

# Blockchain for Architecture and Cities

## CHEAT SHEET

from the presentation “Blockchain as building blocks for architecture and cities”

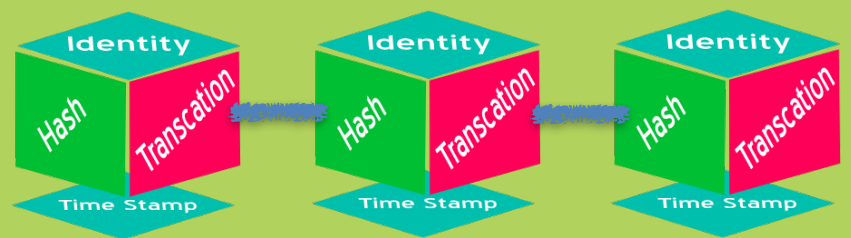
### Blockchain definition from Satoshi Nakamoto’s white paper:

Blockchain is an open, distributed ledger that can record transactions between parties or peers (also called nodes) efficiently and in a verifiable and permanent way, without a “go-between”.

In the distributed ledger’s network, in other words decentralized network, it time stamps transactions by hashing them into an ongoing chain of hash-based, proof-of-work. They form a record that cannot be changed without redoing the proof-of-work. This is where innovation in the blockchain comes: The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of Central Processing Unit (CPU) power, in other words, consensus from the brain of your computers. As long as a majority of CPU power is controlled by nodes, such as your project peers or stakeholders, that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain, as proof of what happened while they were gone.

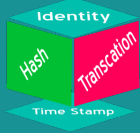
### Blockchain definition in 3 words:

**Decentralized database technology.**

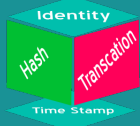


## Just imagine:

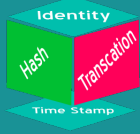
### Contracts for Construction on blockchain technology: Smart Contracts



**Owner/Architect**



**Owner/Contractor**



**Contractor/Subcontractor**

### Smart Contract

In a standard business contract, each type of contract for construction has its pre-determined terms, in written or printed form. The difference of a smart contract is that it is a **computer code written inside a blockchain protocol**. The computing innovation here is that the terms of the contract are enforced by the blockchain network. It allows stakeholders who don’t know or trust one another to collaborate without fear that the other party won’t perform or deliver within the terms of the contract. In 2018, a US Senate report said: "While smart contracts might sound new, the concept is rooted in basic contract law."

## Just imagine:

### Virtual Practice on blockchain

One of the biggest challenges within a traditional virtual practice, is the issue of trust. Workers in a virtual practice are often contract workers located anywhere in the USA or the world, and the architect or business owner cannot control when and how they do the specific work.

The difference in a virtual practice running on blockchain technology versus a traditional virtual practice is that this mutual distrust is actually the power behind what’s making blockchain technology more effective, and thus making virtual collaboration also more effective.

### Building Information Modeling (BIM) on blockchain

Just imagine in a blockchain platform, the difference of BIM on blockchain technology is you can avoid loss of privacy, loss of data in the form of intellectual property, and loss of accountability within stakeholders — through the addition of a time stamping layer. You and your stakeholders can work on only 1 BIM model for the project and each stakeholder in the VDC project gets the same copy of the same BIM model, and not a version of it, when you issue documents at different architecture phases. Issued documents, can allow verification of the issue history — streamlining any revision, which is permanently recorded on the blockchain. There is absolutely no method of potential malicious amendment at a later stage. It allows for a verification of the document’s date, authenticity, origin, integrity and content without necessarily exposing the content itself. The BIM model could be signed by the architect and his team before time stamping, and can be undeniably claimed to have been in their possession and knowledge at the time of the blockchain time stamping. Referencing the respective blockchain ledger transaction ID, can undeniably prove this with absolutely no doubt. The same process is true for the architect’s consultants working on the same BIM model. They can also all be held accountable for the content they contribute in the BIM model, including having a strong argument to support their individual intellectual property within the VDC project. The time stamping feature of blockchain technology can become proof of prior design existence to any subsequent claim of authenticity by others in the future for the same or similar content, say for example if a renovation or historic preservation is necessary for the VDC project.

## Blockchain technology in action:

### Examples of Smart City projects on blockchain

- **Singapore:**  
**Smart Nation Project**
- **India:**  
**Smart Cities Mission**
- **China:**  
**Integration in Real Estate and other government initiatives**

### Blockchain-based tools the industry can now use:

- **Email:**  
**johnmcafeeswiftmail.com**
- **Contracts:**  
**blockusign.co**
- **Web Browser:**  
**brave.com**

The architecture, engineering, and construction industries under the umbrella of real estate are likely to be disrupted by blockchain technology in the next 5 to 10 years.

See references from original presentation on “Blockchain as building blocks for architecture and cities”.

**Want to learn more or get more details?**  
**Great! Engage with us:**



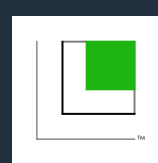
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