Mobility Analytics as a Service – The EMERALDS perspective

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"Novels from data management universe - different applications, from EU Green Deal, Water, Food and Mobility" webinar, 29/5/2023

EMERALDS
Extreme-scale Urban Mobility
Data Analytics as a Service

ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ
UNIVERSITY OF PIRAEUS

EMERALDS – Extreme-scale Urban Mobility Data Analytics as a Service

✓ Topic: HORIZON-CL4-2022-DATA-01-05 Extreme data mining, aggregation and analytics technologies and solutions (RIA)

✓ Duration: Jan. 23 – Dec. 25

✓ Grant amount: 4,998,438 EUR

✓ The project's vision is to design, develop, and create an urban data- focused **Mobility AI as a Service (AIaaS)** toolset, consisting of the so-called **'emeralds' services**

EMERALDS Services Toolset

Collect and manage spatio-temporal data of **high volume, velocity and variety** – advanced capabilities in data mining (searching and processing)

Analyse in online and offline settings – **Reduce data integration time** by pairing data-streams with a storage-querying-analytics backbone

Import to real-time responsive AI/ML algorithms – Combine multiple heterogeneous data sources to **model the urban environment with increased accuracy**

Visualize results in interactive dashboards with **enhanced visual analytics capabilities**

Implement privacy preservation techniques at all data modalities and at all levels of the architecture – **Performing sensitive data analytics tasks in-situ**

EMERALDS

Objective #1

Design a **service-oriented reference architecture for mobility data management** performing at the edge/fog/cloud compute continuum
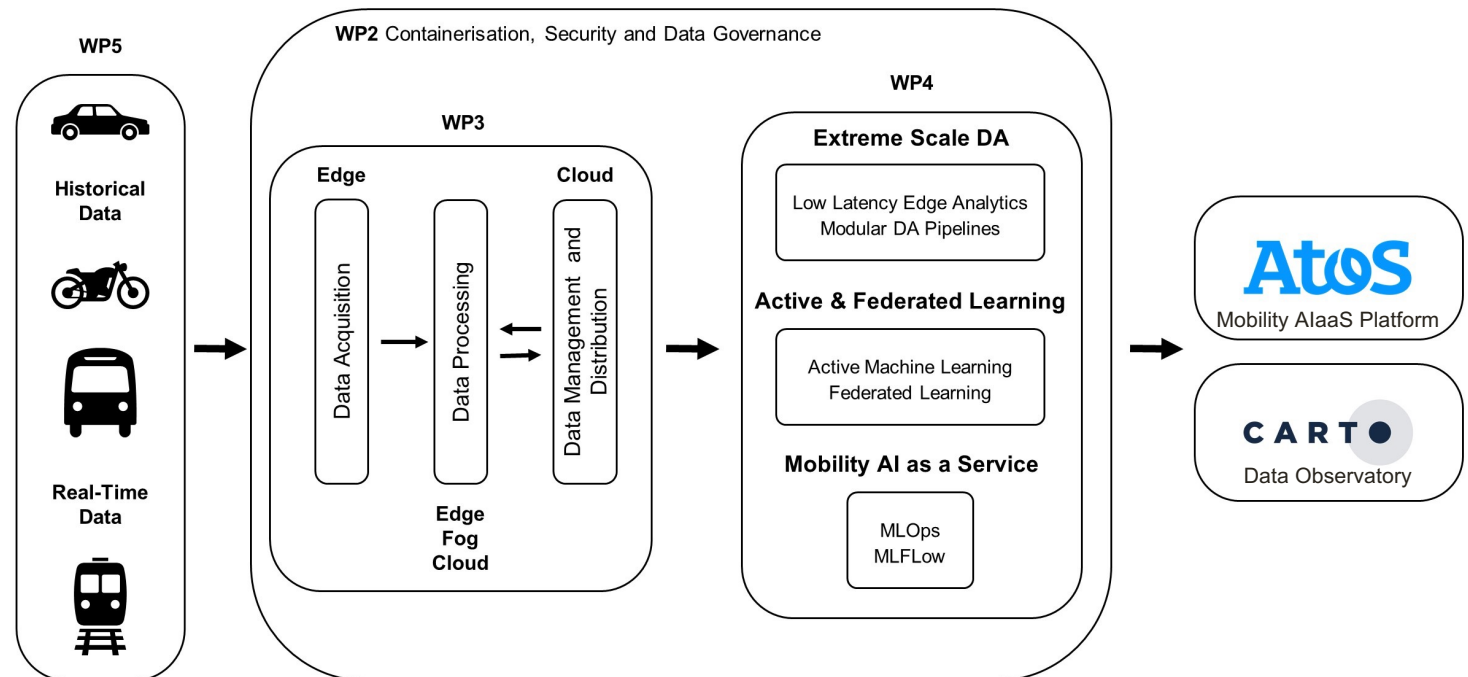
Objective #2

Develop **extreme-sc...** **& analytics methods** **('emeralds') for urba...**

Objective #3

Develop **mobility dat...** **AI/ML tools and servi...** **Mobility Analytics as...**

Objective #4

Demonstrate the results and validate their usefuln... **adoption applications in c...**

WP5

Historical Data

Real-Time Data

WP2 Containerisation, Security and Data Governance

WP3

Edge

Cloud

Data Acquisition

Data Processing

Data Management and Distribution

Edge Fog Cloud

WP4

Extreme Scale DA

Low Latency Edge Analytics Modular DA Pipelines

Active & Federated Learning

Active Machine Learning Federated Learning

Mobility AI as a Service

MLOps MLFLow

AtoS
Mobility AIaaS Platform

CARTO
Data Observatory

Objective #1

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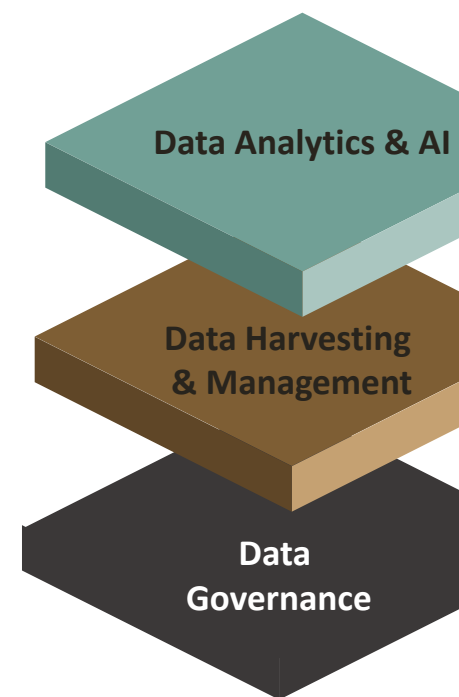
Objective #2

Develop **extreme-scale processing & analytics methods and tools ('emeralds')** for urban mobility data

Objective #3

Develop **mobility data analytics and AI/ML tools and services (MLOps) – Mobility Analytics as a Service (MAaaS)**

Objective #4

Demonstrate the results over **three pilot use cases** and validate their usefulness through **two early adoption applications in commercial offerings**.

Data Analytics & AI

Data Harvesting & Management

Data Governance

'emeralds'
✓ ATOS Mobility AIaaS Platform
✓ CARTO Data Observatory
✓ Edge (in-situ) Learning & Analytics
✓ Active & Federated Learning
✓ XAI techniques
✓ Privacy-aware in-situ Data Harvesting
✓ Extreme scale data Processing
✓ Data streaming integrators (Copernicus, etc.)
✓ Mobility Data Fusion and Management
✓ Security and Data Governance

Objective #1

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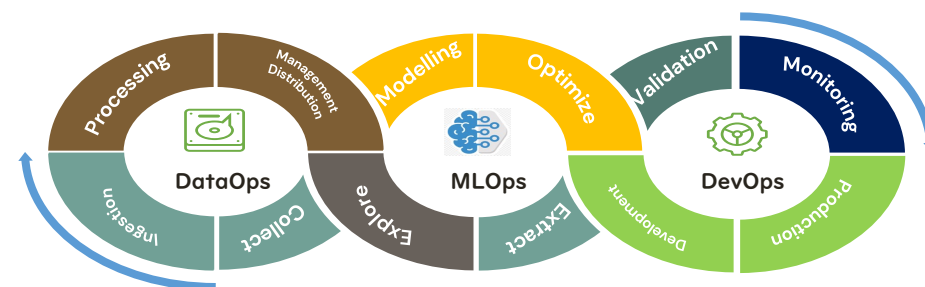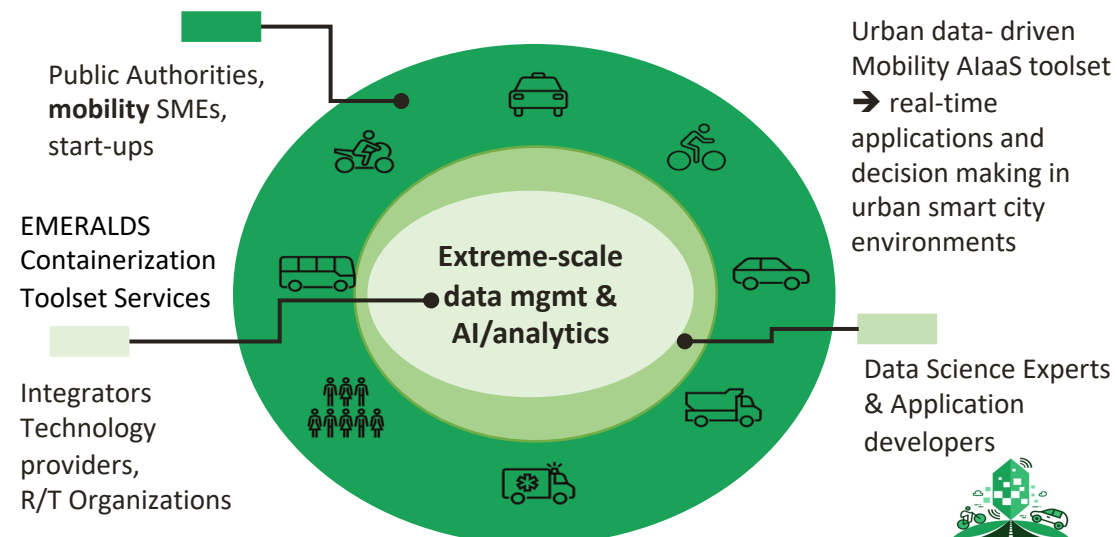
Objective #2

Develop **extreme-scale processing & analytics methods and tools ('emeralds')** for urban mobility data

Public Authorities, **mobility** SMEs, start-ups

Urban data- driven Mobility AIaaS toolset ➔ real-time applications and decision making in urban smart city environments

EMERALDS Containerization Toolset Services

Extreme-scale data mgmt & AI/analytics

Integrators Technology providers, R/T Organizations

Data Science Experts & Application developers

Objective #3

Develop **mobility data analytics and AI/ML tools and services (MLOps) – Mobility Analytics as a Service (MAaaS)**

Processing · Management Distribution · Modelling · Optimize · Validation · Monitoring

DataOps · **MLOps** · **DevOps**

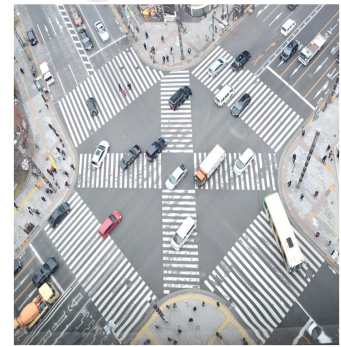Ingestion · Collect · Explore · Extract · Development · Production

Objective #4

Demonstrate the results over **three pilot use cases** and validate their usefulness through **two early adoption applications in commercial offerings**.

Objective #1

Design a **service-oriented reference architecture for mobility data management** performing at the edge/fog/cloud compute continuum

The Hague

Utrecht

Riga

Risk-assessment, prediction and forecasting during events

Multi-modal integrated traffic management

Traffic data analytics for public transport systems

Objective #2

Develop **extreme-scale processing & analytics methods and tools ('emeralds')** for urban mobility data

Objective #3

Develop **mobility data analytics and AI/ML tools and services (MLOps) –** **Mobility Analytics as a Service (MAaaS)**

PTV | GROUP

CARTO

Objective #4

Demonstrate the results over **three pilot use cases** and validate their usefulness through **two early adoption applications in commercial offerings**.
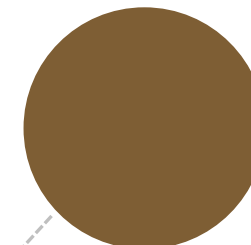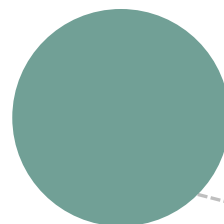
Data Spaces initiative

Data Spaces Business Alliance
BDV BIG DATA VALUE ASSOCIATION | FIWARE FOUNDATION | gaia-x | INTERNATIONAL DATA SPACES ASSOCIATION

Mobility Data Space
Data Sharing Community

DATA SPACES SUPPORT CENTRE

MobiSpaces
new data spaces for green mobility

DATA SPACE FOR SMART AND SUSTAINABLE CITIES AND COMMUNITIES

Standardized Data Formats and Protocols

ETSI

Open Geospatial Consortium

cen

CENELEC

EMERALDS

High-quality data & s/w sources

Adra
The AI Data Robotics Association

AI⚙TI

AI4EU

Multiplier Networks

Inter-disciplinary collaborations
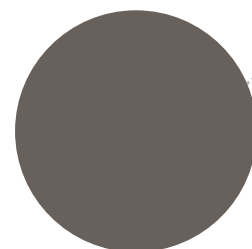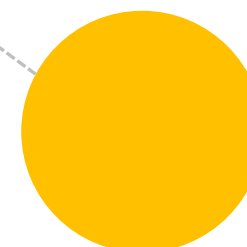
Projects under the topic
HE Cluster 4 – Data 01 and
other relevant projects

Copernicus

EGN⚙S

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www.emeralds-horizon.eu

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