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:

1. 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.

   ![Diagram of IoT and edge computing software stack](image)

   - Synergistic Meta-Orchestration
   - Cloud Computing Infrastructure
   - Edge Computing Infrastructure
   - IoT Devices
   - IoT and Edge computing Software Stack

   **What you can control:**
   - 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:**
   - Video transcoding in case of a camera, image analysis in case of a face detection sensor

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

   ![Diagram of synergetic meta-orchestration framework](image)

   - Orchestration Management Interfaces
   - Depiction of Cloud Convergence (Application Oriented)
   - Edge/Cloud Convergence (Application Oriented)
   - Physical Convergence (IoT Device Oriented)

   **Virtual Object Stack (VOStack):**
   - Orchestration Management Interfaces
   - Generic/Supportive Functions
   - IoT Device Virtualized Functions
   - Autonomic and 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

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.

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