Laying the groundwork for autonomous transport networks

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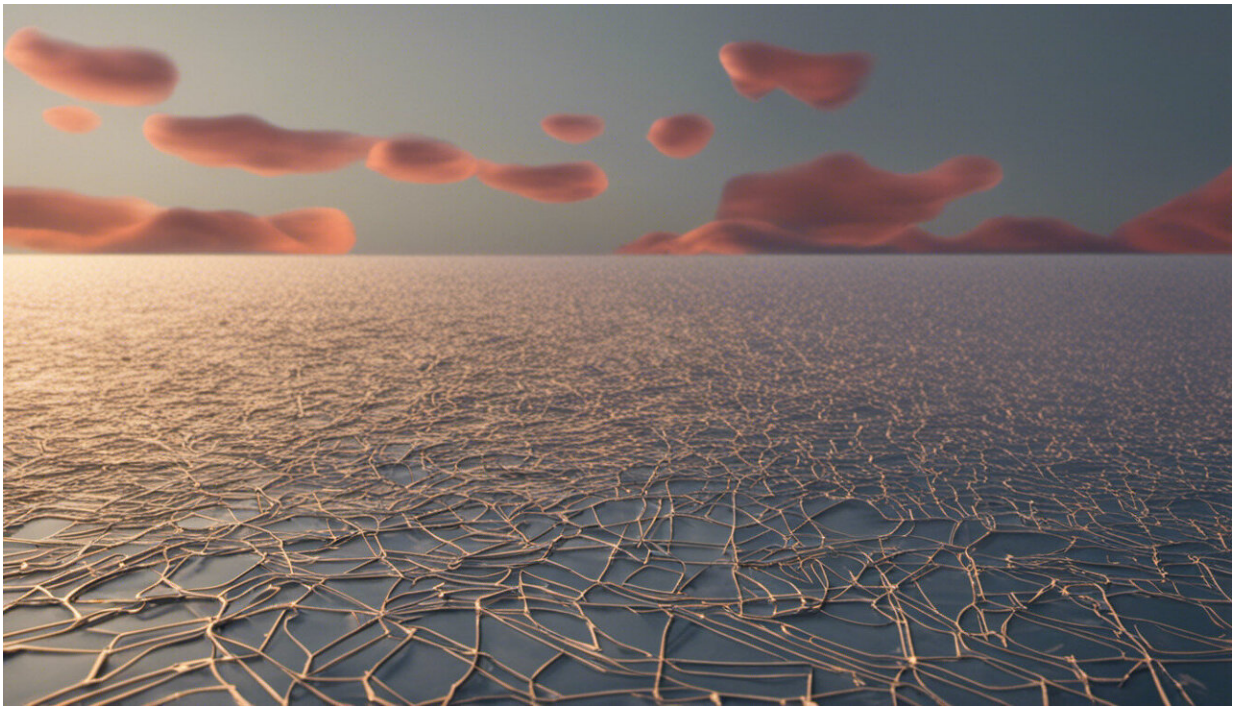

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With the increased use of connected devices and endpoints where Internet of things devices, satellites and sensors produce constant streams of information, the amount of data collected presents significant challenges. In particular, the use of Big Data analytics in the context of smart cities highlights the need for creating a software system capable of

collecting, processing and making use of vast amounts of geographically distributed data. The EU-funded ELASTIC project is addressing exactly this issue and creating a software architecture framework for the efficient distribution of intensive computation functionalities across the edge and cloud.

The innovative fog computing environment also takes into account non-functional requirements inherited from the system domain. Eduardo Quiñones from ELASTIC project coordinator Barcelona Supercomputing Center explains the details of the software architecture in an article. "The ELASTIC project is set in the context of fog computing—an extended version of cloud computing to the network edge—and is suitable for Internet of Things (IoT) and autonomous systems applications that require fulfilling non-functional requirements."

Quiñones continues: "Current big-data software architectures execute most of the data analytics computation into powerful cloud services, which heavily affects the capabilities of the system to provide real-time guarantees. This approach also imposes the need of increasing the level of security to minimise potential attacks while the data is being transferred to cloud, which may end up affecting the overall safety assurance levels." He adds: "The ELASTIC technology addresses these challenges by efficiently distributing the big-data computation across the compute continuum in a holistic way, taking into account real-time, energy efficiency and security requirements. Overall, ELASTIC aims to provide the technological background for the development of new and safe autonomous mobility services."

Public transport solution

The framework developed by the ELASTIC project is deployed in Florence's public tram network. In the same article, Quiñones also says: "By enhancing the sensing capabilities of the tramway vehicles and the

city, advanced mobility applications are being developed. These applications aim for an enhanced interaction between the city and public vehicles, and a safer and smarter urban mobility environment, with reduced accidents, traffic improvement, and reduced maintenance costs."

According to Quiñones, the ELASTIC system will help "collect data from the vehicles and tram stations, such as obstacles in front of the trams, travel speed and energy conditions, arrival and departure times, upon which valuable knowledge will be extracted across the compute continuum, guaranteeing the response time of the system and ensuring that data remains anonymous in order to guarantee the privacy of the citizens."

The ongoing ELASTIC (A Software Architecture for Extreme-ScaLe Big-Data AnalyticS in Fog CompuTIng ECosystems) project will run until end-November 2021. It's among several initiatives that hold out the promise of integrating data from multiple organisations, diverse environments and a wide variety of intelligent devices aimed at sustainable, efficient and safe mobility applications in future smart cities.

More information: ELASTIC project website: elastic-project.eu/

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