

Storing and attributing log data using blockchain technology

Blockchain technology is incredibly young, even the most mature of the blockchain technologies are either functionally complete but very simple or lack important features. The thesis has assessed blockchain technology for implementation with the Bosch Transport Data Logger, TDL.

The TDL is a sensor-equipped logging device with a companion smartphone app. The device is fastened to packages during transportation and logs how the packages have been handled while in the care of post and transport companies. For example, unacceptable temperatures, humidity and manhandling are logged.

The two main types of blockchain technology, permissionless and permissioned, are found to have inherent trade-offs between open/closed participation and poor/good performance. Hyperledger Fabric, most mature of the permissioned blockchain systems, was used to build a TDL Blockchain System proof of concept. Log data and other information from and about the TDL devices, transferred by the transport company employees using the companion app, are stored on the blockchain.

Generally, just saving sensor values is not enough to accomplish anything. To give credence to the logged data and to be able confidently to act upon it, the data must be made trustworthy. In an environment where data is generated while the sensor device is in the hands of different organizations, trustworthy connections between each data point and the organization responsible must be made. This to prevent blame-shifting of the type “it was like that when I got it”. To bring historical and documental truth closer to one another, further links between the real world and the data must be made, provided in part by devices needing to digitally sign the data logged by them.

The thesis can be used by Bosch to learn about blockchain technology and its applicability for the TDL. If they or others want to extrapolate they could use the thesis results to draw conclusions for other similar devices and systems. The general thesis recommendation is two-fold. If an organization simply wants to implement blockchain technology applications and not help develop the underlying technology the blockchain technology sector is not yet ready for them, otherwise now is a good time to jump in.