Blockchain to support PIRRS

PIRRS, Kick-off meeting
Geneva, 2-4 September 2020
After the hype, the dust has settled: Time for a rational debate

Starting question:
Can blockchain solve the problem?

Underlying question:
Do we actually expect the problem to occur?
What is a blockchain

• A distributed data structure for recording transactions maintained by nodes without a central authority

• A database because it is a digital ledger that stores information in data structures called blocks

Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data (generally represented as a Merkle tree).

• As an open, distributed ledger it records transactions between two parties efficiently and in a verifiable and permanent way. By design, a blockchain is resistant to modification of the data
Application area par excellence:

- Area with disputes (unnecessary time and money is spent on resolving asset ownership claims)
- Area with highest feasibility and expected impacts (e.g. McKinsey)

McKinsey: Blockchain beyond the hype: What is the strategic business value?, June 19, 2018 | Article, retrieved on 26/08/2020
Main considerations for rail asset registry implementation

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Challenges</th>
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<tbody>
<tr>
<td>Elimination of risks of syntax errors and noncontiguous asset histories</td>
<td>Confidentiality of information</td>
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<td>Mitigation of potential liability of the Registrar</td>
<td>Need for coordination</td>
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<td>Speed and costs reduction</td>
<td>Implementation costs</td>
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<td>Legal compliance (e.g. privacy laws of multiple countries)</td>
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Blockchain for asset registry

Possible levels of implementation:

<table>
<thead>
<tr>
<th>Level</th>
<th>Name</th>
<th>Description</th>
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<tbody>
<tr>
<td>0</td>
<td>No integration</td>
<td>No use of blockchain</td>
</tr>
<tr>
<td>1</td>
<td>Blockchain recording</td>
<td>Blockchain used to record documents related to assets ownership</td>
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<tr>
<td>2</td>
<td>Smart workflows</td>
<td>Blockchain used to record transactions and progress in transactions</td>
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<tr>
<td>3</td>
<td>Blockchain registry</td>
<td>Central database replaced with permissioned blockchain</td>
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<tr>
<td>4</td>
<td>Interoperability</td>
<td>Different blockchain registers merge</td>
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These impact costs and benefits and could be considered as options in a potential cost-efficiency / cost-benefit analysis
But, we should not be looking for an application of a fancy solution/technology!
So, let’s go back to the underlying question:

**Do we actually expect the problem(s) to occur?**

- What is the experience with aviation registry?
- What are the plausible scenarios and how frequent are they?

Could a strong business case be built, or not?
Making the railway system work better for society.

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