

Session 3: AI and Smart City/Smart Home

## **The ELASTIC project: A Software Architecture for Extreme-Scale Big-Data Analytics in Fog Computing Ecosystems**

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### **Abstract**

Big data is nowadays being integrated in systems requiring to process a vast amount of information from (geographically) distributed data sources, while fulfilling the non-functional properties (real-time, energy-efficiency, communication quality and security) inherited from the domain in which analytics are applied.

The ELASTIC project is developing a novel software architecture (SA) to help system designers to address this challenge. The SA will incorporate a novel elasticity concept to distribute and orchestrate the resources across the compute continuum (from edge to cloud) in an innovative fog computing environment. The new elasticity concept will enable to match analytics workload demands and fulfilling non-functional properties. The fog computing architecture will incorporate energy-efficient parallel architectures, combined with innovative distributed storage, secure communications and advanced cloud solutions. Overall, the SA will enable the combination of reactive data-in-motion and latent data- at-rest analytics into a single extreme-scale analytics solution, in which the analytics workloads will be efficiently distributed across the compute continuum based on their suitability and data processing needs. The capabilities of ELASTIC are being demonstrated on a real smart-mobility use case, featuring a heavy sensor infrastructure to collect data across the Florence tramway network, equipped with advanced embedded architectures, heterogeneous sensors, V2I connectivity and access to cloud resources.