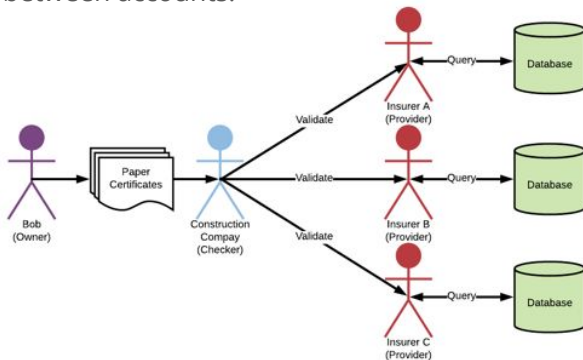


Smart Contracts

MARKET NEED

Blockchain may be one of the most revolutionary technologies to arise in the last decade, with the potential to transform many industries. Blockchain applications centre around the management of value through the use of programs called *smart contracts*. Value on a blockchain can take many forms including currency, real world assets, identity and credentials. *Smart contracts* are used to enforce contractual agreements, often using triggers from outside the blockchain to transfer value. A commonly used *smart contract* in the context of cryptocurrencies is the transfer of money between accounts.

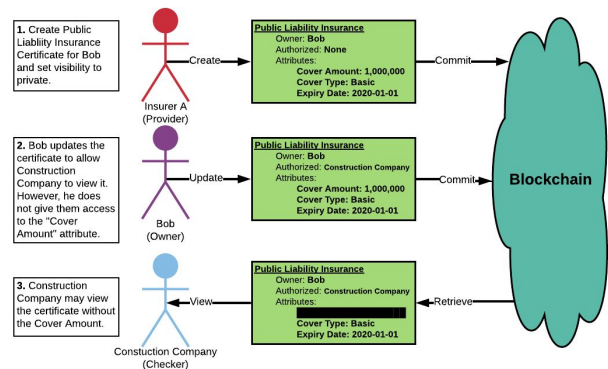


Traditional credential verification which is susceptible to fraud and inaccurate information.

The aim of this project was to explore the power of *smart contracts* and create a demonstrator prototype application using them. The demonstrator we created has widespread applicability. It involves the management of credentials using a blockchain. This entailed having three blockchain roles: **provider**, **owner** and **checker**. The system enables a credential **provider** to assign a credential to an **owner**. The owner can then share this credential, or parts of it with **checkers**.

TECHNOLOGY SOLUTION

The blockchain application was developed using Hyperledger / Fabric. Figure 2 illustrates a use case of the system which enables an **owner** to share parts of their credential with a **checker**.



Blockchain based credential management with granular permissions. This shows the steps involved in creating a "Public Liability Insurance" certificate, assigning it to Bob, and Bob permitting "Construction Company" to view it.

APPLICABILITY

Credentials are an integral part of many organisations. Using a blockchain to manage credentials has a number of benefits:

- Provenance
- Transparency
- Shared responsibility
- Synchronised data
- Permissioned access

The demonstrator is domain agnostic and can be adapted to address credential management in many areas of industry.

RESEARCH TEAM

Saad Shahid
Dr. David Haughton
Dr. Oisín Boydell
Dr. Brian Mac Namee

www.ceadar.ie