(http://r3cev.com/press/2016/4/4/microsoft-and-r3-partnership-to-accelerate-adoption-of-distributed-ledger-technology-by-global-banks)
Microsoft and R3 Partnership to Accelerate Adoption of Distributed Ledger Technologies by Global Banks. ×

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R3 POV (/blog/?category=R3+POV)

# Introducing R3 Corda™: A Distributed Ledger Designed for Financial Services (/blog/2016/4/4/introducing-r3-corda-a-distributed-ledger-designed-for-financial-services)

Richard Gendal Brown (/blog/?author=5703dcfce321405cd80239ee) · April 5, 2016
(/blog/2016/4/4/introducing-r3-corda-a-distributed-ledger-designed-for-financial-services)

***A Post by Richard G Brown, Chief Technology Officer, R3***

As reported in Bloomberg (http://www.bloomberg.com/news/articles/2016-04-05/protecting-trade-secrets-challenges-wall-street-blockchain-play)this morning, I'm delighted to confirm that R3 and our member banks are working on a distributed ledger platform for financial services: ***Corda™***.

For the last six months, my team and contributors from our membership have been building a distributed ledger platform prototype from the ground up, specifically designed to manage *financial agreements* between regulated financial institutions. I am massively excited by the progress our team, led by James Carlyle, our Chief Engineer, and Mike Hearn, our Lead Platform Engineer, are making and I think the time is right to share some details.

## Corda: A Distributed Ledger for Recording and Managing Financial Agreements

Corda is a distributed ledger platform designed from the ground up to record, manage and synchronise financial agreements between regulated financial institutions. It is heavily inspired by and captures the benefits of blockchain systems, without the design choices that make blockchains inappropriate for many banking scenarios.

Corda's key features include:

- Corda has no unnecessary global sharing of data: only those parties with a legitimate need to know can see the data within an agreement
- Corda choreographs workflow between firms without a central controller
- Corda achieves consensus between firms at the level of individual deals, not the level of the system
- Corda's design directly enables regulatory and supervisory observer nodes
- Corda transactions are validated by parties to the transaction rather than a broader pool of unrelated validators
- Corda supports a variety of consensus mechanisms
- Corda records an explicit link between human-language legal prose documents and smart contract code
- Corda is built on industry-standard tools
- Corda has no native cryptocurrency

Corda's design is the result of detailed analysis and prototyping with our members and will be open sourced when the code has matured further.

In the remainder of this post, I want to share some insight into our thinking.  Why are we building Corda?  Why have we made some of the design decisions we have?  When will the code be ready for others to examine and build upon? How does this relate to other platforms and projects?

## A thought experiment

When I joined R3 from IBM in September 2015, I forced myself to stop and think.  The blockchain bandwagon was running at full speed, I'd just been appointed CTO of a project intended to bring blockchains to finance but there was a nagging worry at the back of my mind…  how could I avoid falling into the trap of believing all the hype?!

I imagined myself sitting in front of the CIO of one of our member banks some time in the future.  I imagined we had naively selected a "blockchain for finance" based on what was popular at the time and widely deployed a range of products and services on top of it. And I imagined we had believed the hype, had suspended our critical faculties and had omitted any engineering.  In this imagined scenario, I now found myself facing an angry CIO, who wanted to know why the system I had built had just failed calamitously. *Why on earth did I build it the way I did?!*

I concluded that an entirely inappropriate answer to that question would be: "because blockchains were cool in 2015"!  No. That simply won't do.

The reality is that solutions based on selecting the design first and then trying to apply it to arbitrary problems never work out well.  Every successful project I've worked on started with the *requirements,* not some cool piece of technology, and I was determined to bring that discipline into our work at R3.

## Remind me again why a system designed to replace banks is also supposedly their saviour?

And there is a second reason for this caution: the technology and finance industries collectively "decided" some time in early 2015 that "blockchain technology" was somehow the future of financial services.

Indeed, I am one of the most active proponents of precisely that claim. But the *reason* for blockchain technology's importance is extremely subtle – and this subtlety is something that most people seem to have missed.

To understand this, we need to look at Bitcoin.

Bitcoin's architecture, as I have often written, is a marvel.  Its interlocking components are one of those rare examples of something so elegant that they seem obvious in hindsight, yet which required a rare genius to create.

But what is often missed is that the cleverest part of Bitcoin isn't actually its architecture; I think the cleverest part was to articulate the *business problem*.  We don't tend to think of Bitcoin as being the solution to a "business problem" but it can perhaps be thought of as a wonderfully neat solution to the problem of: "how do I create a system where nobody can stop me spending my own money?" Now, I can't claim to know the mind of Satoshi and he certainly didn't write the whitepaper in this way but it triggers a very useful thought-experiment.

In fact, once you write this 'business problem' down, the design drops out almost trivially!  (Almost...) You want always to be able to spend your own money? Then you can't have a central point of control.  It could be shut down by the authorities.  You can't even have a collection of validators with known identities as they could also be shut down with concerted effort.  Very quickly you realise you need a massively replicated consensus system and, if you don't want to tie actions to real-world identities, you need something like Proof of Work to make the voting work.  You work the logic through and pretty much the whole design (the blockchain, the need for mining, block rewards, maybe even the UTXO transaction model, etc., etc.) drops out.  Of course, it does push a lot of work onto the users: confiscation of somebody's bitcoins is easy if you know their private key... but let's leave that to one side for now.

And this way of looking at it is important because it highlights how Bitcoin's blockchain can be thought of as the *solution* to a business problem.  Satoshi Nakamoto didn't wake up one morning wanting to "apply Blockchain to finance".  Blockchain was the tool that was invented to solve a real problem.

So we have a conundrum, right?  If that's the case, then *what on earth* is the argument that says blockchain has *any* relevance at all to banking?!

Indeed, last time I checked, banks have the *inverse* of my Bitcoin problem statement!

## What is the defining characteristic of blockchain systems?

So I spent most of October sitting in a dark room (really! This was our first London office... a tiny four-person room in a shared working space in the City of London) questioning some of the most fundamental assumptions about blockchains.  *What is it exactly that makes them interesting to banks?*

Most people had already made the mental leap that the "bitcoin package" was unacceptable as a take-it-or-leave-it deal: proof of work is unnecessary for private deployments, for example.  But, as I looked around, all I could see was firms who had accepted everything else...  It seemed strange to me that, as an industry, we could tease apart *one* part of the "blockchain bundle" but then stop there.

I spent several of my earlier, formative years at IBM in a role called "technical sales". If you've ever bought technology from a large IT vendor, you'll have met somebody like me. We're the people who visit clients with the sales rep and act as the technical expert: we explain how the product works, make sure we're proposing the right solution to the client and ensure there is no technical barrier to closing the deal.

A lesson I learned very early in that role was: it doesn't matter how hard you wish or how many client meetings you schedule or how aggressive the sales rep gets, if you can't show how your solution is going to solve the client's business problem then the deal almost certainly won't close. And those that do are the ones you'll live to regret...

Fast forward a decade, and as I surveyed the blockchain landscape in October 2015, all I could see was excitable (and vocal!) firms touting solutions that made very little sense to me for the kinds of problems I was trying to solve. I will confess to many moments of self-doubt: maybe they were all sane and *I* was the mad one..?!

But I ploughed on: even if they *are* right that a "take it or leave it" blockchain design is the saviour of the financial industry, I'll be doing our members a favour if I could explain *why*.

So we started picking away at what can perhaps be called the "blockchain bundle": the collection of services that blockchains provide to those who use them.

We concluded that a blockchain such as the ones underlying Bitcoin or Ethereum or any of the private variations actually provide at least five interlocking, but distinct, services. And the right approach is to treat them as a *menu* from which to select and customise... different combinations, in different flavours, for different business problems.

## CONSENSUS

The first, and most important, feature of blockchains – and the thing that is probably genuinely new in terms of scale and scope – is that they create a world where *parties to a shared fact* know that the fact they see is the same as the fact that other stakeholders see:

*"I see what you see... and I know that what I see is what you see"*

And, critically:

*"I know that you know that I know"!*

And:

*"I know that you know that I know that you know..."*

And so on...

And it makes this promise across the Internet between mutually untrusting parties. Sure: consensus systems and replicated state machines have existed for years but consensus systems at Internet scale, between untrusting actors, that work in the face of powerful adversaries? That's a step forward.

In Bitcoin, the shared facts are things like: "What are all the bitcoin (outputs) that have not yet been spent and what needs to happen for them to be validly spent?". And the facts are shared between all full node users.

In Ethereum, the shared fact is the state of an abstract virtual computer.

But notice something interesting: there isn't some law of nature that says the set of people who have to be in consensus is the whole world. Bitcoin just happens to work that way because of its unique business problem. If you don't have Bitcoin's business problem then be very wary of those trying to sell you something that looks like a Bitcoin solution.

## VALIDITY

The second feature in the "blockchain bundle" is *validity*. Tightly linked to consensus, this feature is the one that allows us to know whether a given proposed update to the system is valid. It is how we define the *rules* of the game.  What does a valid "fact" look like in the system?  What does a valid update to that fact look like?

### UNIQUENESS

The third feature in the blockchain bundle is its "uniqueness service".  I can quite easily create two perfectly *valid* updates to a shared fact but if they *conflict* with each other then we need everybody who cares about that fact to know which, if either, of those updates we should select as the one we all agree on.  The "anti-double-spend" feature of blockchains gives us precisely this service and it's hugely important.

### IMMUTABILITY

The fourth feature in the "Blockchain Bundle" is often, if misleadingly, termed "immutability": data, once committed, cannot be changed.

This isn't quite true: if I have a piece of data then *of course* I can change it.  What we actually mean is that: once committed, nobody *else* will accept a transaction from me if it tries to build on a modified version of some data that has already been accepted by other stakeholders.

Blockchains achieve this by having transactions commit to the outputs of previous transactions and have blocks commit to the content of previous blocks.  Each new step can only be valid if it really does build upon an unchangeable body of previous activity.

### AUTHENTICATION

The final critical feature in the "Blockchain Bundle" is authentication: every action in the system is almost always associated with a private key; there is no concept of a "master key" or "administrator password" that gives God-like powers.  This is quite different to traditional enterprise systems where these super-user accounts are prevalent and petrifying from a security perspective.

## So what is the *financial services* business problem?

So why did I take us through this analysis?  Because it gets us to the heart of the distributed ledger domain: the thing that is *genuinely new* is the emergence of platforms, shared across the Internet between mutually distrusting actors, that allow them to reach consensus about the existence and evolution of facts shared between them.

So if that's what this is all about, then what are the "shared facts" that matter in finance? What business problem would we need to have for any of this work to be of any use at all?

And this is the light bulb moment *and the fundamental insight driving the entire Corda project*:

The important "shared facts" between financial institutions are *financial agreements:*

- Bank A and Bank B agree that Bank A owes 1M USD to Bank B, repayable via RTGS on demand.
- *This is a cash demand deposit*
- Bank A and Bank B agree that they are parties to a Credit Default Swap with the following characteristics
- *This is a derivative contract*
- Bank A and Bank B agree that Bank A is obliged to deliver 1000 units of BigCo Common Stock to Bank B in three days' time in exchange for a cash payment of 150k USD
- *This is a delivery-versus-payment agreement*
- … and so on…

The financial industry is pretty much *defined* by the agreements that exist between its firms and these firms share a common problem:  the agreement is typically recorded by *both* parties, in *different* systems and *very large* amounts of cost are caused by the need to fix things when these different systems end up believing different things. Multiple research firms have postulated that tens of billions of dollars are spent each year on this problem.

In particular, these systems typically communicate by exchanging *messages*: I send an update to you and just *hope* you reach the same conclusion about the new state of the agreement that I did. It's why we have to spend so much money on reconciliation to check that we did indeed reach the same conclusions and more money again to deal with all the problems we uncover.

Now imagine we had a system for recording and managing financial agreements that was *shared* across firms, that recorded the agreement consistently and identically, that was visible to the appropriate regulators and which was built on industry-standard tools, with a focus on interoperability and incremental deployment and which didn't leak confidential information to third parties.  A system where one firm could look at its set of agreements with a counterpart and know for sure that:

*"What I see is what you see and we both know that we see the same thing and we both know that this is what has been reported to the regulator"*

That's Corda.

## How does Corda choose from the "Blockchain Bundle" Menu?

So now we understand the financial services requirement, we can look again at the "Blockchain Bundle" menu from above and outline the choices we've made.

### CONSENSUS

A critical piece of the Corda philosophy is that our problem is to ensure that "I know that you see the same details about a shared fact that I see".

But this *does not* mean that a third party down the road also needs to see it: our consensus occurs between parties to deals, not between all participants.

### VALIDITY

Furthermore, in Corda, the only people who need to be in agreement about a fact are the stakeholders to that fact:  if you and I agree about something that pertains only to us then why should we care what some completely unrelated third party thinks?  And why would we even **think** of sending them a copy so they could opine on it? So, in Corda, we let users write their validation logic in time-tested industry-standard tools and we define who needs to be in agreement on a transaction's validity on a contract-by-contract basis.

### UNIQUENESS

Just like every other distributed ledger out there, we need to be sure that two valid, but conflicting, transactions cannot both be simultaneously active in the system.  But we also recognise that different scenarios require different tradeoffs. So Corda's design allows for a range of "uniqueness service" implementations, one of which is a "traditional blockchain". But it doesn't need to be and, for our purposes, we also need implementations that make different tradeoffs under Brewer's CAP theorem (https://en.wikipedia.org/wiki/CAP_theorem): in particular, some financial services use-cases need to prioritise consistency at the expense of availability in the event of a network partition.

### IMMUTABILITY AND AUTHENTICATION

Here, Corda's design departs very little from existing systems: our data structures are immutable and our building block is the exchange of digitally-signed transactions.

So Corda is very traditional in some respects – we directly apply the "authentication", "immutability" and "uniqueness service" features of blockchains but we depart radically when it comes to the scope of "consensus" (parties to individual deals rather than all participants) and "validation" (the legitimate stakeholders to a deal rather than the whole universe or some arbitrary set of 'validators').

## How is Corda Different?

Hang on?  Isn't this the same pitch that every other blockchain firm is making? Not quite.

Notice some of the key things:  firstly, we are *not* building a blockchain.  Unlike other designs in this space, our starting point is individual agreements between firms ("state objects", governed by "contract code" and associated "legal prose").  We reject the notion that all data should be copied to all participants, even if it is encrypted.

Secondly, our focus is on agreements: the need to link to legal prose is considered from the start. We know there will still always be some disputes and we should specify right up front how they will be resolved.

Thirdly, we take into the account the reality of managing financial agreements; we need more than just a consensus system. We need to make it easy to write business logic and integrate with existing code; we need to focus on interoperability. And we need to support the *choreography* between firms as they build up their agreements.

## Different Solutions for Different Problems

But... we should be clear.  We are not viewing Corda as a solution to all problems.  This model is extremely powerful for some use-cases but likely to be less well suited to others.  It's why we continue to engage extremely deeply with all our partners who are working on complementary platforms in this space; we are not omniscient.  Moreover, there are still many significant design and research questions we have to resolve: there is still a great deal of work to do.

Furthermore, I have been deeply impressed by the quality engineering embodied in the many platforms that have passed through our labs and you will continue to hear about projects we are delivering on platforms *other* than Corda: different solutions for different problems is our mantra. Indeed, those who have attended panels or workshops in recent months will have heard me saying this for some time now.

Corda does not seek to compete with or overlap with what other firms are doing:  indeed, we are building it because no other platform out there seeks to solve the problems we're addressing. That's what makes this space so endlessly exciting.

## What next?

In the coming weeks and months, you'll hear more about Corda, about our initial projects and about its design.  We will also be gearing up to release the core platform as open source, possibly as a contribution to other endeavours.  Watch this space.

And... we're still hiring (https://jobs.lever.co/r3cev.com): there is a great deal of work still to do!

Weekend Read (/blog/?category=Weekend+Read)

# The Weekend Read: April 2 (/blog/2016/4/1/the-weekend-read-april-3)

Tim Swanson (/blog/?author=564ca4cce4b09d1f2d439543) · April 2, 2016 (/blog/2016/4/1/the-weekend-read-april-3)


Left-to-Right: High Lizard Buterin, Master Lizard Swanson, Grand Lizard Grant

It’s been a busy week for magic internet money and their cousins, magic internet ledgers.

On the cryptocurrency-side of the world there were a few op-eds related to Bitcoin as an asset class.

- At the beginning of the week David Andolfatto, a VP at the St. Louis Federal Reserve asked, “Is Bitcoin a Safe Asset? (http://andolfatto.blogspot.com/2016/03/is-bitcoin-safe-asset.html)” Andolfatto argues that it could be.

- One of the multiple responses includes Frances Coppola who wrote a counterpoint (http://www.forbes.com/sites/francescoppola/2016/03/31/in-technology-we-trust-maybe/print/) in *Forbes,* that “it is a lousy asset.”

- Independently, Warren Weber, a staff economist at the Bank of Canada, published (http://www.bankofcanada.ca/wp-content/uploads/2016/03/swp2016-14.pdf) a working paper looking at a hypothetical “bitcoin standard” – comparing it in juxtaposition with a “gold standard”.  Spoiler alert: he doesn’t think such a standard would arise for multiple factors including external competition from both the private sector and governments themselves.

- Ethereum, the step-brother that is currently taking some of the spot light from Bitcoin, had a big week too. *The New York Times* did its first full story (http://mobile.nytimes.com/2016/03/28/business/dealbook/ethereum-a-virtual-currency-enables-transactions-that-rival-bitcoins.html) on it and Microsoft announced (http://www.coindesk.com/microsoft-ethereum-3-million-developers/) that developers could now use Visual Studio to write Solidity-based smart contracts.

- Earlier this week, CB Insights (a witty venture tracking firm) held a webinar that covered the "Bitcoin / Blockchain" ecosystem (deck (https://www.cbinsights.com/reports/CB-Insights-BlockchainWebinar-March2016.pdf)) (recording (https://www.cbinsights.com/research-blockchain-webinar-recording)). It provides a good general overview, though I think it lacks a number of recent developments in the overall "Blockchain" capital markets world. For instance, Tradeblock recently launched (https://tradeblock.com/blog/axoni-launches-to-provide-permissioned-ledger-technology) Axoni (a private / permission blockchain) and Peernova isn't really a "Blockchain" company now. And it is a little outdated on the cryptocurrency side of things. For example, Mirror is completely out of the ecosystem altogether, 21inc is basically a software company at this point, Buttercoin is bankrupt and Blockscore shouldn't be included in either bucket.

- Deutsche Bank published (https://www.dbresearch.com/servlet/reweb2.ReWEB?document=PROD0000000000395535&rwnode=DBR_INTERNET_EN-PROD$NAVIGATION&rwobj=ReDisplay.Start.class&rwsite=DBR_INTERNET_EN-PROD) its 6th in a series of posts on talking points related to blockchains.

- The Dutch Central Bank announced (http://www.coindesk.com/dutch-central-bank-to-create-dnbcoin-prototype/) that it was creating a prototype "DNBCoin" to better understand how digital currencies work and the impact a central bank issued digital currency would have on other areas of the financial system.

- CFTC commissioner, J. Christopher Giancarlo gave a keynote speech (http://m.mondovisione.com/media-and-resources/news/special-address-of-cftc-commissioner-j-christopher-giancarlo-before-the-deposit/) at a DTCC event (photos (http://dtcc.com/news/2016/march/31/thought-leaders-gather-at-dtcc-blockchain-symposium)) regarding blockchains. The tl;dr is that the CFTC would like to work with other regulators to "develop a "do no harm" framework" just as regulatory bodies did 20 years ago with the nascent interwebs. For those keeping score at home (not counting the footnotes or title) the phrase: "distributed ledger" appeared 7 times, "blockchain" appeared twice, "DLT" appeared 33 times and "bitcoin" appeared zero times.

- SEC Chair Mary Jo White also briefly mentioned (http://www.sec.gov/news/speech/chair-white-silicon-valley-initiative-3-31-16.html) distributed ledger and blockchain technology in a speech at Stanford this past week as well and noted that, "One key regulatory issue is whether blockchain applications require registration under existing Commission regulatory regimes, such as those for transfer agents or clearing agencies. We are actively exploring these issues and their implications."

- Also on the regtech front, speaking at a Tokyo conference last week, a representative with Japan's Financial Services Agency (FSA) singled out (http://www.coindesk.com/fsa-minister-asia-competitive-edge-blockchain-tech/) distributed ledgers and blockchain technology as

tools for Asia to gain a competitive advantage in financial services.

- Speaking to Risk.net about individually segregated accounts (ISA), Lee Braine, a bank architect with Barclays CTO office, argues (http://www.risk.net/risk-magazine/news/2452707/blockchain-tipped-as-fix-for-margin-segregation) that the industry needs "to come up with an automated solution to help individual segregation, where you could have a plethora of subaccounts, and potentially a shared ledger solution could help with that." (See also: 'Smart' derivatives can cure XVA headaches (http://www.risk.net/risk-magazine/opinion/2422606/-smart-derivatives-can-cure-xva-headaches) by Massimo Morini and Robert Sams.)

- American Banker had a good overview (file:///C:/Users/Emily%20Rutland/AppData/Local/Microsoft/Windows/INetCache/Content.Outlook/QJWQ8UTO/The%20Futu
on identity management efforts connected with banks

- IBM explained (http://www.ibtimes.co.uk/ibm-blockchain-leader-jerry-cuomo-using-shadowchains-launch-moonshots-1551843) where some of the inspiration came for building its Open Blockchain effort.

- And lastly, in the spirit of April 1st, the Ethereum Foundation has formally announced its stealth partnership with R3: Lizardcoin (https://blog.ethereum.org/2016/04/01/ethereum-partners-with-r3cev-on-lizardcoin-bringing-together-the-best-of-centralized-finance-and-blockchain-technology/) (see signing ceremony at top).

R3 POV (/blog/?category=R3+POV)

# Settlement Risks Involving Public Blockchains (/blog/2016/3/30/settlement-risks-involving-public-blockchains)

Tim Swanson (/blog/?author=564ca4cce4b09d1f2d439543) · March 30, 2016 (/blog/2016/3/30/settlement-risks-involving-public-blockchains)

*Entrepreneurs, investors and enthusiasts claim that public blockchains are an acceptable settlement mechanism and layer for financial instruments. But public blockchains by design cannot definitively guarantee settlement finality, and as a result, they are currently not a reliable option for the clearing and settling of financial instruments.*

Over the past several months there has been a crescendo of pronouncements by several cryptocurrency enthusiasts, entrepreneurs and investors claiming that public blockchains, such as Bitcoin and Ethereum, are an acceptable settlement mechanism and layer for financial instruments. Their vision is often coupled with some type of sidechain or watermarked token such as a colored coin (http://r3cev.com/s/Watermarked-tokens-and-pseudonymity-on-public-blockchains-Swanson.pdf).

The problem with these claims and purported technical wizardry is that they ignore the commercial, legal and regulatory requirements and laws surrounding the need for definitive settlement finality.

*For the full article, please visit TabbFORUM (http://tabbforum.com/opinions/settlement-risks-involving-public-blockchains)*

Weekend Read (/blog/?category=Weekend+Read)

# The Weekend Read: Mar 27 (/blog/2016/3/27/the-weekend-read-mar-27)

Todd McDonald (/blog/?author=53f54893e4b0943964d79c0a) · March 27, 2016 (/blog/2016/3/27/the-weekend-read-mar-27)

My kids tried to turn these in for Ether-eggs

I hope that everyone is enjoying the beautiful spring weekend. Due to the light news week and the Easter meal honey-do list awaiting your author, we will egg-roll with a quick hit link list. Enjoy.

- **Linux Foundation Hyperledger Hackathon**: please check out the Github wiki (https://github.com/hyperledger/hyperledger/wiki) for updates on this week's event. CoinDesk review here (http://www.coindesk.com/hyperledger-on-the-verge-of-merging-blockchain-code-from-ibm-digital-asset/). Also released: new Hyperledger whitepaper (https://docs.google.com/document/d/1Z4M_qwILLRehPbVRUsJ3OF8Iir-gqS-ZYe7W-LE9gnE/edit) (mainly based on the IBM OBC whitepaper). Hackathon review deck here (https://docs.google.com/presentation/d/185C9JUICwJQFnf6vH2nOEBNATAVG1XBVY-e-EV6oRSQ/edit?pref=2&pli=1#slide=id.p). As with any open source project, having a wide distribution of voices heard is EXTREMELY important for the long term success of the project, so please check out the community page (https://www.hyperledger.org/community) to find out how you can participate.

- **More RegTech**: 'DNBcoin': the Dutch central bank experiment with a blockchain-based coin (https://www.linkedin.com/pulse/dutch-central-bank-experiment-blockchain-based-simon-lelieveldt)

- **FRBNY on Bitcoin**: Is Bitcoin Really Frictionless?

(http://libertystreeteconomics.newyorkfed.org/2016/03/is-bitcoin-really-frictionless.html#.Vvfnf2QrK2y)

- **International Securities Association For Institutional Trade Communication** (ISITC) event (http://www.coindesk.com/2017-2025-securities-timeline-industry-blockchain/). Thanks for the invite!

- **Dogs and Cats...Living Together (https://www.youtube.com/watch?v=JmzuRXLzqKk)...Mass Hysteria**: Vitalik Buterin Charts Ethereum's Path Forward at Coinbase HQ (http://www.coindesk.com/vitalik-buterin-previews-ethereums-path-forward-at-coinbase-hq/)

Weekend Read (/blog/?category=Weekend+Read)

# The Weekend Read: Mar 20 (/blog/2016/20/3/the-weekend-read)

Todd McDonald (/blog/?author=53f54893e4b0943964d79c0a) · March 20, 2016 (/blog/2016/20/3/the-weekend-read)

## 1. The Economist as un-Hype Man

The Economist is back on the blockchain beat with a pair of short articles. The first (http://www.economist.com/news/finance-and-economics/21695068-distributed-ledgers-are-future-their-advent-will-be-slow-hype-springs) is a pseudo-cold shower for the enthusiasm within financial services to "put a blockchain on it (https://www.youtube.com/watch?v=iHmLljk2t8M)," lead by a quote from the Blockchain Beard (https://twitter.com/sytaylor) himself. The article ends on a more hopeful note:

> *Yet it would be wrong to conclude that the blockchain is no more than a fad. It is merely moving through the same hype cycle as other next-big-things have done before it: inflated expectations are followed by disillusionment before a technology eventually finds its place. Although it will take a while for distributed ledgers to rule the world, they are an idea, to paraphrase Victor Hugo, that will be hard to resist.*

The second (http://www.economist.com/news/finance-and-economics/21695088-even-central-bankers-are-excited-about-blockchain-redistributed-ledger) outlines the nascent love affair between central bankers and distributed ledgers: our oft-cited Regtech theme which we will discuss further down the page. The article does end with a nice crypto-libertarian head exploder: "The technology first developed to free money from the grip of central bankers may soon be used to tighten their control."

## 2. Good News

A warm welcome to SBI Holdings as our newest (https://www.finextra.com/pressarticle/63543/sbi-holdings-to-join-r3-blockchain-consortium/wholesale) R3 member institution. It is great to have their team on board, as SBI has been quite active in the ledger space, including their recent JV (http://www.coindesk.com/sbi-holdings-ripple-new-company/) with Ripple to create SBI Ripple

Asia. Another member bank, Unicredit, recently released a white paper (http://www.coindesk.com/unicredit-white-paper-explores-blockchain-uses-for-bank-payments-post-trade-processes/) discussing the potential applications of blockchain tech to financial services. The authors Matteo and Vittorio have a wealth of hands-on experience to draw from and the paper is well worth a read in full. And a congrats as well to the TradeBlock team for their recent announcement (http://www.ibtimes.co.uk/icap-completes-blockchain-technology-test-1549595) of a successful PoC with ICAP as well as their new sister company Axoni.

## 3. Regtech and Identity

The US Dept of Homeland Security (DHS) recently announced (https://www.cryptocoinsnews.com/department-of-homeland-security-wants-blockchain-applications/) requests for proposals in two blockchain related areas. One area is not too surprising: "Blockchain Applications for Homeland Security Analytics." But the other one ("Applicability of Blockchain Technology to Privacy Respecting Identity Management") truly piques my interest, both for their desire to learn more about identity management and in their concern to respect privacy!

Continuing the identity theme, Barclays announced (https://www.finextra.com/newsarticle/28636/barclays-launches-identity-service-for-access-to-online-government) that they are "one [of] a group of nine companies certified by Gov.UK.Verify to supply and manage public IDs for services." The Gov.Verify program has had some ups and downs, but the effort to create a digital identity service (http://www.barclays.co.uk/identity), if only for government services, should be commended. Speaking of the UK government, we have yet another article (http://www.bloomberg.com/news/articles/2016-03-16/britain-rethinks-cash-in-race-osborne-can-t-afford-to-lose) touting their aggressive push towards central bank digital currency as part of the government's fintech hub strategy: "The speed with which the digital-currency agenda has captured the imagination of U.K. officials hints at its potential strategic value for both central banking and the economy."

...and finally, an article (https://stratechery.com/2016/bitcoin-and-diversity/) that I missed from last week by the always excellent Ben Thompson at Stratechery. The post is nominally about the block size debate, yet it is more a meditation on how a lack of diversity within tech can lead to blind spots in decision making:

> *Ultimately, I don't know what will happen to Bitcoin, but I'm skeptical of folks who are attracted to it because it allegedly removes humans from the equation: that is and always has been an idea that only makes sense in the very narrowest view of a single Bitcoin transaction, as we are seeing all too clearly in the community's inability to address a relatively minor issue.*

> *More broadly, I hope that the fundamental humanity that goes into any decision — product, policy, or otherwise — is appreciated by everyone in tech. Just as products and companies are either growing or dying, so too efforts to make the technology industry more accurately reflect, and thus better serve (and better monetize!) the diversity of the human race, are either explicitly improving the status quo or implicitly embracing it. There are no neutral "rules."*

Weekend Read (/blog/?category=Weekend+Read)

# The Weekend Read: Mar 13 (/blog/2016/3/13/the-weekend-re)

Todd McDonald (/blog/?author=53f54893e4b0943964d79c0a) · March 13, 2016
(/blog/2016/3/13/the-weekend-re)

# 1. Regtech (cont)

Thanks to Kathleen B for filling in for me last week. We return once again to the Regtech theme. ESMA Executive Director Verena Ross delivered this speech (https://www.esma.europa.eu/sites/default/files/library/2016-345_financial_innovation_towards_a_balanced_regulatory_response_-_speech_by_v._ross_0.pdf) to the recent Bank of England event, highlighting what ESMA has learned form their recent call for evidence:

> *We have found that clearing and settlement, collateral management, record of ownership and securities servicing are the areas where the technology is most likely to bring useful changes. It does so through the provision of a unique reference database, instantaneous reconciliation across all participants, immutable shared records and transparent real-time data.*

A review of the speech can be found here (https://www.finextra.com/newsarticle/28599/esma-expresses-case-for-and-against-distributed-ledgers-in-post-trade-markets).

Bank of England continues to explore the idea of central bank digital currency, which includes the research (https://www.technologyreview.com/s/600980/a-bitcoin-style-currency-for-central-banks/) put forward recently by researchers Sarah Meiklejohn and George Danezis at University College London, dubbed "RSCoin":

> *RSCoin's ledger is solely in the hands of the central bank, which would also retain a special encryption key that could be used to control the money supply—for example, to take actions like the quantitative easing programs the Federal Reserve and other central banks put in place after the 2008 financial crisis.*

> *A small collection of third-party organizations would be chosen by the central bank to process new transactions and submit them for inclusion in the central ledger. Meiklejohn says it would make sense for large commercial banks to play that role. RSCoin's centralized design, she says, means it can handle very large numbers of transactions, unlike Bitcoin.*

# 2. R3 In The News

It was a busy week for R3 news stories. R3's Charley Cooper attended the above BoE event and a few of his comments are included in this rundown (http://uk.reuters.com/article/uk-boe-banks-tech-idUKKCN0W91QK). Charley also features in this WSJ CIO Journal story (http://blogs.wsj.com/cio/2016/03/09/public-vs-private-blockchain-sparks-emotional-debate/) on the public/private blockchain debate. Our Lab Legend Tim Grant spoke with CoinDesk (http://www.coindesk.com/r3-biggest-ever-blockchain-trial-is-only-the-beginning/) this week to give some further detail to our recent blockchain trials. R3's Ian Grigg participated on a panel in London earlier this week, which the IBTimes summarizes in this story (http://www.ibtimes.co.uk/r3-blockchain-architect-ian-grigg-its-not-binary-choice-between-fully-permissioned-fully-1548562). And finally, ICYMI, have a read of Kathleen's latest R3 POV post entitled *Colored Coins: Bitcoin's Specter Haunts Capital Markets (http://r3cev.com/blog/2016/3/10/crohm762dezrriuferri4cpocrau8q).*

# 3. Odds n Ends

Vitalik Buterin details the pros and cons to the UTXO model (https://medium.com/@ConsenSys/thoughts-on-utxo-by-vitalik-buterin-2bb782c67e53#.s1y72uyjb) in relation to the open source Hyperledger project.

Airbnb potentially exploring a blockchain based reputation system (https://thestack.com/security/2016/03/09/what-airbnbs-blockchain-authentication-proposal-means-for-privacy-online/).

I for one welcome our AI overlords: Google DeepMind beats a human at Go (http://www.theverge.com/2016/3/13/11184328/alphago-deepmind-go-match-4-result)!

R3 POV (/blog/?category=R3+POV)

# Colored Coins: Bitcoin's Specter Haunts Capital Markets (/blog/2016/3/10/crohm762dezrriuferri4cpocrau8q

Kathleen B (/blog/?author=56be05e83c44d8873efbac49) · March 10, 2016
(/blog/2016/3/10/crohm762dezrriuferri4cpocrau8q)

At R3, our team of engineers are in constant collaboration with the financial services professionals at our 42 member banks.  Most of our work entails marrying requirements with development execution to satisfy the standards of our consortium.

Though we cannot claim a monopoly on expertise in distributed ledgers or capital markets, we have begun to eliminate certain approaches to any financial-grade software solutions. Upon examining the distributed ledger landscape, we've found that the most saliently unsuitable application of distributed ledger technology is also one of the most popular: colored coins.

Colored coins are Bitcoin transactions which carry particular meanings. Since every transaction is traceable in Bitcoin, you can designate certain coins and say that each one represents an asset. Transaction participants can then trade each coin with purported finality.

In their original conception, colored coins inherited all of Bitcoin's properties. For capital markets applications, this is problematic since Bitcoin's cryptocurrency design is optimized for an open system where anonymous participants are potentially hostile. Bitcoin employs some unique design choices, such as anonymous consensus for miners and a purposefully costly transaction validation scheme, to achieve this feat. Bitcoin provides users with a number of features, yet many of these features become redundant if a required solution does not want to resist censorship.

In private applications of colored coins, the code base can be amended to engineer away less desirable features in Bitcoin. It's our belief, however, that patching over a codebase built to power a censorship-resistant cryptocurrency is not the basis of any serious application in capital markets. Standardizing on a colored coin solution despite its origins betrays a desire to get to market as fast as possible, which is bound to happen at the expense of quality.

(https://medium.com/@arthurb/making-sense-of-colored-coins-c0a9e3459b1e#.iptc5if3s)

Colored Car...or an alternate development of the trucking industry inspired by colored coins

Colored coin solutions replicate the "move fast and break things" attitude common to Silicon Valley rather than being designed in a way that best addresses the problem they seek to solve. The multiple hacks on Bitcoin exchanges through the years attest to the inadequacy of this approach when millions, let alone billions, of dollars are at stake.

Executives don't need to be ace developers to intuit why colored coins are insufficient for financial services software applications. A software which proposes to transform the capital markets infrastructure ought to be built from the ground up with the needs of institutions in mind, not retrofitted from another code base. Even if developers of colored coin solutions find hacks to patch deficiencies in Bitcoin's code when creating a capital markets application, it seems nonsensical to trust the development of critical infrastructure to developers which opt for tweaking over building.

Weekend Read (/blog/?category=Weekend+Read)

# The Weekend Read: March 6 (/blog/2016/3/5/the-weekend-read-march-6)

Kathleen B (/blog/?author=56be05e83c44d8873efbac49) · March 6, 2016
(/blog/2016/3/5/the-weekend-read-march-6)

*[Todd is busy soaking up the sun in greener pastures for the weekend. This edition of The Weekend Read is brought to you by Kathleen Breitman, a Strategy Associate at R3.]*

**1. In the Beginning**

A big shout-out and congratulations to our Lab team for putting the rubber to the road with Project Genesis (http://r3cev.com/press/2016/3/3/r3-completes-trial-of-five-cloud-based-emerging-blockchain-technologies-with-40-bank-consortium-members):

> "[40 banks] connected to R3-managed private distributed ledger technologies built by Chain, Eris Industries, Ethereum, IBM and Intel. They evaluated the strengths and weaknesses of each technology by running smart contracts that were programmed to facilitate issuance, secondary trading and redemption of commercial paper, a short-term fixed income security typically issued by corporations to raise funding.
>
> Each of the distributed ledgers ran a smart contract based on identical business logic to enable the banks to accurately compare the difference in performance between them. Cloud computing resources were provided by Microsoft Azure, IBM Cloud and Amazon AWS to host the distributed ledgers."

Genesis is a modest feat relative to our ambitions, but it's a critical stepping stone in realizing the (ambitious (http://www.forbes.com/sites/georgehoward/2016/02/15/how-blockchain-could-

help-kanye-use-facebook-to-get-out-of-debt-and-solve-facebooks-video-problem/#6c129e8755e2), much hyped (http://www.economist.com/news/special-report/21650295-or-it-next-big-thing)) promise of distributed ledger technology.

**2. Into the Ether**

Vitalik Buterin conducted a very interesting interview (https://news.bitcoin.com/vitalik-buterin-ethereums-price-rise-increases-our-sovereignty/), published Thursday, where he discusses his progress with Ethereum and some potential directions the project will take. Most interesting to me:

> "BC: When will the issuance of Ether taper off?
>
> VB: We are planning a proof of stake switch early next year, which will greatly reduce issuance, likely to 0-2m per year."

Over the past week, the price of Ether has almost doubled while BTC fell 10%. The price of ETH has been correlated to BTC but the two have uncoupled. This pattern hasn't traditionally happened with an alt coin and it may signal more direct competition between the two.



[Data Courtesy of Coinmarketcap.com]

At present, it looks like ETH is bucking the trend of most alt coins. That said, this could also be a temporary liquidity issue due to ETH primarily being traded for BTC.

**3. On Truth and Lies and "Blockchain"**

Computer scientists will tell you that blockchains are not a particularly new application of distributed ledger technology or cryptographic methods. And, though scores of "innovation experts" will tell you otherwise, blockchains are only good for a select subset of business problems. In a closed network, most use cases would be better served by a distributed ledger or a centralized database.

While I appreciate the factual bases of frustration with this newfound interest in "blockchain", I think it's fantastic to see many executives start to rethink their approach to data and technology. I try to employ precision in my word choice but, if I have to use the word "blockchain" to communicate a better way to approach a problem, I'm happy to forgo my pedantic inclinations and keep the big picture in mind.

That said, I do have grievances. Over the past year, I've enjoyed talking to many businesspeople about the potential of distributed ledgers and how they can help solve problems. Since my sojourn began, I've seen the word "blockchain" evolve from a way to describe the bundling, validation and ordering of transactions, to a way of describing distributed ledger technology broadly. Now, however, "blockchain" has become a catchall for new technology. (Selected turns of phrase now include: "How are you approaching blockchain?" "Are you ready for blockchain?") In an effort to preserve the word's meaning, I have created a table for interpreting "blockchain talk":

| Blockchain Talk | Recommended Interpretation |
|---|---|
| "Blockchain for enterprise" | Distributed ledger (usually) |
| "Internal blockchain" | Correct by construction database |
| "Ledgerless blockchain" | Timestamping service |
| "Blockchain is run on advanced cryptography" | Ask this person to define a hash function |
| "What's your strategy for Blockchain?" | Delete this email |

**Administrative Announcement**

I'm speaking at the MIT Bitcoin Expo (http://mitbitcoinexpo.org/) this Sunday. Please don't hesitate to say "hello" or drop me a line if you will be there!

Weekend Read (/blog/?category=Weekend+Read)

# The Weekend Read: Feb 28 (/blog/2016/2/28/the-weekend-read-feb-28)

Todd McDonald (/blog/?author=53f54893e4b0943964d79c0a) · February 28, 2016 (/blog/2016/2/28/the-weekend-read-feb-28)

## 1. The Straw Man of Tabb

Larry Tabb has released a (paid) report entitled *Blockchain Clearing and Settlement: Crossing the Chasm* (https://research.tabbgroup.com/report/v14-009-blockchain-clearing-and-settlement-crossing-chasm). I have read a few summaries and excerpts (here (http://tabbforum.com/opinions/is-blockchain-the-holy-grail-for-capital-markets) here (http://ftalphaville.ft.com/2016/02/26/2154510/blockchain-and-the-holy-real-time-settlement-grail/) and here (http://www.efinancialnews.com/story/2016-02-22/blockchain-challenges-according-to-larry-tabb?mod=home-news)) yet not the full report...so at the risk of attacking a straw man of a straw man: the arguments noted against using a blockchain seem to assume a version of the technology forever stuck in 2015.  There (seems to be) no concept of different versions or applications of shared ledgers that account for the issues raised. Drop us a line if you want to chat Larry.

The Brookings Institute released part 2 (http://www.brookings.edu/blogs/up-front/posts/2016/02/25-bitcoin-explainer) of their summary of the recent Hutchins Center conference this week. This is welcome news, as it gives me another excuse to showcase my favorite meme featuring our very own Charley Cooper, aka "Scared Banker Guy":


Ripple released a report (https://ripple.com/files/xrp_cost_model_paper.pdf) earlier this week that goes into detail on how their protocol can save costs in global interbank settlement. Interestingly (http://www.coindesk.com/ripple-banks-42-percent-international-payments/), the report segments the solution, showcasing both Ripple and Ripple+XRP.

## 2. RegTech

Back by popular demand (of one reader (https://twitter.com/jony_levin) at least), more snippets of RegTech news. CFTC hosted a rescheduled Tech Advisory Committee meeting this week, featuring one section on blockchain. This article (http://news.medill.northwestern.edu/chicago/blockchain-could-decentralize-clearinghouses-regulators-take-notice/) gives a good review of the discussion:

> *Brad Levy, CEO of financial information firm MarkitSERV, told regulators during this week's meeting that he believes operational risks and costs could be immediately reduced by implementing blockchain technology in an exchange setting.*

> *But such a network would and should look quite different from the Bitcoin network, Levy said, characterizing the cryptocurrency's users as favoring anonymity. "We don't think that that's necessarily the model that our industry will adopt," he added. "Identity will be key." Along those lines, Levy assured the CFTC that he would expect regulators to gain more immediate access to trade data under a blockchain system. "We think about the regulators as a node. …. They themselves become part of the network and have their own permission-ing, based on whatever rights they're supposed to have as regulators," Levy said.*

The RBA follows the lead of other CBs by making a few positive comments (http://www.smh.com.au/business/banking-and-finance/reserve-bank-says-australian-dollars-could-come-in-digital-form-in-future-20160223-gn0zxx.html) towards the idea of CB issued digital currency:

> *"A plausible model would be that issuance would be by the central bank, with distribution and transaction verification by authorised entities, which might or might not include existing financial institutions," Mr Richards said. "The digital currency would presumably circulate in parallel, and at par, with banknotes and other existing forms of the national currency."*

Finally, the FCA checks back in to update (https://www.finextra.com/newsarticle/28514/fca-to-extend-innovation-hub-advance--research-into-blockchain-tech) the good progress made so far on their Innovation Hub initiative:

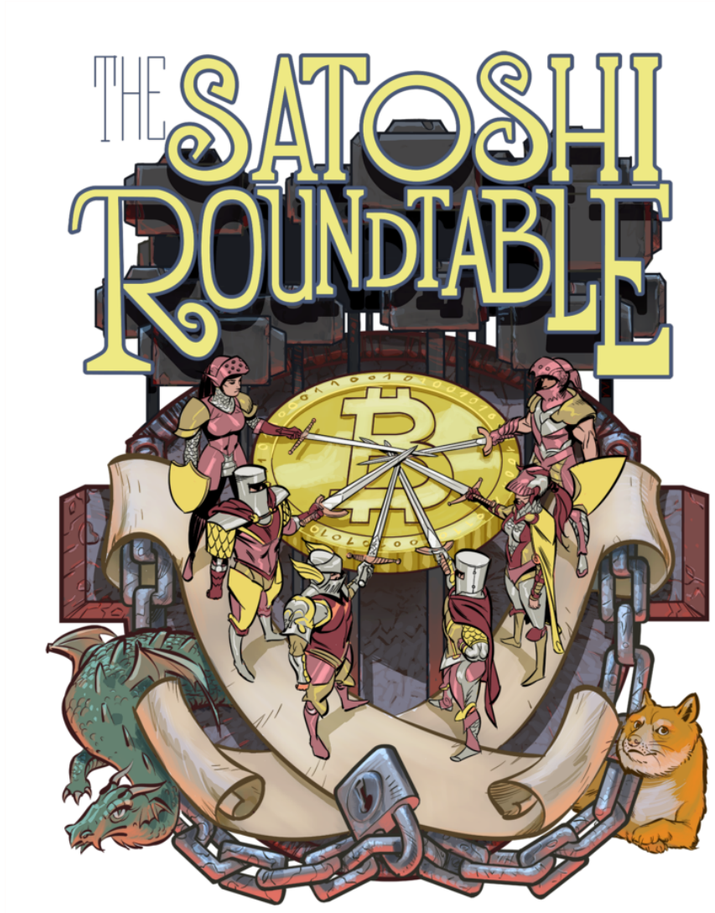
> *[Christopher Woolard, director of strategy and competition] says the FCA is particularly interested in exploring whether blockchain technology can help firms meet know your customer or anti-money laundering requirements more efficiently and effectively, concluding: "We are engaged in discussions with government and industry on this issue."*

## 3. Bitcoin to the Core

Joi Ito chimed in this week (http://joi.ito.com/weblog/2016/02/22/my-view-on-the-.html) with his thoughts on the block size debate, casting Bitcoin Core in a light similar to a salon of fin de siecle artists:

> *The future of Bitcoin, decentralized ledgers and other Blockchain-like projects depends on this community. Many people call them "Bitcoin Core" as if they are some sort of company you can fire or a random set of developers with skills that you can just train others to acquire. They're not. They're more like artists, scientists and precision engineers who have built a shared culture and language. To look for another group of people to do what they do would be like asking web designers to launch a space shuttle. You can't FIRE a community and, statistically speaking, the people working on the Bitcoin ARE the community.*

American Banker has a lengthy profile (http://www.americanbanker.com/news/bank-technology/from-toxic-assets-to-digital-currency-barry-silberts-bold-bet-1079246-1.html?zkPrintable=1&nopagination=1) on Barry Silbert (with some quotes by the Swanny as well), concluding with this: "Within five years, he predicts, bitcoin either 'will be a failed experiment, and something else will have taken its place, or it will be eating the world.'" Perhaps those at the invite-only Satoshi Roundtable (http://satoshiroundtable.org/) will be doing the eating, and not just the kind that their all-inclusive resort bracelet will get them during their retreat...As the Satoshi Whitepaper says: "We propose a solution to the double-spending problem using a peer-to-peer network coupled with annual, private, mostly male, retreats for libertarian celebrities."




One can hope it is meant to be ironic...

Weekend Read (/blog/?category=Weekend+Read)

# The Weekend Read: Feb 21 (/blog/2016/2/21/the-weekend-read-

# feb-21)

Todd McDonald (/blog/?author=53f54893e4b0943964d79c0a) · February 21, 2016 (/blog/2016/2/21/the-weekend-read-feb-21)

Another stark reminder of a breakdown in governance...

## 1. Bitcoin Bun Fight

The he-said, he-said battle for Bitcoin's soul continues. Earlier this week, the research group IC3 released a paper (http://fc16.ifca.ai/bitcoin/papers/CDE+16.pdf) describing the challenge faced by Bitcoin to scale in any meaningful way, with any block size increase being seen as "only a first increment" to a solution. This Tech Review article (https://www.technologyreview.com/s/600781/technical-roadblock-might-shatter-bitcoin-dreams/) gives a good overview of the group's opinion that block size changes are just the start: “The current debate is missing the forest for the trees,” says Juels. “We have to think in terms of a fundamental redesign if we’re going to see robust scaling in Bitcoin.”

BitTorrent inventor Bram Cohen has an excellent post on Quora (https://www.quora.com/What-is-the-state-of-Bitcoin-in-2016/answer/Bram-Cohen) that succinctly covers the challenges, opportunity and harsh reality for Bitcoin today. I will skip summarizing and urge you to read it in full, but wanted to highlight this passage, emphasis added:

> *Bitcoin as a provider of real service doesn't seem to be going anywhere. Mass consumer adoption isn't happening, and there isn't much reason for it to. [snip] If you don't have either of those problems [blacklisted transactions or frozen accounts] Bitcoin is more expensive and inconvenient than regular banking is, and far more expensive and inconvenient than regular banking could be* ***if it starts supporting smart transactions on public ledgers without bothering with the baggage of mining****.*

Luckily though, Bitcoin Inc *finally* came to consensus on a near term roadmap (https://medium.com/@bitcoinroundtable/bitcoin-roundtable-consensus-266d475a61ff#.p5aesln97) at the latest Scaling Bitcoin meeting in Hong Kong, which kinda sorta agrees to think about a hard fork in 2017 if, maybe, we will see...The news was met with a price bump in BTC but also skepticism from within Blockstream, as one of their own speak

(https://np.reddit.com/r/Bitcoin/comments/46po4l/we_have_consensus_in_april_we_get_sw_3_months/d074dh7)s out against the accord, as well as a rebuttal by Coinbase (https://medium.com/@bitcoinroundtable/bitcoin-roundtable-consensus-266d475a61ff#.p5aesln97) and Xapo (https://twitter.com/wences/status/701188674126352385). Looks like Punxsutawney (http://www.npr.org/sections/thetwo-way/2016/02/02/465253970/groundhog-day-punxsutawney-phil-did-not-see-his-shadow) Satoshi saw his shadow after all and we are in for more interminable weeks of this debate.

## 2. Linux Foundation

The recently announced Linux Foundation Open Ledger Project has been rechristened to the Hyperledger Project (https://www.hyperledger.org/). The above trials and tribulations around implicit governance within the Bitcoin community serve as a sobering reminder of the challenge to successfully establish and nurture a multi-stakeholder open source codebase. You can visit the project's github repo here (https://github.com/hyperledger/hyperledger) to review the four initial contributions. R3 will be participating in this hard work, as both members of the project's board (https://www.hyperledger.org/about/board-members) and technical steering committee (https://www.hyperledger.org/about/tsc). As DTCC's chief technical architect Rob Palatnik says in this Wired article (http://www.wired.com/2016/02/wall-street-is-embracing-the-blockchain-its-biggest-threat/):

> *If the financial industry is to get ahead of the tech curve, he explains, it must do so in a considered and collaborative way. Given the very nature of blockchain technology, this collaborative approach is the right idea. If a company builds a blockchain-like system inside its own organization, that's only so useful. The real power of the blockchain is as a distributed ledger that's outside of the control of any one organization—a ledger that keeps, as Palatnick calls it, "a single indisputable version of the truth."*

## 3. Banks and Blockchain (cont)

Bloomberg has another heartwarming and uplifting piece (http://www.bloomberg.com/news/features/2016-02-16/european-bank-nightmare-far-from-over-as-fines-and-fintech-loom) about the implosion of banks, this time focused on European banks. No pull quotes from the article will be posted here as this is a family friendly blog...This macro backdrop will only heighten the focus for banks to find ways to cut costs and reduce the burden of regulatory compliance.

Capco and Finextra released an interesting report (https://www.finextra.com/newsarticle/28468/bank-cost-cutting-driving-uptake-of-financial-industry-utilities---finextra-research?utm_medium=twitter&utm_source=dlvr.it) on how this feeds into the push towards "utility-based shared service models." The interesting angle for distributed ledgers in the utility model is that the technology has the *promise* to address what Capco outlines as the key obstacles to utility uptake: standardization hurdles, data security and (most importantly in my eyes) the concern of losing fair access or fair control over the shared utility. This last point is very important, as DLT can balance the political control within the utility by distributing it across the participants (versus the old model of anointing a central operator).

Yet cost cutting is one side of the equation. George Samman reviews his initial thought on the more hopeful angle of new revenue generation in his recent blog post (http://sammantics.com/blog/2016/2/16/revenue-generating-vs-cost-cutting). His view is that it all comes back to smart contracts, as he references to R3's Kathleen Breitman's inaugural POV post *The Problem with "The Problem with Oracles"* (http://r3cev.com/blog/2016/2/16/the-problem-with-the-problem-with-oracles):

*There have been many estimates about the potential cost savings from "blockchain" and/or distributed ledger technology in capital markets. Many of these figures are driven by the assumption that ledger integration will automate or obviate the need for many back office processes. At present, the use of smart contract-enabled distributed ledgers are the best way to introduce this automation, making them an attractive area of focus for financial institutions.*

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