1. Entity posing the challenge

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2. Challenge

Is it possible to develop a digital twin as a centralising technology for the data generated in the different life cycles of an infrastructure?

3. Possible solutions that can be applied

- Data visualisation technologies: Virtual reality (VR) and digital twin
- Adding sensors to infrastructure

4. Context

The companies that propose the following challenge are mostly companies that design and carry out civil works, but they also supply the market with conservation and maintenance services for infrastructures in various fields such as roads, railways, hydraulic works, etc. In this sense, these infrastructures are made up of an infinite number of components that need to be monitored and maintained in order to function properly over time.

Maintenance and inspection is still done in person, and where in many cases all the data is generated and captured in a traditional way, on paper documents and classic, sector-specific computer programmes. Nevertheless, in some cases, the companies proposing the challenge have already started to implement different sensor technologies such as IoT in their infrastructures, so that they can store data in the cloud and carry out preliminary analyses of this data. These advances are making it possible for them to start **monitoring some of the infrastructures they manage and maintain in real time**.

Architects, engineers, construction companies and urban planners have been using computer-aided design and BIM software for a long time to help create, plan and build their projects. However, with the advent of the internet of things (IoT), sensors, big data and cloud computing, they can now create 'digital twins' of entire infrastructures that display and behave in a variety of different scenarios. This new technology means that it is possible to have a **digital model of the infrastructure and to feed it with real data during the entire life cycle of the project** - design, construction, operations and maintenance... - which in turn means that we can run simulations, study performance problems and identify possible improvements.

5. Subsidiary challenges and objectives

The companies proposing the following challenge are looking for startups to join them in designing and putting together digital twins of some of the infrastructures they build, manage or maintain in order to create:

- A highly accurate virtual model/simulation of the infrastructure to make it possible to manage information centrally, comprehensively and reliably throughout its life cycle.
- To provide a generic overview of the different machines and/or connected pieces of equipment that generate and analyse large volumes of data.
- To monitor the infrastructure easily and in real time.
- To assess the behaviour of infrastructures and their components when faced with possible changes, in different contexts and in real time.
- To develop predictive maintenance in order to provide an adequate prognosis of the condition of an installation or infrastructure in order to be able to anticipate possible failures and incidents and, therefore, save costs.
- To provide a fully immersive VR experience for the managers/renters/owners of the infrastructure.