TECHPARK SÜDTIROL / ALTO ADIGE

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Bolzano, 10.08.2023

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 the implementation of new web-components for the Open Data Hub. 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 (31.08.2023):
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

One of the most important Data Providers for the Open Data Hub is Autostrada del Brennero, which shares multiple valuable datasets related to the real-time conditions on the A22 highway.

In order to give 3rd parties the possibility to easily reuse this information, in particular in order to more efficiently reach certain target groups (e.g. tourists in their hotels), a new set of web-components based on some of these datasets will be implemented. More specifically the web-components to be **designed and implemented** are the following.

2.1 WEB-COMPONENT TRAVEL TIMES

A first web-component based on this data was already developed: https://webcomponents.opendatahub.com/webcomponent/noi-mobility-traffic?from=%2F

In this web-component travel times on the A22 highway are compared with those related to alternative roads.

The requested web-component should be a simple visualization of the travel times on the single stretches on the A22 highway, with a UX / UI similar to what reported in the following picture (taken from the Traffic Management Center of Autostrada del Brennero). The definition of the layers for the colours of the states (green, yellow, red) should be easily configurable, for each direction of travel – since they are based on the reference travel times in free flow conditions.

The web-component should be organized in two different modular components, one for the map and for the table view, which could be used also independently one from each other. The end-point for the travel times of A22 is https://mobility.api.opendatahub.com/v2/flat,edge/LinkStation

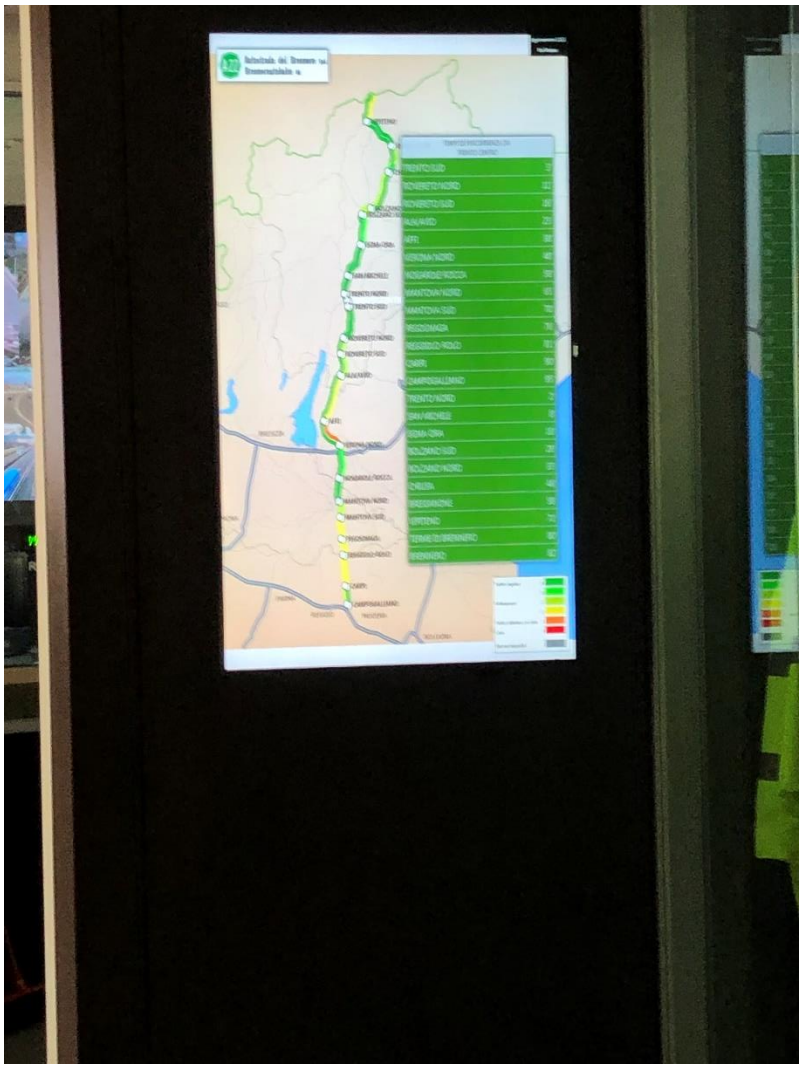


Figure 1: Reference visualization of travel times on the A22 highway.

2.2 WEB-COMPONENT AIR QUALITY

A second web-component aims to present the current real-time measured air quality conditions in correspondence of the A22 highway. In this case, a network of low-cost air quality sensors placed on the highway is going to be considered. It could be also possible to include the visualization of other reference air quality stations, in particular the one managed by the Environmental Agencies of the Provinces of Trento and Bolzano. The visualization should be very similar as for the web-component related to the travel times, with a map presenting the position in which air quality sensors are installed and a table view presenting the position / location of the measurement and the real-time air quality value. Colors have to be visualized according to reference thresholds that will be give and that can be easily configured in the software. The web component should be configurable so that it is possible based on the user selection to switch from one pollutant to another one (e.g. NO2, PM2.5, etc.).

This web component is intended to be used mainly for internal purposes. This means that an authentication layer needs to be taken into account and implemented. The expected user experience foresee to give grant for trusted users that have already access to this data through the API. For more details on the authentication / authorization architecture of the Open Data Hub, please refer to the page: https://opendatahub.readthedocs.io/en/latest/guidelines/authentication.html

2.3 WEB-COMPONENT EMISSIONS

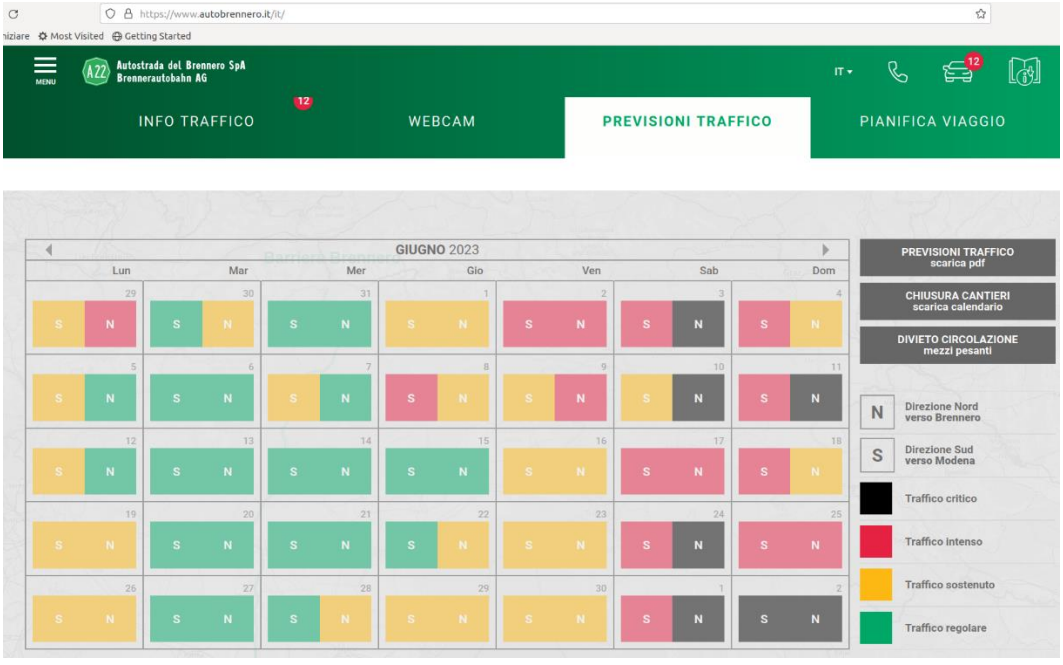
The Open Data Hub is enriched by external AI-as-a-service tools with enrich raw data made available by Data Providers. One example of such elaborations is the computation of the emissions produced by traffic, measured by fixed measurement systems. On certain traffic stations, that have shown to provide reliable and high-quality data, together with the classical traffic data (e.g. number of vehicles per category, associated speed, etc.) there is the possibility to get the emissions produced, with reference the most relevant greenhouse gas emissions and air pollutants. The emissions are computed at a point level and expressed in terms of [g/km]. To be representative of the basic stretch of the A22 highway (i.e. from a toll gate to the following one), they must be multiplied for the length of the stretch.

The visualization result should be at the end similar to the previous two web-components, with a visualization on map of the emissions placed on the reference stretch and a table view presenting the estimation of emissions produced. Again, the colors have to be set according to reference thresholds that can be easily configured in the software of the web-component.

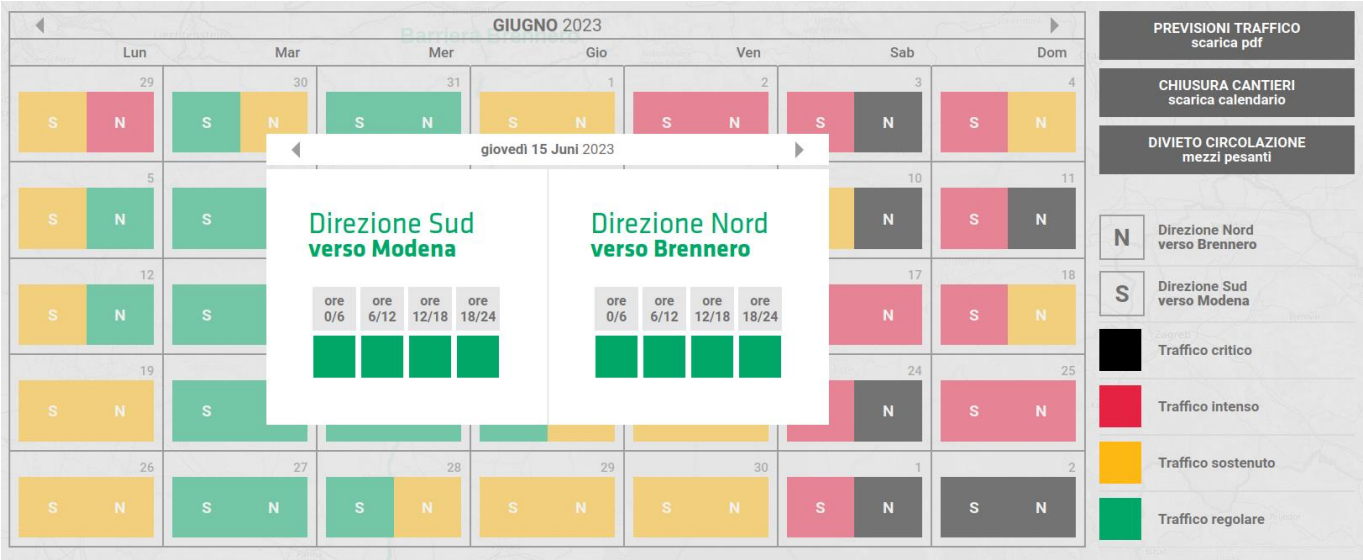
As for the air quality web—component, this application is intended for internal use and has to foresee an authentication step giving the possibility for only granted users to use it.

2.4 WEB-COMPONENT TRAVEL PREDICTIONS

The web-component travel predictions is going to present the predictions made by Autostrade del Brennero in relation to expected traffic volumes for the following days, as it is currently visualized on the web-site (https://www.autobrennero.it/it/).



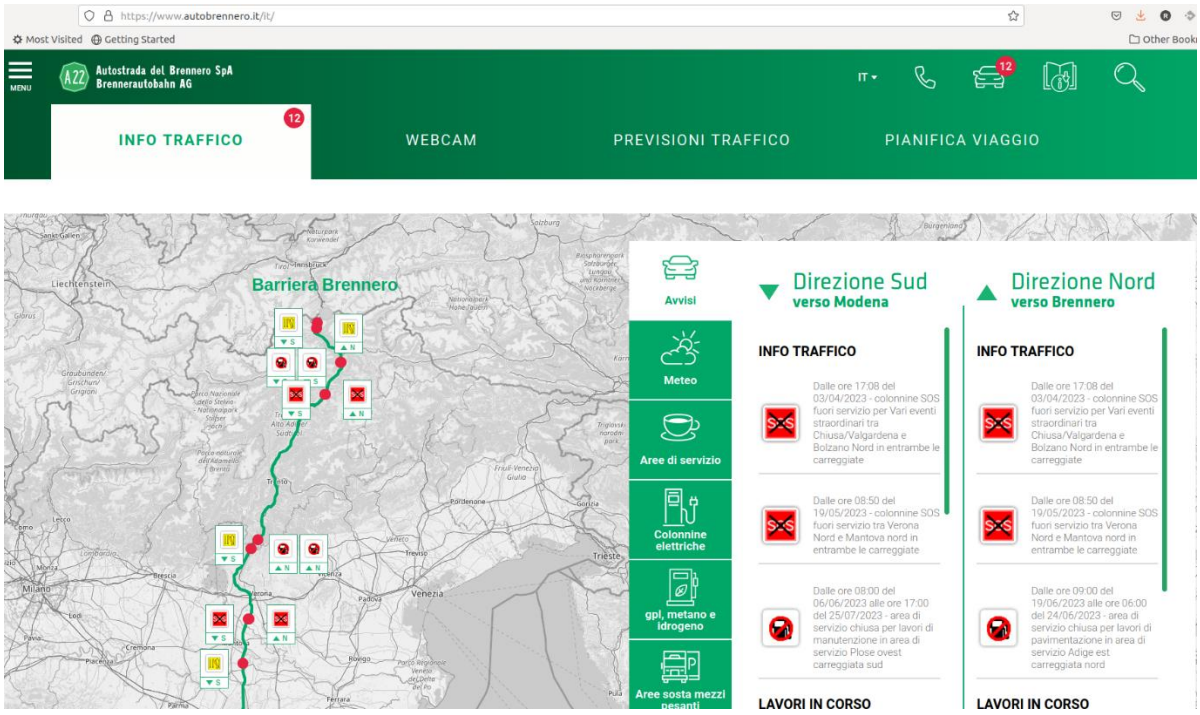
The predictions will be available on a level of resolution of 6 hours. This kind of detail can be seen by clicking on a single day. The current visualization considers the worst situation to characterize a certain day in the main view.



This data has not been integrated in the Open Data Hub but will be made available with a similar structure as for the other mobility datasets.

2.5 WEB-COMPONENT TRAFFIC EVENTS

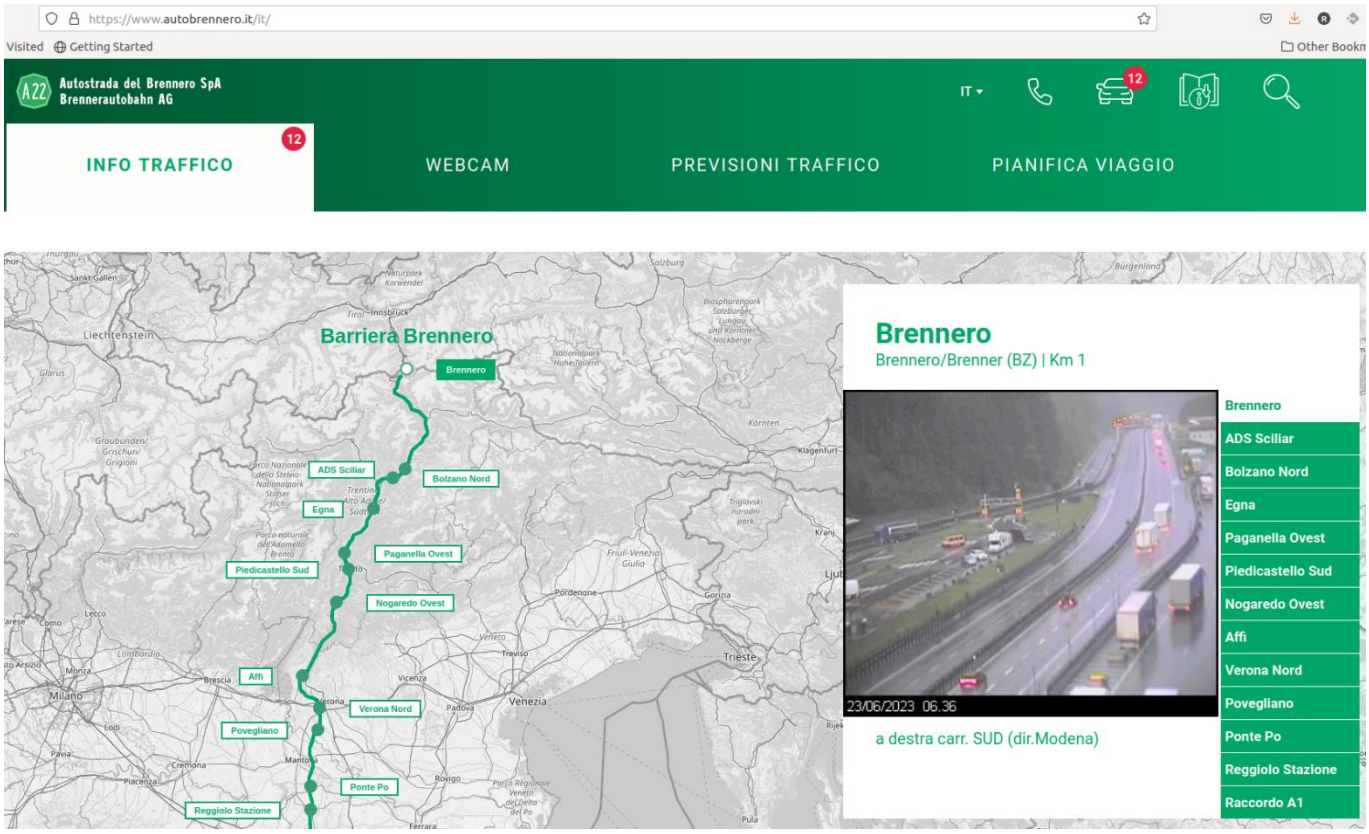
The web-component traffic events is going to present the real-time traffic events on the A22 highway, as it is currently visualized on the web-site (https://www.autobrennero.it/it/).



The events are provided according to different categories, e.g. traffic events and roadworks, and have to be presented as such on the web-component. This data has not been integrated in the Open Data Hub but will be made available through the existing end-point https://mobility.api.opendatahub.com/v2/flat,event/A22 (the access to the current datasets is restricted, needs an authorization mechanism for accessing this data – for a visualization of the data structure it is possible to check the end-point https://mobility.api.opendatahub.com/v2/flat,event/PROVINCE_BZ).

2.6 WEB-COMPONENT WEB-CAMS

The web-component web-cam is going to present the traffic situation recorded by a network of webcams on the A22 highway, as it is currently visualized on the web-site (https://www.autobrennero.it/it).



This data has not been integrated in the Open Data Hub yet. Since at present there are Data Providers that are sharing this kind of data with the Open Data Hub, the API structure that will be published by the Open Data Hub is still under definition. In any case, it is to be expected something simple, e.g. a JSON with the list of web-cams and their associated metadata, including a link from which it is possible to get the latest picture taken by the web-cam.

2.7 COMMON REQUIREMENTS AND SPECIFICATION

Following requirements have to be guaranteed:

- the web-components should be conceived to be used on screens, since this could be the first information channel;
- the web-components is able to refresh automatically every 5 minutes, so to display the real-time information without that the user needs to refresh the page.

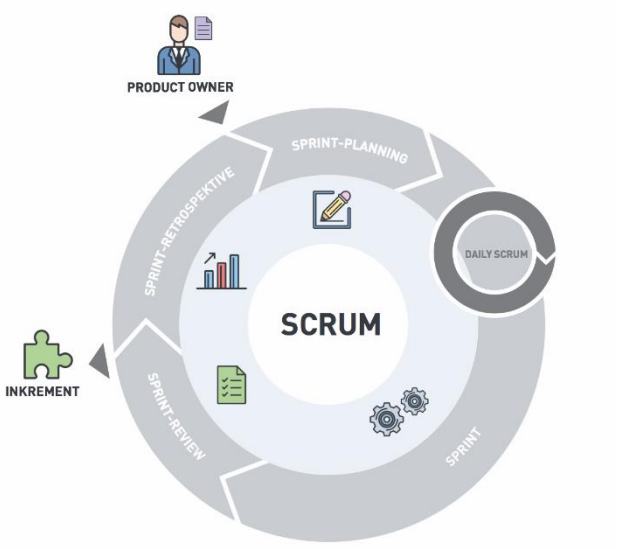
- the web-component should be available in multiple languages (IT / DE / EN). The fixed texts needed on the web-components, to be reduced as much as possible, are provided by NOI.
- the web-components are intended to be included in the Open Data Hub Web Components Store (https://webcomponents.opendatahub.com), so please follow the guidelines available on https://webcomponents.opendatahub.com/how-to for creating. The activities requested include the full support for properly preparing the web-components for such an integration, by respecting all technical specifications foreseen.

3. Technical constraints

In this section the constraints that the service provider must follow to work with NOI on this project are listed and described.

3.1 WORK METHODOLOGY

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 to test the new working versions of the software components. For the publication of the new versions a Continuous Integration (Jenkins) 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 into 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. This technologies are described in the technical documentation, available at the following link:

https://docs.opendatahub.bz.it/

3.2 REPOSITORY GIT

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 Github Actions 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. The repository of the Open Data Hub Data browser is:

https://github.com/noi-techpark/it.bz.opendatahub.databrowser

3.4.1 Documentation

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 must 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 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.

3.4.2 Licensing and Reuse compliance

In respect to the licensing and copyright information, the service provider must 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.

3.4.3 Pull request (PR)

As mentioned in the previous paragraphs 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://opendatahub.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 GitHub 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.

3.4.4 Commits

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").

3.4.5 Deployment

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).

3.4.6 Testing

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.

3.4.7 API development

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.

3.4.8 Access Control List (ACL) management

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.bz.it/en/latest/guidelines/authentication.html

3.4.9 Dockerization

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).

3.3 WORKING PLACE AND HOUR

3.5.1 Working Hours

The execution of the works that involve collaboration with the staff of NOI Techpark or other entities involved in the project must be carried out within a timeframe ranging from 9.00 to 12.00 and from 15.00 to 17.00. Depending on the needs, different times may be agreed via email between the service provider and the entities involved.

3.5.2 Working Place

The meetings that will be agreed during the project will take place, according to the needs of the project team, online or in the NOI Techpark offices:

- Via Alessandro Volta, 13, Bolzano.

Any expenses that the supplier will have to incur to reach these locations will not imply an additional cost for NOI Techpark. In any case, any travel costs that the supplier will have to incur to ensure the natural performance of the project activities (e.g., extraordinary coordination meetings, interventions that require presence on site, development activities to be carried out in agreement with the one or more entities / suppliers involved in the project, etc.) can't be billed to NOI Techpark.

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 some indications and concepts on how the design and implementation will be carried out. It is important to highlight also the experience with the design and implementation of web components, in particular in the smart mobility domain.
- **Economical quote**: should be provided in the form of a price for the entire activity. Design and implementation should be quoted separately. Each web-components has to be quoted separately, since it may happen that different suppliers will implement different web-components

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 (open-source.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.