Blockchain Overview

A Framework for Understanding Blockchain & the Key Use Cases

11FS

My Background at Barclays

- Started looking at Blockchain “side of desk” in early 2014
- Became officially full time October 2014
- Identified now over 60x use cases, completed 20 experiments and now moving into develop pilots
- Founder member of R3 consortium
- April 2016 became the first UK bank to offer accounts to Blockchain companies
- PoCs and Accelerator companies…

everledger CHAINALYSIS Tallysticks safello WAVE

Today we're going to talk about

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What is Bitcoin?

What is Ethereum?

What is Blockchain?

What is DLT?

Why is the price of crypto skyrocketing?

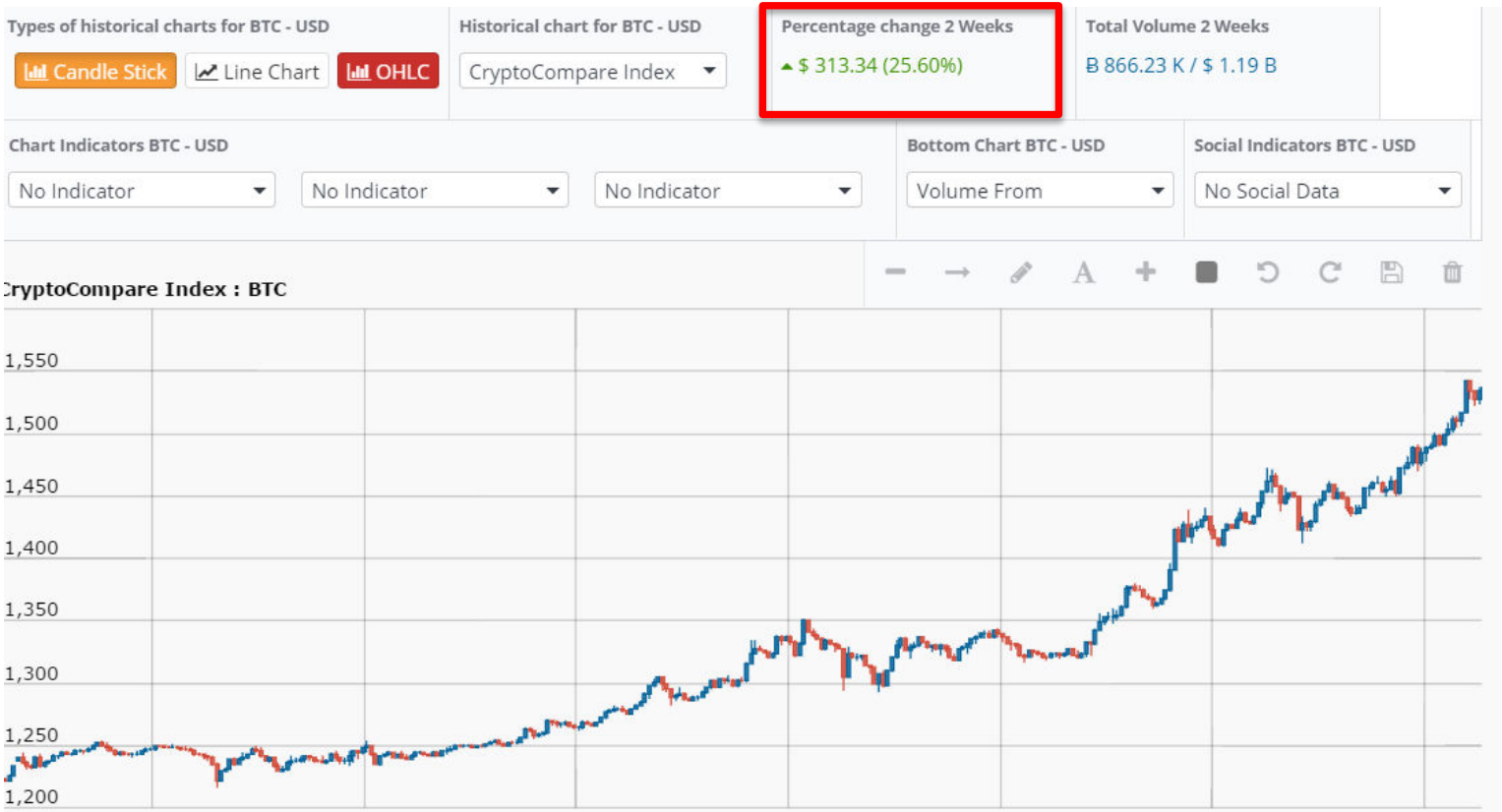
Impact on Industry

Industry Use cases

Why everyone has a different opinion on what's going on

Too Much of This…

$1,800 Bitcoin price 😱



You're gonna say – but doesn't that just mean it's super volatile and doesn't function as a currency…

and I'm going to say I don't care…

The fact is Bitcoin is still a thing and still growing 6 years on…

I was one of the first to say I like the tech not currency though for good reason…

How much is an Ether these days?

So what if a magical cryptocurrency is $87? Well consider it's presale in 2015 launched at $1…

Even if that crashes that's phenomenal

Unlike most things in start-up land the general public can play here…

But it's largely outside of regulation

Exchanges do KYC and make efforts to be fit regulation but consumer protection is weak

What is an ICO

ICO stands for “Initial Coin Offering” and is the catch all term given to a new fund raising mechanism being used by Blockchain projects.

Instead of raising venture capital from investors, they offer a “coin”, similar to a Bitcoin that anyone can buy on a public exchange.

Part kickstarter, part IPO

https://www.smithandcrown.com/icos/

https://www.coinbase.com/legal/securities-law-framework.pdf

Some takeaways;

1. This is where the genuine innovation is happening, but also the most regulatory risk – pay close attention
2. My rule is never put anything (personally) into a crypto asset you wouldn’t be willing to lose in Vegas
3. If you’re a large company – the next slide is going to be more directly informative to strategy in the short term
4. If you’re thinking about leaving a large company to do something exciting – ICOs are steadily becoming legitimised in the way crowd funding did

In Other News

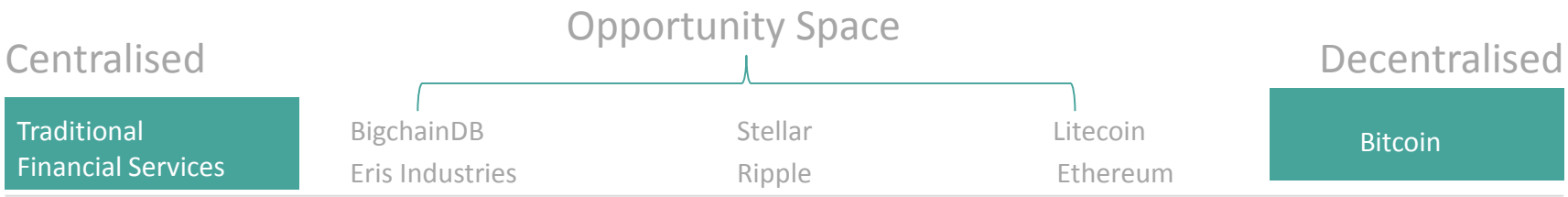
- JP Morgan Leaves R3
- Ripple joins BOE accelerator
- London Markets Target Operating Model
- Canadian Banks are trialling Blockchain identity programme http://www.coindesk.com/us-credit-raters-canada-banks-blockchain/
- Lockheed Martin are live with a “Blockchain” from Guardtime http://www.coindesk.com/defense-giant-lockheed-martin-integrates-blockchain/
- R3 now has 10+ regulators on board http://www.coindesk.com/r3s-newest-regulator-looks-dlt-kyc-testing/
- The ECB has backed away from regulating DLT http://www.coindesk.com/ecb-blockchain-principles-spur-adoption/
- Northern Trust and BNPP are live with DLT offerings

Custodian Market Use Cases

- Northern Trust: Reducing the cost of Private Equity administration
  - How: by giving transparent access to the data on IBM's Hyperledger (DLT) and using cloud and cryptography chips to secure the data
  - Benefit: **Cost Reduction** PE analysts get the data faster, more efficiently and at lower operating costs for NT
  - https://www.northerntrust.com/about-us/news/press-release?c=70b5ba1adc9928f9977162844c34f57a
- BNP Paribas: Issuing Micro Bonds
  - How: After the French Government opened up to crowd funding companies, BNP launched a new platform using Distributed Ledger to support a low cost bond issuance platform
  - Benefit: **New Revenue** smaller companies can now issue bonds because the issuance cost is dramatically reduced
  - https://group.bnpparibas/en/press-release/bnp-paribas-securities-services-expands-blockchain-platform-private-stocks
- BNY Mellon (among many other things… Search "BNY Blockchain"): Replacing Disaster Recovery with Distributed Ledger
  - How: Internal development team created from open source code
  - Benefit: **Reduce Cost** in the first instance of own back ups, and potentially offer to clients as a solution
  - http://www.coindesk.com/bny-mellon-backing-bank-transactions-blockchain-tech/
- State Street: Securities Lending – increased collateral efficiency http://fortune.com/2016/12/21/state-street-blockchain/
- State Street: Entire 2017 Strategy - http://www.coindesk.com/state-streets-blockchain-strategy-big-and-bold-for-2017/

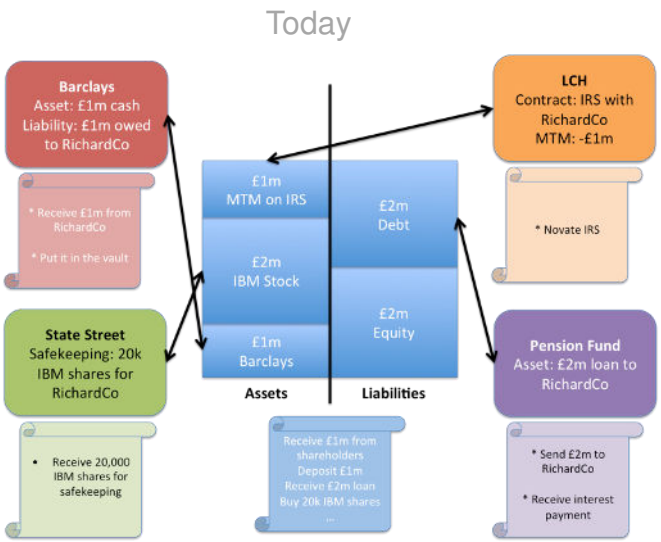
Blockchains without the Coin?

- Recent discourse has evolved. There's now an argument over what *The* Blockchain is. Is it the actual code and network that supports Bitcoin?
- Bitcoin's breakthrough was to have everyone share an entire copy of an entire ledger. The opposite of what banks do, but it introduced new problems
- Replicating all data to all nodes isn't compatible with data privacy legislation banks need to adhere to, it also places uncomfortable amounts of control on core devs and mining conglomerates (consider there are 192 SWIFT members, vs 9 dominant miners)
- Richard Brown (R3) described a continuum in 2014 (pictured below) where there are a set of design choices and trade offs to be made depending on what you're trying to achieve.

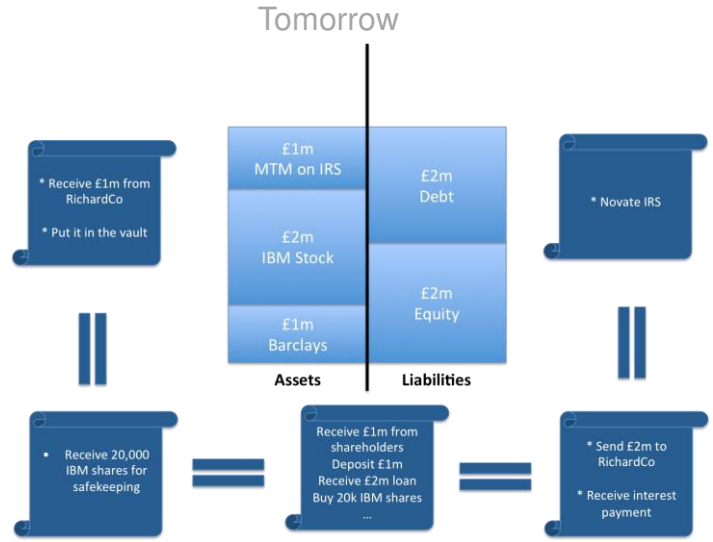


The Shared Ledger (SL) Concept

- Conceptually the idea is to create one “global” ledger for the world rather than each bank maintaining books and records separately
- Below is a scenario where multiple banks and corporates need to keep up to date with where their assets and liabilities are (image courtesy for Richard Brown www.gendal.me)



Reconciliation through paper, many databases
2 – 5 day settlement of transactions

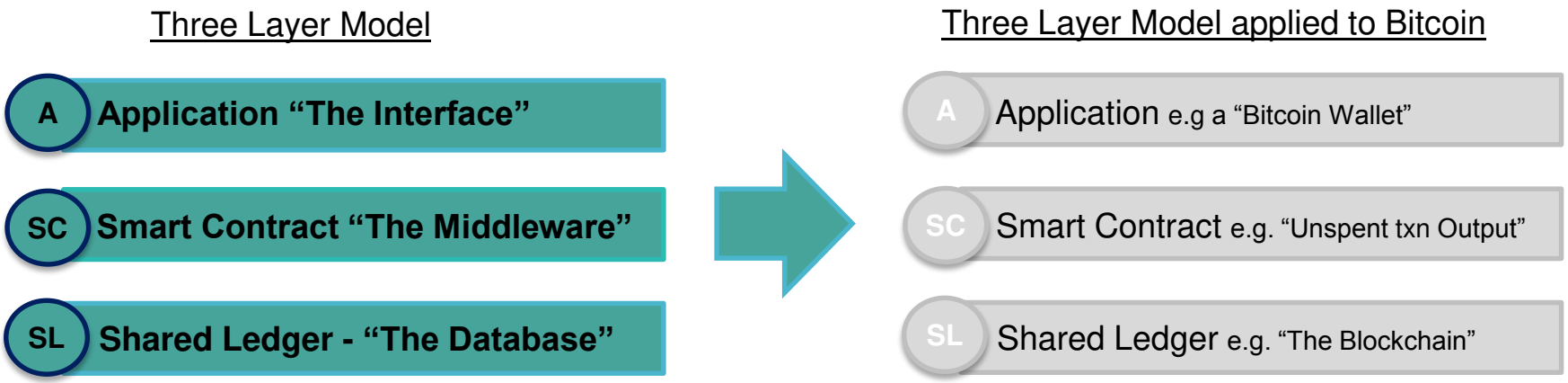


Reconciliation through cryptography “mining”
2 – 5 second settlement of transactions

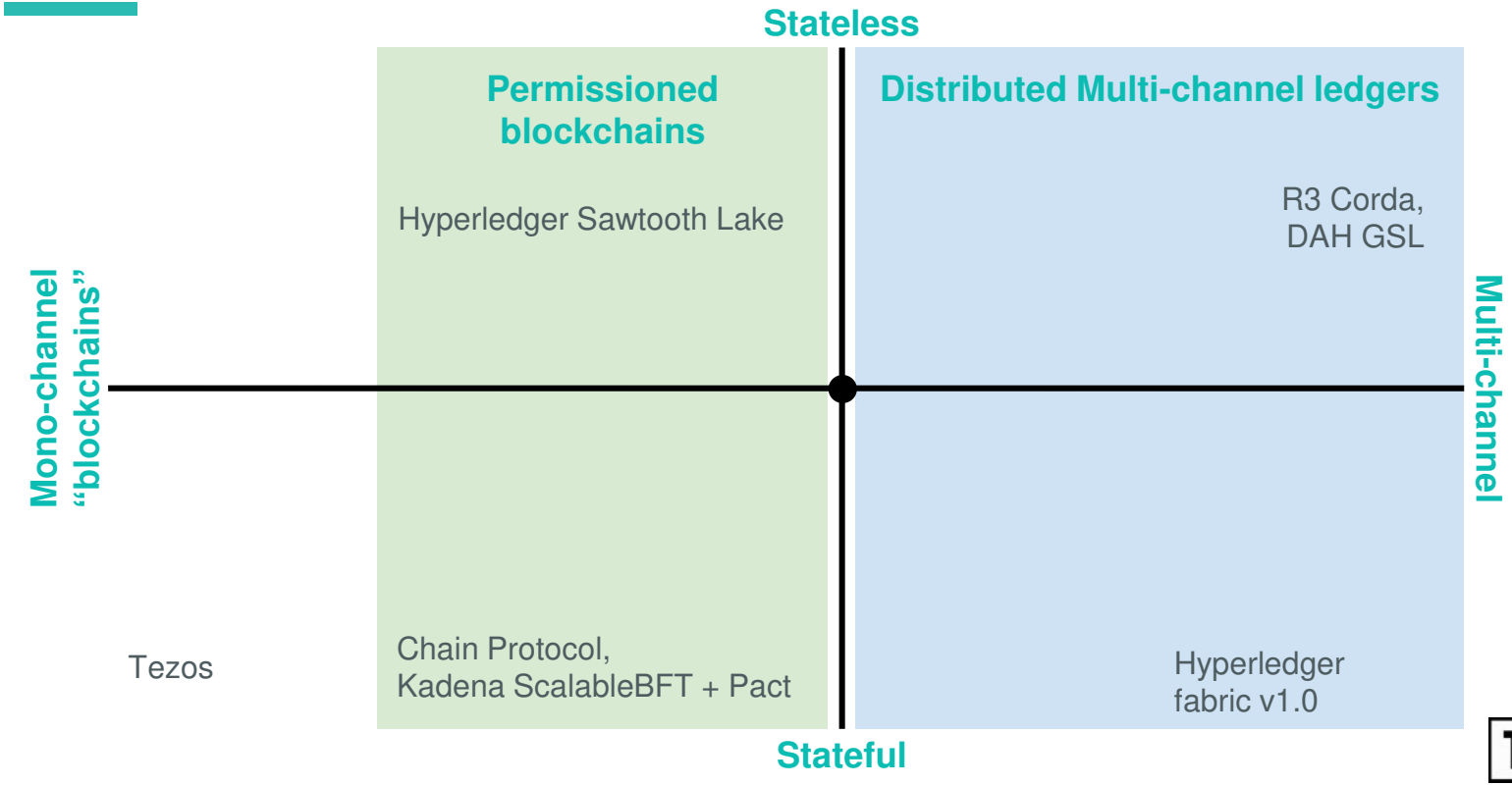
“Blockchain” – A Three Layer Model

There are a number of technologies all being called “Blockchain”

- In addition within each of these technology types, there are a number of approaches each with their own world view and terminology
- The diagram below attempts to simplify this by abstracting the broader concepts
- The diagram on the right then puts this in the context of Bitcoin (as a reference only)



Comparison – Architecture (Axis not Quadrant)



Sources: Company Websites, Team Analysis; DLT Taxonomy: Colin Platt 2017

Thank you!

11:FS is a Global Advisory Firm who are recognised subject matter experts in Fintech

We believe financial services is only 1% done and with the power of modern technologies like Blockchain there is significant value to be unlocked. 11:FS team have built digital banks, research portals, benchmarking products and fintech labs across a range of financial services disciplines. Be sure to follow @11FSteam and our podcast @Fintechinsiders which is available on iTunes now!

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July 2016

Use Cases

Interoperability and Backward Compatibility

Industry: Financial Services

Use Case Overview – KYC / AML

- KYC is a significant cost / overhead for FIs, and in theory DLT lends itself to solving the challenge of needing to check data that is notarised from multiple sources
- Fis risk significant fines for not properly following KYC and AML processes
- In addition FIs have been attempting to build KYC registries for at least a decade, through SWIFT, but also efforts such as OIX
- Whilst there are a number of approaches, most focus on ensuring KYC data is *notarised* to a blockchain, as a point of reference.

Benefits and Considerations

- Fis could easily validate KYC / AML docs against a shared network, where governments and banks can “point at” with a digital signature an identity document
- The single largest cost in most banking operations is the due diligence around KYC / AML
- However there are numerous approaches finding out which is best will require experimentation. How would you design a solution?

Use Case Overview – Trade Finance

- Trade finance is where for example a retailer buys 6 months of garments from their supplier in China
- Trade Finance is paper based, and has no obvious point of centralisation (involves governments, banks, shipping companies and nearly every corporation in the world)
- As a result its highly paper based and subject to fraud, forgery and significant costs for all involved
- DLT can be built with no point of central authority
- Therefore there are a number of projects focussing on reducing the cost of trade finance either by notarising documents (tamper resistance)

Benefits and Considerations

- Fis could easily validate Trade docs against a shared network, where governments and banks can “point at” with a digital signature an identity document
- The estimated annual cost of postage in trade finance is $40Bn, which would be displaced
- There are many parts to trade finance, many actors and many start-ups attempting to resolve. How would you design a solution?

Industry: Insurance

Use Case Overview – Provenance

- A high percentage of high value items (handbags, diamonds and electronics) are never recovered by police and are written off by insurers
- This creates a risk profile in home contents insurance that is difficult to underwrite accurately.
- Many start-ups are now tracking goods throughout their entire lifecycle using DLT (e.g. Provenance and Everldger)
- This would mean whenever goods are recovered there would be a shared, notarised record of the underlying owner, in theory reducing the overall risk to the insurer

Benefits and Considerations

- Insurers could offer new products around “protect your goods for life”
- Reduced premiums become a competitive advantage
- However there are very few items available today tracked this way and it will require strong network effects for these services to become mainstream

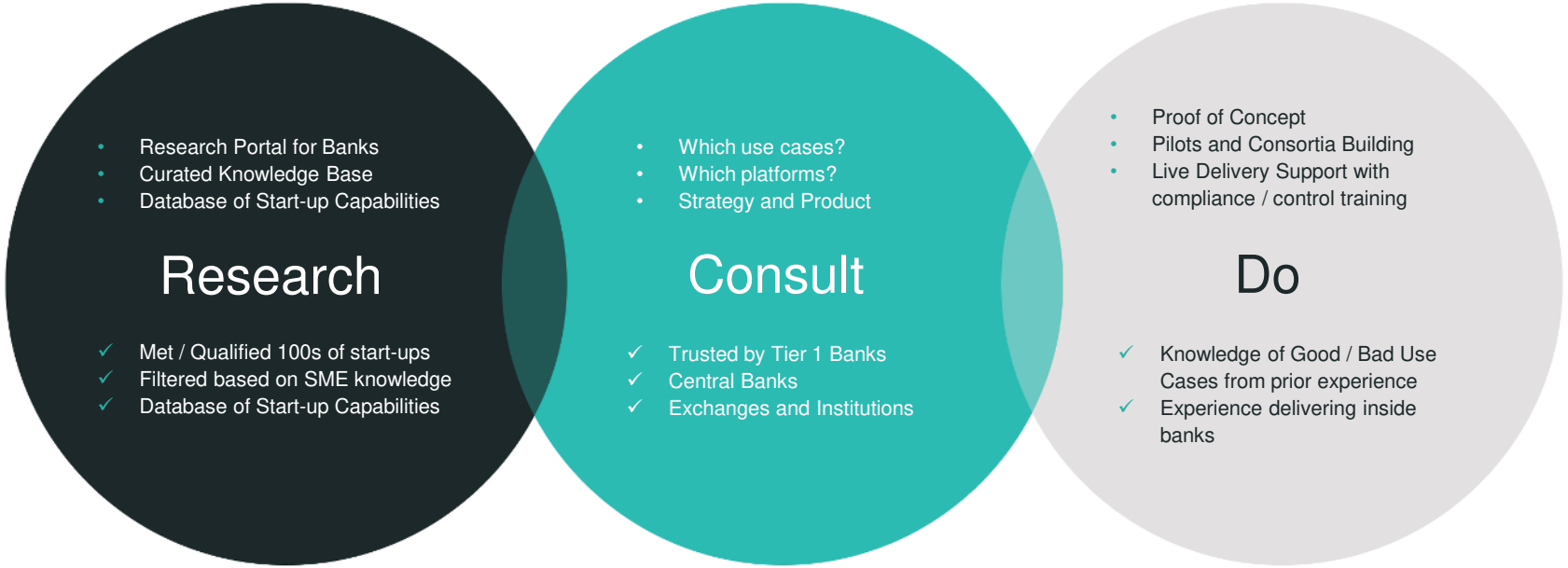
Use Case Overview – Fraud Prevention

- Document forgery or defrauding creates a significant risk to insurers annually across a number of insurance products
- From simple claims of theft, where no theft has occurred to death certificates for life insurance pay outs
- The notary capability of DLT would ensure this is much more difficult to forge, whilst bringing operational efficiency for the insurer

Benefits and Considerations

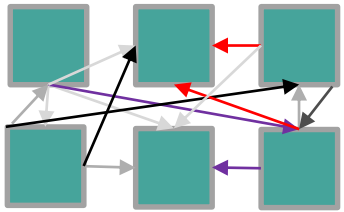
- A reduction in fraud losses for the insurer would improve margins
- Customer experience can be improved during life events, especially bereavements where an insurer would have certainty over the death of a family member and be able to offer (e.g.) condolences instead of requesting documents to be sure a death has occurred.

Market Leading Blockchain Insights



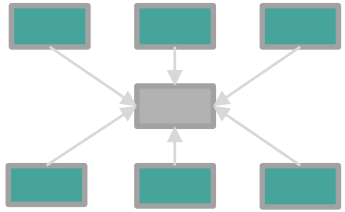
What Problem does Blockchain Solve?

Many industries evolve with duplication of capability and cost, for example many industries start out looking like this…



- 100s of bespoke systems, operating 9 to 5 in different time zones on 1970s technology
- Very Expensive point to point integration creating a “web” of different interfaces, complexity and cost
- Duplication of effort, with many systems doing the same things in a different way
- No co-ordination of effort (“throw over the fence” and wait for a response)
- Bespoke systems require highly skilled talent pool to maintain
- Cannot easily adapt to change

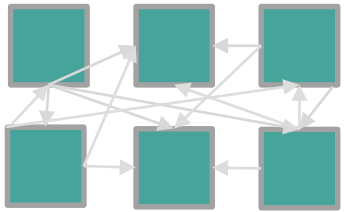
Traditional Solution #1 - Centralise



- ✓ Amount of work bespoke systems do reduced
- ✓ Simplified integration
- ✓ Reduction in duplication of effort
- ✓ Ability to co-ordinate effort

- Central entity performs very simple tasks
- Can be very expensive to run the central body
- Has to move at the pace of the slowest member of the network
- As a result what we centralise tends to be very simple transactions (e.g. Visa / Vocalink / Central Banks)
- Centralising everything would be the perfect solution in theory but in practice is very difficult to achieve

Traditional Solution #2 - Standardise

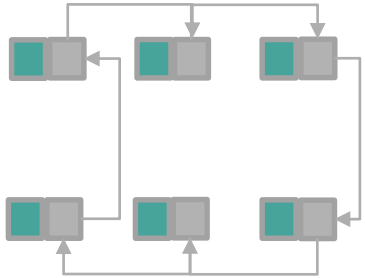


- ✓ Simplified integration
- ✓ More complex tasks than a centralised entity
- ✓ Less systemic risk than a centralised entity

- Bespoke systems still performing expensive un-coordinated work
- Has to move at the pace of the slowest member of the network
- As a result what we standardise tends to be fairly simple transactions (e.g. SWIFT, FIX, ISDA)
- Standards are a more pragmatic solution to organising a large group of entities but not as efficient as standardised

What Problem does Blockchain Solve?

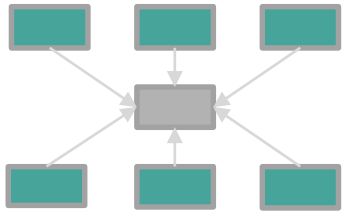
Blockchain / DLT Provides a 3rd Conceptual Design Option



- ✓ Gradual removal of work from internal systems and reliance on DLT Service reduces cost and complexity
- ✓ Integration is managed through “consensus” as is reconciliation
- ✓ Removal of effort duplication
- ✓ Effort now co-ordinated
- ✓ Commodity skills can now be introduced (e.g. DevOps, RESTful APIs)
- ✓ Creates new business models (especially when balance sheet or perceived “control” has held back progress in an industry
- • Unproven at scale and many challenges around standards and adoption remain
- • May be more short term benefit in adopting APIs / DevOps capability

Blockchain can manage activities inside the member organisations – and ensure their effective completion in a way a standard and central entity cannot

VS Centralised

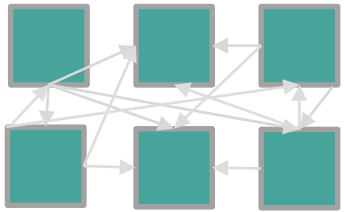


- DLT / Blockchain not as efficient as centralised
- However – creates new business models
- Opportunity for more complex transaction types
- DLT provides workflow “orchestrated” inside organisations and has certainty over what each entity has done and can see

Centralised may work better when

- Small number of entities to co-ordinate, perhaps in one geography
- Simple transaction type or interaction between entities
- Having one provider of technology does not create risk or business model concern for members
- Having one entity in “control” position in industry is not considered risky by regulators

VS Standardised

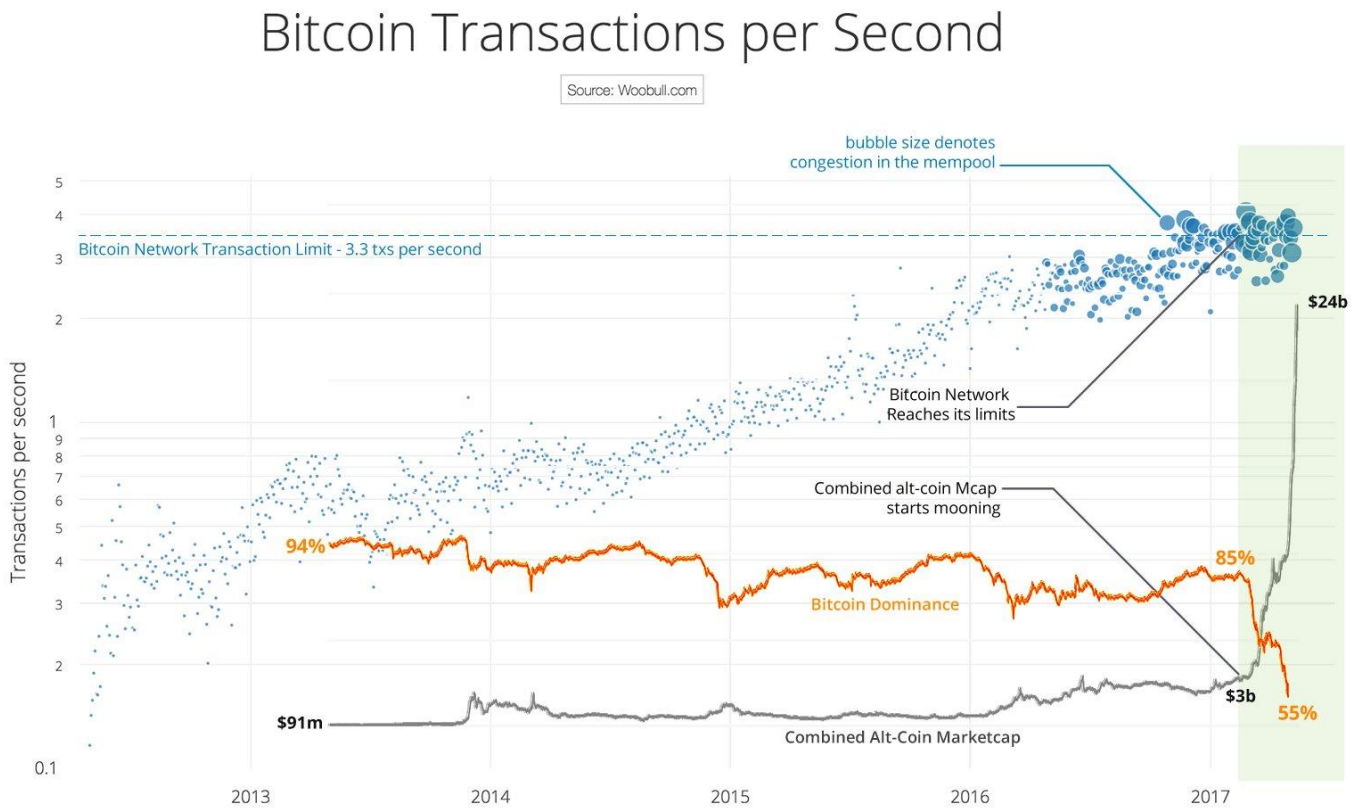


- DLT / Blockchain requires more up front effort than a simple messaging standard
- API standards could potentially provide some of the benefits of DLT / Blockchain
- DLT / Blockchain comes into it’s own when you need certainty over state of data and certainty over workflow management at member organsiations

Standards may be better when

- Workflow completion and data reconciliation assurance is not as important
- Existing processes inside member organisations are effective
- Less change in member organisations is desirable
- Member organisations have a compliance or regulatory mandate to adhere to in a short time frame

Bitcoin is growing but lack of scale holds it back



Unified Non Technical Model for DLT

Centralised

Processing or data

Traditional Financial Services

BigchainDB
Eris Industries

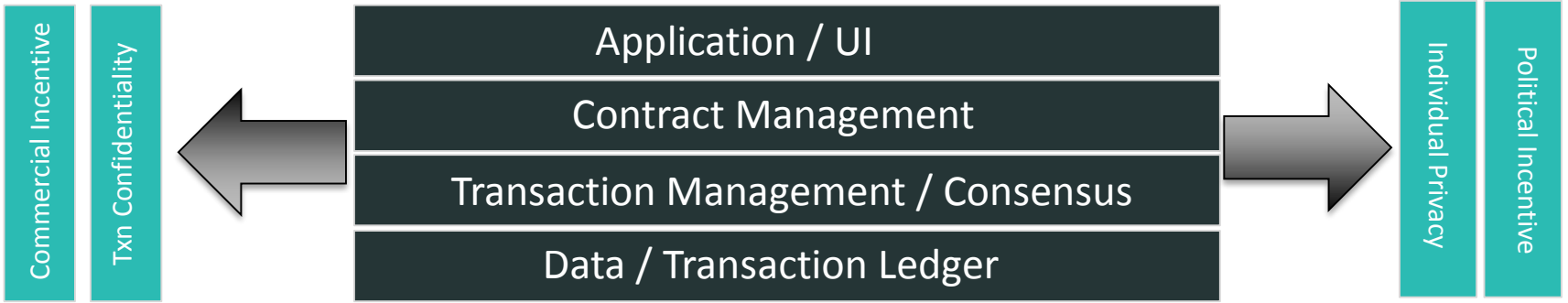
Stellar
Ripple

Counterparty
Ethereum

Decentralised

Bitcoin

The spectrum of centralised / decentralised can is a design choice but will always require the components below. Forces will pull in either direction depending on who you are and what you want to achieve.



What's going on in Blockchain

"Blockchain" remains an illusive subject to define with many opinions on what it means

Typically someone will come and explain Bitcoin to you and you'll be left scratching your head as to how this thing could ever be used by a bank…

The Bad

- People got sick of hearing "blockchain"
- JPMC left R3

The Good

- ICO's Became a thing
- BTC and Eth price record
- Sharecharge
- Gnosis
- Live DLT from BNPP, Northern Trust