VISION OF RAINBOW

TO DESIGN AN OPEN &TRUSTED FOG COMPUTING PLATFORM

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RAINBOW

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RAINBOW

Open & Trusted
FOG
Computing Platform

Manage Scalable Heterogeneous & Secure IoT Services

In May 2022, RAINBOW reached a significant milestone by delivering the second version of its integrated fog computing platform. RAINBOW's second release offers enhanced functionality and several new features:

- Policy Editor has been updated. Policies and Service-level objectives (SLOs) can now be visually created and applied.
- The pre-deployment constraint solver is implemented and integrated through the policies, allowing to allocate specific compute nodes based on needs, while RAINBOW now offers deployment topology optimization.
- The CJDNS is now integrated with the key management which allows the secure enrolment for onboarding new computes nodes in the cluster.
- The analytics and SLO editors have been significantly improved so that more complex SLOs can be supported and tested.

RAINBOW CONSORTIUM

UBITECH · TU WIEN · POLITECNICO DI TORINO · Πανεπιστήμιο Κύπρου University of Cyprus · DTU

ΑΡΙΣΤΟΤΕΛΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΕΣΣΑΛΟΝΙΚΗΣ · LINKS · Infineon · netcompany intrasoft · Suite5 We Deliver Intelligence

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KPIs ▶

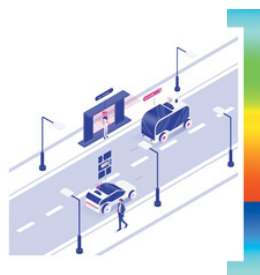| Decrease effort and investment for developing and managing the lifecycle of fog computing services and increase software delivery cycles speed. | Improved interoperability of cloud-based services used in fog and edge execution environment | Improved efficiency and performance of fog nodes due to more efficient service development and orchestration | Increased trust feeling of data and services relying on fog-based services and improved security and privacy guarantees | Increased productivity of business applications which rely on, or can be developed based on fog computing services |

3 USE CASES

DIGITAL TRANSFORMATION OF URBAN MOBILITY
The Digital Transformation of Urban Mobility use case is focused on low-latency and overall system reliability as well as node trust-enabling. The early-stage technical evaluation under this use case successfully completed testing pertaining to automatic power consumption and bandwidth occupancy optimization.

HUMAN ROBOT COLLABORATION
The Human-Robot Collaboration in Industrial Ecosystems use case is focused on low-latency and physical personnel safety for optimal human-robot symbiosis in a working environment. The early-stage technical evaluation under this use case successfully completed testing pertaining to scaling in and out of localization and collision avoidance services, monitoring and data sharing.

POWER LINE SURVEILLANCE VIA SWARM OF DRONES
The Power Line Surveillance via Swarm of Drones use case is focused on automatic deployment, node trust-enabling and extending current system capabilities on a technical level. The early-stage technical evaluation under this use case successfully completed testing pertaining to time-efficient drone handover from ground station to ground station, increase in productive flight distance per drone and reduction of temporal overhead in terms of data acquisition.

RAINBOW OBJECTIVES

01. FOG ARCHITECTURE
Provide an open and trusted fog computing reference architecture and highly relevant industry use-cases that facilitate the design, development and orchestration of scalable, heterogeneous, secure and privacy-preserving IoT services and cross-cloud applications, incorporating technological and business requirements coming from the industry, the research and academic community.

02. ORCHESTRATION, DATA COLLECTION & ANALYTICS
Provide a set of innovative mechanisms and middleware tools for IoT orchestration, data collection and decentralized analytics that guarantees network security, data protection, identity management and resource integrity. The key characteristic of the middleware will be the embedded intelligence and remote attestation mechanisms for establishing trust and QoS requirements while coping with performance and network uncertainties.

03. STORAGE & PROCESSING
Enable secure and efficient data storage and processing at the fog and edge layer and facilitate the extraction of high-level analytic insights by introducing novel decentralized algorithms and open APIs.

04. PROOF OF CONCEPT
Prove the applicability, usability, effectiveness and value of the RAINBOW integrated framework, models and mechanisms in industrial, real-life trustworthy services, applications and standards demonstrating and stress-testing the RAINBOW artefacts, methodologies and services under pragmatic conditions against a pre-defined set of use cases.

05. COMMUNICATION & SCIENTIFIC DISSEMINATION
Ensure wide communication and scientific dissemination of the innovative RAINBOW results to the industry, research and international community, to realize exploitation and business planning of the RAINBOW design models, software kits and orchestration mechanisms, to identify end-users and potential customers, as well as to contribute specific project results to relevant open source communities.