NebulOuS

A META OPERATING SYSTEM FOR BROKERING
HYPER-DISTRIBUTED APPLICATIONS ON
CLOUD COMPUTING CONTINUUMS

ANNEX 1

NEBULOUS – OPEN CALL #1

GUIDELINES FOR APPLICANTS

14/02/2024

Funded by
the European Union

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

This document provides a full set of information regarding the NebulOuS 1st Open Call for Proposals, also referred to as **NebulOuS Open Call #1.**

All associated Annexes must be additionally read for the submission of a Proposal.

2 CONTEXT

The increasing adoption of multi-cloud solutions for data and processing, intensive applications pose challenges such as minimizing the distance between processing jobs and data sources, ensuring security and trust, and maintaining Quality of Service (QoS) guarantees. Despite advancements in multi-cloud implementations, they may be insufficient for addressing the growing volume of data generated by a multitude of connected devices. With the rise of Edge computing, especially for time-sensitive and location-aware applications, there is a need to process data closer to the source to meet low-latency requirements and address security and privacy concerns. Additionally, it is needed to emphasize the importance of a fog brokerage paradigm which ensures the efficient processing of heterogeneous data across dispersed cloud resources, aligning with the European Data strategy and adhering to service-level agreements, including considerations for energy efficiency.

2.1 NEBULOUS PROJECT

NebulOuS, standing for A META OPERATING SYSTEM FOR BROKERING HYPERDISTRIBUTED APPLICATIONS ON CLOUD COMPUTING CONTINUUMS, is a European Horizon Europe Research and Innovation Project, funded under grant agreement number 101070516.

The NebulOuS project aims to design and implement a novel Meta Operating System which enables secure and optimal application provisioning and reconfigurations over the cloud computing continuum. To this end, disparate resources from the far edge to public and private cloud offerings, as well as processing nodes with significant capacity in between, will be exploited to augment modern hyper-distributed applications. NebulOuS vision is to enable transient fog brokerage ecosystems that seamlessly exploit edge and fog nodes, in conjunction with multi-cloud resources, to cope with the requirements posed by low latency applications.

2.1.1 TEAM

The NebulOuS consortium, comprising of 16 participating institutions, has been established to efficiently manage all project tasks and provide the necessary expertise for its successful execution, during the 36 months of project implementation.

The NebulOuS consortium consists of:

- **Four research institutes** (EUT, ICCS, SEERC, BIBA) with expertise in cloud service brokerage, cross-cloud monitoring, fog computing, semantic modelling, policy-based quality assurance, and SLA management.
- **One university** (UiO) specializing in multiclouds, cross-cloud application optimization, cloud deployment, and blockchain technologies.
- **Seven technology providers**, including 6 SMEs (7Bulls, AE, UW, EXZ, UBI, AuG) and 1 industrial partner (TID), contributing with expertise in multiclouds, edge computing, IoT data

management, and security technologies, with a focus on system development, innovation, integration, and business consulting.
- **Five pilot partners** (UW, TTA, MrB, FIRE, AuG) offering real testbeds for cloud and fog computing, conducting experiments and evaluations.
- **One SME** (F6S) specializing in business planning, exploitation, and financial support for third parties.

2.1.2 PROJECT AMBITION AND SPECIFIC OBJECTIVES

NebulOuS aims to advance state-of-the-art (SOTA) in cloud and fog brokerage, cross-cloud applications deployment, self-adaptive reconfiguration, SLAs, secure network overlay, and model-driven quality assurance. The project aspires to integrate NebulOuS innovations into real-world settings, ensuring applicability in cloud and fog computing ecosystems. The ambition includes extending SOTA in optimization, serverless support, IoT/fog data management, semantic models, and efficient monitoring with AI-driven anomaly detection, achieving target Technology Readiness Levels (TRLs) for each aspect. NebulOuS envisions surpassing existing solutions and contributing to the evolution of cloud and fog computing technologies.

To meet the ambitious mission, the team defined the below described objectives (O).

O1: Fog brokerage for facilitating cloud computing continuum
The objective is to design a conceptual architecture supporting fog brokerage in diverse cloud computing settings. This involves delivering a Multi-Criteria Decision Making (MCDM) approach for precise and imprecise requirements, developing mechanisms for cross-cloud and fog applications, and enabling dynamic workflows orchestration.

O2: Non-repudiable SLAs and security in the NebulOuS Meta-OS
This objective aims to deliver mechanisms for automatic SLA derivation, interpretation into blockchain-based smart contracts, secure layer enactment, and the design of NebulOuS's security toolbox.

O3: Intelligent management of applications, business processes, and data streams lifecycle
The objective involves delivering a lifecycle management toolkit for data streams in IoT and fog settings, mechanisms for optimal allocation and orchestration of application components, and proactive self-adaptation functionalities.

O4: Model-driven quality assurance in fog brokerage
The objective is to define semantic models for intermediation tasks, user preferences, requirements, and compliance, ensuring a suitable basis for automatic SLA creation.

O5: Efficient, fault-tolerant monitoring and AI-driven anomaly detection
This objective aims to develop an event management system for real-time complex event processing, enhance features for efficient monitoring, and provide AI-driven mechanisms for anomaly detection in cross-clouds and fog computing.

O6: Test and validate the NebulOuS Meta-OS platform in complementary use cases
This objective focuses on designing validation pilots to showcase the platform's applicability in cloud and fog computing ecosystems and implementing pilots across different application domains.

2.1.3 TECHNICAL OVERVIEW OF NEBULOUS APPROACH

NebulOuS embraces a model-driven and user-centric approach to deploying hyper-distributed applications in the Cloud-Edge continuum. It aims at offering a simple yet powerful means for end users to define customised application compositions and deployments.

An application to be deployed in NebulOuS requires the following elements:

- Open Application Model (OAM)[1] describing the set of components that conform the application.
- A metric model for capturing the QoS requirements associated with each of the application components.
- The optimisation model describing the constraints and objectives of the automatic application management problem.

Error! Reference source not found. shows a conceptual diagram of the NebulOuS architecture:

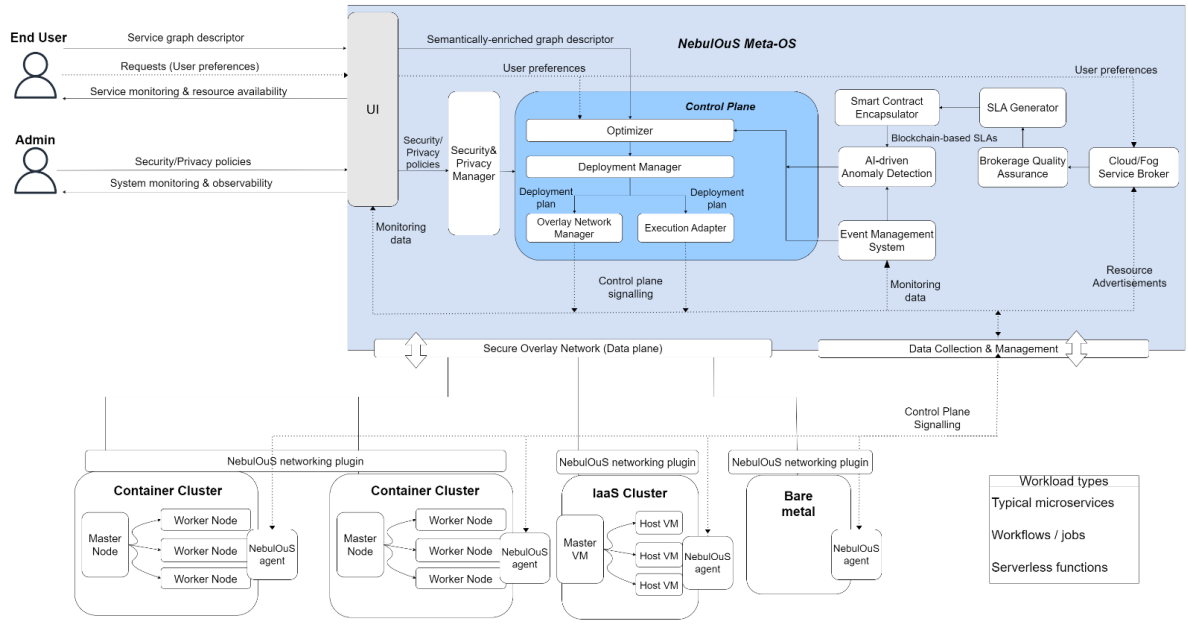


Figure 1: NebulOuS architecture

From the NebulOuS final user perspective (application developer or devOps), the solution offers a Graphical User Interface (GUI) through which applications can be deployed and monitored. As a central component, the NebulOuS Control Plane is responsible for the service deployment, orchestration, optimization, and real-time reconfiguration across the entire cloud-to-edge continuum. Based on the distributed applications' design time requirements, it deploys the service graph on the available cloud/edge resources and continuously monitors them latter (triggering reconfigurations at runtime, if needed) to ensure that the services operate optimally. Application placement is optimized in a dynamic manner (when relevant), so that all applications meet their performance targets, and the infrastructure is not over-subscribed. It evaluates the severity of situations forwarded to it by the AI-driven anomaly detection mechanism, or the EMS and triggers reconfiguration action(s) suggesting either application-level or platform level adaptations.

[1] https://oam.dev/

Furthermore, it also allows for real-time scheduling of functions and workflow tasks, using traditional and AI-based scheduling approaches. To achieve this functionality, platform is composed of various modules: the Optimizer, the Deployment Manager, the Overlay Network Manager and the Execution Adapter. There are also several other components which comprise the NebulOuS Meta-OS and intermediate between the NebulOuS Agents and Control Panel. Those modules implement different functionalities such as Data Collection and Management, Event Management, Anomaly Detection, blockchain-based SLAs etc. The most important one is the brokerage functionality, which is served by two components: the Cloud/Fog Service Broker and the Brokerage Quality Assurance mechanism. By receiving advertisements for the infrastructure and services that can be made available, as well as the preferences of end users with respect to their services and the available resources being brokered, it enables the formation of ad hoc clouds between different organizations, or different units of the same organization.

Last, communication on the NebulOuS Meta-OS is mainly concerned with two aspects: connectivity establishment between the infrastructure resources and data management in the entire continuum. To this end, NebulOuS includes two main components which realize this functionality: the Overlay Network Manager and the Data Collection and Management component. The former establishes tunnels between the different physical and virtual devices, to create secure overlay networks. The latter assumes the role of a communications middleware, capturing raw IoT data streams and managing data flow details, while also handling the exchange of control plane information between the distributed agents and the logically centralized orchestration components of our Meta-OS.

2.1.4 PROJECT USE CASES DESCRIPTION

During NebulOuS project, will be implemented use cases as pilots to test the platform usability and applicability in cloud and fog computing ecosystems in different domains.

Domain: environment
Use Case: crisis management
In the face of large-scale disasters like floods, earthquakes, and wildfires, coordinating response efforts becomes a monumental challenge. NebulOuS takes centre stage in crisis management, offering an adaptable fog computing platform designed to overcome communication disruptions and elevate the efficiency of response teams.

Concept

NebuOuS addresses disrupted communication during crisis with its **adaptable fog computing platform**. This technology enables efficient coordination and data processing in large-scale disasters, utilising **AI algorithms** to enhance situational awareness for crisis management and response teams. The platform ensures reliable communication and computation capabilities, even in situations where traditional infrastructure is compromised.

Benefits

The flexible fog computing solution of NebulOuS can be tailored to specific disaster scenarios, ensuring versatility in communication and computing capabilities.

The deployment of AI algorithms across various levels of the edge-cloud-continuum enables real-time data processing, significantly improving the situational awareness of crisis management staff and response teams.

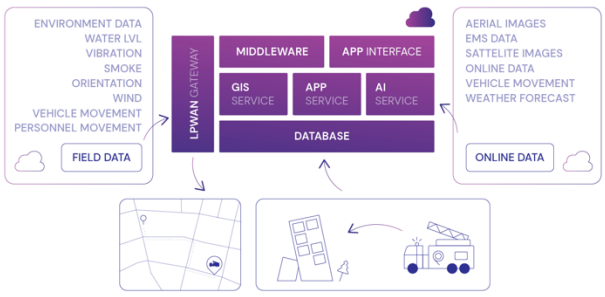


Figure 2: Crisis management use case diagram

Domain: transportation and logistics
Use case: supply of fresh food to a city and last mile delivery optimalization

Mercabarna (MrB) is a food city that operates 24 hours a day with the aim of guaranteeing the supply of fresh food to the public. The facility houses 600 companies specialising in the distribution, preparation, importing and exporting of fresh and frozen products.

Under this environment, the main challenge of Mercabarna is to improve the management of the fresh and frozen products, and in general freight exchange, from the point of view of the product value chain considering the logistics, especially focusing inside Mercabarna's premises, but also considering information and decision-making indicators coming from outside.

The pilot has two goals, which are divided into two use cases:
Development of Mercabarna's internal traffic Digital Twin to support Mercabarna's intra-logistics operations management, and

Capture and management of the data on trucks' destination (city areas) to improve the last-mile goods distribution in the city. Every objective will be addressed in a separate application.

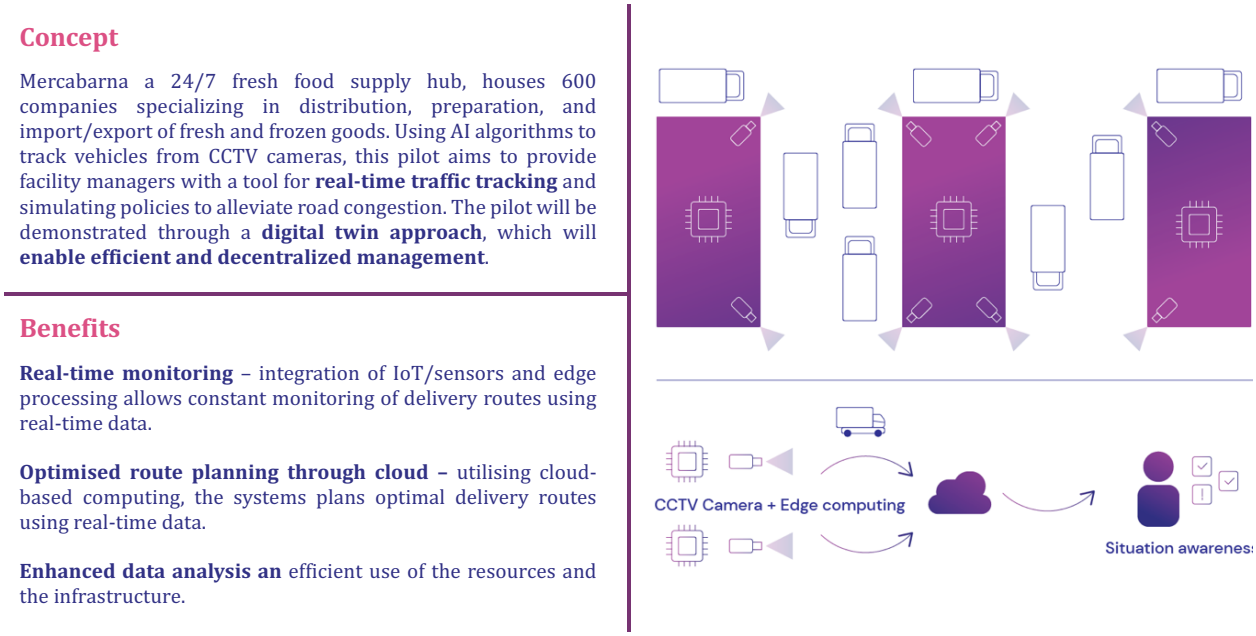


Figure 3: Supply of fresh food to a city use case diagram

Concept

Over 7,000 trucks daily leave Mercabarna's facilities, congesting Barcelona's streets and competing for parking space. This use case aims to create a **real-time system for monitoring transport vehicles and providing efficient routes.** Using a Digital Twin approach and the NebulOuS meta-OS, the pilot enables AI-driven recommendations for delivery routes based on live traffic data.

Benefits

Real-time GPS data monitoring – integration of IoT/sensors and edge processing allows constant monitoring of delivery routes using rea-time data.

Optimised delivery route planning through cloud – utilising cloud-based computing, the system plans optimal delivery routes by considering different factors.

Enhanced data analysis an efficient use of the resources and the infrastructure.

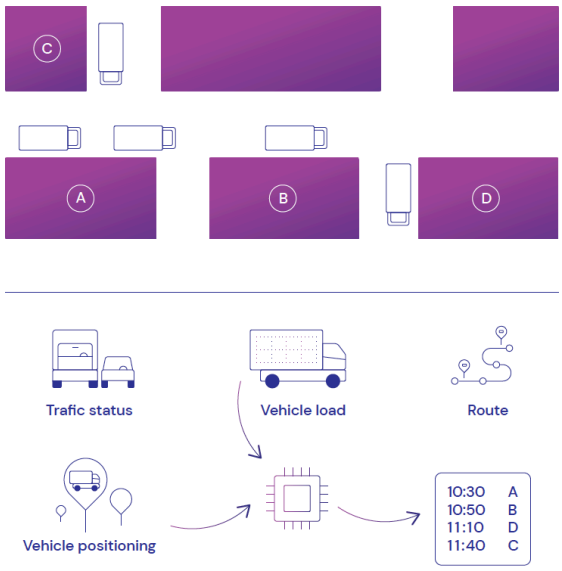


Figure 4: Last mile delivery optimalization use case diagram

Domain: smart city
Use case: computer vision for city maintenance

Cities use the IoT to collect real-time data to better understand how demand patterns are changing and respond with faster and less expensive solutions. With a 5G connection, cities will be able to gain knowledge at every social iteration and protect their data lakes from external access. From sensors, street furniture, and user equipment, cities are constantly producing data which requires connecting the sources and storing their data. As more knowledge is gained and more data is collected, there is an increasing need to process and secure data analysis mechanisms and exchange between geographically distributed places.

Concept

The use case involves **leveraging IoT for real-time data collection in cities** to understand changing demand patterns. With a focus on smart-city maintenance, **the pilot will validate 5G technology, integrating IoT sensors for data collection and edge processing**. This enables real-time analysis and actionable insights directly from edge devices. Specifically, the use case applies computer vision to detect damage in buildings and infrastructure.

Benefits

By pairing the NebulOuS platform with Computer Vision technologies, **algorithms can be deployed on multiple levels to give connectivity, edge analytics, and interoperability** to the cities, making it easier to evolve.

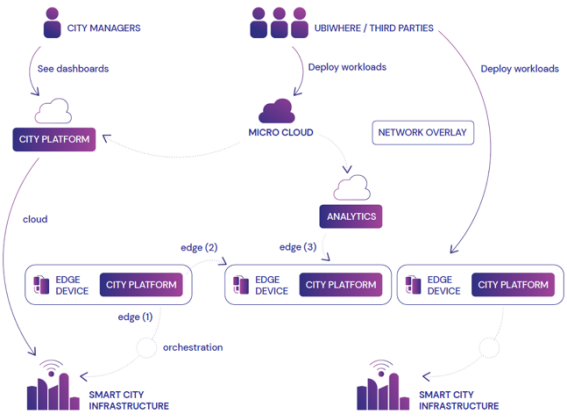


Figure 5: Computer vision for city maintenance use case diagram

Domain: energy and utilities
Use case: windmill maintenance

The goal of the use case is to validate the NebulOuS framework in deploying wind turbine inspection software in an optimal way, making appropriate use of cloud and fog resources. Drones capture high-resolution images of wind turbine blades, which are processed by AI-enabled algorithms to automatically detect turbine damages and discover other valuable information for turbine maintenance. This process however generates a considerably high amount of data that typically is stored on the camera memory and later copied to a database for offline processing by the AI algorithms. NebulOuS will automatically and in real-time handle this process being infrastructure agnostic and without needing human intervention. NebulOuS will exploit 5G networks and will cope with data streaming, efficiently utilizing cloud and edge computing paradigms to enable data processing as close
to its data source as possible.

Concept

The windmill maintenance use case is to **automate the process of data acquisition and processing using drones**. This will allow automatic and real-time handling of the turbine damage detection process being infrastructure agnostic and requiring minimal human intervention. The use case will demonstrate hoe the NebulOuS framework can efficiently deploy wind turbine inspection software, efficiently utilising cloud and fog resources.

Benefits

Immediate quality feedback and on-line process.

No dedicated data upload step – the data processing begins at the edge and is redirected to private or public cloud resources only if a potential anomaly is identified.

Asset management application involved only after data is processed – minimal amount of data collected and stored for further offline analysis.

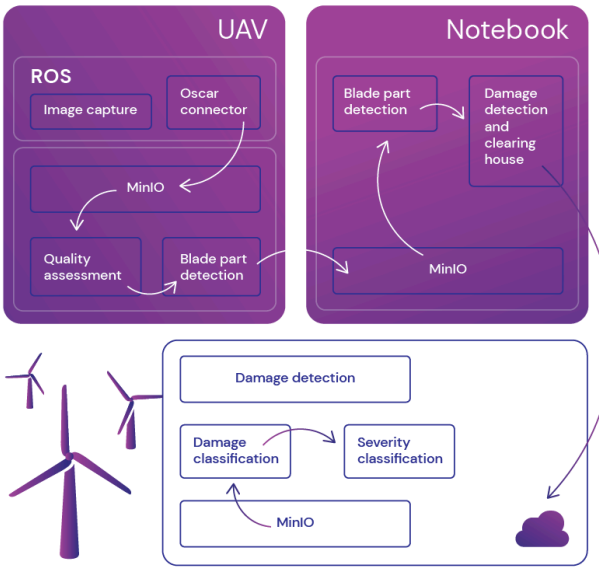


Figure 6: Windmill maintenance use case diagram

Domain: agriculture
Use case: precision agriculture

Precision agriculture (PA), satellite farming or site-specific crop management (SSCM) is a farming management concept based on observing, measuring and responding to inter and intra-field variability in crops. Today, even though significant effort has been put on making innovative precision agriculture technologies, the actual adoption of the innovation has been notoriously slow. The biggest problem most of the newest technologies have, is the time and effort overhead added to the farmer.

Concept

The use case leverages edge IoT devices in the field. The goal is **to reduce the tasks sent to the cloud provider, significantly reducing costs, and optimising time and task completion**. NebulOuS will provide efficient task scheduling and secure data transmissions, adapting to network bandwidth and connection stability. NebulouS technology allocate data streams propagation and processing across diverse micro local clouds, private clouds, public clouds and edge resources.

Benefits

NebulOuS technology **will enable to allocate some of the data streams propagation and processing to a combination of heterogeneous micro local clouds, private clouds, public clouds as well as edge resources, increasing the transfer of valuable data at the same cost.** By doing this, NebulOuS platform will **optimise processing jobs that can be time-critical** like pattern recognition for spotting low vegetation areas that do not need any fertilizer, r port-operational analysis applications like leaf pattern recognition for spotting certain diseases.

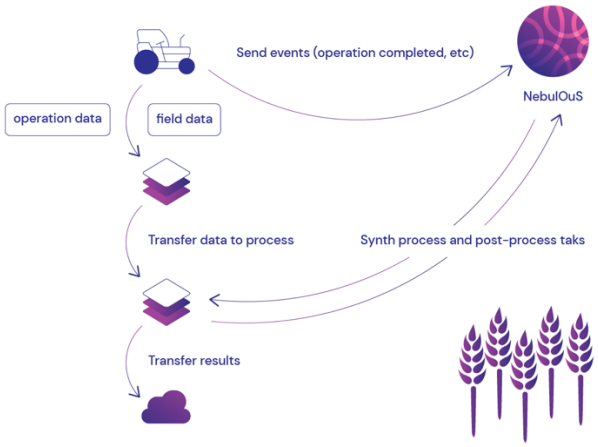


Figure 7: Precision agriculture use case diagram

3 NEBULOUS CALL FOR PROPOSALS

During implementation of NebulOuS project, it is envisaged to organise 2 open calls dedicated for SMEs, start-ups and small consortia to validate the NebulOuS architecture. The calls will fund up to 9 projects implementing additional use cases. The total budget for 2 open calls is €1.350.000 and available funding per project is up to €150.000.

3.1 NEBULOUS OPEN CALL #1 OBJECTIVES

The objective of the NebulOuS Open Call #1 is to give selected applicants the opportunity to discover NebulOuS at the second half of the project, when a mature release of the Meta-OS stack will be available. Selected teams will test components of the NebulOuS architecture, by providing additional use cases where an IoT to Edge to Cloud infrastructure is needed.

The objective of NebulOuS Open Call #1 will be validation of basic aspects of the platform and NebulOuS will invest a total of €600.000 to fund 4 projects bringing an added value to NebulOuS by showcasing new use cases in different domains than those covered already by the Project, as presented in section 2.1.4.

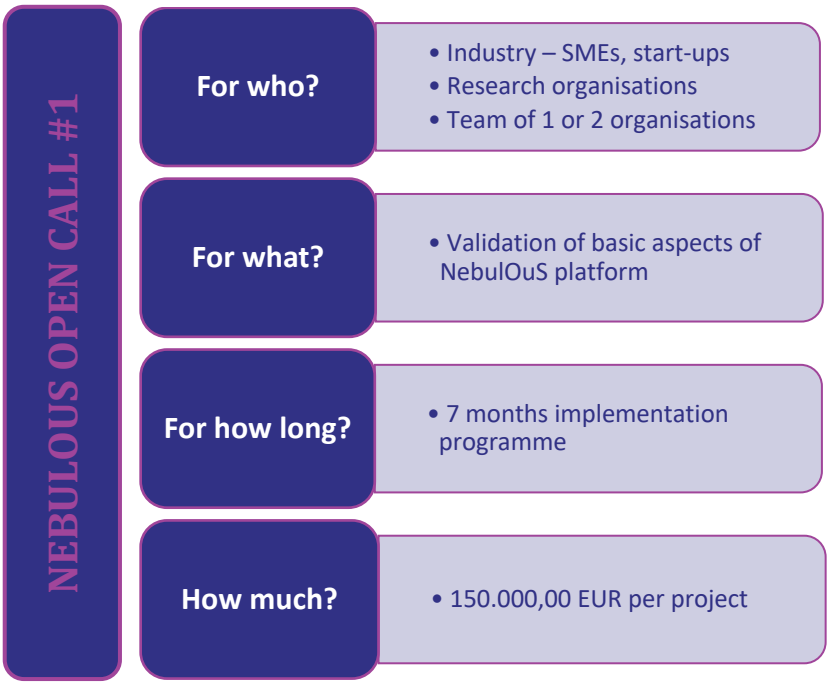


Figure 8: NebulOuS Open Call # 1 design

3.2 CHALLENGES CHARACTERISTICS

A core part of NebulOuS is the design and implementation of pilot demonstrators to test the NebulOuS usability. The current NebulOuS pilots are thoroughly described in section 2.1.4.

The objective of NebulOuS Open Call #1 is to address supplementary use cases extending beyond the pilots implemented within the project, through which to demonstrate the replicability and sustainability of NebulOuS framework covering a wide spectrum of use cases. It also aims to guarantee proper and wide external evaluation and validation of the project results, increase awareness, attract and engage key stakeholders and end-users, and ensure sustainability throughout and after the project end.

It is expected that all newly proposed use cases will enable to assess in various contexts and environments the quality of the user experience when using the solution, the acceptability of the solution regarding the ecological and societal impact and the impacts of such immersive collaboration on the overall performance.

For this, it is required that the proposed use case demonstrates that NebulOuS can cope with at least one of the challenges defined below.

Table 1: Challenge #1 description

Challenge #1 – Workflow application
A workflow application is composed by a directed graph of tasks. Upon reception of an initial request, the first task of the graph runs and produces an output that must be consumed by the following task/s. A downstream task cannot start before all its predecessors have finished processing and the output data from these predecessor tasks are available for processing. Once a task has processed the input and produced the output it can be terminated, and the associated resources freed. The lifecycle of such applications ends when, eventually, an egress tasks is reached, and results of the workflow application are returned to the user. A workflow is often iteratively executed when the next input dataset becomes available, and many instances of the same workflow can therefore be submitted at different time points and executed alongside other instances of the workflow submitted earlier and still running at different stages in the workflow application graph. To tackle this kind of applications, NebulOuS offers a workflow orchestrator component that manages the execution of multiple parallel instances of a workflow application, using the minimal number of resources needed while maintaining the SLOs defined by the user.
Ideal applicant: An ideal applicant opting for this challenge must present an application that adheres to the provided definition of "workflow application". The application should have at least 3 steps with dependences. Moreover, the applicant must accredit that, in normal operation conditions of the application, there is a need for executing at least 3 parallel instances of the same workflow, using resources from the cloud computing continuum (cloud, fog and edge).
Specific milestones (MS) to be achieved: MS1: A workflow model of the application's task that can be scheduled by NebulOuS. The workflow should have at least 3 steps. In normal operation conditions, the need for executing at least 3 instances of the same workflow should be accredited. MS2: A successful execution of a single workflow run on relevant and realistic user data. MS3: Successful execution of multiple instances of the workflow submitted at various time points running on real user data. MS4: An evaluation of running multiple interfering workflow instances simultaneously on a set of NebulOuS managed resources.

Table 2: challenge #2 description

Challenge #2 – IoT application with variability
In NebulOuS, a data processing pipeline is understood as a directed acyclic graph of steps. A step is a logic block that receives data from a single input stream, does some computation over it and produces results in one or more output streams. In IoT scenarios, this kind of applications are often heavily impacted by data locality, and clearly benefit from performing as much computation as possible in nodes close to the information source. In parallel, the fluctuation of the workload requires constant modulation of the dedicated computation resources to an application. To simplify the deployment of IoT applications, NebulOuS provides specific semantics for modelling IoT data processing pipelines. With them, users can express data transformation pipelines by identifying their main components (data sources, transformation operations and data consumers) and interlace them to conform data transformation flows. Moreover, the user can specify the range of parallel instances for each step and the grouping conditions for messages when processed in parallel. Once the application has been defined by the user, the orchestration of these data transformation pipelines is handled by NebulOuS core, allocating/deallocating computational resources whenever needed to adapt to the current workload.

Ideal applicant:

An open call applicant opting for this challenge must present an application focusing on the near-real time analysis of geographically distributed sensors. The application must clearly benefit from the use of edge/fog resources while also allowing to use of cloud resources during workload peaks. The use case should have a high variability on the volume of data to be processed and the geographic source of this data.

The presented application should make use of the IoT data processing pipeline orchestration functionalities. For this, said application must require the execution of a transformation pipeline with at least 3 steps and being at least one of these steps parallelizable.

Specific milestones to be achieved:
MS1: An application modelled using NebulOuS definition language that requires frequent re-adaptation of the deployment graph due to the fluctuation of the workload both in terms of volume and geographical distribution.
MS2: A data transformation pipeline that can be scheduled by NebulOuS. The pipeline should have at least 3 steps and allow parallel execution on, at least, one of these steps.

Table 3: Challenge #3 description

Challenge #3 – Serverless application
NebulOuS can deploy applications across the entire Cloud-to-Edge Continuum, supporting a wide variety of resources from the Data Centre to the User Edge. This includes the entire spectrum of available options, from container-based deployments to VM-based ones. Furthermore, NebulOuS accommodates not only "serverful" approaches, but also the serverless paradigm, allowing users to integrate the execution of their functions using our Meta-OS.
Ideal applicant: An open call applicant opting for this challenge must present an application that heavily relies on the use of serverless functions to perform its tasks. The functions need to be compatible with Knative.
Specific milestones to be achieved: MS1: An application modelled using NebulOuS definition language that requires the use of at least 3 different serverless functions that are run during normal application operation. MS2: A successful deployment and execution of the application with serverless functions.

Table 4: Challenge #4 description

Challenge #4 – Open challenge
If you do not see a predefined challenge that aligns with your needs, you can propose a use case within a domain and challenge of your choice. We are eager to explore new areas where NebulOuS framework can be validated by ensuring appropriate use of cloud, fog and edge resources. Submit your own use case.

Table 5: Challenges requirements description

Challenges requirements
Applicants must showcase a functional application. The application should adhere to a microservices architecture, with various components interacting to deliver the required functionalities. It is preferred that this component-to-component communication is articulated (or can be) using MQTT, AMQP, STOMP or Wire protocol. Demonstrating scalability is crucial, allowing the application to flexibly scale out or in, in accordance with workload variations. For this, applicants must clearly identify what application components are scalable and what are the metrics (CPU usage, latency of requests, etc...) that must guide the decision on the number of instances of these components. Candidate applications should clearly benefit from the use of edge resources, when possible, while seamlessly transitioning to cloud resources if the situation demands. Applicants must articulate scenarios demonstrating the necessity for such scalability.

Applicants must be willing to adapt the application to collect the necessary application-level metrics that can guide NebulOuS on deciding when a re-configuration of the application deployment topology is necessary. Technical description of the NebulOuS platform is publicly available NebulOuS website. Report titled **D2.1 Requirements and Conceptual Architecture of the NebulOuS Meta-OS**. The applicants should be familiar with the document.	
NebulOuS components to be used	In general, applicants must use NebulOuS to manage the needed computing resources and deploy their applications. In particular, participants of "Challenge #1 – Workflow application", must use the NebulOuS workflow orchestrator. Participants of "Challenge #2 – IoT application with variability" must use the NebulOuS IoT data stream orchestration tool. Participants of "Challenge #3 – Serverless application" must use the NebulOuS serverless toolbox.
Source code availability	Applicants must be capable of doing the necessary adaptations of selected use-case to make it compatible with NebulOuS (e.g.: develop software probes for metrics relevant for optimizing the application deployment topology)
Programming Language	Application components should be deployable using Kubernetes.
Security	Applicants must provide their own infrastructure (public/private cloud providers and edge nodes) for the use case deployment. NebulOuS will need to be given administrative access to this infrastructure for it to be able to instantiate nodes in cloud providers and deploy software in cloud/edge nodes. By default, NebulOuS control panel will be running on cloud resources managed by NebulOuS consortium, thus, access from the internet for the applicant infrastructure is required. If necessary, NebulOuS control panel can be installed in infrastructure managed by the applicant. In such situation, the applicant must provide a suitable node to deploy the NebulOuS control panel and grant NebulOuS members access to it for deploying and monitoring the software.
Data Management	Data generated by the OC participants (application modelling files and application execution logs and traces) will only be published and publicly available if the Authors/Data providers give their permission. In such scenario, it will be incorporated into the project DMP and participants will be requested to outline how data is collected, generated and/or processed with details of the type of data/metadata, the origin of such data, the quality assurance of such data and how the applicant intends to comply with the FAIR data principles (Findable, Accessible, Interoperable, Reusable) along with storage, security, and re-use plans for such data.

Deliverables and expected outcomes of 3rd party projects	It is expected that during use-case project implementation specific deliverables will be submitted: **D1: Application description and initial software architecture (M1)** This document should present a detailed description of the application including a short introduction on the application goal, a description of the main functional/non-functional requirements it satisfies. The document must also provide an in deep view on the current software architecture detailing the different application components, its functionalities and sequence diagrams that explain how these components interact between them to fulfil the described requirements. A set of real/expected usage scenarios of the application need to be provided, including information on the application workload and metrics that allow to measure it (number of users, number of requests, etc.). Focus should be put in scenarios where scalability of the application is demonstrated to cope with sudden workload peaks, leveraging the use of cloud resources. **D2: Deployment of the application using NebulOuS (M7)** This document should present the adapted software architecture for a better exploitation of NebulOuS platform. The document should also include the OAM, SLO and optimization problem definition needed by NebulOuS to deploy the application. Finally, the documents should report on the impact that using NebulOuS had on the application in terms of reliability, user experience, operational cost, etc.
KPI and milestones	KPIs: KPI 1 – Successful deployment of the use case in the selected domain (Target value – minimum 1) Milestones: Each use case has individually described milestones to be achieved as defined in challenge #1, #2 and #3. Selected applicants will need to stipulate on the workplan when the milestones will be achieved. For challenge #4, milestones will be set-up individually.

Resources provided by NebulOuS	Access to NebulOuS architecture and components and introductory workshop regarding the platform.
	• Access to specialized and qualified resources:
	  ○ Direct support and guidance from a pool of mentors for using NebulOuS and adapting the application to leverage NebulOuS capabilities.
	  ○ Designated mentor in implementation stage.
	• Dissemination of results and achievements

4 ELIGIBILITY CRITERIA

All applicants will have to abide by all general requirements described in this section to be considered eligible for NebulOuS Open Call #1.

4.1 APPLICANT

NebulOuS will fund third-party projects that may be from:

- **Single entity** - Micro, small and medium-sized enterprises (SMEs) working on the IoT, Edge, Cloud or other related technologies.
- **Consortium of maximum of 2 entities** - Micro, small and medium-sized enterprises (SMEs) working on the IoT, Edge, Cloud or other related technologies AND a research organisation provided that the SMEs is a leader of the consortium.

These entities are eligible under the following conditions:

Micro, small and medium-sized enterprises (SMEs) are considered eligible ONLY if complying with the Commission Recommendation 2003/361/EC and the SME user guide. In summary, the criteria which define an SME are:

a. The headcount in the Annual Work Unit (AWU) is less than 250.
b. Annual turnover less or equal to €50 million OR annual balance sheet total less or equal to €43 million.

Start-ups that do not have yet annual turnover or balance sheets are also considered eligible given that they fulfil the criteria (a) and (b) at submission time.

In addition, the following conditions apply:

- The applying **SMEs** should not:
  - Have convictions for fraudulent behaviour, other financial irregularities, or unethical or illegal business practices.

  Have been declared bankrupt or have initiated bankruptcy procedures.
  - Be under liquidation or an enterprise under difficulty accordingly to the Commission Regulation No 651/2014, art. 2.18.

  Be excluded from the possibility of obtaining EU funding under the provisions of both national and EU law, or by a decision of both national or EU authority

Research organisation is considered as eligible when is a legal entity established as non-profit organisation carrying out research and/or technological development as its main objective. It might be a public or private research and technology organisation (RTOs), university, and other non-profit research organizations and research centres.

Proposals must ensure that there is no risk of double funding. The fundamental principle underpinning the rules for public expenditure in the EU states that no costs for the same activity can be funded twice from the EU budget, as defined in Article 111 of Council Regulation (EC, Euratom) No 1605/2002 of 25 June 2002 on the Financial Regulation.

NOTE: All entities of the consortia must be registered with a verifiable VAT (which will be requested as part of the individual Declaration of Honour). Unincorporated start-ups are not eligible, even if the Coordinating entity on a given application is registered.

4.2 COUNTRIES

Entities legally established in any of the following countries are eligible to participate in the NebulOuS Open Call #1:

- The Member States (MS) of the European Union (EU), including their outermost regions.

Horizon Europe associated countries (those that have signed an agreement with the EU as identified in the HE Programme Guide) according to the updated list published by the EC.

4.3 FINANCIAL ELIGIBILITY

The following financial conditions apply for proposals to be eligible:

- The total budget per project may not exceed **€150.000**.

The total amount requested must represent 100% of the total project costs.

PROPOSAL SUBMISSION

Proposals must be submitted electronically, using the NebulOuS Online Submission Service accessible via the F6S platform at https://www.f6s.com/nebulous-open-call-1/apply.

Proposals submitted by any other means will NOT be taken into consideration and evaluated.

Only one proposal will be accepted for funding per applying entity, consortium and consortium partners. Multiple submission is not allowed, therefore such applications even if submitted on time will be declared as non-eligible.

Applicants cannot be funded by other projects approved under the **CL4-2021-DATA-01-05** topic.

4.4 LANGUAGE

English is the official language for NebulOuS Open Call #1. Submissions for NebulOuS Open Call #1 done in any other language will be considered ineligible and will not be evaluated.
English is the only official language during the whole execution of the NebulOuS programme. The language in which the Subgrantees provide deliverables (reports on the work done in their projects) will be English.

4.5 CONFLICT OF INTEREST

Applications will not be accepted from entities who are partners (beneficiaries) or affiliated entities/ linked-third parties in the NebulOuS consortium or who are formally linked in any way to them.

Applicants must not have any current and/or potential conflict of interest with the NebulOuS Open Call #1 selection process and during the whole project implementation. The winning applicants will be required to declare that they know of no such potential conflicts of interest by submitting Annex 4 - NebulOuS - Open Call #1 Declaration of Honour SME (template) or Annex 5 - NebulOuS - Open Call #1 Declaration of Honour consortium (template) during the contracting phase.

- All cases of conflict of interest will be assessed case by case. Applicants must take all measures to prevent any situation where the impartial and objective evaluation and implementation of the project is compromised for reasons involving economic interest, political or national affinity, family or emotional ties or any other shared interest ('conflict of interests').
- If a conflict of interest is discovered and confirmed at the time of the evaluation process, the proposal will be considered as non-eligible and will not be evaluated.

5 PROPOSAL PREPARATION AND SUBMISSION

5.1 SUBMISSION OF PROPOSALS

The submission will be done through the F6S platform:
https://www.f6s.com/nebulous-open-call-1/apply

The applicants are required to register a profile at F6S to submit a proposal. The templates to NebulOuS Open Call #1 documents are available on the NebulOuS website: https://nebulouscloud.eu/open-calls/

These are:

- **Annex 2 – NebulOuS Open Call #1 Application Form at F6S**: Includes the administrative questions to be completed directly on the F6S platform: https://www.f6s.com/nebulous-open-call-1/apply. The form is extracted as a document for reference purposes only. The application form should be directly filled at the F6S platform.
- **Annex 2.1 – NebulOuS Open Call #1 Proposal template:** This describes the project and is structured into multiple mandatory sections document that must be submitted in a .pdf format containing the description of the proposed project and uploaded as part of the application form at the F6S platform. Proposal is limited to 10 pages excluding the cover page and ethics and security section.
- **Annex 3 – NebulOuS Open Call #1 Sub-grant agreement**: template of the sub-grant agreement to be signed by NebulOuS representative and selected applicant.
- **Annex 4 or 5 – NebulOuS Open Call #1 Declaration of Honour:** template of the declaration of no conflict of interest and that all conditions related to the NebulOuS Open Call #1 are accepted by the applying entity(ies). Upon acceptance of proposal for funding, the signed and stamped declaration must be submitted.
- **Annex 6 – NebulOuS Open Call #1 SME Declaration**: template of SME qualification. Upon acceptance of proposal for funding, the signed and stamped declaration must be submitted.
- **Annex 7 – NebulOuS - Open Call #1 Bank account information**: template of the selected applicant bank account information.

The project proposals must strictly adhere to the F6S application form, which defines sections, required Annexes, and the overall length. Participants are requested to carefully read and follow the

instructions in the form. Additional material, which has not been specifically requested in the online application form, will not be considered for the evaluation of the proposals and may be subject to withdrawal from the evaluation.

Applying to an open call takes time and dedication and we would like to make sure that you understand the crucial rules:

- **Be on time:** make sure you submit your proposal through the F6S platform before the deadline of **17 of April 2024, 17:00 CET**. If you submit the form correctly, the system will send you a confirmation of your submission (please check your SPAM folder as well). Proposals submitted by any other means are ineligible, hence will not be evaluated.
- **Be exhaustive**: have you answered all the sections of the form and uploaded all required Annexes? It will not be possible to add any information after you submit your application or reach the submission deadline.
- **Every question deserves your attention**: all sections of your proposal must be filled in. Make sure that the data provided is true and complete. This is crucial for us to properly assess your proposal.
- **Documentation format**: any document requested in any of the phases must be submitted electronically in .pdf format without restrictions for printing.

Applicants are recommended to become familiar with **Annex 3 – NebulOuS Sub-grant agreement and Annex 4 or 5 – Declaration of Honour;** these documents must be provided if the applicant is selected and are mandatory to finalise the contract and enter the funding programme.

It is strongly recommended to not wait till the last moment of submission. **Failure of the proposal to arrive in time for any reason, including communications delays, or network issues is not acceptable as an extenuating circumstance and will automatically lead to rejection of the submission.** The time of receipt of the proposal as recorded by the submission system will be definitive.

Please note that after application submission, editing is not possible. If the applicant discovers an error in the proposal and provided the call deadline has not passed, the applicant may request the NebulOuS Open Call #1 team to re-submit the proposal (for this purpose please contact us at opencall@nebulouscloud.eu with a message titled: RESUBMISSION REQUEST). However, NebulOuS is not committed that resubmission in time will be feasible in case the request for resubmission is not received by the NebulOuS team at least 48 hours before the call deadline.

5.2 DATA PROTECTION

In order to process and evaluate applications, the NebulOuS consortium will need to collect Personal and Industrial Data. F6S Network Ireland Limited, will act as Data Controller for data submitted through the F6S platform for these purposes. A Data Protection Officer (DPO) has been appointed by F6S generally, to ensure compliance with data protection regulations, such as the General Data Protection Regulation (GDPR), and that personal data is collected, processed, and stored in a secure manner.

The F6S platform's system design and operational procedures ensure that data is managed in compliance with the General Data Protection Regulation (EU) 2016/679 (GDPR). Each applicant will accept the F6S terms to ensure compliance. Please refer https://www.f6s.com/privacy-policyto review the F6S platform's privacy policy and data security policy.

Apart from the F6S platform, data will also be stored in the F6S Google Drive, and in the project repository on Group-Office managed by the project coordinator EURECAT.

Please note that the NebulOuS consortium must retain generated data until five years after the balance of the NebulOuS project is paid or longer if there are ongoing procedures (such as audits, investigations or litigation). In this case, the data must be kept until they end.

6 EVALUATION PROCESS

NebulOuS Open Call #1 evaluation process is shown below.

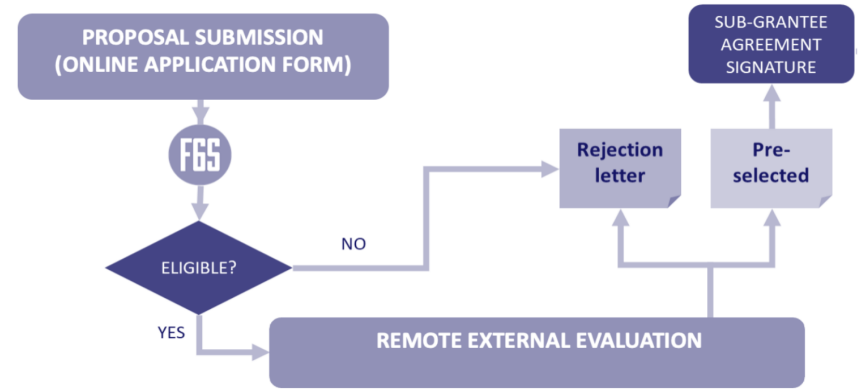


Figure 9: NebulOuS Open Call #1 process

6.1 PROPOSAL EVALUATION AND SELECTION

The evaluation of proposals is carried out by the NebulOuS consortium with the support of independent external experts (Evaluation Panel). The NebulOuS consortium ensures that the process is fair and in line with the principles outlined in the European Commission's rules on proposal submission and evaluation.

Step 1: Eligibility check

An initial eligibility check will be done by the NebulOuS team to filter out and discard non-eligible proposals. The following information will be checked:

- Submission has been made through the F6S platform and by the defined deadline. [Y/N]
- All the eligibility conditions specified in section 3 are met. [Y/N]

The applicant submitted only one proposal [Y/N]

- The Proposal does not exceed the maximum available funding [Y/N]

- The proposal, including the F6S application form and all requested and mandatory information and documents, are fully completed (this includes a full proposal with all sections completed). [Y/N]
- The proposal is written in the English Language. [Y/N]

Proposals must meet ALL the eligibility criteria. The eligibility check enables the creation of a shortlist of proposals to be evaluated in the next step of the evaluation process.

Proposals marked as non-eligible (for not meeting one or more of the eligibility criteria) will be informed by e-mail.

Step 2: External remote evaluation

Proposals considered eligible will be moved to the remote evaluation phase. The external evaluation will be done remotely by evaluators and using the F6S platform.

The evaluators will be selected from a pool of experts that will be established through a call for expressions of interest. The call will invite experts to provide their expertise in the domains addressed by the open call, as well as experience in evaluations. Expert profiles will be evaluated, and a pool of evaluators will be established. The top-ranked experts will be invited to evaluate proposals.

Two external evaluators will evaluate each proposal and will be distributed considering their domains of expertise and, whenever possible, country of origin.

The proposals will be evaluated according to the criteria shown in Table 6 below.

Table 6: Evaluation criteria description

Criteria	Description	Weight
C1 - Novelty, adequateness of the proposed use-case to be implemented with NebulOuS	• Level of innovation and technological challenges addressed. Concept fit to the NebulOuS objectives and the 7-month programme. Quality, credibility, and clarity of the technical description of how to achieve the objectives. Level of integration with NebulOuS technologies to test and validate. • Feasibility of the proposed work and technological contribution.	30%
C2 - Economic, social and environmental impact of the planned use-case	Applicants defined their ambitions and a clear set of expectations aligned with the objectives of the Call. Proposal demonstrates impact on the NebulOuS framework, on the industry/market that will be addressed. • Overall impact of the proposed use case. Effectiveness of the proposed measures to exploit and disseminate the use-case results. Expected Social and environmental impact	30%

C3 - Expertise and excellence of the proposed team	The entity(ies) has technical capacity and expertise to develop proposed use case. • Clarity of each partner role, applicable only for applying consortia. • Appropriateness of the skills and experience of the project team	20%
C4 - Project planning and value for money	• Quality, effectiveness, and clarity of project work plan including activities and structure. Allocation of appropriate resources to the proposed use case • Justification of the proposed resources and their deployment. • Justification of the proposed costs.	20%

Each criterion will be scored between 1 and 5. Half point scores are not given. For each criterion under examination, score values will indicate the following rationale:

Table 7: Evaluation scores

Score	Result	Rationale
1	Fail	The proposal fails to address the criterion under examination or cannot be judged due to missing or incomplete information
2	Poor	The criterion is addressed in an unsatisfactory manner. There are serious inherent weakness
3	Good	While the proposal broadly addresses the criterion, there are significant weakness that would need correction
4	Very Good	The proposal addresses the criterion well, although certain improvements are possible
5	Excellent	The proposal successfully addresses all relevant aspects of the criterion in question. Any shortcomings are minor.

The score (including for each criterion) is calculated based on the average of the scores provided by the evaluators, rounded to the nearest point (1, 2, 3, 4, 5), before computing the overall score. Overall score is the sum of the scores of each criterion multiplied by the respective weight, rounded to the nearest integer value.

The threshold for each criterion is three (3) out of 5 points, therefore any criterion with a lower score is automatically rejected.

$$\text{Overall score} = (C1 * 30 + C2 * 30 + C3 * 20 + C4 * 20) / 100$$

Each evaluator will record their individual assessment of each proposal using an Individual Evaluation Report (ISR). A single Evaluation Summary Report (ESR) will be prepared by the Evaluation Panel, representing opinions and scores on which the evaluators agree.

Step 3 Consensus meeting

Evaluators involved in the remote evaluation will carry out a consensus meeting with the objective of gathering their evaluations, defining a common score for the proposals, and preparing evaluation reports.

In the end of the evaluation period the consortium will review the scores provided by the different experts to assess the following items:

I. Significant discrepancies in the scores of specific proposals.

II. Consistent significant deviations in scoring from specific evaluators.

If any of the deviations are identified, the consortium will hold consensus meetings to consolidate the scores. If significant discrepancies are not resolved, the consortium may request a third evaluator to score the relevant proposals. In the case of adding a third evaluator, the final score of each criterion is computed according to the following formula: Score = (lowest score + medium score * 4 + highest score) / 6

Step 4 Ranking and Final selection

At the end of the remote evaluation process, all proposals will be ranked in a single list.

In case there are proposals with equal scores, tie-breaks will be addressed by giving priority to the proposals with the highest score in specific criteria, considering the following order:

I. Rule 1: The Applications will be ranked based on their overall score.

II. Rule 2: In case following Rule 1 there are Applications in the same position, priority will be given to Applications that have higher scores in the criterion C1.

III. Rule 3: In case following Rule 2 there are Applications in the same position, priority will be given to Applications that have a higher score in the criterion C2.

IV. Rule 4: In case following Rule 3 there are Applications in the same position, priority will be given to Applications that have higher scores in the criterion C3.

V. Rule 5: In case following Rule 4 there are Applications in the same position, priority will be given to the one submitted earliest.

The proposals with higher scores will be selected until reaching the available funding. Up to 4 proposals will be selected and invited to the contract negotiation step. It is envisaged to select one proposal per challenge.

Every eligible applicant will receive via email:

An Evaluation Summary Report (ESR);

- A letter informing of the rejection decision or invitation to negotiation and the following steps.

6.2 REDRESS PROCESS

Within three (3) working days of receiving (1) a rejection letter informing the proposal as non-eligible or (2) an ESR of non-acceptance, an applicant may submit a request for redress if they believe the results of the eligibility checks have not been correctly applied, or if they feel that there has been a shortcoming in the way their proposal has been evaluated.

In such a case, an internal review committee from NebulOuS will examine the applicant's request for a redress. The committee's role is to ensure a coherent interpretation of such requests, and equal treatment of applicants. Requests for redress must:

- Be related to the evaluation process or eligibility checks.
- Clearly describe the complaint (in English).

Sent by the entity's legal representative that has also submitted the proposal.

The committee will review the complaint and will recommend an appropriate course of action. If there is clear evidence of a shortcoming that could affect the eventual funding decision, it is possible that all or part of the proposal will be re-evaluated.

Please note:

This procedure is concerned only with the general evaluation and/or eligibility checking process. The committee will not question the scientific or technical judgement of the evaluators.

A re-evaluation will only be carried out if there is evidence of a shortcoming that affects the final decision on whether to fund the proposal or not. This means, for example, that a problem relating to one evaluation criterion will not lead to a re-evaluation if a proposal has failed anyway on other criteria.

The evaluation score following any re-evaluation will be regarded as definitive. It may be lower than the original score.

All requests for redress will be treated in confidence and must be sent to the NebulOuS team by email to opencall@nebulouscloud.eu

7 CONTRACTING

After the evaluation phase conclusion and final project selection, the NebulOuS consortium will start the contract preparation phase in collaboration with the representatives of the projects that have been awarded. Contract preparation will go via administrative and financial checking (and potentially into technical or ethical/security negotiations) based on evaluators' comments. On a case-by-case approach, a phone call or teleconference may be needed for clarification.

The objective of the contract preparation is to fulfil the legal requirements between the NebulOuS consortium and each beneficiary of the open call. The items covered are presented below.

Table 8: Legal requirements

Requirement	Description
Proof of legal existence	Company Register, Official Gazette or another official document per country showing the name of the organisation, the legal address and registration number and a copy of a document proving VAT registration (in case the VAT number does not show on the registration extract or its equivalent).
Specific to SMEs 1.Proof of the SME condition is required: • If the applicant has been fully validated as an SME on the Beneficiary Register Participant Portal, the PIC number must be provided. • If the applicant has not been fully validated as an SME on the Participant Portal, the following documents will be required to prove the status as an SME: ○ **SME Declaration (Annex 6)** signed (with a valid e-signature or by hand) and stamped: In the event the beneficiary declares being non-autonomous, the balance sheet and profit and loss account (with annexes) for the last period for upstream and downstream organisations is required. ○ Status Information Form, which includes the headcount (AWU), balance, profit & loss accounts of the latest closed financial year and the relation, upstream and downstream, of any linked or partner company. 2. Supporting documents: • In cases where either the number of employees or the ownership is not clearly identified: any other supporting documents which demonstrate headcount and ownership such as payroll details, annual reports, national regional, association records, etc.	
Sub-grant agreement	The contract signed between NebulOuS Consortium represented by its coordinator (EUT) and the beneficiary/ leader of consortium. Contract as provided to the sub-grantee is final and may not be changed, including the addition or removal of any articles or other content.
Declaration of Honour	The Document which covers all conditions related to NebulOuS - Open Call #1 signed by the legal representative of the applying entity/ leader of consortium.
Bank Account information	The account where the funds will be transferred will be indicated via a specific form signed by the entity. Payments will be made in Euro to the bank account indicated by the beneficiary/leader of consortium.

It should be emphasised that each participating SME should provide at contract preparation time a valid VAT number[2]. Failure to provide a valid VAT number will automatically result in exclusion from the contract preparation.

[2] To be checked at European Commission services such as http://ec.europa.eu/taxation_customs/vies/

The request of the above listed documentation by the NebulOuS consortium will be sent to the project representatives, including deadlines by which information and documentation should be sent. In general, the negotiation should be concluded within 2 weeks. An additional period may be provided by the NebulOuS coordinator in case of a relevant reasoning. In case negotiations have not been concluded within the above period, the proposal is automatically rejected and the next proposal in the reserve list is invited to initiate the contract preparation.

At the end of the contracting phase, the sub-grantee funding agreement will be signed between the NebulOuS Consortium represented by its coordinator (EURECAT) and the selected applicant, represented by its leader.

All documentation that requires a signature (e.g., declaration of honour, bank account, and sub-grant agreement) must be signed with a valid electronic digital signature or by hand (e.g. with the same signature on the identity card).

In case of applying consortia, the consortium leader and the other consortium partners are responsible to make an agreement that shall cover the rights and obligations between them.

8 NEBULOUS PROGRAMME

This section is dedicated to NebulOuS awarded projects follow-up.

8.1 PROJECTS IMPLEMENTATION AND REPORTING

Each funded project will be divided into 3 phases.

Phase 1

The 1st phase focuses in designing the implementation plan, with support of dedicated mentor including key requirements and roadmap for the development and deployment of the use case. Selected applicants will need to stipulate on the workplan when the milestones will be achieved. During this phase will be also defined a set of KPIs. These KPIs will be different per team and will be related to the use case to be implemented. These KPIs will measure the technological advance, the progress in the business strategy but also the commitment and involvement of the teams attending periodic call meetings with the coaches, meeting the deadlines for reporting, etc. At the end of the Phase 1, Beneficiary(ies) will have to deliver the assigned deliverable as a means of verification of work performed.

Phase 2

2nd phase will last up to 3,5 months and projects will perform their development based on the implementation plan developed in Phase 1. By the end of the phase, the coaches will assess the KPI's percentage of execution of each use case. The beneficiaries should consider the following:

Showcasing the development of use case

- proof of achieved KPIs as per the requirements and implementation plan of the applicant.

Phase 3

3rd phase will last up to 3 months. This phase is critical to leverage the results of the previous Phases. The aim is to validate the use case. Pilots will again be evaluated against a defined set of KPIs. At the end of Phase 3, Beneficiaries will have to deliver the assigned deliverable as a means of verification of work performed.

Summary of all phases is demonstrated below.

Table 9: Overview of funded projects' phases

Phase	Duration	Activity	Means of verification
Phase 1	2-3 weeks	Implementation	**KPIs:** Individually defined KPIs per project and team **Deliverables:** D1 - Application description and initial software architecture
Phase 2	3,5 months	Development	Mid-term review of the achievement of Milestones and KPI's percentage of execution
Phase 3	3 months	Demonstration	**Deliverables:** D2 - Deployment of the application using NebulOuS Final review of Milestones and KPIs achievement

Events participation

During the phases, the selected Beneficiary(ies) should participate in various types of events (audio calls, video calls, webinars, online training, virtual conferences, etc.) organized or suggested by the NebulOuS Consortium, to support their use case implementation in the NebulOuS framework and extend their knowledge regarding NebulOuS project. Beneficiaries might be obliged to attend 2 physical meetings organized in EU to show case results of funded third party projects.

Progress evaluation and reporting

The milestones, KPIs and deliverables will be evaluated at the end of each Phase. A remote review will take place after each phase to evaluate the progress of the Beneficiary(ies).

The sub-granted project must submit to the NebulOuS consortium the deliverable(s)/report(s) corresponding to each Phase by the day of the end of the respective Phase, unless otherwise indicated by the NebulOuS consortium.

8.2 MENTORING

Within the duration of the programme each Beneficiary will be appointed a dedicated mentor. The mentor is an individual, from the NebulOuS consortium with expertise in the topics and solutions being addressed within the project. The mentor will be responsible for supporting, providing feedback, motivating, and evaluating the Beneficiary.

Specifically, the mentor will:

- Organise regular calls with the assigned project.
- Ensure that the work plan, deliverables, and project reports are delivered on time.

- Follow the project's progress towards achievement of defined KPIs and results (sub-granted project progress).

Provide a technical evaluation of the deliverables and reports submitted by the Beneficiary, including approval, rejection, or request for improvements.

Engage with other NebulOuS partners to discuss needs from the sub-granted project.

9 FINANCIAL SUPPORT PROVIDED

For accessing the funding, the third-party projects deployment needs to demonstrate and present proofs of their progress and achievements and the achievement of KPIs and deliverables presented must be assessed positively in each of the phases. In case of missing the above, the third parties are not paid and may be requested to not participate longer in the NebulOuS project.

The grant received by the third parties is to finance:

- Internal personnel costs resulting of the development and management activities of the third-party projects.
- Purchase costs necessary to carry out the activities e.g. hardware purchases.

Travel and subsistence to attend the NebulOuS events.

The selected 4 projects will become part of NebulOuS activities for the 7 months period composed of 3 Phases. Payments will be done in 3 instalments (20% + 40% + 40%) based on concrete results, deliverables, and review of each phase. Summary of funding is shown in table below:

Table 10: Summary of funding of the third parties' projects.

Programme phase	Duration	Funding
Phase 1 - pre-financing	2 weeks	30,000€
Phase 2 - Mid-term review and first payment	By the end of month 4	60,000€
Phase 3 - Final review and second payment	By the end of project (month 7)	60,000€

Teams will be paid according to their overall completion of KPIs.

- A 100% completion of the KPIs will launch a full payment.

A lower completion of the KPIs will launch the proportional payment. If the KPIs are met by less than 50% the payment will be retained until the end of the phase. If less than 25% the teams will be automatically disqualified from the process

- Any use case that underperforms by fulfilling less than 25% of their KPIs in either phase will automatically be disqualified from the project and no further payments will be released.

Detailed payment schedule and payment conditions will be settled in the **Sub-grant Agreement (Annex 3).**

10 RESPONSIBILITIES OF BENEFICIARIES

The selected third-party is indirect Beneficiary of the EC funding. As such, they are responsible for the proper use of the funding and ensure that the recipients comply with obligations under Horizon Europe specific requirements as described in Horizon Europe.

10.1 DATA PROTECTION AND CONFIDENTIALITY

During the implementation of NebulOuS Open Call #1 activities and for five years after the end of the programme activities, the Beneficiary(ies) must keep confidential any data, documents, or other material (in any form) that is identified as confidential at sub-contract signature ('confidential information').

If a selected applicant requests, the Commission and the NebulOuS Consortium may agree to keep such information confidential for an additional period beyond the initial five years. This will be explicitly stated in the Sub-grant agreement.

If the information has been identified as confidential during the NebulOuS programme or only orally, it will be considered to be confidential only if this is accepted by the NebulOuS coordinator and confirmed in writing within 15 days of the oral disclosure. Unless otherwise agreed between the parties, they may use confidential information only to implement the Sub-grant Agreement.

The selected Beneficiary(ies) may disclose confidential information to the NebulOuS Consortium and to the selected reviewers, who will be bounded by a specific Non-Disclosure Agreement.

10.2 PROMOTING ACTION AND GIVING VISIBILITY TO THE EU FUNDING

The selected Beneficiary(ies) must promote the programme activities, the NebulOuS project and its results, by providing targeted information to multiple audiences (including the media and the public) in a strategic and effective manner and to highlight the financial support of the EC.

Detailed requirements will be listed in **Annex 3 - Sub-grant Agreement.**

Any publicity made by selected third-party in respect of the project, in whatever form and on or by whatever medium, must specify that it reflects only the author's views, and that the EC or NebulOuS project is not liable for any use that may be made of the information contained therein.

The EC and the NebulOuS Consortium shall be authorised to publish, in whatever form and on or by whatever medium, the following information:

the name of the selected project members;

contact address of the selected project;

the general purpose of the project;

the amount of the financial contribution foreseen for the project; after the final payment, and the amount of the financial contribution received;

the geographic location of the activities carried out;

the list of dissemination activities and/or of a patent (applications) relating to the foreground;

the details/references and the abstracts of scientific publications relating to the foreground and, if funded within NebulOuS project, the published version or the final manuscript accepted for publication;

the publishable reports submitted to NebulOuS;

any picture or any audio-visual or web material provided to the NebulOuS in the framework of the project.

10.3 IPR

Applicants will remain the sole owners of their respective IPR.

The NebulOuS Consortium itself will not retain an equity stake in any applicant's company, nor will it retain any IPR. However, the NebulOuS Consortium will be granted the right to make internal use of any IPR applicants produce as part of their NebulOuS Open Call activities.

NebulOuS and the European Commission may ask beneficiaries who have received funding to present their work as part of public relations and networking events to showcase the benefits of the NebulOuS project.

10.4 CHECKS AND REVIEWS

The EC may, at any time during the implementation of the sub-project and up to three years after the end of the sub-project, arrange for a check and review to be carried out, by external auditors, or by the EC services themselves, including the European Anti-Fraud office (OLAF). The procedure shall be deemed to be initiated on the date of receipt of the relevant letter sent by the EC.

Specific details and guidelines related to the checks are provided in the sub-grant agreement is Article 10.

Selected applicants need to keep sufficient records and supporting documents to prove that work has been appropriately implemented.

11 CHECKLIST

Does your planned work fit with the call for proposals? Check that your proposed work does indeed address the NebulOuS Open Call # 1 objective.

- **Is your proposal eligible?** The eligibility criteria are given in *chapter 4 Eligibility criteria*. Any proposal not meeting the eligibility requirements will be considered ineligible and will not be evaluated.

Budgetary limits. Check that you comply with any budgetary limits as expressed in *chapter 9 Financial support provided.*

- **Is your proposal complete?** Make sure you have completed all mandatory fields**.**

Does your proposal fulfil the requested information? Proposals should be precise, and concise and must answer to requested information, which is designed to correspond to the applied evaluation. Omitting requested information will almost certainly lead to lower scores and possible rejection.

Have you maximised your chances? There will be strong competition. Therefore, edit your proposal tightly, and strengthen or eliminate weak points.

Have you submitted your proposal before the deadline? It is strongly recommended not to wait until the last minute to submit the proposal. The failure of the proposal to arrive on time for any reason, including network communications delays, is not acceptable as an extenuating circumstance. The time of receipt of the application as recorded by the submission system will be definitive.

Do you need further advice and support? You are strongly advised to communicate with the NebulOuS team. Please refer to chapter 13 *Contacts* where you can find all contact information.

12 OPEN CALL # 1 DOCUMENTS

NebulOuS Open Call #1 will be supported by the aforementioned documents available at https://nebulouscloud.eu/open-calls/. Applicants are encouraged to get acquainted with the documents before submitting a proposal:

- Annex 1 – NebulOuS Open Call #1 Guidelines for Applicants
- Annex 2 – NebulOuS Open Call #1 Application form (template)
- Annex 2.1 – NebulOuS Open Call #1 Proposal (template)
- Annex 3 – NebulOuS Open Call #1 Sub-grant agreement (template),
- Annex 4 – NebulOuS Open Call #1 Declaration of Honour SME (template)
- Annex 5 – NebulOuS Open Call #1 Declaration of Honour consortium (template)
- Annex 6 – NebulOuS Open Call #1 SME Declaration (template)
- Annex 7 – NebulOuS Open Call #1 Bank account information

13 CONTACTS

The NebulOuS consortium will provide information to the applicants primarily via https://www.f6s.com/nebulous-open-call-1/apply so that all information (questions and answers) will be accessible to all potential applicants.

- No binding information will be provided via any other means (e.g., telephone, video calls).

More info about NebulOuS at: https://www.nebulouscloud.eu/

More information about NebulOuS Open Call #1: https://nebulouscloud.eu/open-calls/

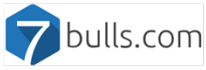
Apply via: https://www.f6s.com/nebulous-open-call-1/apply

- F6S support team (for platform issues during the application): support@f6s.com
- Other support: opencalls@nebulouscloud.eu

CONSORTIUM


UBITECH
ubiquitous solutions


SOUTH-EAST
EUROPEAN
RESEARCH
CENTRE
SEERC


7bulls.com


Activeeon
SCALE BEYOND LIMITS


AUGMENTA
PRECISION AGRICULTURE · REDEFINED


ubiwhere
SUITING THE FUTURE


eurecat


mercabarna


existanze
#connectingdots


FGS


TTAnalysis


@fire


Telefónica


BIBA

NebulOuS

A META OPERATING SYSTEM FOR BROKERING HYPER-DISTRIBUTED APPLICATIONS ON CLOUD COMPUTING CONTINUUMS

Funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or Directorate-General for Communications Networks, Content and Technology. Neither the European Union nor the granting authority can be held responsible for them.