

BIM+Blockchain:

A Solution to the "Trust" problem in Collaboration?

Link to conference paper
<http://arrow.dit.ie/bescharcon/26/>

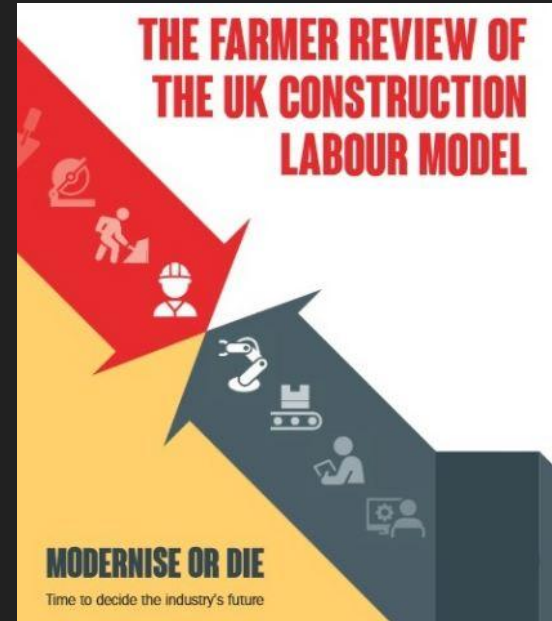
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The AECOO industry is undergoing a **digital transformation**.

It needs to, design and construction has suffered for decades from remarkably poor productivity relative to other sectors,

Today in an adversarial economy based on legacy hierarchy the incentive is to **minimize information** transfer between parties.

In the future world of networks, the incentive will be to **maximize the transfer of information** between parties.



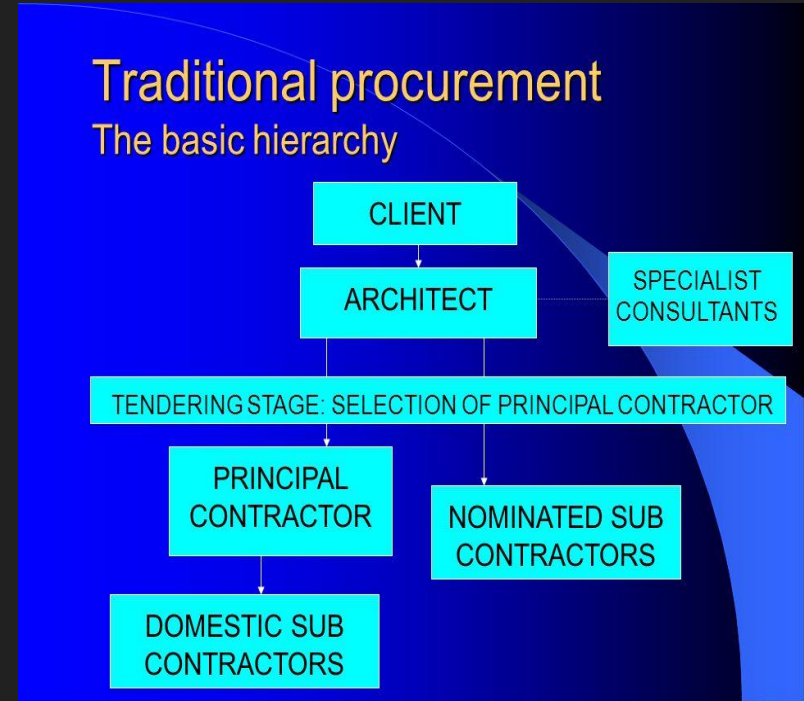
Traditional Procurement

The first problem is around the created data.

The traditional way information is created builds a top down **hierarchy** that tends to put the originators in control of the flow of data

Collaborative BIM disrupts this process. The control of the data/information now becomes available to all in a (de) centralised collaborative setting.

In a true multidisciplinary BIM collaboration many professionals contribute to the “design” of a building and in essence become a **network**.



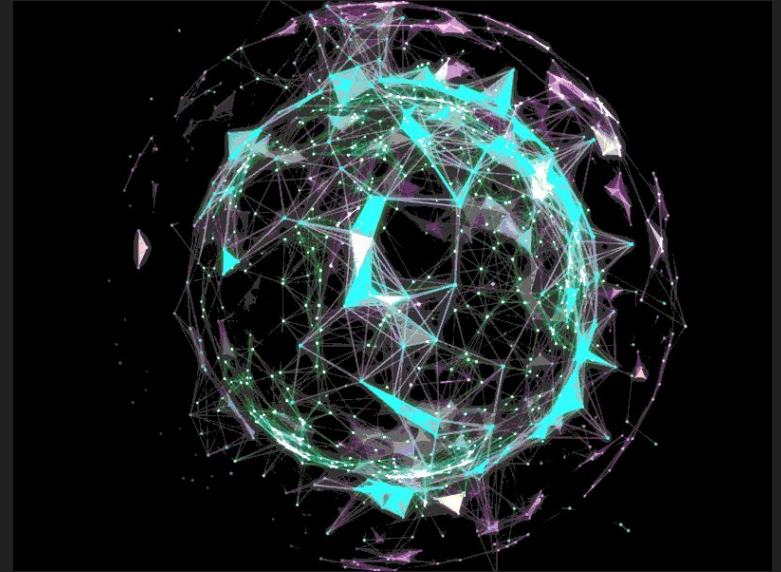
True Collaboration is the “Culture Change” called for in the AECOO Industry



Representation v Simulation (**BIM**)



Hierarchal structure v Networked structure (**Blockchain**)



(It's) Building Information Management (not modelling)

BIM models have great potential to become **massively networked ledgers** of engineering information shared by multiple writers where responsibility can be transparent, consensus is assured, and immutability is secure.



This can only be successfully achieved through a network structure.....

Enter Blockchain

Take Blockchain out of its natural home of cryptocurrencies it is somewhat of a *“solution looking for a problem.”*

That's good !

Blockchain is very versatile and its potential has been recognised by lots of different industries now the potential is being recognised by people within the Design & Construction industry.



Blockchain

What is a Blockchain? It's a fundamentally different technology for databases with multiple non-trusting writers who can modify the database directly”

What problem does Blockchain solve? Simply put it's the trust aspect of an ancient human ritual “the handshake” an agreement for a value transaction.

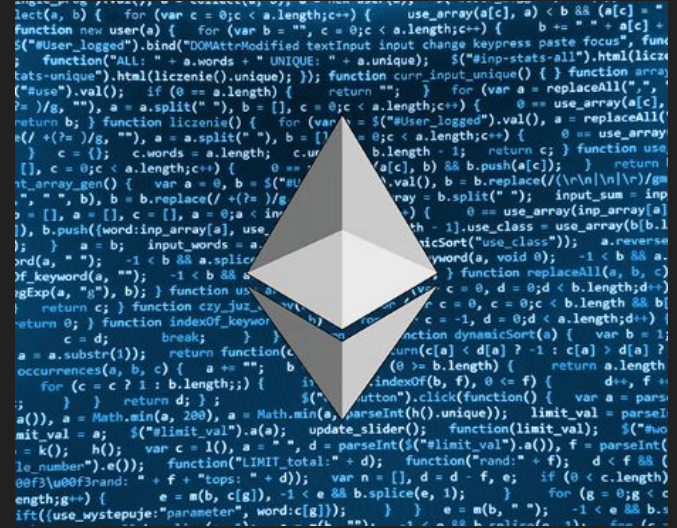
How does it do this? It employs cryptography to secure a unique identity for the value transaction, this value transaction is then “chained” to the previous through a digital signature.

Why is it different to existing database's? It's not centralised, it's distributed and each participant owns a live copy which is updated when a consensus is reached.

There are a multitude of Blockchains available all for different uses and purposes. The Ethereum Blockchain is perhaps the most visible and interesting because it features **smart contract** (scripting) functionality.

Smart Contracts are **autonomous scripts** that are stored on the Ethereum Blockchain that can carry out the direct transaction of value between untrusted agents.

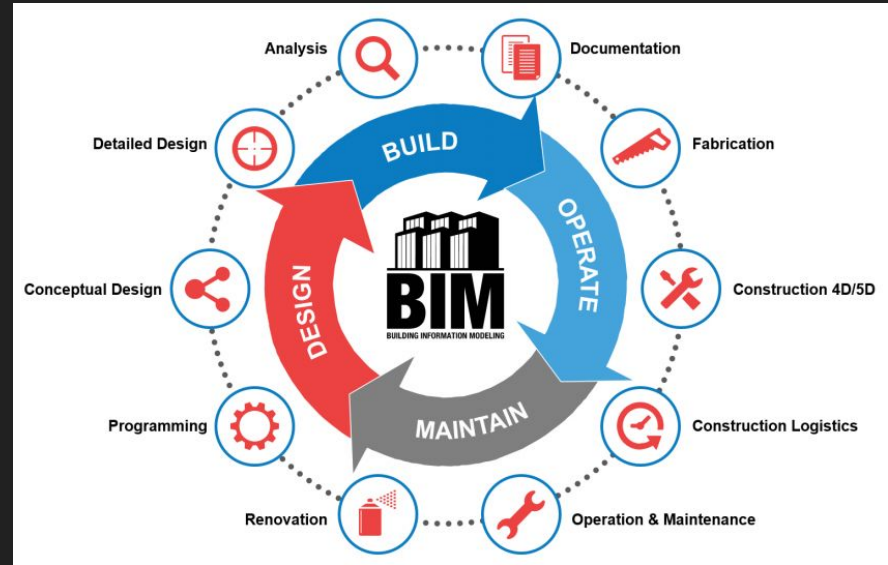
The Ethereum Blockchain is a platform onto which “smart contracts” applications are being built.



New Value Networks

BIM creates entirely new “value networks”.

The notion was that 3D models would be an efficient way to produce 2D documents, the next evolution of CAD enhancement. But it quickly morphed to a point where the model created brand new value networks: clash detection, quantity takeoffs, field BIM, direct fabrication, energy analysis—and, ultimately, BIM models as a store of myriad facility information.



Our current business model is broken

We want to fundamentally change things,

We are committed to changing things,

We now have the toolset to change things.

The Blockchain has created new opportunities to **incentivize human behavior.....this is "Culture Change"**

**Human behavior
flows from three
main sources:
desire, emotion,
and knowledge.**



Plato - Greek Philosopher
www.geckoandfly.com

New Value Networks

Blockchain will create it's own new “value networks”

.
This is in essence what BitCoin is, a Derivative (it derives it's value from something else)

The AEC industry powers its economy by converting created virtual value to a physical real world value.

But correspondingly, the industry loses out because there is no method of measuring and converting the intrinsic value of the real world artifact back into a digital value for the AEC collaborative.



Intrinsic & Intangible Value

This synergy that exists between BIM+Blockchain gives rise to an opportunity to develop a “**new value proposition**” for clients and stakeholders in the design and construction industry.

Adding a **new layer to assign value to intrinsic intangible elements** of collaborative professional services.

Rewarding the tangible value of the collaborative BIM database over the lifecycle of the building by measuring into existence performance based targets.

#AECoin a Cryptocurrency for the AEC industry

Incentivise and **reward** the intrinsic value of the collaboration through a AEC cryptocurrency coin using claim and validation of claim as the consensus mechanism.

How?

Self and Peer Assessment - Claim & Verification of Claim.

BIM+Blockchain

What the Internet did for society and industry 20 years ago is what Blockchain can do for the next 20 years,

That is to provide a platform for application development to drive efficiencies and effect a digital transformation in the targeted industry.

Here we have the ingredients:

BIM, a visualised database of code simulating a proposed building bringing with it a host of new value networks,

Digital methodologies supporting a collaborative platform

Cloud based technology a platform for multidisciplinary collaboration,

Reality capture technologies that allow for verification on the conversion of digital assets to real assets,

Existing professional set to provide **Oracle (certification)** services to a consensus mechanism,

Functionally **permissioned Blockchain technology** that provides a platform for true consensus driven collaboration,

Internet of Things is becoming simpler and accessible for building operations combined with Blockchain allowing a micro economy develop around an artifact,

“Smart” contracts, which are a set of coded instructions on a blockchain that allow, when conditions are met , a value transaction to happen,

A **real desire to effect a new paradigm** in a difficult industry that is ready to make a contribution to the environmental, social and economic fabric offering a way forward for culture change.

“Quant” is Engineering Coin that will reward intrinsic intangible value leading to a “new value proposition” for clients and AEC professionals.

Network over Hierarchy

Hierarchical structures are being replaced by network structures in many industries simply because networks are more efficient, enjoy higher market valuation, they are fault tolerant, and self regulating



Digital Transformation in the AECOO Industry

Next, factor in Internet of Things IoT, Artificial Intelligence AI, Machine Learning ML, Augmented Reality AR, complexities of integrating them all would far exceed the ability for a centralized management system. Such scenarios may be textbook-perfect applications for Blockchain technology.



“Asking people who are at the center of the industry to change must be accompanied by new processes that are measurable, workable and exciting to adapt.”

A Cryptocurrency for the AEC Industry



An example of this is being developed by IEBC, the “Integrated Engineering Blockchain Consortium”

QUANT is an extremely simple application for Blockchain Technology that reverses the economic incentives from creation of value through debt (Traditional) to the creation of value directly through human productivity. (Digital Transformation)

<http://iebc.co/>

"One coin to rule them all and to
a building profession bind them"

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Conclusion

Blockchain is here to stay, it cannot be un-invented and while many have predicted its demise, the idea of Blockchain software has only increased in applicability.

The AECOO industry has 3 choices, fight it, ignore it, or own it.



To finish “Future Proofing”

