CLASS

EDGE AND CLOUD COMPUTATION:
A HIGHLY DISTRIBUTED SOFTWARE
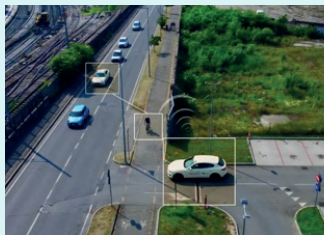*FOR BIG DATA ANALYTICS*

In a nutshell

The European project CLASS developed a novel software architecture framework that offers:

- A smart, safe and sustainable transportation solution
- Faster software development and deployment capabilities
- A flexible and scalable architecture
- Applicable to a wide range of application domains with critical real-time requirements, e.g., smart factory, smart healthcare, etc.

The challenge

Help developers deploy and execute big data analytics applications, taking into account

- Geographically distributed data sources generating massive volumes of data
- Highly heterogeneous computing and networking infrastructures at cloud and edge
- Diverse analytics engines and programming models.
- Strict QoS constraints, especially for real-time applications

The solution

The novel CLASS software architecture (SA) provides a unified ecosystem with

- A unified data analytics platform for task-based and map-reduce analytics engines
- Transparent distribution of computation across the compute continuum
- Support for concurrency through parallel and serverless execution frameworks
- Advanced scheduling that minimizes end-to-end latency in real-time
- Automatic scaling of cloud resources to match application QoS requirements
- Distributed data management and storage

The smart city use case:

The CLASS SA has been validated in a living lab environment in the Modena Automotive Smart Area (MASA), involving:
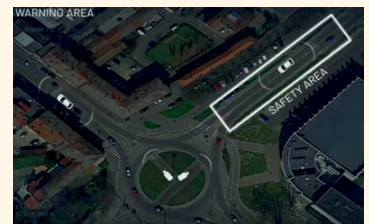
- A street camera infrastructure that collects a vast amount of data
- Interconnected computing resources at edge and cloud
- Connected cars equipped with heterogeneous sensors and V2X connectivity

Three smart city applications:

The novel CLASS software architecture (SA) provides a unified ecosystem with

- Collision detection: Warning drivers for collision hazards across the driving path, by detecting and tracking and predicting the movement of vehicles and vulnerable road users in real-time:
    - 2 seconds warning margin
- Air pollution estimation: Calculate the pollution emissions due to current traffic conditions in real-time, based on the type and driving behavior of circulating vehicles:
    - NO_x, CO,PM, PN, HC emissions in real-time
- Digital traffic sign: An enhanced traffic management simulation environment based on real-time information collected from the city

Partners

Barcelona Supercomputing Center — Centro Nacional de Supercomputación

Comune di Modena

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