CELTIC-NEXT
Σeureka Cluster

AI-NET-ANIARA

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Chalmers University of Technology (CTH), Sweden
Eltek AB, Sweden
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Opel Automobile GmbH, Germany
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Project Website

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Automation of Network edge Infrastructure & Applications with aRtificiAl intelligence

Digital transformation is ongoing in many areas today, which will impact many aspects of people's lives via means such as smart cities, robotic, transportation, and next-generation industries. At the same time, the current centralized cloud infrastructure is not adequate to serve the transformation's requirements. We believe that three technologies can come together to shape a new secure service and application platform; 5G, edge-centric compute & artificial intelligence.

Main focus

Complete network automation is a clear prerequisite for the efficient use of a highly integrated and flexible edge infrastructure which is programmable across all its components, from basic connectivity setup to fully virtualized network functions and application components.

The primary objective of the ANIARA project is to provide intelligent network automation enablers and solutions for high-performance services deployed and operated at the network edge. To manage complexity, we need to take advantage of artificial intelligence to complement traditional optimisation algorithms. Currently, deep edge network nodes will be deployed at locations not prepared for the power requirements of edge-centric compute. To answer this, we need to analyse requirements and develop methods to minimize energy consumption.

Approach

The use cases developed in the project will be used as driving scenarios and the enablers and solutions will be used in demonstrations of the use case implementations. In order to test the most promising
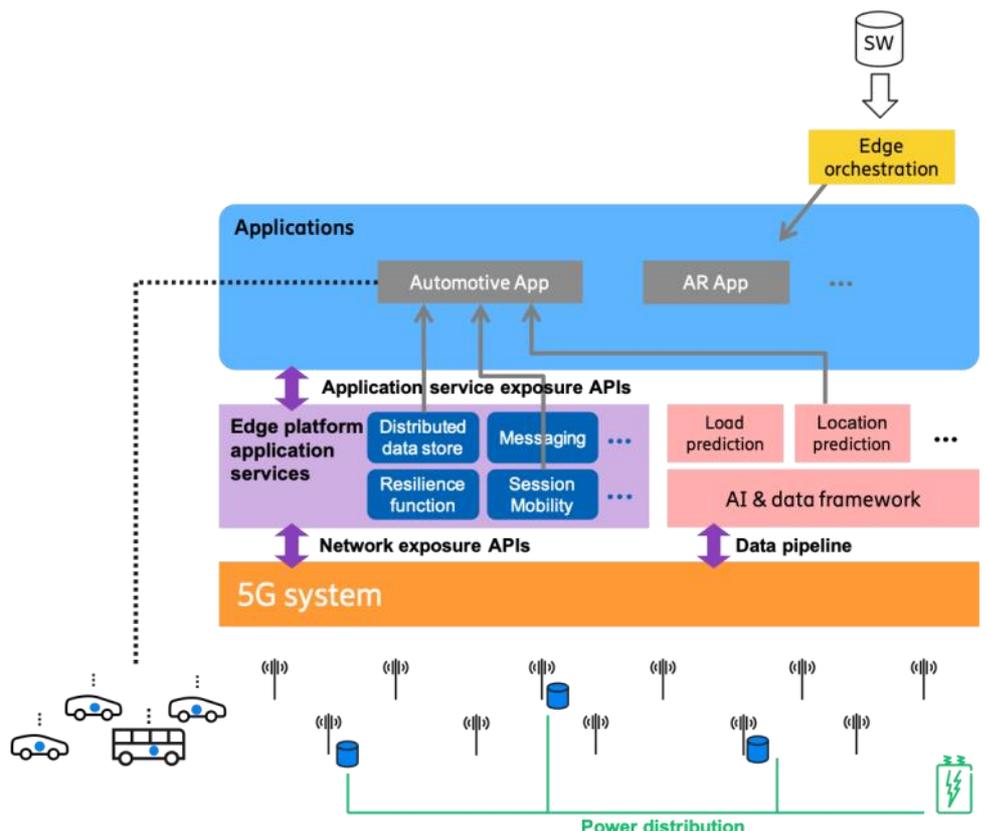
results/solutions in a real-world environment, ANIARA plans to develop a number of proof-of-concept demonstrators, leveraging on the testbed facilities present at the premises of some of the partners in the consortium.

The ANIARA sub-project have activities in several areas which are linked together as in the figure below.
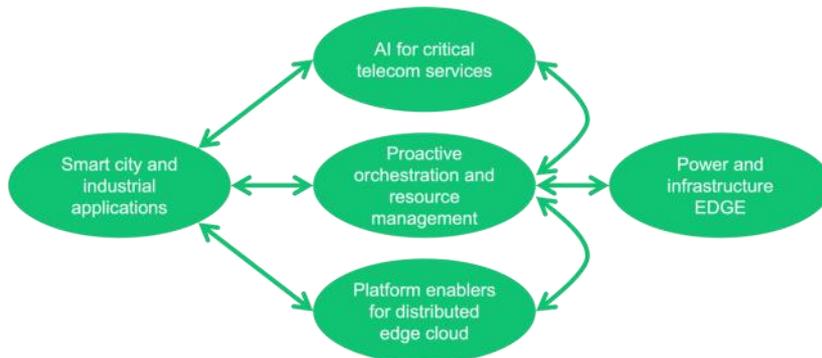
Based on experiences from similar projects, we see that for a project of this size and complexity, a loosely coupled project enables more innovation and initiative from project partners. Efforts to create a coordinated larger solution have in the past created a lot of overhead in planning and integration of the different technical solutions and enablers. It has also been easier to create commercial services and products of enablers. We aim to create integrated PoCs where we can identify an added value and understanding which we can leverage. As a result, the ANIARA sub-project is focused on developing enablers rather than huge solutions. In our experience, this also it

much easier to transfer the project results to commercial use in products and services compared to cases where complete solutions were developed. The focus on enablers developed in the WPs also make the project management effort manageable.

Main results

The primary objective of the ANIA-RA project is to provide enablers and solutions for high-performance services deployed and operated at the network edge. The use cases developed in the project will be used as driving scenarios and the enablers and solutions will be used in demonstrations of the use case implementations. Even if the ANIARA focus is on enablers and solutions, there is also an objective to demonstrate selected use cases and solutions in more realistic testbed. Here the RISE ICE testbed in Luleå, and the Fraunhofer IPT 5G testbed in Aachen together with the German edge cloud will be used. We will also aim to establish contacts with other existing testbeds for this purpose. To manage the complexity automation of network edge infrastructure, ANIARA will develop artificial intelligence methods as well as more traditional optimisation algorithms. ANIARA will analyse requirements for power distribution and supply, then develop methods to minimize energy consumption. These solutions would enable deep edge nodes to be deployed at locations not originally prepared for the power requirements of edge-centric compute.

Impact

The project we will organize a wide set of dissemination activities, aiming at dedicated workshops with involvement of SMEs, workshops and demonstrations at major conferences. We will also target giving seminars in relevant universities, industry groups and industry events. We will select the dissemination venues and methods to ensure the strong strategic impact of the project outcomes, which can potentially impact the long- and short-term development plans of the relevant industry.

All ANIARA's partners will be actively involved in the project dissemination actions through organization and participation in the workshops and conferences, invited talks, and demos. We will also establish collaboration with different national initiatives to enhance the reach and impact of the project results and promote the opportunity of edge computing. Currently focused areas are IT-security, artificial intelligence, AR & VR and driverless transport systems. Research conducted in the ANIARA project could be used to extend the initiative in the areas 5G and edge computing.

About CELTIC–NEXT

CELTIC-NEXT is the EUREKA Cluster for next-generation communications enabling the digital society. CELTIC-NEXT stimulates and orchestrates international collaborative projects in the Information and Communications Technology (ICT) domain.

The CELTIC-NEXT programme includes a wide scope of ICT topics based on new high-performance communications networks supporting data-rich applications and advanced services, both in the ICT sector and across all vertical sectors.

CELTIC-NEXT is an industry-driven initiative, involving all the major ICT industry players as well as many SMEs, service providers, and research institutions. The CELTIC-NEXT activities are open to all organisations that share the CELTIC-NEXT vision of an inclusive digital society and are willing to collaborate to their own benefit, aligned with their national priorities, to advance the development and uptake of advanced ICT solutions.

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