

Blockchain and the City Challenge **Use Case 3 Summary**

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17 October Introduction and Workshop
13-15 November Hackathon and Workshop



Trusted Operations & Maintenance data management

Use Case context: Complex O&M organization and multiple expectations

The daily life within a utility company or a mass transportation operator consists primarily of maintenance activities for various equipment and machines. These activities are carried out by many teams, from many companies (including EDF plants, suppliers, subcontractors) and surveyed by many organizations (including the safety authority, EDF or SNCF engineering, academics, and so on).

The traceability of all of these operations presents a major challenge. Maintenance books record the maintenance tasks that are related to a given material. They typically include logs such as equipment states and parameters at the date and time of a given activity.

Currently, Operational & Maintenance (O&M) management systems are set up on a daily basis. Information is stored in conventional relational databases. Despite the high security level of these systems, applications and data can be corrupted.

Most of the time, information systems allowing O&M management systems are managed by a single actor (for example, EDF or SNCF). Other actors (such as suppliers, subcontractors, authorities, and so on) do not participate in the governance of these systems and do not have proof of the accuracy of the historical information. Sometimes, each maintenance company has its own information system with its own database.

Therefore, knowing the truth requires cross-referencing data from different IT systems – and those data can contradict each other. In each case, EDF and SNCF have to exchange some specific O&M information with suppliers or subcontractors to carry out maintenance tasks, and

with authorities for analyses and verifications. This information is often confidential, so, it is important that each partner has only access to the information with which it is concerned. In fact, several requirements have to be considered in the design phase of the maintenance book:

- Record of critical data provided by the equipment,
- Certification of maintenance data,
- Certification of the operator in charge of a maintenance activity,
- Protection of confidential information,
- Sharing data with several partners with different interests

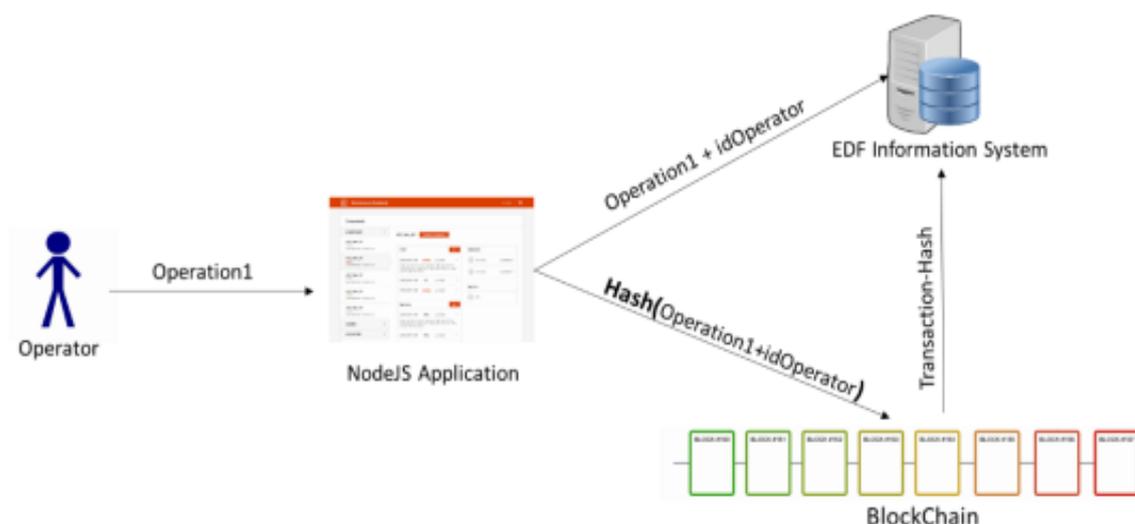
Given this context, blockchains and DLTs, which provide direct connections to machines, test equipment and digital assistants, may provide many benefits.

Use Case expectation: Enhance O&M operations traceability and integrity with a low cost and secure decentralized information system

The basic idea behind this Use Case is to register in a blockchain the critical characteristics of an O&M operation, and to exploit smart contracts to check the consistency of such data and its compliance with procedures (when applicable). The blockchain is expected to be managed by a consortium. Solutions and ideas should focus on some of the following needs:

- Actor authentication and roles on the blockchain (BC),
- Machine authentication and data collection on the BC,
- Data collection from human operators on the BC,
- Certification of maintenance data on the BC,
- Confidentiality of O&M data on the BC,
- Integration within the utility information system,
- Consistency checking,
- Verification of certificated data by a controller,
- Possible role of tokenization to incentivize fulfillment of procedures by the actors.

The figure depicts a typical framework for a development of a blockchain-based O&M book.





Assets required:

Hardware

- Tbf. EDF and SNCF will provide some data, specification and hardware as inputs/

Digital assets

- No requirement on blockchain technology
- OS code preferred

Should you have any questions :

EDF: Diane Le Cottonnec, diane.le-cottonnec@edf.fr

Trusted IoT Alliance: Evan Birkhead, evan@trusted-iot.org