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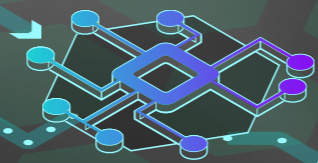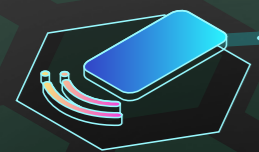NepheleProject

nephele-project.eu

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A lightweight software stack and synergetic metaorchestration framework for the next generation compute continuum

NEPHELE's vision is to enable the efficient, reliable and secure **end-to-end orchestration of distributed applications** over programmable infrastructure that is spanning across **the compute continuum from Cloud-to-Edge-to-IoT**, removing existing **openness** and **interoperability** barriers.
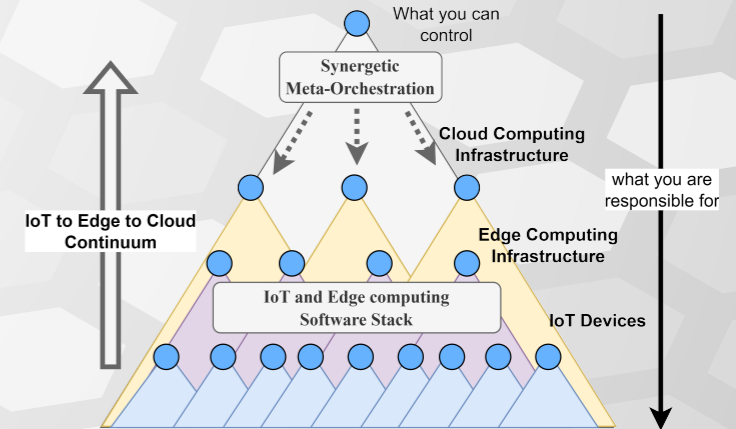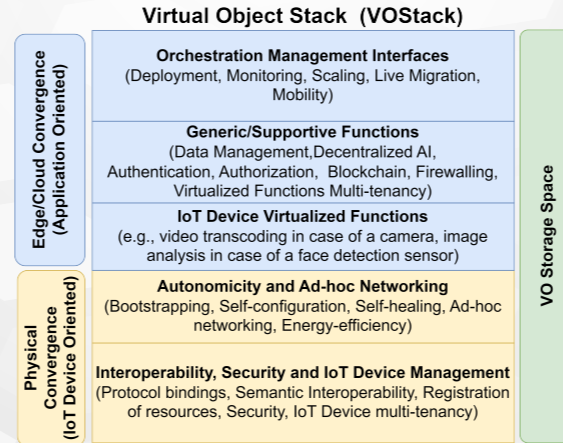
The NEPHELE project aims to introduce **two core innovations**, namely:

An IoT and edge computing software stack (VOStack) for leveraging virtualization of IoT devices at the edge and supporting openness and interoperability aspects in a device-independent way.

A **synergetic meta-orchestration framework** for managing distributed applications in the **compute continuum** based on the adoption of a **"system of systems"** approach.

Virtual Object Stack (VOStack)

Edge/Cloud Convergence (Application Oriented)

Orchestration Management Interfaces
(Deployment, Monitoring, Scaling, Live Migration, Mobility)

Generic/Supportive Functions
(Data Management, Decentralized AI, Authentication, Authorization, Blockchain, Firewalling, Virtualized Functions Multi-tenancy)

IoT Device Virtualized Functions
(e.g., video transcoding in case of a camera, image analysis in case of a face detection sensor)

Physical Convergence (IoT Device Oriented)

Autonomicity and Ad-hoc Networking
(Bootstrapping, Self-configuration, Self-healing, Ad-hoc networking, Energy-efficiency)

Interoperability, Security and IoT Device Management
(Protocol bindings, Semantic Interoperability, Registration of resources, Security, IoT Device multi-tenancy)

VO Storage Space

What you can control

Synergetic Meta-Orchestration

Cloud Computing Infrastructure

IoT to Edge to Cloud Continuum

what you are responsible for

Edge Computing Infrastructure

IoT and Edge computing Software Stack

IoT Devices

The NEPHELE outcomes are going to be demonstrated in **use cases** across various vertical industries, including areas such as **disaster management, logistic operations** in ports**, energy management** in smart buildings and **remote healthcare** services. Two successive **open calls** are planned.