lot of use and proof of concepts cases out there that are being coordinated with some very reputable firms, mostly outside of the electronic components," he said. For instance, Walmart implemented a block chain platform to track the goods it sells. If there is a product recall by a manufacturer, Walmart can identify where all the products are in hours rather than weeks.

"Over the last year the interest level in blockchain is much higher" among component manufacturers, distributors, OEMs and electronics manufacturing services providers, said Elario.

Interest is rising because of the track and trace capability that block chain can deliver, said Elario. However, he said he was not aware of "any actual applications that are in distribution or the electronic component industry yet. I do know that there are companies that are involved in use cases, and in the development," he said.

The ECIA has formed a blockchain working group of subject matter experts to study how blockchain could be implemented in the electronics industry. The working group is "looking at use cases and opportunities for our industry," he said.

Elario said if a blockchain is created for the electronics industry "everyone in the industry would probably want to be part of it and have visibility about parts." Block chain participants would be responsible for entering the correct information when they purchase a component. "The beauty of the data it is immutable," said Elario. "It cannot be changed."

No hacking

He said it would be virtually impossible for someone to hack a blockchain. "Everyone is saying they are 99.9 per cent sure of blockchain cannot be hacked. With a block chain ledger there would be numerous entries concerning activity of the part.

"If anyone wanted to hack it, they would absolutely have to change every ledger entry at the same time, at the same point with the same information which is basically impossible," said Elario. "That's what they mean by immutable. The information is right and remain right through the life of the part," he said.

Tait added because blockchain by nature is distributed across nodes in the supply chain

and geographical areas, it is virtually impossible for counterfeiters to hack it or create a counterfeit block chain.

"It could be done in theory but it would take a lot of time and effort set up of a bogus blockchain," he said. "The bad guys are not going to be able to play. If I am a buyer and I see anything in that block chain ledger process that's suspicious, I'm not going to buy that part," said Tait.

While interest in block chain is growing in the electronics industry, it is unknown when it will be deployed. Some companies are offering block chain products and solutions. Tait noted OpenPort, a Hong Kong based company, provides block chain logistics solutions for enterprise supply chain management. Its technology gives its customers enterprise resource planning (ERP) integrated shipment visibility and electronic proof of delivery from a road freight transporter and creates record of events from pick-up to delivery.

IBM offers companies some blockchain solutions including a system-on-a-chip microcomputer and TradeLens, an open and neutral blockchain platform that provides a shared ledger for shipping and logistics companies.

"This year we will move forward as an industry with some use cases, with some companies in the industry that have an appetite to work with some proof of concepts," said Elario. He expects by the end of the year there will be some use proof of concept cases underway with technology companies.

"From there we will learn what the next steps are" for block chain to become a reality in the industry, said Elario. "It's hard to say when



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you will see a live block chain in our industry, but I would definitely say five years is too long," he said.

While many in the electronics industry may be attracted to blockchain because parts can be traced, there are other benefits. Block chain would also provide a lot of other information about parts such as certificates of compliance (CoCs) to regulation environmental laws and regulations such as RoHS and WEEE as well as other regulations concerning components right now.

Such documentation is very "manually driven in the industry and very cost inefficient," said Elario. "Certificates of compliance is very paper intensive driven part of the industry. "Manufacturers have to produce a piece of paper" to

show parts are in compliance with certain regulations and "customers and distributors have to handle the paper," he said. Often teams of people have to be involved with CoC paperwork.

"A lot of that goes away when you can develop a blockchain type solution where the information is accessible to anyone in the block chain," he said. "Blockchain will bring a ton of efficiency to the industry once we get ourselves on the path of implementation," said Elario. Blockchain will also create greater efficiencies in supply-chain management and logistics. "Shipping, inventory and warehouse management, transportation, and bills of landing are just some of the applications that block chain will improve," said Tait. "The key point with blockchain is you have to work out where

it's actually adding value, where it is better than what is currently in place," said Tait.

The efficiency and traceability that blockchain technology will deliver will come at a price. There will be a cost to implement block chain, although right now it is not known how much it would cost or who would have to pay. It is likely that the cost would be spread throughout the supply. Once there is a blockchain in the industry, "I'm guessing there will be some type of fee associated to be part of it," said Elario. There might be a subscription fee or some type of member's fees or dues to be in an electronic components industry block chain for track and trace, he said.

While there will be a cost, "you have to counterbalance that against the cost of doing

nothing with the current system" said Tait. Counterfeit parts cost the semiconductor industry billions of dollars per year. Tait noted that the International Chamber of Commerce estimates that by 2022 counterfeit parts including electronic components and will negatively impact the global economy by \$4.2 trillion and put 5.4 million jobs at risk.

If counterfeiting could be stopped it would obviously be a huge savings for the industry and would pay for the cost of implementing block chain, he said.

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