Julia: **Hello and welcome to this DerivSource podcast.**

I'm Julia Schieffer, the founder and editor of DerivSource.com

Everyone is talking about blockchain technology these days but for many, the applicability of this new technology to financial services, and in particular post-trade processing, is not really well understood. Recently Markit along with seven firms successfully tested blockchain technology and smart contracts to manage the post-trade lifecycle events for standard North American single name credit default swaps (CDS).

This test demonstrated that complex events inherent to CDS, including payments, amendments, novations and compressions, can be efficiently managed on blockchain - in a permissioned, distributed, peer-to-peer network.

So today with me on this podcast I'm speaking with Jeff Billingham Vice president, Markit about this test and really to learn more about how it worked and what the implications are for the OTC derivatives industry at large.

Welcome to the podcast, Jeff.

Jeff: Great to be here Julia, thanks for having me.

Julia: Tell me a little bit about how the seven firms came together to execute this blockchain test and what is the aim, and really why did you choose to use CDS transactions first?

Jeff: It's a great question. I think what attracted us most to the CDS discussion was obviously there's a place where Markit holds a lot of expertise, a large part of the processing franchise began in the credit space. We were looking to leverage that expertise in investigating how we could potentially use blockchain in the OTC contract space. So it was really, for us, about smart contracts. We really liked the team at Axoni; they have proven themselves to us, we have been working with them, we have known them for quite some time. We approached them and said "Listen, we have expertise in the credit space, we see a possibility to investigate how smart contracts might work in a peer—to-peer network. Is this something that you think you, and potentially some of our partners, would be interested in pursuing?"

They had a whole lot of interest in doing that, I mean a whole lot of technical expertise in the blockchain space, and they went out to the banks, some of our dealers, well, mutual clients I would say, so a lot of the biggest dealers in the space, and those who could prove that they could have the time and the technical backup to actually test this in real time. Those were the banks who we decided would be best suited to be a part of this group of concept with us.

Julia: That's great. Tell me about the test, because really how did this test operate and what did it reveal?

Jeff: We started in the credit space, I think because it is a fairly standardised contract upfront so it was an excellent starting point for the industry. I think a lot of people in 2015 sort of looked to blockchain to solve those highly bespoke exotic, maybe lower volume products and contracts out there. And we sort of took it off in a direction and said "Is there something we can find that is fairly standardised upfront but is fairly technical in the backend?" A lot of event processing; credit events, payments, all those kind of things that affect a credit contract, I think that combination was really advantageous for people to, again, have a single point of entry as to actually creating the contract, and then we can look to leverage a blockchain to manage all of the other highly technical post-trade events that happen once you have come to an agreement on your trade.

For us, it certainly revealed that a blockchain is something that can manage contracts, or really agreements between parties, on our behalf. I think it really gave legs to the smart contract term. We hear 'smart contract' thrown around in the blockchain discussion, it's almost a separate ball of wax, but creating the contracts and creating the agreements and then having them exist within this peer-to-peer network, proved to us that all of those interested parties who have contracts with each other can manage those contracts and actually really have ownership and warehouse capabilities of those contracts within a network that they are all part of, as opposed to going to other providers to say "Please store this piece of paper on my behalf, and send me a report to tell me what I owe and what I don't owe, or what I own and what I don't, and when I'm supposed to step out of it, or if I can step out of a contract". All of those things that you need to go to a third party for… Now, because everybody owns, to a certain extent these shared books and records of all of these contracts, they can source these things within the network itself.

Julia: Q. In the press release you mentioned that this test had been successful. Just briefly, what does it mean by it 'being successful'?

Again, the banks Axoni and DTCC, those who were around the table, those people were chosen because they had the expertise and the manpower behind this to really investigate what are the functional requirements to make this a success within a fairly short amount of time. You know, what are the non-functional requirements, to also make this a serious consideration for advancement and scalability in a real-world scenario. I think the test was in excess of 80 different tests to figure out once we've come to an agreement on this trade, can this peer-to-peer network and the processing power required here, can we send it information about a credit event, and can that credit event update all of the contracts in this network? A number of those different tests proved to us that there is sufficient through-put, there is sufficient security, there is a sufficient ability to scale this out to be representative of what we expect a warehouse to do today.

I think the test ultimately proved out to us that the amount of volume that the test itself proved that this would be a viable solution and it could be used in a very short amount of time. People say "When is this going to come to fruition?" This is something that a lot of work needs to be done, but within a matter of months, in a few quarters, we could see this going from something that is very proven concept to something that is potentially very real for the industry.

Julia: **That's great Jeff, because I do feel like a lot of the chatter about blockchain right now is that hypothetical talk, and that's why I think it's great that we're having a conversation about this test, because people really want to see it in practice and the practicalities as to how it can be applied as opposed to just the theory of the technology.**

Sticking with the test a little bit longer, you mentioned what it meant for it to be successful; were there any particular lessons that you learned from this test or maybe surprising findings that you discovered as a result?

Jeff: I think the conversation around throughput is something you hear very frequently in this space. I think people, especially when we talk about digital currencies, people say "Well something akin to Bitcoin is blockchain; you can confirm something around seven transactions a second, and that's not representative of credit card transaction companies. The throughput required there is thousands of transactions a second. This proved to us that, again, having a shared, distributed network of processing power can push through a considerable amount of agreements, can process a number of different bespoke post-trade

events (these can happen simultaneously). So everything I think can happen at a much larger scale than I thought we were going to prove out within the time allotted for this first phase.

Julia: **So, safe to say you were pleasantly surprised.**

Jeff: To certain extent we knew everyone is proving out this technology, right? We have proof of concepts going on, so as to say "Okay, if we all come together in some managed permission network, yes the processing power that we all contribute by running nodes in this network will essentially provide the same sort of architecture that maybe one single provider does today". So, I think the expectation is certainly there, that this works, but this test went a little bit further to say "Okay, we're not just proving it out, but again we're looking at those functional requirements, those non-functional requirements, what are the specific details that are required, especially in the credit markets, to make this a scaleable solution for years to come?" Those were the things that we proved out in addition to having an expectation that this technology architecture is something that yes can work in theory.

Julia: I guess the big question now, really Jeff, is what happens next. Now that you've done these tests, tell me a little bit about what the next steps are.

Jeff: Sure. I think this test shows people again what smart contracts are really all about. What does it mean to have a smart contract exist in a peer-to-peer network? For us, it defines that a number of people in the industry come to an agreement among certain trades. The existence, the authenticity of those agreements, can be maintained in a peer-to-peer network.

All of the data, be it market data or any sort of requirements like an asset transaction or a market transaction or a peer transaction, something like if we have a contract together and I just step out of that contract, there are a number of different elements within the post-trade lifecycle that can be managed very efficiently at a fairly low cost with this blockchain network. I think insofar as it is a cost-cutting discussion, this is most certainly the best way forward looking at those agreements that we had in the OTC space, how can we warehouse those in a peer-to-peer network to manage our cost base? For us at Markit, see the future as a big portion of the blockchain discussion around smart contracts. There's also a conversation around actual digital assets, so how can you create those, create and maintain assets that are natively digital? So, things like cash, digital currencies that aren't run by a central bank, but those are interesting elements that we

would like to explore more.

Julia: Jeff, now that you've done this test, I'm curious if your view or your perspective of how blockchain operates has changed?

Jeff: I think it's affirmed a lot of the concepts that we've built out over the course 2015 at Markit. There's a smart contract or an agreement discussion, there is a digital asset discussion, we've gone to great lengths internally to define those and see what workflows can help really bring those to life. The test here, the proof of concept here was helpful in defining what smart contracts are for us.

It does open up possibilities to investigate what digital assets might be like. Things like just having some sort of concept of credit tokens is very interesting to us. If you look at the way the obligations inside these contract, if you can digitise the obligations, i.e. cash, credit, and securities or equity, if you can actually digitise those things, meaning have them managed in a blockchain of their own and a peer-to-peer network of their own, that is a very sort of compelling solution. To combine those digital assets and somehow obligate those digital assets inside digital contracts, I think it's sort of the future or where we see a lot of blockchain technology moving forward in the next couple of years.

Julia: We've already identified that one of the advantages of using blockchain is cost savings, which you've already mentioned. Were there any other advantages to using blockchain technology in the scenario that you tested that you discovered or that you think is ever increasingly important?

Jeff: The cost saving discussion I think uses blockchain as a utility. That's an excellent way to look at a blockchain network of some sort. How can we create architecture, especially in the financial services industry, that allows us to minimise our costs? Some implications of Bitcoin's blockchain that you can settle something relatively quickly, you can do it without the need or reliance on one single counterparty, and you can do it in a network that is fairly robust because everybody is managing books and records on everybody else's behalf, right. So those characteristics are really excellent answers to some of the cost concerns in the financial services space.

But I think there's a whole other portion of this discussion, which is about taking a potentially more competitive view of what blockchain mean. I looked at Bitcoin's blockchain and I said "Bitcoin's blockchain exists with or without me". It didn't require everybody to come around the table and say "Okay, this is what we want to do". You can see how

something akin to that might work in the financial services space. It could be a very competitive way to say "Let's build the network to secure some kind of asset. It's a company's securities, or is it an

exchange, is there a possibility to somehow incentivise a network to come together to secure assets outside of something like digital currency? And I think that's a very exciting element of this discussion that we're not wholly focused on at this point in time.

Julia: Final question for you Jeff. We've talked about the next step for you at Markit in terms of continuing these tests and where you'd like Blockchain to go, but looking more generally in terms of blockchain in the financial services sector, is there some kind of forward looking view, or how would you like to see the financial services sector evolve in the use of blockchain and smart contracts?

Jeff: That's a great question. I think what's important here is to define proof of concepts as actual product development. We saw this proof of concept was developing smart contracts, which is a real, tangible thing. We talk about collateral optimisation, we talk about liquidity, we talk about clearing… we talk about these sort of… we talk about a lot of these things that aren't necessarily products, they're more the result (or the intended result) of something that is the success of a blockchain network. So we're very focused on digitisation of agreements, i.e. smart contracts, and digitisation of assets, and we say to ourselves "If you can manage what is essentially that operational risk, if you can somehow minimise the cost-base to manage and maintain the assets that you own and the agreements that you are privy to and you can minimise the cost-base to transact those between counterparties, then you can see how you might be able to engender some degree of balance sheet flexibility, so then you can get into that sort of balance sheet risk discussion.

If I'm spending less money just locking up my capital because I don't know when things are going to settle, or I don't necessarily have a clear view as to where my balance sheet is at any given point during the day, if a blockchain allows that to happen you can start to see how collateral might change. And then, if you're able to squeeze out some degree of flexibility with collateral, then you can start to talk about liquidity and how this might affect actual market risk. If I have a degree of flexibility in my balance sheet, you might be able to achieve some degree of risk parity between what is presently very different assets. Things that are just simply illiquid and you can't collateralise right now you might very well be able to do so, but again that's all predicated on what I believe

and what Markit believes is Step I, which is digitisation of assets and digitisation of contracts.

Julia: **Great, I think that's been a very useful chat for our audience who might be coming up to speed with blockchain technology, but I think the analysis that you have conducted through this test is also quite illuminating for how this technology and smart contracts as well can be used in practice. So thank you Jeff for joining us in this podcast.**

Jeff: Thank you so much.

Julia: **I hope you enjoyed this podcast. This is one of many in a series that we are running at the moment on innovation in financial technology.**

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