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 Pledger Project



PLEDGER

Paving the way for next-generation
edge computing



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THE PLEDGER PROJECT

Pledger is an EU-funded project that paves the way for next-generation edge computing infrastructures, through a new and innovative architectural paradigm: Pledger couples the benefits of low latencies on the edge with the robustness and resilience of cloud infrastructures.

PLEDGER ALLOWS:

- Edge Computing Providers to enhance the stability and performance effectiveness of their edge infrastructures, through modelling the overheads and optimal groupings of concurrently running services, runtime analysis and adaptation, thus gaining a competitive advantage;
- Edge Computing Adopters to understand the computational nature of their applications, investigate abstracted and understandable QoS metrics, facilitate trust and smart contracting over their infrastructures and identify how they can balance their cost and performance to optimise their competitiveness and monitor their SLAs;
- Third parties to act as independent validators of QoS features in IoT applications, enabling new decentralised applications and business models, thus filling a large gap in the emerging Edge/IoT computing market landscape.

CHALLENGE AND SOLUTION

One of the main drawbacks and hindering factors in the process envisioned by Pledger is the lack of cross-layer knowledge and the inability to exchange it that are enforced upon the involved roles:

- the IaaS Providers that require improved awareness on the types of applications executed by their customers,
- the Adopters/Consumers (e.g. SaaS providers) of infrastructure services, that require improved awareness on the types of physical nodes their applications will be executed on.

Pledger introduces necessary improvements across this value chain by following a black box approach in all the involved layers, in order to adapt to the specifics of the ecosystems in question and the corresponding lack of knowledge. The proposed approach does not assume any kind of Adopter-Provider interaction, but all the necessary information is extracted via non-intrusive methods abiding to this role separation imposed by the Cloud business model.



USE CASES

USE CASE 1: Mixed Reality applications on the edge

Computation capacity for achieving high resolution graphics at the edge is imposing new requirements for performance, scalability and QoS. Industrial players are increasingly demanding applications of greater complexity which require a higher level of performance. Pledger will explore the possibilities of utilising edge computing, making the usage of remote rendering possible by outsourcing the demanding processes like calculations, application logic, or content rendering to other fog nodes or the cloud.

USE CASE 2: Edge infrastructure for enhancing the safety of Vulnerable Road Users (VRUs)

Ensuring the road safety for vulnerable road users (VRUs) in metropolitan areas is required in order to reduce the number of accidents and serious injuries or even fatalities. Pledger will evaluate how different types of sensors and radio technologies supported by the city infrastructure can be used to enable edge computing-assisted risk detection and mitigation for VRUs in an everyday scenario in the city of Barcelona.

USE CASE 3: Manufacturing the data mining on edge

Data recording in combination with self-learning algorithms allow modern production systems to precisely determine the condition of a machine, predict any pending maintenance and ensures complete component traceability. However - edge devices available today often cannot provide the desired performance for these computing operations. Pledger will explore, implement and test possible data and computation transfers to the cloud.

BENEFITS AND IMPACT

- Rich data sets for better Machine Learning – Consolidating data in the cloud for sophisticated Machine Learning applications.
- High Performance Computing – Leverage the Edge for computationally intensive analysis or machine learning.
- Security – Trusted and secured end-to-end communications
- Blockchain – Bringing Smart Contracts to the Edge.

