

# The Virtual Hackathon of CEF Projects

## 2×1 HACKATHON

### Shed Light-on red traffic lights and urban greenery status

(4th July 2022 - 24 January 2023)

Terms and Conditions of participation

#### 1. Context

This virtual hackathon is an initiative promoted by the consortium of [Dydas](#) and [Spotted](#) projects, both financed under the programme of the European Commission [CEF Telecom](#) - European Commission.

#### 1.1 About DYDAS - DYnamic Data Analytics Services

The DYDAS project involves the creation of a platform capable of handling large volumes of dynamic data, enabling the public sector and industry to benefit from large-scale data analysis.

Emerging technologies are opening a new information age. In line with the objective of the CEF 2018 work programme and the CEF-T-5 call, the project will contribute to the European data infrastructure by improving the sharing and re-use of public and private data. By enabling the use of dynamic data sets such as Earth observation satellite and vehicle data, promoting HPC-based R&D through an integrated research laboratory and scientific knowledge and collaboration system, offering easy-to-use HPC-based services and tools, through specialised interfaces, and designed to provide different user experiences to a wide range of users. In addition, DYDAS promotes the sharing and re-use of public and private data in a secure environment and through innovative monetisation mechanisms.

This collaborative platform will act as an e-marketplace for data access, but as added value it will be equipped with HPC-enabled services based on Big Data technologies, machine learning, AI and advanced services. The project will test the data analysis capabilities of the platform through the integration and operation of three use cases (maritime, energy and mobility). A key and differentiating element of the project will be the implementation of a Geospatial Data architecture. Architecture that, through the adoption of a geospatial data model and interoperability rules, allow seamless integration and processing capabilities of large data sets for innovative use modes.

#### 1.2. About Spotted - Satellite Open Data for Smart City Services Development

The history of cartography is more than 4000 years old. Man has mapped and documented paths and roads since the beginning of civilization. Today a huge amount of data, not comparable with those of the past – in particular geolocation data – is

changing both citizens' lives and the way of running businesses. In this scenario investment companies, outsourced service providers, and public administrations are searching for solutions that allow to view and analyse data on map, offering various possibilities for use, such as: Geomarketing, logistics optimization, land management in order to make lasting investments. If such systems already exist on the market, SPOTTED will ensure system functionality, interoperability and cross border at no cost available to both public administrations and private companies.

Funded by the European Commission under the Connecting Europe Facilities (CEF) program-Horizon2020, SPOTTED aims to provide an innovative solution based on the integration and customised processing of massive Open Data collections, including Earth Observation (EO) data, to monitor and support decision makers in the field of green areas management. Data provided by Open Data portals from the public administrations involved in the consortium, the European Data Portal and Copernicus, including real-time data captured by sensors, which will be handled by means of the CEF Context Broker Building Block. Furthermore, relevant datasets generated by the Action will be made available itself through the European Data Portal. The ultimate objective is to show how this framework will generate innovation and large-value creation through the implementation of three pilots in Milan, Helsinki and Naples, focused on the monitoring and planning of green areas in the cities in relation to different factors (e.g., tourism impact, quality of life, economic growth etc.).

## 2. Hackathon Objective

**The CEF projects virtual hackathon** will be a competition for innovative ideas aimed at developing new smart services, solutions or applications in the sector of Smart Mobility, urban green areas management and open data (including satellite data and Earth Observation data). The aim is to create innovative solutions to support technical and business activity.

- the implementation of innovative systems applied to diverse domains (e.g. Smart Mobility, and Smart Cities but not limited to these);
- the adoption of Open Data in the context of all the vertical domains mentioned, using also data available in the [European Data Portal](#);
- leveraging the Building Blocks promoted by CEF project: primarily Context Broker
- the development and long-term sustainability of (but not limited to) European Cities.

**Four Cities will be involved in the hackathon: Milan, Naples, Rome and Helsinki.**

## 3. Challenges

The CEF projects virtual hackathon is divided into diverse Challenges promoted by:

- [Dydas consortium](#) Shed Light-on red traffic lights.

- [Spotted consortium](#) - Shed Light-on greenery status.

By using the Context Broker, open data and platform, applicants will receive the technical guideline provided by the technical staff of both projects.

Two main challenges have been identified:

### **3.1 Objectives of the 1st Challenge promoted by Dydas - Shed Light-on red traffic lights**

The objective of this challenge is to stimulate creativity in finding solutions for every day urban mobility problems: DYDAS platform aims to give value to data and ideas, and provides the necessary tools to achieve them. The challenge involves experts and developers to solve a problem using open data with a vision on smart cities capabilities. One of the main issue of large cities is traffic, often caused by traffic lights: the challenge is to use data to create an algorithm capable of reducing overall traffic by controlling stop lights all over the city. The algorithm should demonstrate that when is applied on a dataset in real time or on historical data, overall time-to-arrive for cars is diminished. Real time decision on traffic can improve air quality by more than 30% and reduce the time spent in private cars by at least 40%. This benefits both health and quality of life for citizens.

**Challenges Description** - The challenge is the creation of an algorithm, based on simulated and/or open data of traffic in a graph portion of a city (real or simulated). The algorithm may use AI (recommended) and must have as input a graph that includes traffic lights status for each node for each edge, and waiting cars/transited cars on each edge, in a 30 seconds timeframe. The output of the algorithm is a graph containing the changes in the traffic lights that must be performed to optimise overall traffic.

### **3.2. Project context**

Data is one of the most valued assets in our time. DYDAS project aims to provide the tools for everyone who wants to provide or use data to increase common knowledge or to give value to ideas and results. In this particular context, environment and sustainability are 2 of the main concerns that can benefit from data driven research and applications. In this context the challenge aims to provide a solution on a common issue: traffic. The impact of the private traffic throughout cities is problematic not only from a timely point of view, but mostly for the environment, and data analysis and modelling can provide solutions to any problem, from the most common to the specific ones.

### **3.3 Needs**

Participants are asked to develop an algorithm that is capable to evaluate in each timespan the best course of action for all traffic lights in a network during a defined period of time (a.e. 1h). The data flow must be simulated real time (at least 30 seconds

time frames) and be processed in an acceptable time (if more than 1 or 2 minutes must be justified). The solution must provide both data workflow to simulate real time streams (at least 30 seconds time frames) and the algorithm that evaluates the time frame status of the network (input). The output of the algorithm must be the changes that the network should perform on stop lights to optimize traffic flow.

The means of verification:

- Test data will be used to simulate flows and results will be measured against best case scenarios;
- Methodology presentation will provide 30% of the evaluation;
- Data presentation will be considered.

### **3.4 Technology to be used**

The algorithm may be AI based (preferred) and can be provided as a trained model or as python script (in this case must be executed on DYDAS platform). Inference must run on DYDAS platform by using the tools the platform provides (Python scripts execution and data storage), and data must be simulated real time by using FIWARE Context Broker, provided with the platform. DYDAS Dashboards and other data presentation tools can be used. Any python based libraries may be used. Training of models may be performed outside the DYDAS platform.

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### **3.5 Objectives of the 2nd Challenge promoted by SPOTTED Shed Light on urban greenery status.**

The objective of the challenge is to collect ideas on how High Value Datasets, open data coming from different data sources (in particular satellite data) can be integrated and exploited to support the decision makers in the green area management starting from the three pilot areas (Milano, Helsinki, Napoli) under SPOTTED project. SPOTTED aims to provide an innovative solution based on the integration and customised processing of massive open data collections, including Earth Observation data to monitor and support decision takers in the field of urban Green Areas management.

- Challenge description: Considering the datasets provided by the SPOTTED project, the applicants must produce an idea to demonstrate how they can support the interested municipalities to monitor and plan the green area, taking into account the different specific needs expressed by the Pilots. Therefore, the applicants should suggest other relevant open datasets, not included in the SPOTTED datasets (in particular EO open data). Participants can also suggest the creation of additional derived datasets by integrating the existing ones into spatial analyses that would render the fundamental characteristics of the three

Pilot cities. All the data will be handled by means of the CEF Context Broker Building Block. The datasets produced would be harmonised and compliant with the relevant metadata standards (e.g. DCAT-AP, GeoDCAT-AP) to be easily published through the European Data Portal.

### **3.6 Project context**

Territorial change, natural or man-made, can have a strong negative impact on land, buildings and critical infrastructures, natural environment both in terms of territorial sustainability and resilience dynamics. Public entities in charge of managing massive land assets need to continuously monitor what happens to the properties under their control and possibly anticipate negative repercussions deriving from unexpected or undesirable changes. In this context, Earth Observation (EO) open data is becoming increasingly important in particular their integration with other non-EO data enables highly valuable commercial applications.

### **3.7 Needs**

Three pilots are involved in SPOTTED in the context of green area management, but with different specific needs. The Municipality of Milan plans to develop a data platform to analyse and predict urban, social, and economic impacts of green transformation initiatives. Helsinki wants to find new ways to monitor sustainability of tourism and assist urban planning by identifying green areas and their changes out of the satellite imagery in the city and neighbourhood level. Naples focuses on urban regeneration strategies by using satellite images to create multi-temporal and multi-parameter thematic maps for a thorough analysis of the starting point of the actions. In the same context, the data carried out from municipalities' pilot project requirements would be integrated and applied to any other city joining the SPOTTED framework.

### **3.8 Technology to be used**

The technology adopted should combine artificial intelligence processes, cloud storage and cloud computing technologies, massive open data collection with customizable dashboards for automatic monitoring, classifying, managing, and predicting emerging land changes. The ideas should improve the current solutions and services and open new business avenues for novel applications based on Open Data libraries and enabling technologies such as EO, AI, Cloud and Big Data. The use of integrated Open Data collections through Open Data infrastructures such as EU Portal, CEF Context broker and Copernicus Hub to empower customised services that optimise the use of data processes addressing them into different monitoring services is recommended.

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## 4. Dates and Times

The Hackathon includes the following activities<sup>1</sup>:

- 1st of July 2022 CEST - Launch of the CEF projects virtual hackathon
- 8 September 15:00 2022 Info and training session
- 14 -15 2022 September presentation at the FIWARE Global Summit
- 17th of January 2023 at 17:00 CET - deadline to submit proposals for Smart Mobility & Smart Cities. Shed Light-on red traffic lights
- January 24th - 25th, 2023 - Time: 10:00-13:00 (CET)
- 26th of January winners celebration
- 17th of January 2023 at 17:00 CET - deadline to submit proposal for Open Data & Green Area Management. Shed Light-on urban greenery status
- January 24th - 25th, 2023 - Time: 10:00-13:00 (CET)
- 26 of January 2023 - winners celebration

## 5. Participants

Participation in the CEF Virtual hackathon is open to all: startups, university students, researchers, professionals, operators, citizens, and associations.

## 6. Methods of Participation and Training of Teams

The composition of each team will be assessed taking into consideration: skills, multidisciplinary approach, personal attitude, and basic knowledge of technologies. Each team must have a minimum of 2 and a maximum of 4 members. According to the challenges chosen, the following private information shall be provided through the registration system:

- Name of the team
- First name, last name of each individual member of the team
- An email and/or phone number of a contact person
- Identification of the status profile and distinctive competencies of the individual participants in the group.

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<sup>1</sup> **These dates may be subject to change.** We strongly recommend you to consult the CEF Virtual hackathon page regularly to keep up to date.

The registration to the CEF Virtual Hackathon entails the acceptance of the Terms and Conditions and the privacy policy. Participants are solely responsible for the information provided and undertake to respond to any requests for information from promoters.

## **7. The Proposals**

Proposals must be submitted within the date and time indicated by the organisers. Proposals have to be submitted through the dedicated form which will be made available on the Virtual Hackathon of CEF projects page. Applications has to be submitted to the following link (Dydas) link (SPOTTED) of the hackathon website

Proposals sent after the deadline will not be considered.

## **8. Public Presentation of Proposals**

Each team will present its proposal with a pitch of 5 minutes in English in the 'Virtual Pitch' session. The virtual presentation (with the subsequent evaluation) will take place according to the tentative dates proposed (See section 4 Dates and Time), link to participate to the virtual pitch will be made available by the organizers in due time. The Jury referred to in art. 9 will evaluate the proposals according to the rules provided for in art. 11. The final product is recognised as intellectual property of the teams, subject to any licences and patents that may be used. The promoters and their partners do not obtain any property rights solely because of the presentation of the final product. Members of the same team are co-authors and have the same intellectual property rights attached to the final product, including any exclusivity on commercial exploitation, which they must exercise by mutual agreement.

## **9. Composition of the Jury**

The complete composition of the Jury will be made public 30 September 2022 (Tentative date). In any case, it may be modified, due to the unavailability of one or more members at any time by the promoters.

Members of the Jury:

- At least a representative of the K2B
- At least one member of the ANCI
- At least a representative of FIWARE Foundation
- At least a representative of the Engineering

Other members of the jury may be added in order to improve the quality of the evaluation process.

## **10. Winners**

The Jury will evaluate individually the submitted proposals. The Jury will meet at the end of each elevator pitch (according to the timeline provided in the section 4). The

Jury will draw up a ranking of the projects presented for each challenge. This date can be changed depending on the number of proposals submitted. There will be 3 winning teams (1st place, 2nd place and 3rd place for each challenge). The jury reserves the right to refuse to award prizes or to award ex-aequo prizes. The jury is sovereign and its judgement is final. It follows that no complaint can be accepted following the nomination of the winners.

## 11. Summits and awards

**Prizes for each challenge** are as follows.

### **Smart Mobility & Smart Cities. Shed Light-on red traffic lights**

- 1st place: 5000 euro
- 2nd place: 3000 euro
- 3rd place: 2000 euro

### **Open Data and Satellite Data. Shed Light-on urban greenery status**

- 1st place: 5000 euro
- 2nd place: 3000 euro
- 3rd place: 2000 euro

**Teams can only win one prize per challenge. Multiple prizes for the same solution are not allowed.**

## 12. Intellectual property

Each team member is committed to:

- respect all intellectual property rights of third-party creations used.
- indemnify the promoters and partners in the event of disputes, including legal disputes, with third parties or partners.

Each participant as a person guarantees that the final product has not been edited or sold and that it is an original work of which team members are the authors and that it does not violate intellectual property rights or other rights of any third party. Each participant as a person also declares that he/she has all the rights necessary to comply with the Regulation. Any violation of the above will ensure ex officio disqualification.

## 13. Personal data and Image Rights

Promoters and their members are authorised to disseminate the names of the winners, the name of the project, its purpose and description, together with extracts or images of the final product. Each team member agrees that the promoters and their members



will photograph or film him/her and disseminate to the public images that may include his/her person.

#### **14. Right of Disqualification and Exclusion**

The promoters reserve the right to disqualify anyone who does not comply with the rules, materials made available to him/her, and the premises of the Hackathon.

#### **15. Cancellation or Change of Dates**

In the event of extraordinary events or other circumstances that make it necessary, the promoters may cancel the Hackathon or move it to another date.

#### **16. Other Provisions**

The participant acknowledges that he/she has been informed that he/she will be held solely responsible for any inaccuracies contained in the registration format he/she has completed or for any failure to comply with the obligations contained in the regulations.

#### **17. Applicable Law**

The applicable law is the Belgium law. In the event of any dispute concerning the interpretation or enforcement of the Regulation, the case shall be brought before the competent court in Brussels. Promoters and partners are not responsible for damage, loss or theft of materials and equipment used by participants for the performance of their work within the Hackathon.