

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



ETSI – LF Edge Hackathon 2022

Team DOMINO solution submission

Oleg Berzin, Equinix,

oberzin@equinix.com

Vivekanandan Muthukrishnan, Aarna Networks,

vmuthukrishnan@aarnanetworks.com



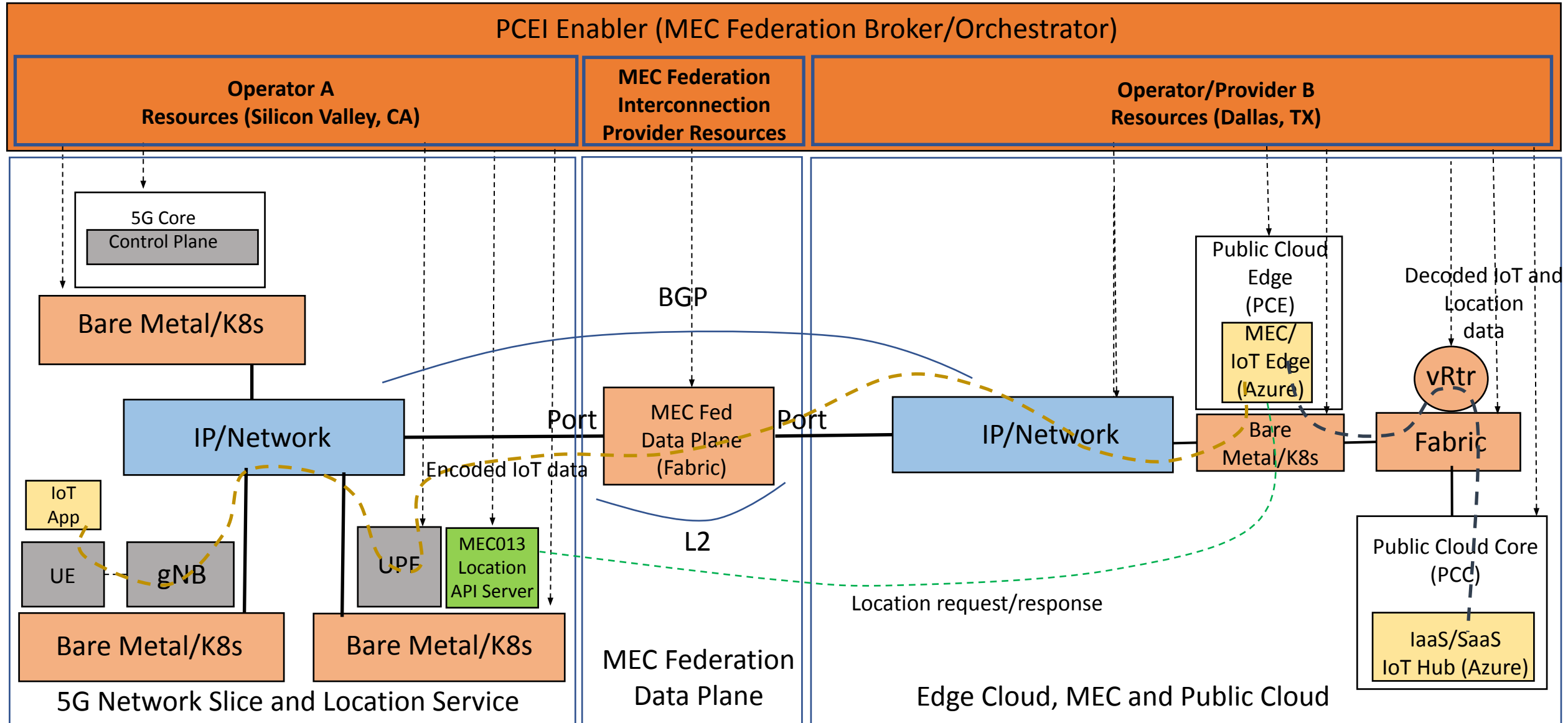
DevOps MEC Infra Orchestration

Introduction

In our solution we use Akraino Public Cloud Edge Interface (PCEI) blueprint and MEC Location API service to demonstrate orchestration of federated MEC infrastructure and services, including:

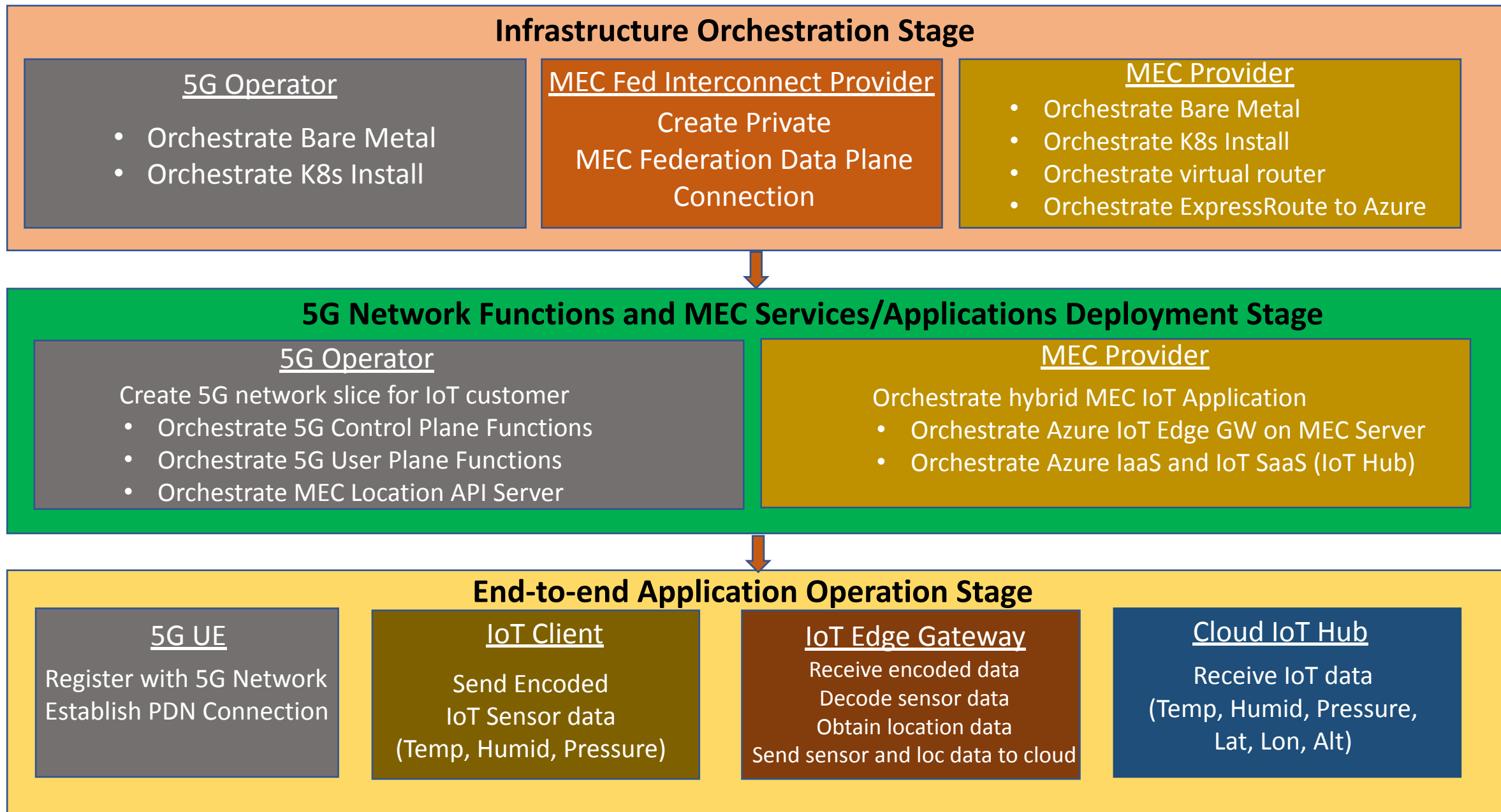
- Bare metal, interconnection, virtual routing for MEC and Public Cloud IaaS/SaaS, across two operators/providers (a 5G operator and a MEC provider)
- 5G Control and User Plane Functions
- Deployment and operation of end-to-end cloud native IoT application making use of 5G access and distributed both across geographic locations and across hybrid MEC (edge cloud) and Public Cloud (SaaS) infrastructure
- 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.

Use Case Description



Equinix
 Aarna
 ETSI MEC
 free5GC
 IoT App (Azure IoT Edge and Azure Cloud)

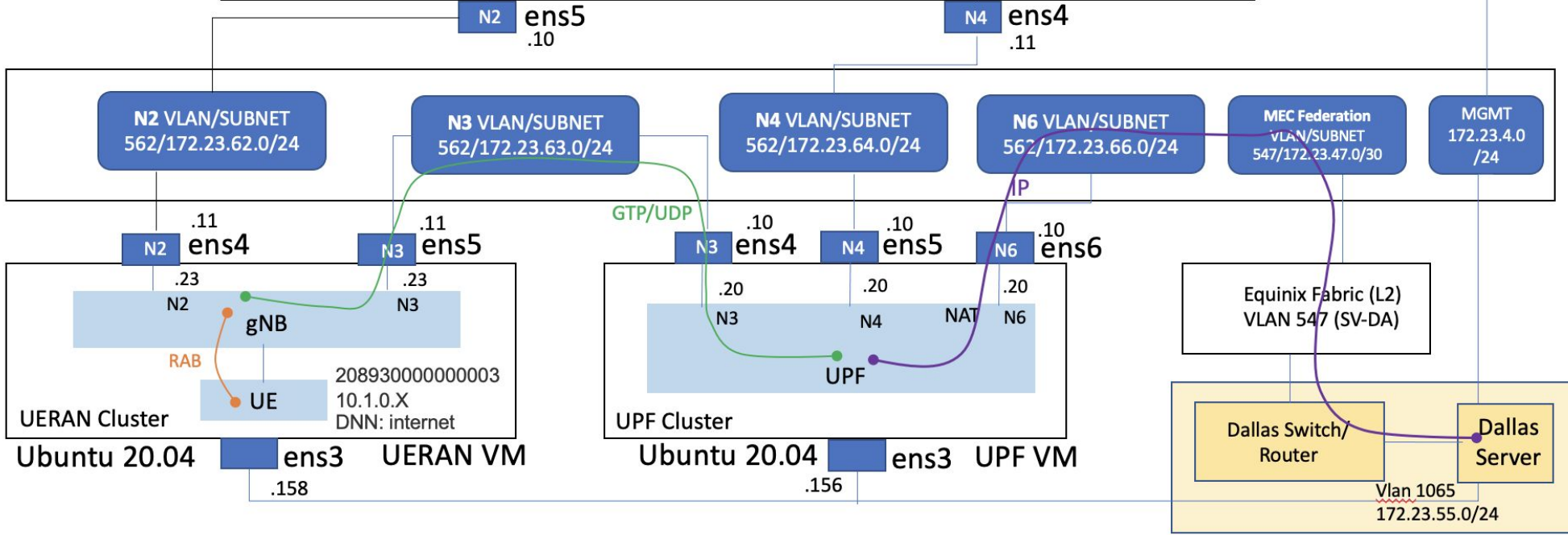
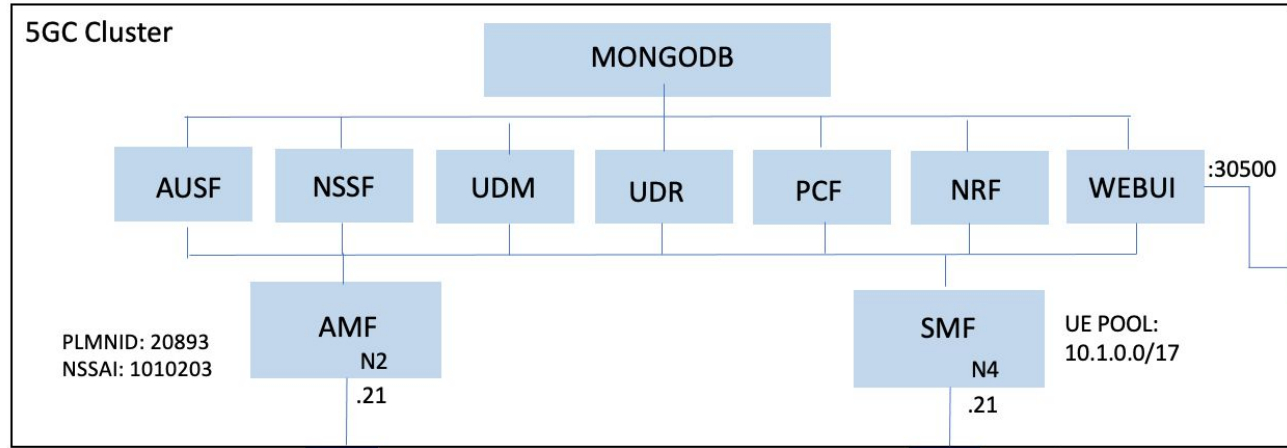
What does the use case do?



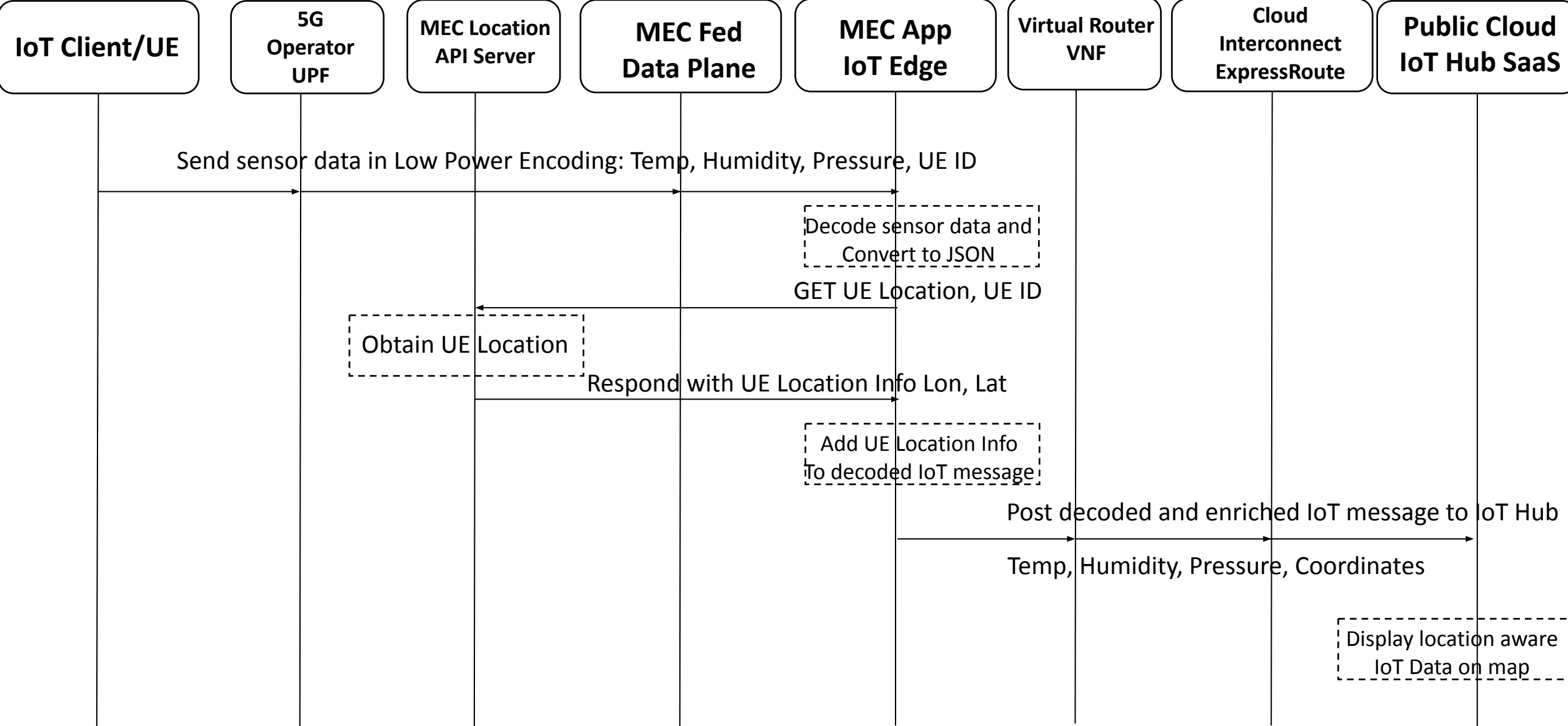
5G cloud native Control and User Plane Functions deployment (with simulated UE/gNB)

PCEI free5GC Deployment – Silicon Valley, CA

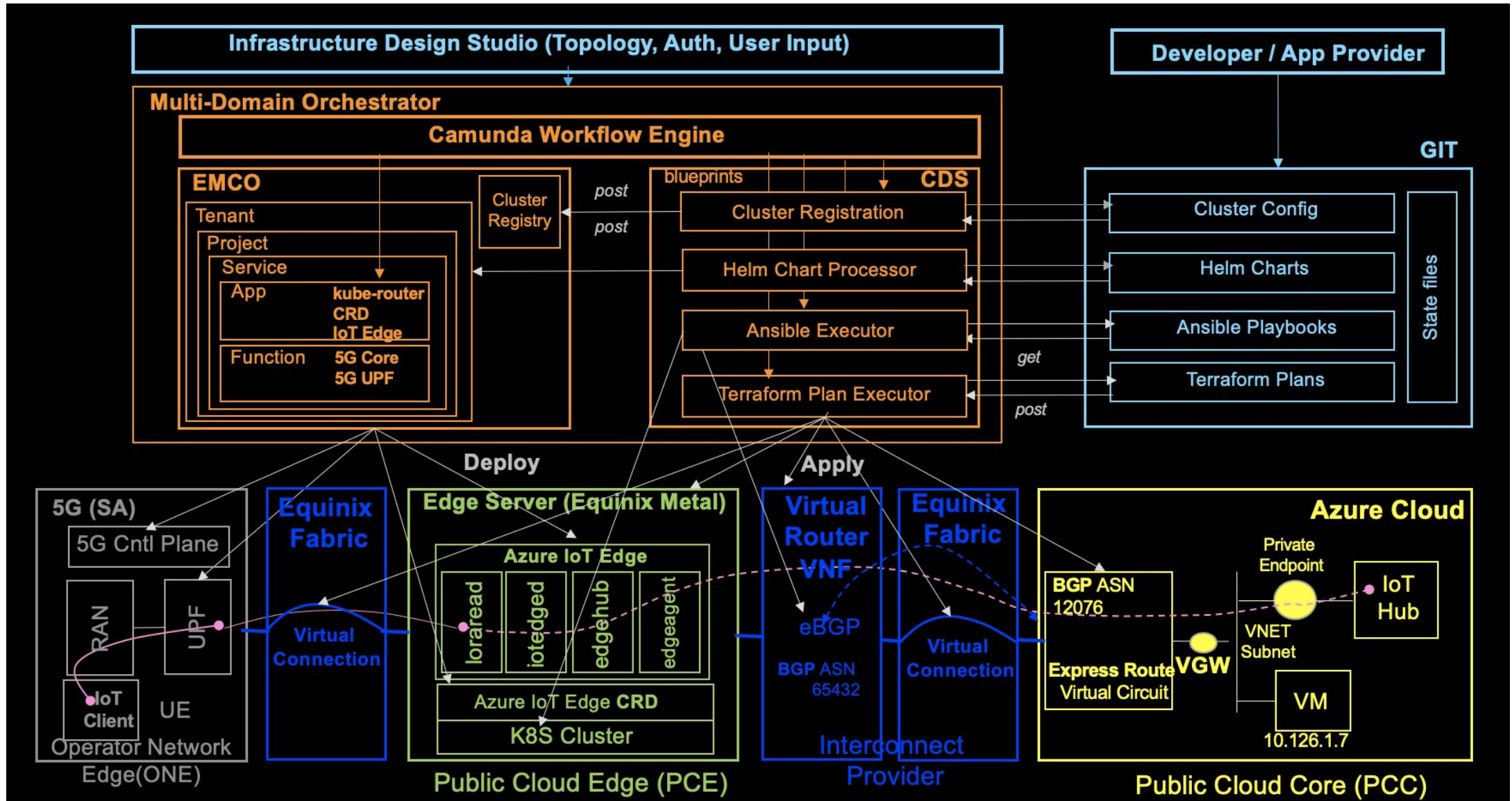
5GC VM Ubuntu 20.04



MEC Service Federation Call Flow: Location aware Low Power IoT



Architecture of the Orchestrator



Summary of 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 Infrastructure-as-Code module into the orchestrator enabling DevOps infrastructure orchestration

Summary of software contributions

- ***Terraform plans***

<https://gitlab.com/akraino-pcei-onap-cds/terraform-plans/-/tree/main/etsi-lfedge-hackathon-2022>

- ***Ansible playbooks***

<https://gitlab.com/akraino-pcei-onap-cds/ansible-scripts/-/tree/main/etsi-lfedge-hackathon-2022>

- ***Helm3 charts***

<https://gitlab.com/akraino-pcei-onap-cds/equinix-pcei-poc/-/tree/main/helm3-charts/etsi-lfedge-hackathon-2022>

- ***Camunda workflows***

<https://gitlab.com/akraino-pcei-onap-cds/camunda-bpmn-samples/-/tree/main/etsi-lfedge-hackathon-workflow>

Acknowledgements

The authors would like to acknowledge the following individuals for their critical contributions to the implementation and validation of this project:

- Kavitha Papanna <pkavitha@aanetworks.com>
- Premkumar Subramaniyan <premkumar@aanetworks.com>
- Sai Lakshmi Cheedella <sailakshmi@aanetworks.com>
- Namachi S <namachi@aanetworks.com>

Thank you

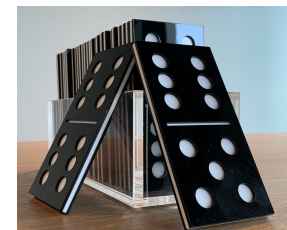
oberzin@equinix.com
vmuthukrishnan@aarnanetworks.com

For more details, please follow the links:

[Detailed solution document](#)

[Demonstration video](#)

[This presentation](#)



DevOps MEC INfra Orchestration