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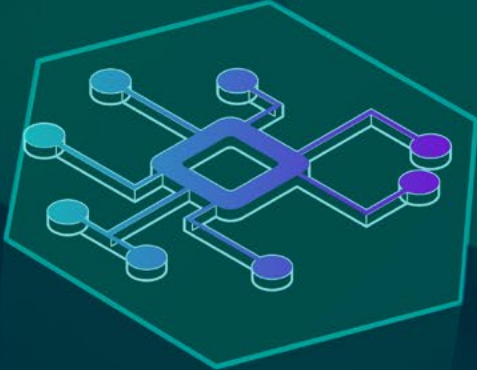
A lightweight software stack and synergetic metaorchestration framework for the next generation compute continuum

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WHY WE NEED NEPHELE?

Internet of Things & Edge Computing: heterogeneity and challenges

The next generation Internet of Things (IoT) and Edge Computing technologies are evolving at a rapid pace. This evolution moves in parallel with the increase in the heterogeneity of the IoT technologies in terms of the production of different types of intelligent IoT devices, the support of diverse communication protocols, and the conceptualization of various information models for semantically representing entities in the IoT world. These trends make inherent the need for novel architectural approaches, able to support by design a full convergence and integration among existing



and evolving IoT and edge computing technologies.

Two main challenges arise:

- the need for **convergence of IoT technologies** based on novel architectural approaches, able to guarantee continuous and seamless openness and interoperability of the plethora of existing and emerging solutions.

- the need for the **provision of an integrated meta-orchestration environment for hyper-distributed applications**, where a synergy between cloud and edge computing orchestration platforms takes place to optimally manage applications' end-to-end deployment and data provision over the continuum.

NEPHELE innovation


To tackle these challenges, NEPHELE introduces two core innovations:

- **an IoT and edge computing software stack** for leveraging virtualization of IoT devices at the edge part of the infrastructure and supporting openness and interoperability aspects in a device-independent way.

- **a synergetic meta-orchestration framework** for managing the coordination between cloud and edge computing orchestration platforms, through high-level scheduling supervision and definition, based on the adoption of a "system of systems" approach.

What does make the difference in NEPHELE?

Nowadays, a plethora of IoT platforms exist for the management of IoT devices and groups of nodes. Each platform tackles part of the challenges related to interoperability, efficient data management, support of self-functionalities, provision of generic IoT enablers and management of IoT applications deployment. In many cases, middleware solutions are required for supporting unified management of swarms of IoT nodes.

 In NEPHELE, through the release of a lightweight software stack, we make available a set of software libraries and tools, able to manage the integration of IoT and Edge Computing mechanisms and coordinate the execution of IoT functions at both the physical (device) and virtual (edge computing infrastructure) level. The

development and release of an open-source software stack (VOStack) that supports virtualization of IoT devices and functions with a twofold perspective (convergence of IoT technologies and unified management of IoT functions by edge/cloud computing orchestration platforms) is considered one of the main novelties introduced by NEPHELE.

In parallel, a plethora of orchestration platforms is available for cloud and edge computing applications, each one targeting a set of application needs. However, the highly distributed nature of such applications creates a need for adoption of synergetic orchestration schemes with dynamic and modular characteristics, where responsibilities for orchestration of parts of the application



can be assigned on demand to different platforms.



NEPHELE aims to provide an integrated environment for the next-generation hyper-distributed applications management, where IoT and edge computing platforms and orchestration mechanisms will interoperate in a secure and trusted way. A meta-orchestrator undertakes the role of efficiently coordinating the management of distributed compute and network resources, and the enforcement of AI-assisted orchestration mechanisms in the various parts of the compute continuum. Intelligence is continuously injected within the orchestration actions, exploiting advances provided by AI technologies in features

detection and inference and leading to the optimal management of the interplay among edge and cloud resources. The NEPHELE Meta-Orchestration system aims to contribute towards the development of an open Continuum Stack, based on the provision of open and modular components that can be adopted by various stakeholders and platforms. Business opportunities may be associated with the overall meta-orchestration system as an integrated environment, as well as for specific components, including the AI-assisted orchestration mechanisms, multi-cluster management mechanisms and network management mechanisms.

NEPHELE use cases and application domains

NEPHELE use cases cover four application domains:

Use case #1 - Emergency/Disaster Recovery:

The goal for this use case is to enhance the first response in emergencies. The use case

decision-making and emergency response, increasing safety and coordination. Robotic platforms have features that are highly appreciated by first responders, such as the possibility to generate 3D maps of a disaster scene in a short time. To achieve this, precise localization and mapping solutions are needed, alongside advanced sensor data fusion algorithms.

Use case #2 - AI-assisted Logistics Operations in the Port of Koper:

The main focus here is to provide solutions to optimize the routing of containers from the Container terminal yard or Depo area to different Container Freight Stations (CFS) within the port, where the cargo is stuffed/stripped, and vice-versa. The objective is to reduce routing times, decrease CO2 emissions, increase truck/forklift utilization, and improve service level agreements (e.g., times of delivery, compliance with goods sensitivity, etc.). The provided application will propose optimal path/track for routing each container within the port area according to requirements given by freight forwarder and to temporal conditions in the port.

scenario is the post-disaster first moments in a container terminal environment. Based on the data coming from the Internet of Things (IoT), devices image recognition, AI-powered decision-making, path planning and other technological solutions can be implemented to support rescue teams. Furthermore, the information that is being extracted from the data should improve the effectiveness of





Use case #3 - Energy management in smart buildings/ cities:

This use case performs intelligent energy-saving actions in smart buildings, not only based on the sensor measures collected by the IoT devices but also the information and data coming from other nodes. Also, some of the VOs Edge nodes will have the capability to predict room occupancy thanks to AI techniques, such as the TinyOL engine, which consumes the sensor measures collected by the IoT devices. This will drive the efficient use of renewable energy sources and the reduction of peaks in energy consumption. A Smart Energy Balancer will be provided that not only works on temperatures but also organizes the switching on and off to limit the number of machines that are on at any given time, limit the power, or prioritize one over the other depending on the complexity of intelligence that we want to implement on the composite system. This scenario also leverages a Distributed Ledger Technology that stores distributed access control policies for the authorization of the requests to a resource.



Use case #4 - Remote healthcare services: The objective is to move from an all-in-one / standalone healthcare solution (ultrasound trolley) towards a delocalized solution with specific modules running in different places. Nowadays we usually have all-in-one / standalone solutions for taking ultrasound images. Depending on the exam to be performed we could have different kinds of probes. All-in-one means that all features - both software and hardware - are plugged together in an ultrasound trolley where we have a Windows OS with all components running on it. The hardware components - diagnostic monitor, physical keyboard - are all mounted on the trolley. Standalone means that the device works with any connection towards the Internet. In NEPHELE, focus is given on the virtualization of this process, taking advantage of the virtualization of IoT devices and the orchestration of the developed distributed application for remote healthcare management.

Extending the application domains: NEPHELE Open Calls

The objective of **NEPHELE Open Calls** is to extend the application domain of its four use cases. **NEPHELE 1st Open Call** is distributing €608 000 to 8 SMEs/Mid-caps for the extension of NEPHELE Virtual Object Stack (VOSTack) and development of Virtual Objects (VOs), composite Virtual Objects (cVOs) and Digital Twins (DTs) -and generic IoT enablers in accordance with the provided software stack.

This call closed on 10th of January 2024 and these were our selected winners:

- **MVO** (Magos Virtual Object), submitted by **QUANTA & QUALIA**, is a digital twin of the human hand, that exploits Magos for immersive, guided, and evaluative training. The project leverages Magos gloves, renowned for their advanced reliability in finger tracking and haptic feedback. They

will provide additional functions to the VO Stack, aiming the creation of an advanced VR remote collaboration platform that moderns training in critical industries such as surgical and cockpit pilot, offering a real-time immersive experience.

- **EVPS** (EV Parking Stack: Extension of VOSTack) submitted by **Parity Platform P.C.**, will extend VOSTack and add new VOs and CVOs required to manage vastly heterogeneous devices in the vertical Electric Vehicle Parking/Charging Businesses. EVPS aims to solve the low context awareness of parking business owners produced by the fact that a plethora of IoT devices from different vendor-specific cloud solutions are used.

- **AGORA** (Agritech Oracle), submitted by **VAIMEE SRL**, is a solution designed to optimize irrigation procedures. The project uses



CRITERIA, an open-source, agro-hydrological model that simulates one-dimensional water flow in different weather and plant conditions. AGORÀ provides irrigation advice for the next few days by integrating CRITERIA with real-time data coming from sensors and weather services. The scope of this proposal



is to integrate and extend the current solution with the NEPHELE software stack.

- **WISE-COOL** (Climate Optimization & Outstanding Living), submitted by **LIFELY**

SRL, aims to realize a software/hardware solution capable of precisely controlling the internal conditions of each room optimizing energy consumption for cooling/heating and maximising indoor comfort for occupants. A real-time DigitalTwin model will be defined to monitor and control the indoor areas.

- **SIREN** (Security and Intelligence for Retail Environments), submitted by **CABOTO SRL**, envisions a sophisticated security system dedicated to big-box retailers, employing a network of fixed IoT sensors and an autonomous LiDAR-equipped wheeled robot. The system can be retrofitted on existing infrastructure or include new sensors, such as door alarms, volumetric sensors, and cameras, strategically placed throughout the facility to detect and relay information on potential anomalies.
- **HELLE** (Humane virtual object development via wearables), submitted by **THINGENIOUS PC**, aims at developing the (c)VOS of human beings exploiting data originated by wearable devices (e.g. smartwatches). This VO representation will be useful for NEPHELE for use cases like search and rescue operations, wellbeing and/or remote healthcare monitoring, where high-level cVOs or services could further process the collected data/information to produce more meaningful ones.
- **ASTERISK*** (Towards Semantic Interoperability for the VOSTack), submitted by **Digiotouch SARM**, will develop semantic interoperability for VOSTack for improved remote healthcare services. Due to the heterogeneity of medical equipment, the EHRs are not semantically interoperable. To help solve this issue, ASTERISK will contribute

to the development of a VOSTack that natively integrates semantic translation of IoT data based on different semantic models (e.g., W3C WoT, NGSI-LD), from one model to another.

- **VOFactory** (Virtual Object Factory for building digital twins), submitted by **Kentyoum**, is helping cities to face today's environmental, economic and social challenges by providing them digital twin-based solutions in a variety of domains such as smart mobility, smart buildings, smart energy, environmental monitoring, etc. The project will create a process and associated tools to build a Virtual Object Factory to accelerate the development of VOs semi-automatically.

NEPHELE 2nd Open Call was launched in August 2024 and will distribute up to €880,000 among up to 8 SMEs or Mid-caps to validate the proposed architectural approach and synergetic meta-orchestration framework implementation, based on the development of intelligent 4 orchestration mechanisms and a set of use cases provided by partners outside of the NEPHELE Consortium in various vertical industries.

Proposals must address one of the two types of projects listed below:

- 1st project type: Development and deployment of a distributed application for the computing continuum
- 2nd project type: Development, integration and evaluation of an intelligent orchestration mechanism for the NEPHELE Synergetic Meta-Orchestrator.

This call will close on 20th of October 2024 at 09:00 AM (Brussels Time). The Guide for Applicants and all the details are available at our [submission platform](#):





HIGHLIGHTS OF THE PERIOD

NEPHELE RECEIVES THE RIAs CHALLENGE 2024 AWARD

The RIAs Challenge, organised by the Inside Industry Association in the context of the EUCloudEdgeIoT initiative, was oriented to highlight Research and Innovation Action projects (RIAs) within the “Edge to Cloud Continuum” which have achieved relevant results and exploitation opportunities.

NEPHELE was one of the four proudly winners of the 2024 edition, among MYRTUS, FLUIDOS and ICOS projects.

Our technical coordinator Anastasios Zafeiropoulos received a custom-made reward during the ECS Brokerage Event 2024 that took place in Brussels, 20-21 Feb 2024. He also had the opportunity

to join this prestigious event to briefly present our project to the audience.

In addition to this, a summary of our project and an interview with our technical coordinator was published on the INSIDE Industry Association magazine, a bi-yearly publication that counts 6500+ subscribers from the field of Electronic Components and Systems community. ([Issue 6, pp. 20-21](#); [Issue 7, pp. 40-43](#)). The project also received broad promotion and visibility on the [INSIDE Industry Association social media channels](#).



NEPHELE receives the EUCEI Award for Open Source and Standardisation

On 18th June 2024 NEPHELE project won the Award for Open Source and Standardisation at the EUCEI's Open Continuum Final Conference! NEPHELE has been recognized for its exceptional

contributions in these areas within the Cloud-Edge-IoT domain.

Our technical coordinator Anastasios Zafeiropoulos from NTUA collected the award in the name of all the consortium during the [Open Continuum Final Conference](#) which took place on in Brussels, Belgium.

NEPHELE inputs to white paper on Technology Implementation Model and Architectural Patterns for CEI use cases

This white paper presents a technical implementation model and architectural patterns identified for Europe's Cloud-Edge-IoT (CEI) market. In this white paper, the UNLOCK-CEI team examines each of the Considered Use Cases through a detailed structural analysis methodology. Each use case is categorised according to its possible architectural approaches for implementation, and common service requirements are identified for key architectural patterns. In

total the original 63 Use Cases presented in D1.2 have been expanded to a list of 79 Use Cases and Use Case Solutions, which form the “Considered Use Cases” that are the foundation of this analysis.

NEPHELE has contributed with its [use cases \(p.31\)](#).



NEPHELE 3rd Plenary Meeting and Advisory Board assessment

On 12-13 December 2023, the NEPHELE Consortium celebrated its third Plenary Meeting in Madrid. Several technical aspects related to architecture and security were discussed. The consortium also had the opportunity to contact the external advisory board, explain the project to them and ask them for their advice. The members of NEPHELE Advisory Board are:

- **Sandra Céspedes**, Concordia University in Montreal, IETF member (Expertise: IoT)
- **Claudio Pastrone** and **Davide Conzon**, Links Foundation (Expertise: IoT and pervasive technologies / Semantic interoperability)
- **Antonio Puliafito**, University of Messina (Expertise: distributed systems, cloud, cyber physical systems, smart cities)



- **Nirwan Ansari**, New Jersey Institute of Technology, (Expertise: Edge/Cloud computing, internet of things, computational intelligence)

- **Amiya Nayak**, University of Ottawa (Expertise: Mobile Computing, Internet of Things)

- **Athanasios Liakopoulos**, WW Hybrid Cloud Practice at Hewlett Packard Enterprise (Expertise: Internet of Things, Cloud Computing)

- **Antonio Kung**, Trialog (Expertise: Internet of Things)

The second day was in Atos-Eviden premises and was mainly devoted to the last technical discussions. Use cases were better described and refined. Exploitation, standardisation and dissemination and communication activities were also discussed.

NEPHELE 4th meeting and 1st project review



On Thursday, 11th April 2024 NEPHELE passed its first review in Brussels. The consortium took this opportunity to hold a rehearsal meeting.

Our reviewers commented very positively on the innovation and technical

achievements of our project. They also provided useful pieces of advice - aligned with the exploitation recommendations of a previous European Commission's MetaOS workshop - related to our risk analysis that will guide our work during the next reporting period and will help to enhance our business and exploitation plan.

NEPHELE 5th Consortium Meeting

NEPHELE held its 5th Consortium meeting at ZHAW School of Engineering in Zurich on 3-4 July 2024. This time the agenda was focused on our four use cases. It was a very productive meeting which brought up fruitful discussions.





NEWS & EVENTS

PAST EVENTS

ECS Brokerage Event 2024



20 February 2024, Brussels (Belgium)

[The ECS Brokerage Event](#) combined the brokerage activities of the industry associations AENEAS, EPoSS and INSIDE Industry Association into one networking event in the field of Electronic Components and Systems. This 2024 edition focused on the opportunities provided under the recently launched Chips JU, as well as the Horizon Europe Programme. The event gathered more than 400 stakeholders and domain key players and offered to participants the opportunity to introduce their project idea during a 5-min pitch and/or present their project idea poster. NEPHELE received the RIAs Challenge 2024 award on this event.

Webinar: “Cloud-Edge-IoT Innovations in Agriculture and Crisis Management: Exploring Data Spaces, Value Chains, and Practical Applications”



20 February 2024, online event

[This webinar](#) was part of the EUCloudEdgeIoT.eu initiative and was co-organised by the MetaOS projects and the AgriDataSpace project. The event provided in-depth market and industry insights for the agriculture sector, with a specific focus on Cloud-Edge-IoT use cases. Our colleague Leonardo Militano from the Zurich University of Applied Sciences (ZHAW) presented NEPHELE disaster management use case in this webinar. Leonardo also participated in an interactive panel discussion with other experts in the field.

Webinar: “Market Pathways for Cloud Edge IoT in the Energy Sector”



29 February 2024, online event

[This webinar](#) was attended by more than 70 professionals and provided in-depth market and industry insights for the energy sector, with a specific focus on cloud-edge-IoT use cases. Use case pitches from the MetaOS portfolio - aeros, Nebulous, FLUIDOS project, EU Project ICOS, and of course NEPHELE - were presented to industry Cloud, Edge and IoT adopters who are interested in trialing novel solutions for their Energy Use Cases.

27th IEEE Conference on Innovation in Clouds, Internet and Networks (ICIN 2024)



12 March 2024, Orange Gardens, Paris (France)

The paper “[Dynamic Schedule Computation for Time-Aware Shaper in Converged IoT-Cloud Environments](#)” by George Papathanail, PhD, Ilias Sakellariou, Lefteris Mamatas and Panagiotis Papadimitriou from University of Macedonia with acknowledge to NEPHELE was presented at this conference and presented in FPS #1 - Edge Computing and IoT session. In this event, our NEPHELE team also presented the demo paper, entitled “A Platform for Time-Sensitive Networking in Converged IoT-Cloud Environments”.



Embedded World Exhibition & Conference 2024 (EW24)

9 April 2024, Nuremberg (Germany)



NEPHELE was one of the sponsors of Research@Eclipse booth in [Embedded World Exhibition 2024 \(EW24\)](#). Each year, exhibitors from around the world present their products, new developments and solutions around Internet-of-Things, hardware, software and systems engineering, safety and security, system-on-chip design, embedded vision, human-machine interaction, wired and wireless data transfer and autonomous systems at this conference.

European Commission's MetaOS workshop

10 April 2024, Brussels (Belgium)



[This workshop](#) brought to its audience insightful discussions on IoT platform integration, key use cases, open calls, European value chains and cybersecurity. NEPHELE and other MetaOS projects had the opportunity to participate on it showcase their open call success stories there. On this event, all participating projects were tasked with crafting a joint document - under the coordination of the EUCloudEdgeIoT - detailing their exploitation plans, success stories and lessons learned.

1st International Workshop on MetaOS for the Cloud-Edge-IoT Continuum (MECC 2024)

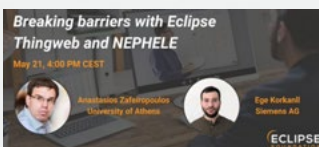
22 April 2024, Athens (Greece)



Co-located with the European Conference on Computer Systems (EuroSys), [this workshop](#) addressed critical issues such as interoperability, standardisation and contribution to relevant open-source projects. Participants had the opportunity to exchange ideas, share research findings, and collaborate on innovative solutions in the field of MetaOS. The MECC workshop was a joint initiative from EU MetaOS projects: FLUIDOS, aerOS, ICOS, NebulOUS, NEMO and NEPHELE.

Research Meets Open Source - Breaking barriers with Eclipse Thingweb and NEPHELE

21 May 2024, online event



[This was the first episode](#) of a new webinar series organized by Eclipse research which aims to encourage collaboration between research projects and well-established open-source projects. This episode featured NEPHELE and Eclipse Thingweb.

Welcome to the EUCEI Community

23 May 2024, online event



[This event](#) was aimed to promote the participation of new members in the MetaOS projects through its open calls and support networking with key use cases and partners across the EUCEI community. NEPHELE participated in this event that gathered the MetaOs projects Open Calls winners, the projects use case owners and the technology architecture and development leaders.



Workshop “A Glimpse of Europe”

28 May 2024, Helsinki (Finland)

[This workshop](#), hosted by SESKO – the Finland national committee of the IEC (International Electrotechnical Commission) – was organised alongside the international committee meeting of ISO/IEC JTC 1 SC 41 and co-organised by AIOTI and the OpenContinuum CSA. This event was focused on IoT and digital twins. NEPHELE was one of the funded projects which showcased their achievements and future plans. Finnish IoT and digital twin application developers also shared their use cases.



4th International Workshop on Time-Sensitive and Deterministic Networking (TENSOR 2024)

3-6 June 2024, Thessaloniki (Greece)

Co-located with IFIP Networking 2024, the goal of [this workshop](#) was to bring together researchers from academia and industry to investigate challenging aspects in the area of time-sensitive deterministic communications and to identify future research directions for ultra-low latency communications. Panagiotis Papadimitriou from University of Macedonia gave a keynote talk at TENSOR 2024 in relation to the NEPHELE Virtual Object Stack and the time-sensitive networking functionalities therein.



Final EUCloudEdgeIoT Open Continuum Conference

18 June 2024, Brussels (Belgium)

[This event](#) brought together over 50 Research & Innovation Actions and several Research & Technology Organisations funded by the European Commission. The conference focused on the value of the EUCloudEdgeIoT.eu (EUCEI) community research for the industry. Engaging panel discussions, the transition to the Nexus Forum CSA and the current status of the project use cases were some of the most important points covered by this event.

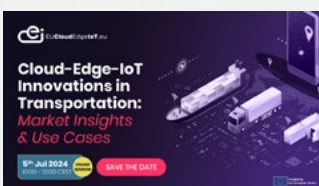
NEPHELE technical coordinator Anastasios Zafeiropoulos participated in the Research Panel 3 with other speakers from the MetaOS projects. NEPHELE also received the Open Source and Standardisation award for its exceptional contributions in this domain.



Webinar “Cloud-Edge-IoT Innovations in Transportation: Market Insights & Use Cases”

5 July 2024, online event

[This webinar](#) was part of the EuCloudEdgeIoT Industry Insights series and was devoted to deliver comprehensive market and industry insights on Cloud-Edge-IoT for the mobility and logistics sector. This event highlighted specific use cases developed by EU-funded projects within the Meta Operating Systems Cluster and other initiatives. It was intended to facilitate dialogue between industry leaders and research experts, fostering collaboration and innovation.





88th Thessaloniki International Fair

7-15 September 2024, Thessaloniki (Greece)

[This year's edition](#) focused on Greece's modern challenges and critical sectors of economy, emphasizing new technological tools, innovation and sustainable development. NEPHELE showed its Virtual Object Stack and Meta-Orchestration Platform in two sessions.

Webinar: "Semiconductors in the World of Cloud, Edge, and IoT"



10 September 2024, online event

[The event](#), organised by EUCloudEdgeIoT and ALLPROS.eu, highlighted emerging trends, challenges and opportunities in the fields of cloud, edgecomputing, IoT and semiconductors technology, NEPHELE technical coordinator, Anastasios Zafeiropoulos, presented cloud-edge-IoT use cases.

UPCOMING EVENTS

Towards deployment of Cloud-Edge-IoT solutions across the computing continuum: from market pathways to large scale pilots (UNLOCK-CEI final event)



23 September 2024, Brussels (Belgium)

[This event](#) will highlight industrial success stories originated from the Meta-OS project supported under the Horizon Europe Work Programme 2024. The event is an ancillary initiative to the AIOTI days on 24th and 25th September 2024. Our technical coordinator Anastasios Zafeiropoulos will participate in Session 2 - Supply-demand dialogue.

eSAAM 2024 on Data Spaces



22 October 2024, Mainz (Germany)

[eSAAM 2024](#) will bring together industry experts and researchers working on innovative software and systems solutions for data spaces, specifically focusing on Security and Privacy, Artificial Intelligence and Machine Learning, Systems and Software Architecture, Modelling and related challenges. The event is co-located with Open Code Experience 2024 (formerly EclipseCon).

IEEE ICC 2025 (Next-Generation Networking & Internet Symposium)



8-12 June 2025, Montreal (Canada)

[This event](#) will focus on "Communications Technologies 4Good", and will include 13 symposia and a variety of tutorials and workshops.



MEET OUR PARTNERS

THIS SECTION WILL BE PRESENTING THE PARTNERS OF THE CONSORTIUM, THEIR PROFILE, MAIN EXPERTISE AND CONTRIBUTION TO THE PROJECT.

OdinS



Odin Solutions (OdinS) is a company located in Murcia, Spain, where it has its development and production facilities and where it is recognised as one of the 10 most innovative companies in the region.

OdinS is dedicated to the design, development and implementation of intelligent products and solutions for monitoring, remote control and automation in smart cities, industrial processes and machinery, with extensive experience in the development of new products, innovation projects, development of industrial patents and participation in R&D projects at national and European level.

The company is formed by a multidisciplinary and entrepreneurial professional team with more than 10 years of experience in industrial monitoring and remote control, and provides products and solutions based on the latest innovative technologies such as Internet of Things, processing platforms in the cloud (cloud computing) or mobile apps. It also manufactures IoT hardware devices (dataloggers and controllers)

that allow the integration of any industrial sensor/actuator and integrates controllers, switchboards and industrial machines. It manufactures communications modules with the latest wireless technologies for use with any industrial installation.

OdinS also develops customised remote control and automation software platforms, secure software which is interoperable with other management applications such as ERP, MES, big data and augmented reality. OdinS products and solutions are oriented to Industry 4.0, smartbuildings, smartcity, agriculture and water, and mobility sectors.

OdinS is a member of International Organizations in IoT ecosystem and participates in standardization bodies for interoperable IoT, cybersecurity and data cloud/edge management.

In NEPHELE, OdinS is leading the use cases design, implementation and evaluation and the task related to cybersecurity and trust management.



Rafael Marín-Pérez



Juan Andrés Sánchez



Alter Way-SMILE

alter way
A SMILE GROUP COMPANY

Alter Way, a French player in open source computing specialising in consulting, managed services, hosting of digital platforms and DevOps is part of the Smile Group, a European leader in open digital and expert in open source (consulting, integration and outsourcing).

Alter Way priorities focus on managed services and cloud infrastructure services and a strong commitment to a more responsible digital world. Since its creation, Alter Way has been a leading actor committed on the development of accessible and eco-responsible open source solutions.

The R&D team's mission within Alter Way is to strengthen the

company's tools and develop innovative solutions. A regular winner of research programmes, the R&D team pursues a simple technological mission: to reinforce existing systems (applications, services, platforms) with DevOps components that facilitate their augmentation by artificial intelligence. Through their R&D department, Alter Way is a partner of many academic, industrial and institutional players that make up their collaborative ecosystem.

In NEPHELE, Alter Way is leading the platform integration, testing and refinement.



Jonathan Rivalan

ININ (Internet Institute)

**Internet
INSTITUTE**

The INTERNET INSTITUTE Ltd (ININ) is an innovation-intensive SME located in Ljubljana, Slovenia. ININ is a university spin-off founded in 2017 and highly specialized in 5G, IoT and cloud solutions.

ININ is well-known as a trusted research and innovation partner in European Commission funded projects. ININ specialises in:

- automation of operations, administration and management (OAM)
- quality and performance evaluation of mobile, fixed and cloud systems
- development, integration and operation of telco and industry grade Quality Assurance (QA) and Critical Communications Systems (CCS)

In NEPHELE, ININ contributes to the development of the Virtual-

Object Stack and Edge and Cloud Computing Synergetic Meta-Orchestration Framework, aiming to facilitate cloud-continuum operations, i.e., Industrial IoT GW as a far-edge orchestrated device and Portable 5G Mobile System (PPDRone) as an orchestrated edge infrastructure. The two appliances will be also used as a mobile network and cloud infrastructure in an AI-assisted Logistics Operations use case. The use case will take place in Port of Koper (Luka Koper) and will target the optimization of the logistics process within the port.



Janez Sterle



Luka Korsic



Rudof Susnik



Renata Globevnik



nephele

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