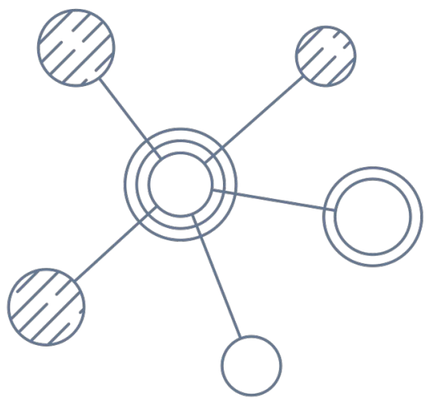
Open Source MEC Platform

Afonso Castanheta, Francisco Cardita, Henrique Cruz,
Luís Oliveira, Pedro Ferreira, Samuel Teixeira
Orientador: Prof. Diogo Gomes, Pedro Escaleira

Project in Computer and Informatics Engineering,
3rd year, LECI

2024



Abstract

Multi-Access Edge Computing (MEC) is a promising paradigm, bringing a cloud-like computation closer to the network's edge. However, the implementation of MEC remains in its early stages, with few projects showcasing its potential.

Our project explores the development of an Application Orchestrator with MEC functionalities using **Open Source MANO (OSM)**, a Network Functions Virtualization (NFV) orchestration platform.

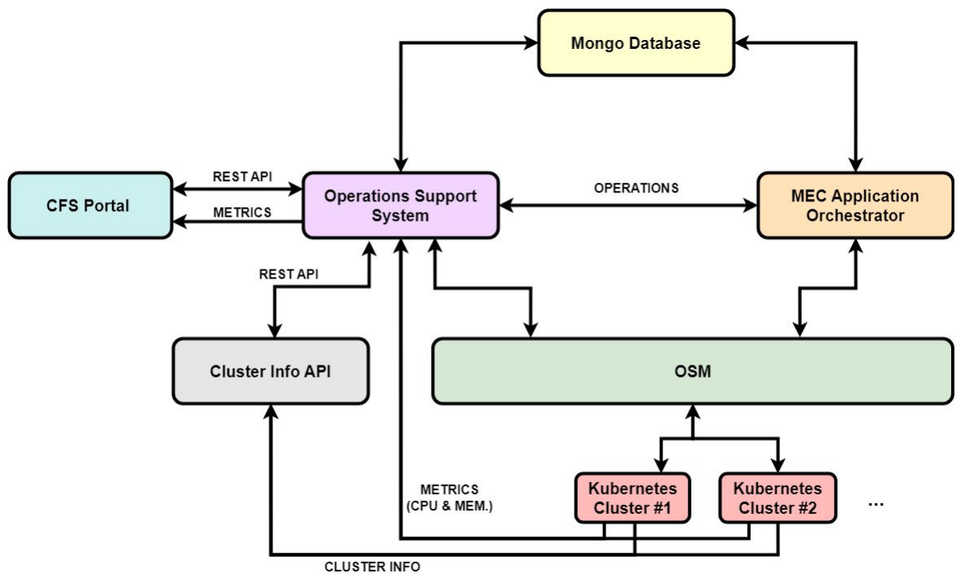


Fig 1- Implemented Architecture

Methods

Our project was based on the reference architecture variant for MEC in NFV, defined by ETSI [1], and is composed of 3 main components:

Customer Facing Service (CFS) Portal: Allows the **onboarding** and **management of MEC apps**, while showing **real-time application metrics**, such as CPU and memory usage.

Operations Support System (OSS): A REST service that validates and forwards requests from CFS Portal to MEAO via Kafka, and sends the Kubernetes clusters' metrics through WebSockets.

MEC Application Orchestrator (MEAO): Service that validates MEC App Descriptors and **translates the MEC functionalities to the analogous NFV ones**.

A **YANG model** was developed based on the ETSI application descriptor information model [2] to define and validate the MEC App Descriptor attributes.

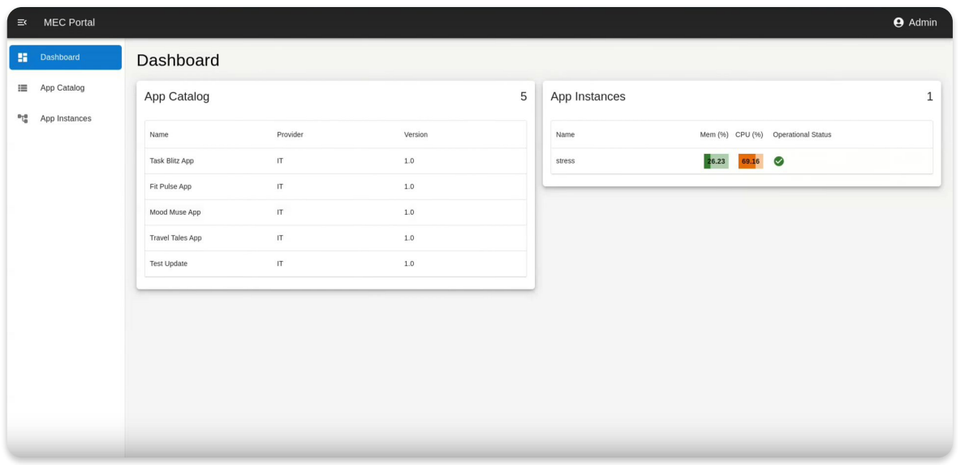


Fig 2- Dashboard page

Results

A system capable of **deploying, instantiating, and monitoring MEC Apps** was built.

To showcase the orchestrator capabilities, an **object detection app** was created and packaged as a MEC App.
Once deployed, a spike in CPU usage can be observed when the app is processing video frames.

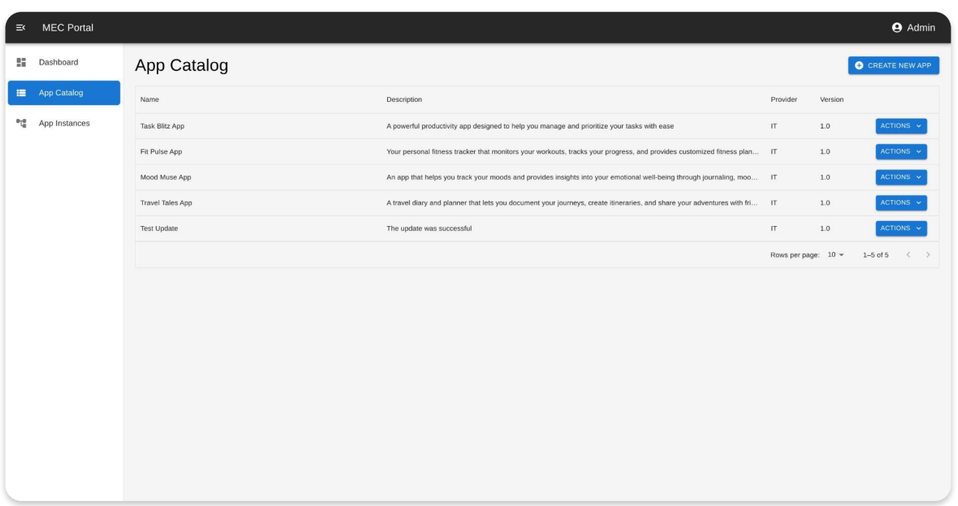


Fig 3- App Catalog page

Various resources are available for better understanding the project, such as:

- **Wiki**, to help setup the application.
- **API documentation** for the OSS endpoints.
- **Demo video** showcasing the app's functionalities.
- **Promotional video** and **website.**

References

[1] ETSI GS MEC 003: "Multi-access Edge Computing (MEC); Framework and Reference Architecture"
[2] ETSI GS MEC 010-2: "Multi-access Edge Computing (MEC); MEC Management"

universidade de aveiro
theoria poiesis praxis

deti departamento de electrónica, telecomunicações e informática