RAINBOW
NEWSLETTER
ISSUE 1, JULY 2020

RAINBOW is a 3-year Research and Innovation Action from 2020 to 2022, funded under the EU Horizon 2020 framework programme, focussing on producing an open, trusted fog computing platform facilitating the deployment, orchestration and management of scalable, heterogeneous and secure IoT services and cross-cloud apps.

MOTIVATION

With IoT now present at our homes, work and daily routines, the number of connected devices and IoT generated data are rapidly exploding. Thus, the amount of data expected to be in transit between IoT devices and the cloud for central processing and analysis is ever increasing, putting higher demands on the cloud services especially for real time and mission critical applications.

Fog computing fills the gap between the edge and the datacenter, broadening the range of options as to where to execute analytics, further reduce the amount of data transferred across networks and upwards to the cloud, and facilitate collaboration between edge devices.

OPEN CHALLENGES

Efficient and agile orchestration of fog services in dynamic fog networks

Intelligent planning in data placement, devising inter-network communication fabric to bridge cross-fog and hybrid cloud/fog deployments

Effective security mechanisms accounting for the distributed nature of the fog computing architecture and the lack of compute and energy resources

Horizon 2020
European Union Funding
for Research & Innovation

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 871403

PROJECT INFORMATION

TITLE: RAINBOW - *A fog platform for secured IoT services*
GRANT AGREEMENT NO: 871403
CALL ID: ICT-15-2019-2020
CALL TOPIC: Cloud Computing
START DATE: January 1st, 2020
END DATE: December 31st, 2022
COORDINATOR: UBITECH Ubiquitous Solutions

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#RAINBOW_H2020
#FogComputing
#EdgeComputing
#Industry4.0
#secureIoT

https://rainbow-h2020.eu

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MISSION & VISION

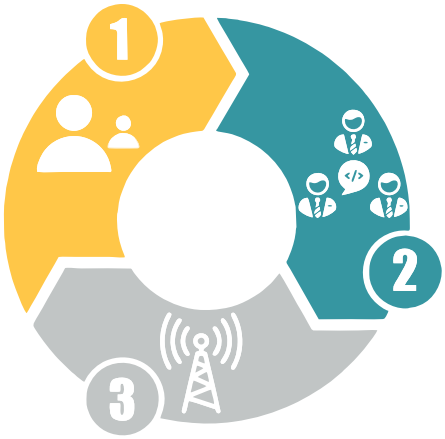
RAINBOW's mission is to design and develop an open and trusted fog computing platform that facilitates the deployment and management of scalable, heterogeneous and secure IoT services and cross-cloud applications.

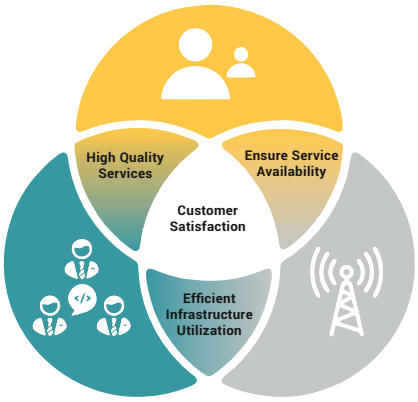
RAINBOW aspires to enable fog computing to reach its true potential by providing the deployment, orchestration, network fabric and data management for scalable and secure edge applications, addressing the need to timely process the ever-increasing amount of data continuously gathered from heterogeneous IoT devices and appliances.

Our solution will provide significant benefits for popular cloud platforms, fog middleware, and distributed data management engines, and will extend the open-source ecosystem by pushing intelligence to the network edge while also ensuring security and privacy primitives across the device-fog-cloud-application stack.

STAKEHOLDERS

1. **END USERS**
   Users interested in solving a problem and outperforming the competition
2. **SERVICE DEVELOPERS**
   Developers or SMEs looking to reach new market segments using SotA tech
3. **INFRASTRUCTURE PROVIDERS**
   Producers of hardware devices in the ICT ecosystem





END USERS – SERVICE DEVELOPERS

Developers must ensure they meet their customers' demands and provide an effective training strategy. Users expect a certain level on the quality of service delivered.

SERVICE DEVELOPERS - INFRASTRUCTURE PROVIDERS

Providers must deliver and support high quality dev-friendly equipment. Developers test and report potential problems.

INFRASTRUCTURE PROVIDERS – END USERS

Providers must guarantee high availability of their service since this is expected by the end users.

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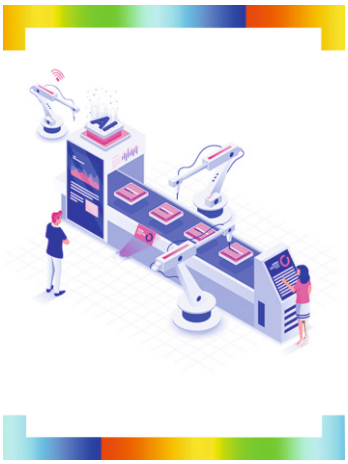
USE CASES

RAINBOW will demonstrate its wide applicability in various domains which are safety-critical and require guaranteed extra-functional properties, including real-time responsiveness, availability, data freshness, efficient data protection and management, energy-efficiency and industry-specific security standards.

HUMAN-ROBOT COLLABORATION IN INDUSTRIAL ECOSYSTEMS

Indoor positioning for safety-critical industrial IoT requires the propagation of telemetry data from thousands of objects, human workers and robotic machinery; all this occurring within millisecond range. At the same time, it requires the execution of complex AI algorithmic models to continuously assess and prevent collisions among objects. Because of the delay-sensitive nature of these tasks, propagating data to central cloud infrastructure, results in cycles, where often coordination assessment and planning are derived too late. These challenges require processing of positioning data directly on or near the sensing entities to guarantee faster reaction.

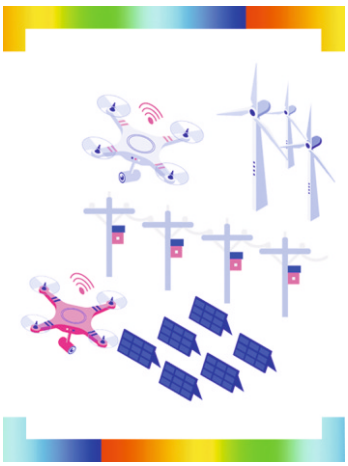


DIGITAL TRANSFORMATION OF URBAN MOBILITY

Aims to create a real-time geo-referenced notification system for vehicles travelling in urban areas about critical situations for the mobility network. Challenges include: a) the identification of the “subject” in charge of reporting and updating local information; b) the study of strategies for the optimal splitting of functions between the on-board application, the edge and the cloud backend and for their dynamic configuration; c) the geographical location of MEC servers to support different user populations and densities; d) the support of the emerging C-V2X PC5 wireless technology. The novelty at this case comes in the form of turning mobility actors into producers and consumers of mobility data, creating virtual local dynamic communities.

POWER LINE SURVEILLANCE VIA SWARM OF DRONES

Although, using a swarm of drones reduces the total time required to scan an entire power line infrastructure, there are significant challenges with the foremost being drone autonomy. Moreover, currently drones do not communicate to coordinate and optimize their flight plans. In addition, surveillance of critical infrastructure requires data protection, high performance, optimized resource allocation, energy reduction and specific restrictions. As such the main innovation concerns the move of data processing on board the UAV. Thus, coordination of routing alteration, image exchanging, terrain overlapping avoidance, etc. can lead to higher energy autonomy and monitoring capacity while reducing overlapping during the image gathering process.



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MEET THE TEAM

The RAINBOW consortium consists of fifteen prestigious partners established in ten EC member states and combines multidisciplinary competences and resources from the academia, industry and research community focussing on Cloud, Fog and Edge Computing, Mesh Networking, as well as on Trusted Computing, System-of-Systems Assurance and Attestation.

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