

Bolzano/Bozen, 3rd August 2022

Market research – Open Data Hub – New inbound architecture testing

This market research aims to identify a partner that can support NOI S.p.A. in activities regarding the testing of the proof of concept of a new inbound architecture of the Open Data Hub.

NOI AG / S.p.A.

A.-Volta-Straße 13A
Via A. Volta, 13A
I-39100 Bozen / Bolzano
T +39 0471 066 600
info@noi.bz.it
PEC: noi@pec.noi.bz.it
www.noi.bz.it

Eintragung im Handelsregister
der Handelskammer Bozen
Steuernr. & MwSt.Nr.:
02595720216
Ges.kapital voll eingezahlt:
110.740.000 €

Numero d'iscrizione nel registro
delle imprese presso la Camera
di commercio di Bolzano
Codice fiscale e part.
IVA.: 02595720216
Capitale sociale interamente
versato: 172.740.000 €

Table of contents

Table of contents.....	2
1. Goal of the market research.....	3
1.1 Introduction.....	3
1.2 goal of the market research.....	4
2. Constraints.....	4
2.1 Economic exploitation.....	5
2.2 Invoicing.....	5
2.3 Work methodology.....	6
3.6 Working place and hour.....	6
3.6.1 Working Hours.....	6
3.6.2 Working Place.....	7
3. Request to the supplier.....	7
3.1 Services and activities.....	7
3.2 expected outputs.....	8
3.3 Competences.....	8
4. Documentation.....	8
5. Deadlines and contacts.....	8

1. Goal of the market research

This chapter aims to explain in more in detail the content included in the market research. The generic goal is the identification of one or more a partner that can support NOI S.p.A. in activities regarding the testing of the proof of concept of a new inbound architecture of the Open Data Hub.

1.1 INTRODUCTION

The Open Data Hub team has started the review and update of the actual Open Data Hub architecture. The goal of this activity is the definition of a new Open Data Architecture that:

- is able to receive data coming from other domains than mobility and tourism (e.g. agriculture);
- is able to receive data from large IoT platforms;
- stores all raw data as they are sent by the data provider in a separate database (Raw Data Table);
- is able to manage a large number of request and a large quantity of data;
- is easily scalable in case of need;
- ensures high performance in terms of number of requests (inbound and outbound);
- guarantees high reliability and resilience regarding network and application failures and traffic spikes.

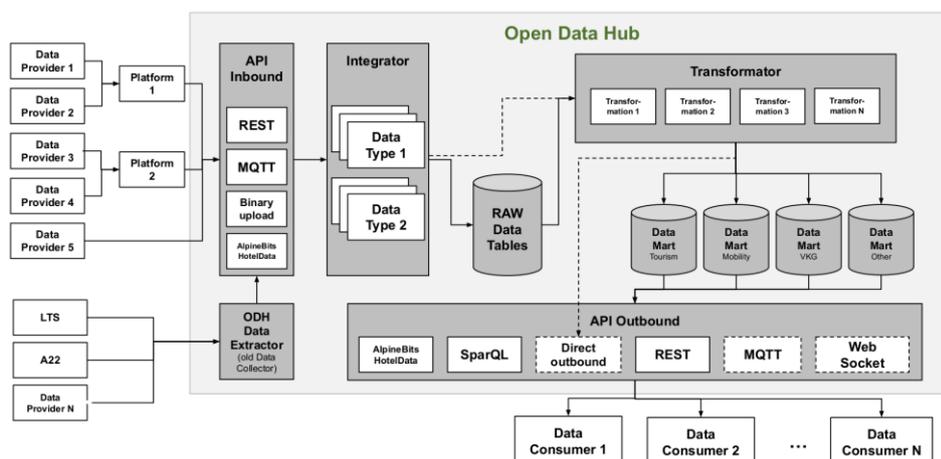


Figure 1: the new high-level architecture of the Open Data Hub.

Taking into consideration this aspects NOI S.p.A. defined a first draft of the high-level architecture that is reported in Figure 1. During the last months NOI S.p.A. defined and implemented a first Proof of Concept (PoC) of the inbound architecture, that includes all components that gets the data form the different Data Providers APIs and stores it in the Raw Data Table. The inbound architecture is described in Figure 2.

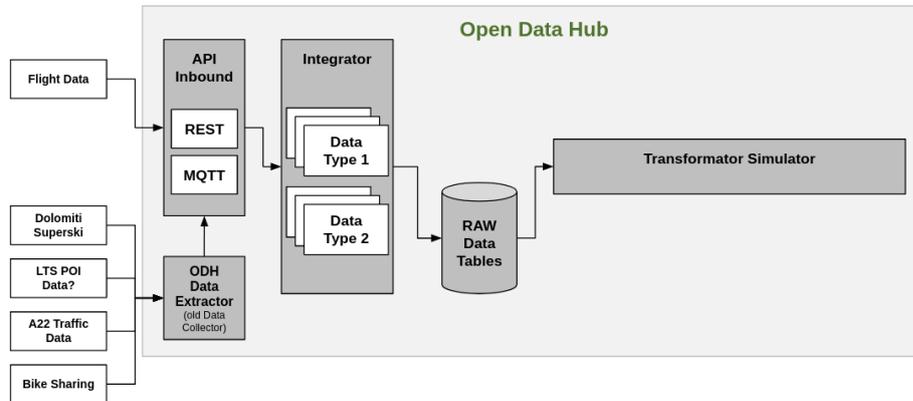


Figure 2: the new high-level architecture of the Open Data Hub.

More information about the technologies and the implementation of the new Open Data Hub Architecture Proof of Concept are available in the slides attached to the present document (ODH-InboundArchitectureDesign.pdf).

1.2 GOAL OF THE MARKET RESEARCH

As mentioned in the introduction of this chapter NOI S.p.A. aims to identify one or more partner to test the new inbound Open Data Hub Architecture proof of concept that has been implemented.

The goals of the test are:

- verify the reliability and the resilience of the new architecture;
- verify the scalability of the new architecture;
- identify possible critical components, single point of failure and aspects;
- Identify possible optimizations;
- define possible solutions and contra measures to be adopted in stress conditions;
- Identify the breaking point in terms of:
 - number of requests processed;
 - quantity of data exchanged;
- Verify that the Raw Data Table is able to manage the inbound and outbound traffic in terms of number of requests and traffic.

2. Constraints

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

2.1 ECONOMIC EXPLOITATION

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 licence (opensource.org/licenses) in a manner compatible with the scope of the "outbound" software licence, 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 licence, the terms of the GNU GPL v3 licence shall apply. The use of material belonging to third parties must be expressly declared at the time of the offer 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 licence under which said material will be published, if indicated. If no licence is indicated, the material will be subject to conditions compatible with the Creative Commons Zero (CC0) licence.

2.2 INVOICING

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 must 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).

2.3 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.

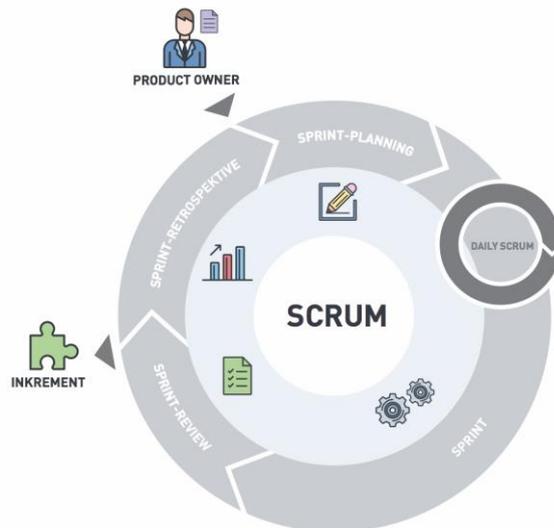


Figure 3: the SCRUM methodology.

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.

2.4 WORKING PLACE AND HOUR

2.4.1 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.

2.4.2 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.

3. Request to the supplier

3.1 SERVICES AND ACTIVITIES

The realization of the test includes also the following activities

- implementation of a monitoring to be used during the testing to monitor the consumption of the single application made available from Kubernetes (e.g. DataDog, Prometheus, ecc.);
- implement a solution that is able to collect the consumption data of the systems managed by AWS (e.g. Amazon SNS and Amazon IoT) that are integrated in the PoC;
- the stress test should be made on all inbound endpoints (REST and MQTT) by sending an incremental quantity of data;
- the stress test should be made also on the Raw Data Table by simulating an incremental quantity of requests incoming from the Transformator;
- the stress test should simulate in an incremental manner the worst scenario possible in terms of traffic and number of request that the Raw Data Table and the entire system in general must manage;
- during the testing the service provider must collect at least the following data:
 - data latency of the response;
 - CPU, RAM and memory consumption of each application;
 - Performance of the consumption of the Amazon SNS queues and eventual number of messages stored in the single queues;
- configuration and check of the horizontal autoscaling of Kubernetes, of the deployments and StatefulSets managed by Kubernetes itself;
- cost estimation of the architecture considering the scaling needs emerged during the testing phase.

3.2 EXPECTED OUTPUTS

The service provider must provide the following outputs:

- monitoring system including source code and documentation;
- a report that includes:
 - results of all the tests;
 - list of the critical aspects identified;
 - list and description of possible improvements and optimizations
 - all outputs of the activities mentioned above;
- a report that describes the methodology technologies and procedures used to test the infrastructure in order to allow NOI S.p.A. , in case of need, to autonomously repeat the tests;
- the documentation, the source code and the software used to test the infrastructure in order to allow NOI S.p.A. , in case of need, to autonomously repeat the tests.

3.3 COMPETENCES

Considering the activities included in this market research, the service provider who wants to send an estimation should provide a list of references. For these types of activities:

- performance and stress testing;
- implementation of monitoring systems.

4. Documentation

To participate in this market research, we kindly ask you to provide the following documentation:

- the company description that also includes the list of references for similar projects;
- the description of the team assigned to the project that includes:
 - profile description or CV of the people involved in the project;
 - hourly rate of each profile involved in the project;
- the cost estimation of every activity described in the paragraph 3.1;
- the total cost for the realization of the described services.

5. Deadlines and contacts

All activities included in the present market research should be concluded by the **28th of October 2022**. In case that a service provider can't fulfil the deadline is can present an offer by including a feasible deadline.

The service providers who are interested in participating in this market research will have to present their estimation by the **3rd of September 2022**.

In case of any question please contact:

Stefano Seppi

Email: s.seppi@noi.bz.it

Tel.: 0471-066674