TECHPARK SÜDTIROL / ALTO ADIGE

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**Preliminary market consultation and contextual request for quote**

Dear supplier,

**NOI SpA** intends to initiate a preliminary market consultation pursuant to art. 20 of LP no. 16/2015 and art. 40 of Directive 2014/24/EC for an automated monitoring tool applied to the Open Data Hub that can automatically check the correctness and completeness of the data collected and visualize these indicators in the form of a web dashboard. More information and specifications about the aforementioned project and this market request are described in more detail in the Annex.

**NOI SpA** invites all interested economic operators to participate by filling in an expression of interest, **also in the form of a quote**, in relation to the products and requirements described in the Annex.

**DEADLINE FOR THE DELIVERY OF THE QUOTE (04.11.2022):**
**The quote is to be sent exclusively by e-mail to r.cavaliere@noi.bz.it**

Best regards
Roberto Cavaliere

**ANNEX: Details of the preliminary market consultation**



## 1. Open Data Hub

The Open Data Hub is an open-source platform developed by NOI in cooperation with a large number of local public and private stakeholder, which aims to open up and made available machine-readable data related to different sectors. The goal is to promote research and development activities based on the usage of such data, so that the full potential beyond its usage can be exploited and innovative products and services can be created and put on the market. For a comprehensive and up-to-date overview of the Open Data Hub, its community and the datasets available so far please refer to the official project web site: https://opendatahub.com/

## 2. Specification of the requested set of activities

With the increase in the usage of the Open Data Hub it is more and more important to keep the quality of the large variety of data collected under control. Being the number and complexity of the different real-time datasets continuously increasing, this need can be accomplished only through an **automated monitoring tool**.

This automated monitoring tool is composed on two functional parts:

- an **automated monitoring "engine"**, which is capable to connect periodically to the API exposed by the Open Data Hub, check the status of the data provided and compute simple data quality indicators;
- an **automated monitoring "visualization tool"**, i.e. a web-application that presents in an interactive dashboards the data quality indicators calculated by the automated monitoring engine.

As far as the **automated monitoring "engine"** is concerned, different types of data quality checks should be implemented. A non-exhaustive list of possible data quality checks categories could be the following:

- data completeness, i.e. the verification that all expected data is provided (e.g. no value for certain fields);
- data accuracy, i.e. the verification that the data is within certain reasonable thresholds;
- data timeliness, i.e. the verification that the data is "real-time" according to the expected update frequency;
- data consistency, i.e. the verification that the data is consistent with a reference API (e.g. control of the expected fields and the type of values that each field should have).

These controls should apply to all datasets of the Open Data Hub, e.g. mobility and tourism sectors. For the mobility domain, the control check should be done not only at a dataset level but also considering the reference Data Providers and highlighting if there are certain measurement stations that do not provide the expected data quality. For the data consistency checks, this should be as much as possible automated by considering the swagger provided by the Open Data Hub, i.e.:

https://swagger.opendatahub.bz.it/?url=https://mobility.api.opendatahub.bz.it/v2/apispec

https://tourism.opendatahub.bz.it/swagger/index.html#/

The automated monitoring “engine” should not only be able to implement a continuously growing number of test cases (initial set to be jointly defined with NOI), but also allow authorized users, e.g. through the automated monitoring “visualization tool” to define additional test cases.

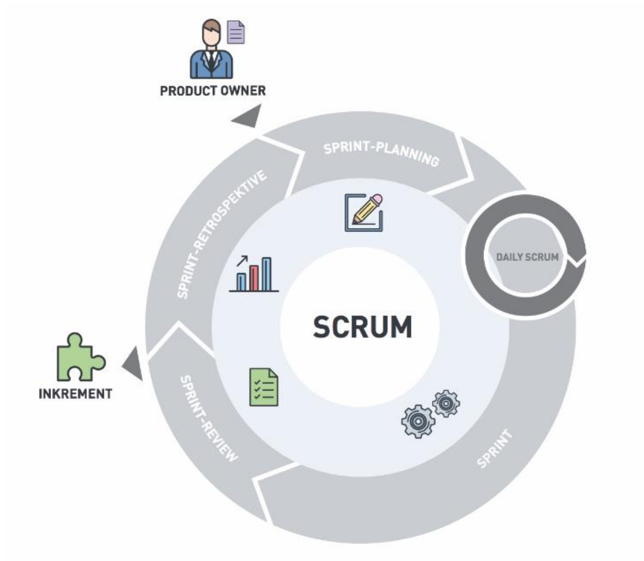
As far as the **automated monitoring “visualization tool”** is concerned, this should be conceived as simple web-based (if possible, also responsive) application showing the results of these test cases in an aggregated form, e.g. through certain KPIs. It is requested that the access to this tool is possible with / without authentication: without authentication, it should present only “high-level” KPIs (e.g. the data quality of all parking data); with authentication, a certain Data Provider could analyse the data quality of only its datasets shared with the Open Data Hub. The authentication should be linked with the Keycloak infrastructure in use by the Open Data Hub for giving access rights to users and organizations to closed data.

This tool could be implemented as a separate component or be an integral part of the automated monitoring “engine”. The offerer should describe the proposed solution to be implemented and how the two components are connected and can share data (e.g. through an API).

In conclusion, the request of this preliminary market consultation is to implement a first Proof-Of-Concept (PoC) of this automated monitoring tool, which should demonstrate its added value and the potential also for Data Providers sharing data with the Open Data Hub.

## 3. Modalities and guidelines for the development

The development of the activities covered by this market survey will follow the agile method (scrum). Two weeks sprint sessions are scheduled, unless otherwise agreed during the kick-off meeting with the core team of NOI S.p.A.




The software development will take place in three phases/environments:

- **development environment**: this environment is on supplier's infrastructure and is used during the development of the software components;
- **testing environment**: on infrastructure made available from NOI Techpark. This environment is used in order to test the new working versions of the software components. For the publication of the new versions a Continuous Integration (GitHub Actions) pipeline will be developed by the NOI team. For this reason, the new versions of the code will have to be "committed" to a dedicated Git Repository according to the instructions provided by the team of the NOI Techpark;
- **production environment**: on infrastructure made available from NOI Techpark. After the testing phase, as soon as the software produced is considered sufficiently stable, the software will be integrated in the production environment. Also, this process is managed automatically with Continuous Integration pipelines.

To coordinate the project NOI S.p.A. will use a Kanban Board in Github. Each functionality or issue will be described by NOI S.p.A. in Github and put on the Kanban Board. The Kanban Board will have the following columns:

- **Backlog**: contains all issues that are on hold and have to be discussed during the next sprint meeting with the supplier;
- **ToDo**: contains all issues that have to be concluded in the actual sprint;
- **In Progress**: contains all issues where the is working on;
- **To Review**: contains all issues where NOI Techpark has to make some reviews and that has to be reviewed during the sprint meeting.

All issues in the Kanban, but the one in Backlog, have to be assigned to the user that has to make the next step (e.g. the issues in ToDo will be assigned to the developer who has to develop the functionality, the issue in ToReview will be assigned to the tester, etc.). The supplier will have access to the project Kanban board and will have to check it regularly.

In order to allow the NOI S.p.A. team to properly review and test the code, for each issue in the ToDo lane the service provider has to send a pull request to the development Branch of the repository at least 5 working days before the sprint meeting.

In order to allow a better integration with the systems already in use by NOI Techpak it is required to implement all software components, where possible, using the technologies that are already in use by the Open Data Hub project. These technologies are described in the technical documentation, available at the following link:

https://docs.opendatahub.com

The source code has to be uploaded to the Git repositories provided by NOI Techpark. During the upload the service provider has to take particular attention to the following aspects:

- do not commit usernames or passwords. NOI Techpark uses Jenkins technology to build the code which implements password ingestion based on special keywords in the source code;
- well document the code describing at least:
    - the general architecture of the system;
    - the list of the licences of all the libraries used;
    - the installation process;
    - all other useful information for people who want to fork or install and use the project.

As Open Data Hub we created some boilerplate repositories for the most common project type (es. Java project, Web Component, .Net Core project, etc.). In case you are starting a new project from scratch, before starting your project please look for the boilerplate that best fits your project and use it to initialize your repository

While you are documenting your code please consider that the official language of the Open Data Hub is English. So, the entire documentation, including the comments in the code, has to be in English. Moreover, you have to observe the following guidelines:

- use the right boilerplate of the README.md if exists;
- use only markdown or text (no binaries, no PDF, etc.);
- should be so detailed that a third person, without any connection to the developers can setup the project, run it and develop it further;
- Java Doc and similar tools for other languages should be as complete as possible;
- add the author tags incl. emails;
- README.md should be a good description of the project and should also have a usage instruction (boilerplate does not consider that). Mainly because tools like **npm** use it as homepage for each project

In general, the documentation of the project (e.g. readme file, license file, etc.) should be done in order to allow third parties developers, who don't know anything about the project, to understand the whole project and also replicate, install or modify it without the need to get in contact with NOI S.p.A.

Therefore, the documentation (README.md) should include also:

- a short description that allows the user to understand the overall goal and functionalities of the project;
- Longer and detailed description that includes also:
    - description of the different parts of the repository/application;
    - description of different parts of the project (also other repositories, if existing, and a link to them) and how this application is part of the overall project;
    - external services/code/framework/software that are used including their licence and copyright information;
- detailed development setup instructions (including testing);

- detailed deployment setup instructions

In respect to the licensing and copyright information, the service provider has to follow the guidelines defined by the Reuse project:

https://reuse.software/

The service provider must provide code where the Reuse linter passes without errors and the licenses must be all compatible with each other.

As mentioned above the service provider, before each sprint meeting, will deliver the source code by making a Pull Request to the Development Branch of the repository Git provided by NOI S.p.A. at the beginning of the project. In general, the service provider has to observe the following guidelines to make the pull requests:

- at the beginning of each sprint the service provider will open a Pull Request (PR) with a prefix [WIP];
- during the sprint the service provider has to regularly push the commits to that PR in order to allow NOI S.p.A. to monitor the status of the project (additional information are available under https://opendata-hub.readthedocs.io/en/latest/contributors.html);
- at the end of the sprint (at least 5 days before the sprint meeting) the service provider will close and send the Pull Request.

NOI S.p.A. will analyze the Pull Request before the meeting and eventually send feedback to the service provider. The minimal requirements for a Pull Request to get accepted are:

- the documentation must exist and be as complete as possible in respect to the status of the project
- commits must not contain credentials or any other sensible data
- contributions (e.g. documentation, comments, etc.) must be in english
- merge conflicts must be resolved by the contributor
- all Continuous Integration verifications must pass
- Pull request branches should possibly have a linear history, that is, they should not contain merge commits

During the development cycles the pull request comments and in general the issues and the dedicated Kanban board on Github (original repository) must be tracked by the service provider. The discussion about issues, pull requests, and other specific comments on the code development will be managed on Git in the project repository and NOT through email. That also involves moving user stories to the corresponding column in the Kanban and assigning them to the right user.

These paragraphs contain some guidelines that the service provider should follow while implementing the project:

- commits should contain a single thing/feature, not be too big and specially they should not be a combination of unrelated features or bug-fixes;
- each commit must be described: present tense and active (e.g. "Add logging to commons" not "commons will get logging now" and not "Added logging").

For the deployment of the project NOI S.p.A. will use its CI/CD infrastructure, for this reason it is important that the service provider includes in the documentation of the project the information about how the application should be deployed or updated by a CD pipeline. Therefore, the documentation should point out the following things:

- What parameters must be configured? Which ones are secrets and which are not?

- What services must be used? (e.g.. PostgreSQL database, S3, ..)
- What steps must be made to package the application/project so that it can be copied to the server?
- What steps must be made on the server after deploying? (ex. database migrations executing with special command)
- What must be adjusted on the server only once? (ex. cron job, shared folder)

All projects should include unit tests and the minimal requirements for the service provider are:

- setup a test infrastructure;
- write unit tests to cover the most important features;
- the minimal test coverage should be 20%;
- tests should mainly cover own business logic (even if minimal) and not third party API's / libraries

Finally, a test driven development is appreciated.

In case that within the project it is foreseen also the development or the change of APIs, the service provider should observe the following guidelines:

- all API calls must be documented in the README.md;
- Swagger UI should be used;
- in case of errors the API should return to the consumer valid and descriptive error messages;
- the API should be RESTful, if possible, but, in case of need, other formats will be considered. In case of non RESTful APIs the service provider should present to NOI S.p.A. enough documentation to allow NOI S.p.A. to decide whether to go on with the new technology or stick to RESTful;
- the API must include also:
  - Response codes,
  - HTTP methods,
  - validity errors,
  - logging: JSON format for production and plain-text for local development written to stdout

In case that the project foresees Access Control List management, the service provider should observe the following guidelines:

- every login to a webapp needs ACL;
- the passwords must be complex enough to be secure;
- Oauth 2.0 standard is required
- Session management for webapps should be present, logout after an inactivity time (the length of the inactivity time depends on the single projects and has to be agreed with NOI S.p.A.)

As an Access Management tool NOI S.p.A. uses Keycloak (https://www.keycloak.org/) instance. More details are available at the following links:

https://docs.opendatahub.com/en/latest/guidelines/authentication.html

https://docs.opendatahub.com/en/latest/guidelines/authentication.html#authentication-to-internal-infrastructure

NOI S.p.A. is using Docker (https://www.docker.com/) to automate the deployment of the application and we strongly recommend to:

- use docker for local development;

- keep local docker setup, staging and production as similar as possible (these will be provided and updated by the NOI S.p.A. team).
- use environmental variables to configure different stages (i.e., .env files)

## 4. Contents and evaluation of proposals / quotes

The technical evaluation and economical quote shall be provided in a document that should not exceed 10 pages of documentation. The documentation can be provided in Italian, German or English language.  Any collaboration with other companies and the presence of any subcontracts must be explicitly indicated. The quote shall be structured as follows:

- **Technical quote**: should include on one side a CV of the company and of the employees that will work on this project, which should preferably be explicitly mentioned, and on the other side provide a technical proposal for the requested implementation. This proposal should also quantify the boundaries of this implementation (e.g. number of starting test cases implemented), even if it is expected that the development will be carried out in an agile way with a step-by-step approach.
- **Economical quote**: following activities should be separately quoted:
  - the design and conceptual work of the visualization tool;
  - the implementation of the PoC in the development environment of the supplier;
  - the support to the NOI staff in the integration of the PoC in the testing and production environment of the Open Data Hub, which will take place only after having positively evaluated the potential of the PoC.

The “best value for money” criterion is going to be followed for the evaluation and comparison of the proposals and to select the supplier. The publication of the present market survey has however not to be seen as an obligation for NOI S.p.A. for the assignment and execution of the requested activities.

## 5. Invoicing procedures

The invoicing of the activities concluded by the supplier will be sent to NOI S.p.A via electronic invoice only after the outputs produced have been successfully tested by NOI S.p.A. Before to proceed with the testing of the outputs, the supplier must provide to NOI S.p.A.:

- the entire documentation;
- if code development is planned, the code must be uploaded to the Git repository provided by NOI S.p.A;
- in the case of multimedia contents (e.g. photos, videos, illustrations, documents), the service provider has to upload it on specific platforms (e.g. Vimeo, Flickr, etc.) and provide the source files or open versions through appropriate file hosting services indicated by NOI S.p.A.

All invoices must include that the transaction is subject to the Split Payment discipline as mentioned in the art.17-ter del DPR 633/197 and must be issued exclusively in electronic format (Unique Office code: T04ZHR3).

## 6. Transfer of rights

Where the creation of material subject to proprietary rights, including copyrights, sui generis data rights, and related rights, including solely of photographs, industrial design, all rights of economic exploitation arising from achieved results are reserved to NOI S.p.A., excepting those expressly excluded when the order is placed.

Further, if the material includes a software development project, all source code from libraries or other modules used in the realisation of an assignment and belonging to a third party must be released under an Open Source license (opensource.org/ licenses) in a manner compatible with the scope of the "outbound" software license, without requirement for adaptation, addition, cancellation or requests for permission from third parties on the part of NOI S.p.A. In the absence of any expressly indicated license, the terms of the GPL v3 or  AGPL v3 (depending on the project type) license shall apply. The use of material belonging to third parties must be expressly declared at the time of the quote, or be easily and immediately understandable from the description of the project. In the event that code is developed during the realisation of this assignment, NOI S.p.A. will initiate a Git repository on which the supplier must develop and publish the source code.

If the material consists of data, creative works (drawings, literary works, cinematographic works, figurative art, photographs), industrial design or other material which are subject in whole or in part to the proprietary rights of a third party, the use of such material is permitted provided it is licensed under conditions compatible with the license under which said material will be published, if indicated. If no license is indicated, the material will be subject to conditions compatible with the Creative Commons Zero (CC0) license.