



Oh no... Not Another Blockchain Article!

No doubt about it, blockchain is a powerful, efficiency-enabling technology, but as Markus Bassler candidly explains, for re/insurers it's also important to be aware of the issues and limitations, and to think carefully about where it could really add value.

A technology that deserves discussion

Yes, there's a lot of great material out there on this 'originally-developed-for-Bitcoin' technology, and it can be a bit confusing at times... And yes, in the name of promoting discussion, and because it very much deserves it, I'm now going to add to it!

To condense the facts:

When multiple, 'mistrusting' parties (i.e. there's a counterparty risk) need to store and share data over the long term, the option is generally to have a centralized database with shared access (controlled by a trusted third-party), or for everyone to have separate databases, to involve various intermediaries for verification, lots of back and forth emails and re-keying of data. Inefficiency can be an issue, there's potential for error, data corruption and fraud, and enhancement attempts may be hankered by IT legacy issues. On the plus side, processing speed is good, all manner of posthumous corrections can be made, privacy is maintained and access to sensitive data can easily be restricted.

Blockchain (hereafter 'BC') is different. BC is a 'Distributed Ledger Technology'. As the word 'distributed' implies, records are stored not in one place, but are synchronized in near real time across many computers/'nodes', hence it is **inherently robust** as many nodes would need to fail for the BC to fail. A BC securely and **immutably** records¹ transactions/digital assets, establishing a **'single source of truth'** that creates a **high level of trust** between (non-trusting) parties and **improves auditing capabilities** (a major plus for auditors and regulators). A BC avoids the headaches of checking and reconciling everyone's individual records and the need for (mutually agreed upon and fully accessible) trusted third-party entities or a central authority to validate records, plus all those back and forth emails and re-keying of data. Compared to traditional solutions, a BC can therefore **reduce the potential for error, data corruption and fraud, and can save considerable time and money.** 'Smart contracts' can be incorporated to add agreed rules/set the parameters that are then automatically carried out.



There are certainly best-fit characteristics and issues to be aware of. Given the advantages, however, it's likely that many of these will be resolved over time."

Several re/insurance industry consortia initiatives, e.g. B3i² and the Institutes RiskBlock Alliance³, are well underway developing BC proofs-of-concept.

For the re/insurance sector, BC offers a plethora of potential efficiency-enhancing applications that could reduce operational costs and increase customer satisfaction – good news for an industry faced with record losses, ongoing low interest rates, low barriers to entry and the age of instant-gratification-expectation.

BC offers efficiencies. We need efficiencies. So should we now move all our processes onto a BC?

¹ in 'Blocks' linked by a cryptographic hash

² <https://b3i.tech/home.html>

³ e.g. <https://www.theinstitutes.org/about-us/media-center/articles/institutes-riskblock-alliancetm-announces-plans-launch-blockchain>

Well 'yes' in some cases, and 'not necessarily' in others. There are issues and limitations to be aware of.

So what are the issues and limitations? Where is BC being used already with encouraging results? Where is it in fact not necessarily the best solution?

Hopefully the content I've pulled together below gives you some food for thought. It would be great to hear your views, ideas and experiences – which is indeed the purpose of this article – so please contact me to discuss.

Blockchain types and challenges

Permissionless (public) BC: Any individual can join or leave the party at any time, e.g. as used by cryptocurrencies including Bitcoin. Lots of BC 'writers'⁴ and 'readers'. Validation is done by computers on the public internet⁵.

Issues/limitations:

- lack of control and liability
- often have high computer power and energy consumption (principally Bitcoin and some other cryptocurrencies due to the 'mining' process⁶)
- low performance speed
- limited scalability

Permissioned (private) BC: Only authorized (requires a central entity to manage/give authorization) individuals can participate in the BC. Bank Crédit Mutuel Arkéa, for example, uses private BCs to share customer data across its different group entities.

An extension of this BC type is the '**Consortium BC**', where a select group of companies cooperate to find solutions to their shared transactional inefficiencies (e.g. using BC platforms Quorum and Corda). Different user rights and blocks are validated via predefined rules. Blocks

are usually processed by a trusted, centralized entity. Consortium BCs are the main focus for business.

Compared to a public BC, permissioned BCs have:

- better control
- much lower computer power and energy consumption
- higher performance speed

Permissioned BCs also have issues/limitations

According to Gartner⁷, BC is still in the phase of 'inflated expectations', and yes, there are certainly best-fit characteristics and issues to be aware of. Given the advantages, however, it's likely that many of these will be resolved over time.

Deciding whether investment in a BC will deliver more value than other tech solutions depends on weighing up the benefits against the relevancy (see, '**General characteristics for a good BC fit**'), investment and potential impact of the following:

- **Standardization and cooperation:** Consortium solutions necessitate cooperation and a standardized process. Standardization may be problematical, and it's often competitors that need to cooperate⁸. If cooperation extends to parties that don't benefit from the BC in line with their respective workloads/level of investment, then the BC may be less likely to succeed.
- **Technological complexity:** BC is more complex than traditional software development technologies and should therefore only be used where its strengths can be leveraged.
- **Other databases and software:** Internal databases and software are still needed. This is mainly because BC will always be slower than centralized databases; centralized databases process transactions once or twice, whereas in a BC they have to be

processed independently by every node in the network.

- **Legal:** For example, are smart contracts enforceable under (which) law, will it remain feasible to use terms such as 'reasonableness' and 'good faith'?
- **Immutability:** This is one of the core strengths of BC, but can lead to issues. The extent to which adjustments can be made depends on how the BC is set up; a close-to-perfect set up from the outset is therefore important. There's also the issue of a potential need to delete data (e.g. consider GDPR's 'right to be forgotten').
- **Regulation:** Access to a real-time, 'single source of truth' is a major plus for regulators. Note, however, that regulations may apply that regulate or restrict the use of a BC (e.g. relating to data privacy, as mentioned above, as well as to tax, anti-money laundering and economic sanctions).
- **Reporting:** Last, and also least, data needs to be uploaded to a database for state-of-the-art reporting.

General characteristics for a good BC fit

Multiple (non-trusting, require intermediaries) parties sharing data. Efficiencies are needed. Immutability is important. The application can be standardized. The tech requirements can be very precisely defined. For consortium solutions, all parties benefit in line with their investment.

BC in supply chain management (tracking)

These two examples present the characteristics of a good BC fit.

Complex products, e.g. aircraft production

Increasingly critical, in particular for complex products such as an aircraft, is for all players to know and have available the exact source of all raw materials and components/products along the full supply chain.

⁴ Also known as miners

⁵ Dowling & Partners report (May 2018).

⁶ The process for adding transactions as 'blocks', designed to prevent fraud, involves tremendous processing power. e.g. <https://markets.businessinsider.com/currencies/news/bitcoin-mining-could-use-more-energy-than-electric-cars-this-year-morgan-stanley-2018-1-1012823094>

⁷ <https://www.gartner.com/doc/3883991/hype-cycle-blockchain-technologies>

⁸ Note, if privacy is required, BCs can be set up to 'hide' data to maintain the required levels of privacy.

BC sets a tough precedent

Every implemented BC application potentially impacts:

The risk landscape for re/insurers.

For example, if a BC improves time and cost efficiencies in supply chain management, see examples in this paper, the risks relating to that sector are altered and potentially also reduced. Risk protection should be adjusted accordingly. Also, with or without a BC, this is risk data that re/insurance should use.

The precedent of efficiency.

Aside from the fact that this is already an industry goal, if the technology used to track and correct a problem is automatic and immediate, the associated financial compensation should not take months or years to complete. That doesn't mean that the solution must be another BC, but it might be.

BC can be used to track the complete origin of every component. All players, every manufacturer within the production process, the aircraft owner, the supervisor and regulatory authority, have access to the exact same verified information at all times.

If problems arise, the diagnosis period is shortened and recalls, for example, can be targeted to the correct area. The result: reduced need for generic, large-scale recalls, less reputational damage.

Food safety

According to the World Health Organization, one in ten people suffer from contaminated food annually. It can take weeks to determine the exact cause and source of the contamination. The result is loss of revenue, as well as potentially unnecessary destruction of food and loss of reputation. Leading global food manufacturers joined forces in 2017 to identify BC solutions.

BC can connect all players: farmers, producers, suppliers, processors, distributors, authorities and ultimately consumers. With appropriate access authorizations, it's possible to obtain reliable and verified information on the origin and condition of food.

Targeted recall of contaminated food via a BC solution directs resources to the right place and fast. The result: less illness, less food waste, less reputational damage.

Examples of BC in re/insurance

In respect of cover types, **several cat bonds/swaps and other parametric covers** are already being piloted and implemented. These BCs involve a standardized, trigger-based process. Note, however, that only the example 'cat bonds and swaps' involves multiple parties, the subsequent livestock and aviation examples involve a single entity (these are private BCs) and could also be achieved, perhaps at lower cost, via traditional technologies.

Shared indemnity contracts (many reinsurance contracts) fit the bill as regards multiple parties and a need for reduced errors and efficiency gains. With transparency and speed, a BC can e.g. track the evolving risks and exposures for all players, initiate premium payments, and verify (e.g. based on a trusted source to verify that an event actually happened) and settle claims. The marine insurance example below, for example, is designed to do exactly this; first results are positive, proving that while complexity may be a challenging factor for BC, it is not insurmountable, in particular if all parties stand to benefit, as they do in this case. Applications in facultative reinsurance (see below) could also be achievable, however, BC solutions may be less successful given potential differences in investment versus benefit for all involved parties.



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Parametric covers**Cat bonds and swaps**

For parametric covers of this type, BC-based contracts can significantly speed up and simplify the transaction process and payments between insurer and investor. Less people are needed to run the process. The cat bond/swap application may or may not be on the BC, but will exchange data with it.

Smart contracts on the BC set the parameters of the contract, including the triggers.

The trigger is via 'oracles', pre-defined and agreed-upon, reliable, trusted entities such as state weather services, which are external to the BC, but which exchange data with it.

In the case of a predefined event (e.g. a tropical cyclone), the predetermined amount is paid out in the BC via the smart contract. If there is no trigger as of expiry, the smart contract triggers the agreed interest payment and repayment of the investment amount.

Regarding BC use in trades, in 2018 Solidum Partners issued cat bonds cleared through a permissioned BC. It helped them syndicate capacity for catastrophe retrocession from a small number of small ILS funds. Using the BC has reduced transaction costs and cut trading time from days to seconds.⁹

Index-based livestock insurance

Kenya's 'Kenyan Livestock Insurance Program' (KLIP) launched a BC pilot in the fall of 2015.

⁹ e.g. <http://www.artemis.bm/blog/2017/08/04/first-blockchain-settlement-for-cat-bond-completed-by-solidum/>

An insurance product was created for local farmers based on the normalized differentiated vegetation index (NDVI). This index measures the 'greenness' of vegetation using satellite data and determines the dryness of the soil (e.g. green = not dry, yellow = very dry). If a certain dryness is reached, the BC automatically (and immediately) triggers a predetermined payment to farmers that are members of the insurance program. Farmers receive a fixed amount which, for example, could be used to buy extra food for livestock to secure their survival.

Aviation insurance application

Flight delays are often part of travel insurance cover; e.g. for delays of 'x' hours, an amount 'y' is paid. The claiming process, however, is notoriously tedious. BC can simplify this transaction, e.g. once a delayed flight has landed, the BC, with pre-determined parameters in the smart contract, would be informed of the delay (and potential claim) via an oracle (e.g. a weather station and/or the airline's database). The BC verifies the parameters of the delay and, if the predefined 'delay length necessary for a claim' is met, the BC could, for example, immediately trigger a payment to the customer's mobile phone.

The process becomes fast and efficient, the customer is less irritated, reputational risk is reduced. AXA's *fizzy*¹⁰, launched in September 2017, was the first application of this kind.

BC in complex re/insurance processes

To benefit from a BC, complex processes with multiple parties first need to be standardized, all parties must benefit in line with their investment and the BC pilot

Key challenges for facultative programs	How BC could help
Multiple versions of truth & high turnaround times	<ul style="list-style-type: none"> Seamless transfer of information across stakeholders Digitally signed contracts Contract updates automatically shared
Fragmented data sources & claims leakage	<ul style="list-style-type: none"> Single version of contract All data stored in a BC Mapping of incoming claims simplified Integrated dashboards with full reinsurance contract details
Administrative overhead	<ul style="list-style-type: none"> Single platform Audit trail of all data Smart contracts initiate processes such as premium payments

Table 1: Key challenges in facultative reinsurance and how BC could help. Source: Cognizant.¹⁴

must precisely define the objectives and technical requirements (the requirement specification).

Marine insurance

Insurwave is a consortium BC for marine insurance that connects all re/insurance parties and marine third-parties to marine identities, risks and exposures. Launched in May 2018, the solution is linked to policy contracts and enables automated policy updates and pricing adjustments to reflect changes in risk, as well as claims validation and payment¹¹. Results so far are good. All parties benefit and success seems likely.

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Complex processes with multiple parties first need to be standardized, all parties must benefit in line with their investment and the BC pilot must precisely define the objectives and technical requirements.”

Facultative reinsurance

As **table 1** shows, facultative reinsurance¹² is a major contender

for BC solutions, with an estimated annual savings potential of USD 100m¹³. The question: Will all parties benefit sufficiently? If not, BC solutions may be less likely to succeed in the short-term.

Share your BC experiences and views

PartnerRe was part of the B3i consortium market testing. We perform targeted research on Insurtech developments, identifying the optimal solutions for working together, for our clients and business partners.

Please email or call to share your BC experiences and views.

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¹⁰ e.g. <https://medium.com/@laurentbenichou/fizzy-axa-reaches-a-new-milestone-fadd41f20e11>

¹¹ e.g. <https://www.insurancejournal.com/news/national/2018/05/25/490345.htm> & <https://worldmaritimeneeds.com/archives/253550/maersk-backed-blockchain-platform-for-marine-insurance-launched/>

¹² A fragmented, complex business involving many players, associated with high cost ratios and errors, high administrative effort, inconsistent interpretation of contracts and long processing times.

¹³ 'How Blockchain can reinvigorate facultative reinsurance contract management', Cognizant (2017) <https://www.cognizant.com/whitepapers/how-blockchain-can-reinvigorate-facultative-reinsurance-contract-management-codex2592.pdf>

¹⁴ Extract by PartnerRe