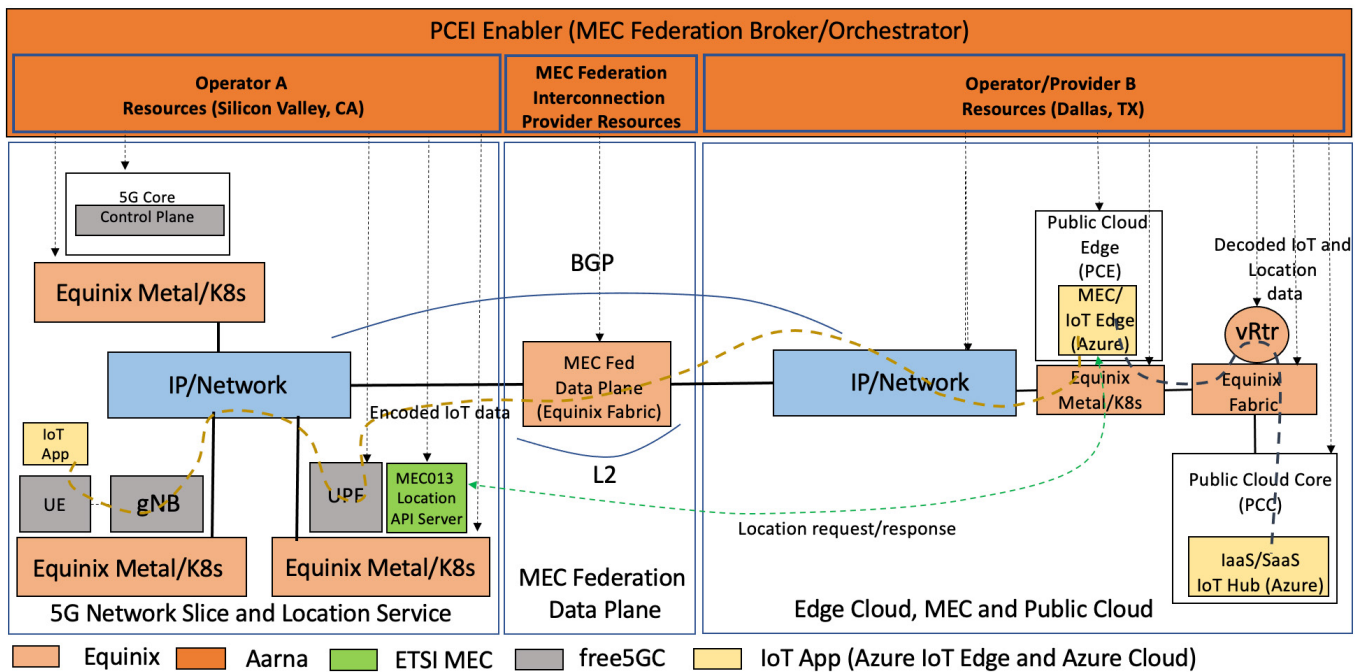


MEC Service Federation for Location-aware IoT with DevOps MEC Infra Orchestration

This solution uses Akraino Public Cloud Edge Interface (PCEI) blueprint to demonstrate orchestration of federated MEC infrastructure and services, including 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 application making use of 5G access and distributed both across geographic locations and across hybrid MEC (edge cloud) and Public Cloud (SaaS) infrastructure.

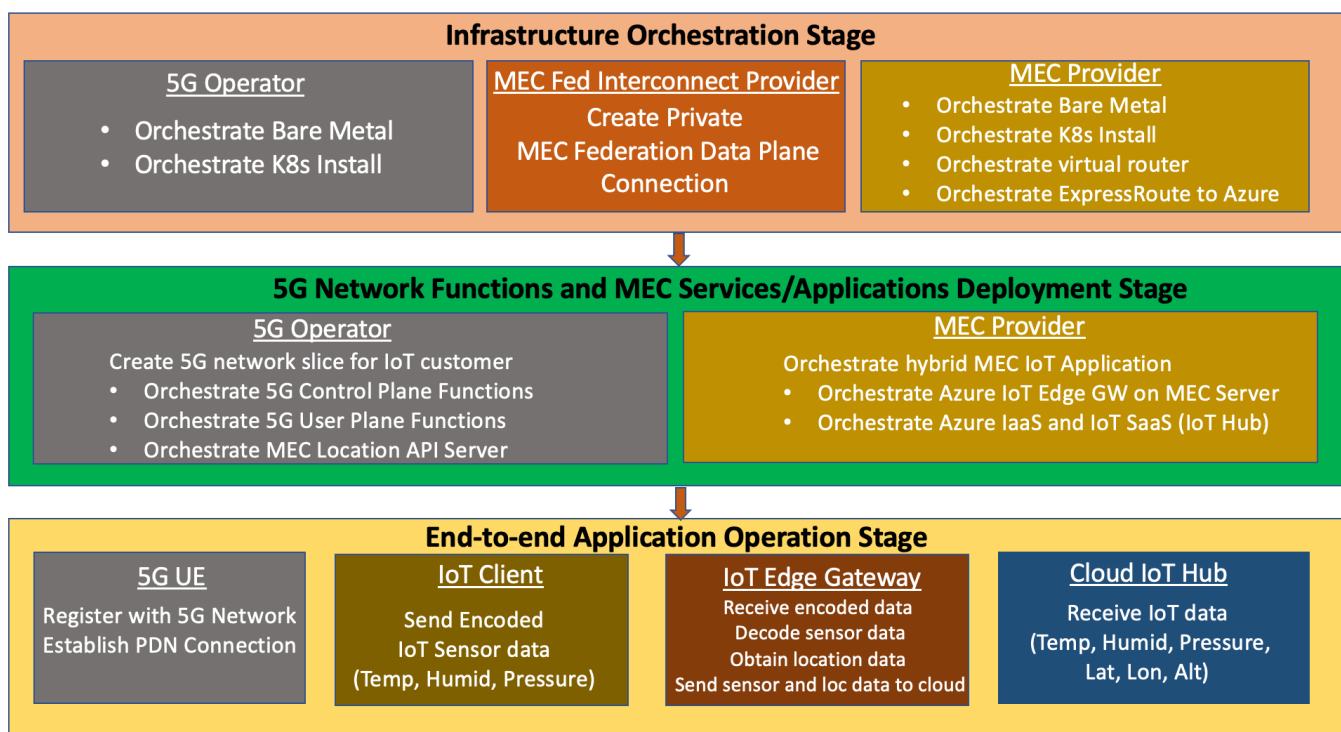


Our use case involves a 5G operator offering 5G access in the Silicon Valley, CA area and a MEC operator offering an edge cloud service for edge applications as well as connectivity to public clouds in the Dallas, TX area.

Both operators/providers use services of a MEC Federation Interconnection Provider (MFIP) to enable several critical functions such as interconnection between the 5G operator domain and the MEC provider domain using a global private interconnection fabric (also referred to as MEC Federation Data Plane), colocation services to host bare metal compute resources as well as private connectivity to public clouds using a virtual network function (VNF) service integrated with the private interconnection fabric.

In our scenario, the MFIP also runs an orchestration service enabling the 5G operator and the MEC provider to activate their respective infrastructure and interconnection components and a subsequent deployment of functions, services, and applications. The scenario is shown on the reverse.

By orchestrating, bare metal servers and their software stack, 5G control plane and user plane functions, 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, we show how it is possible for providers to enable sharing of their services in a MEC Federation environment.



Summary of contributions and innovations

In this solution we provide the following contributions and innovations:

- 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



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