How to Build Edge Solutions with LF Edge Akraino blueprints & ETSI Multi-access Edge Computing (MEC) APIs
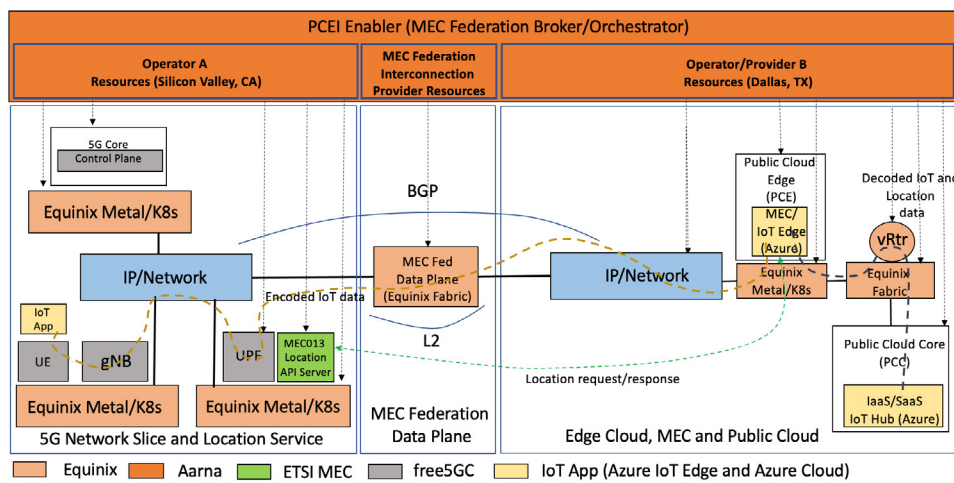
AKRAINO

CHALLENGE

Multi-access Edge Computing (MEC) offers application developers and content providers cloud-computing capabilities and an IT service environment at the edge of the network. This environment is characterized by ultra-low latency and high bandwidth as well as real-time access to radio network information that can be leveraged by applications.

While 5G MEC offers a plethora of benefits, including performance, flexibility and the ability to offer new network services to increase revenue for multiple use cases. However, in order to take advantage of this approach, users need the ability to connect to public clouds, IoT applications, and MEC Location API services in a federated MEC environment — a significant challenge for today's public and private network operators.

SOLUTION

The solution is based on: Akraino's Public Cloud Edge Interface (PECI) blueprint

The Akraino Public Cloud Edge Interface (PCEI) blueprint provides the multi-domain orchestrator to enable infrastructure orchestration and cloud native application deployment across public clouds (core and edge), edge clouds, interconnection providers and network operators.

This solution uses the Akraino PCEI blueprint to demonstrate orchestration of federated MEC infrastructure and services. These included 5G Control and User Plane Functions, MEC and Public Cloud IaaS/SaaS across two operators/providers (a 5G operator and a MEC provider), as well as deployment and operation of end-to-end cloud native IoT applications. These make use of 5G access and are distributed both across geographic locations and across hybrid MEC (edge cloud) and Public Cloud (SaaS) infrastructure.

The Akraino Public Cloud Edge Interface (PCEI) blueprint provides the multi-domain orchestrator to enable infrastructure orchestration and cloud native application deployment across public clouds (core and edge), edge clouds, interconnection providers and network operators.

By orchestrating bare metal servers and their software stack, 5G control plane and user plane functions, the interconnection between the 5G provider and MEC provider, connectivity to a public cloud as well as the IoT application and the MEC Location API service, this solution shows service providers how it is possible to enable services sharing in a MEC Federation environment.

This open source solution is audacious in its scope — a functional demonstration showing a realization of ETSI MEC Federation architecture. It's a powerful use case for the PCEI blueprint to orchestrate and manage edge infrastructure and cloud applications. PCEI has significant market potential and is already being leveraged by at least one vendor for a productized SaaS version of PCEI – **Aarna Edge Services**.

In this solution, the contributions and innovations include:

- A practical use case showing a realization of ETSI MEC Federation architecture
- An introduction and a functioning demonstration of MEC Federation Data Plane
- Implementation of the GSMA OPG Edge Node sharing scenario using MEC Federation
- Implementation of ETSI MEC Location API Service and its integration with a MEC application
- Implementation of a combined MEC Federation Broker and MEC Orchestrator with unique capabilities for infrastructure orchestration in multiple domains such as public cloud, edge/MEC cloud, network operator, 5G control plane and user plane cloud native function deployment as well as cloud native service and application deployment
- Implementation of integrated Terraform & Ansible Infrastructure-as-Code module into the orchestrator enabling
- DevOps infrastructure orchestration
- Cloud native 5G Control Plane and Distributed UPF deployment design and the correspondent Helm Charts
- Use of production services (by Equinix) such as bare metal cloud, virtual network functions, public cloud access and a global interconnection fabric as dynamically orchestratable infrastructure components for the realization of the MEC Federation use case
- Implementation of a reference IoT client custom software module for Azure IoT Edge that enables its integration with ETSI MECLocation API service
- An end-to-end demonstration of the infrastructure orchestration, 5G control plane and user plane functions deployment, ETSI MEC Location API service deployment and the location aware, distributed IoT application operation

Benefits:

- Reduces complexity for orchestrating edge infrastructure, applications, and network services
- Supports multi-cloud (agnostic) strategies connecting the edge to public clouds
- Significantly reduces development time and manual work hours with in a pre-packaged blueprint
- Provides opportunities for industry collaboration and the addition of value added services

Recognition:

- The solution was named the winner of the ETSI & LF Edge Hackathon 2022.

COMPANIES

Aarna Networks

Aarna Networks solves management complexity of enterprise edge and private 5G network deployments and is on a mission to help enterprises and network operators unlock previously unimagined new services and drastically slash operational costs. As a SaaS solutions and software provider, Aarna leverages open source, cloud native, and DevOps methodologies to provide zero-touch edge and 5G service orchestration and management services.

Equinix

Equinix is the world's digital infrastructure company. Digital leaders harness Equinix's trusted platform to bring together and interconnect foundational infrastructure at software speed. Equinix enables organizations to access all the right places, partners and possibilities to scale with agility, speed the launch of digital services, deliver world-class experiences and multiply their value, while supporting their sustainability goals.

About Akraino

Akraino, an LF Edge project, is a set of open infrastructures and application blueprints for the Edge, spanning a broad variety of use cases, including 5G, AI, Edge IaaS/PaaS, IoT, for both provider and enterprise edge domains. These Blueprints have been created by the Akraino community and focus exclusively on the edge in all of its different forms. What unites all of these blueprints is that they have been tested by the community and are ready for adoption as-is, or used as a starting point for customizing a new edge blueprint.

You can get involved in the Akraino community by visiting the **Wiki** and joining the **Mailing List**.

LF EDGE   BUILDING AN OPEN SOURCE FRAMEWORK FOR THE EDGE