

# Cos4Cloud

Co-designing Citizen Observatories Services  
for the European Open Science Cloud



This project has received funding from  
the European Union's Horizon 2020  
research and innovation programme  
under grant agreement No 863463

## Towards an Interdisciplinary Citizen Science Interoperable Service in EOSC

### EGI Conference 2022

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# Issue: Citizen Science data is split across APIs

- **Citizen Science** data is being split **across** very many different portals, each portal operated by a small community with **different APIs**. Fetching the data programmatically is **time intensive and error prone**.
- **Several efforts** are done to **integrate** these **disparate data structures** into useful open datasets. An example in biodiversity is the Global Biodiversity Information Facility (**GBIF**) dataset that aggregates many data sources.
- **Still**, most of these aggregated resources are served by **specific thematic APIs**. This makes **re-use** of the data a **real challenge**, in particular when it comes to interdisciplinary knowledge building where **merging data from different themes** is required.

# Cos4Cloud\*: STApplus

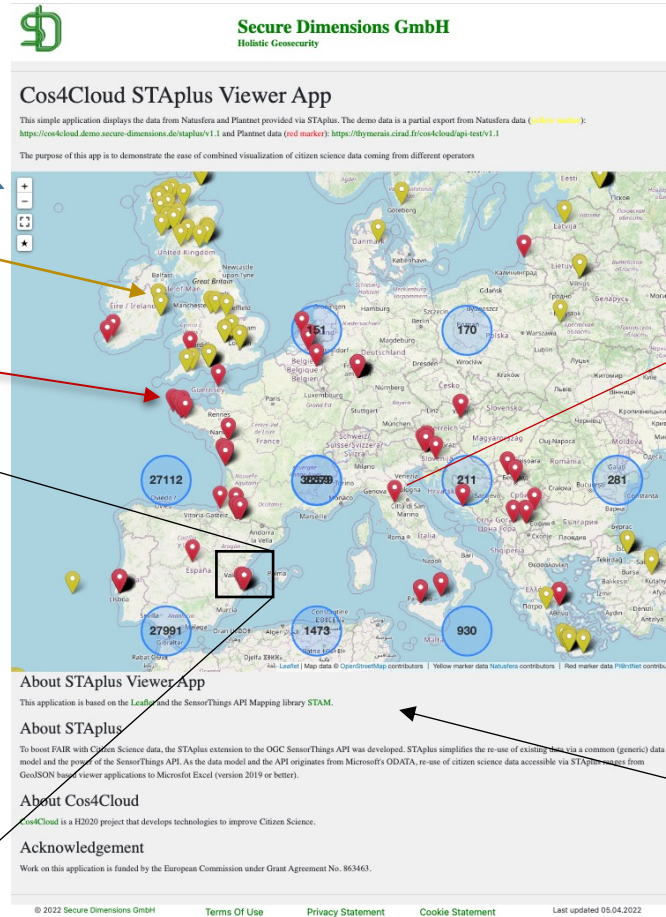
- In **Cos4Cloud** we have developed a novel solution based on the Internet of Things. Our approach – called **STApplus** – defines an **extension** to the existing Open Geospatial Consortium **standard SensorThings API**.
- STApplus\*\* aims to enforce the **FAIR's** aspects of **Interoperability and Reusability**. To add the necessary elements for considering the **citizens and their recognition**, we propose a **generic data model** that supports additional **business logic**.
- Because **STApplus** is **backwards compatible** with **OGC SensorThings API**, it can be **applied to already existing deployments** and thereby has a wide uptake potential.

\*: <https://cos4cloud-eosc.eu> is receiving funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 863463

\*\* : STApplus will become available as OGC Best Practices shortly (<https://docs.ogc.org/bp/21-068/21-068.html>)

# Web-Application for viewing Citizen Science across different providers using STApplus

- Leaflet based map view
- Natusfera data
- Pl@ntNet data



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### Cos4Cloud STApplus Viewer App

This simple application displays the data from Natusfera and Pl@ntnet provided via STApplus. The demo data is a partial export from Natusfera data (yellow markers) and Pl@ntnet data (red marker). <https://cos4cloud.demo.secure-dimensions.de/stapplus/v1.1> and Pl@ntnet data (red marker): <https://mymerais.cirad.fr/cos4cloud/api-test/v1.1>

The purpose of this app is to demonstrate the ease of combined visualization of citizen science data coming from different operators

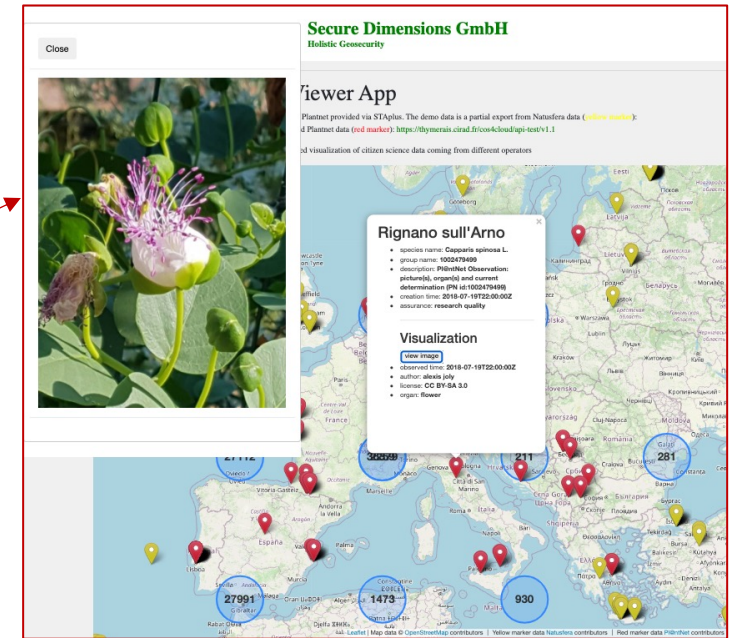
**About STApplus Viewer App**  
This application is based on the Leaflet and the SensorThings API Mapping library STAM.

**About STApplus**  
To boost FAIR with Citizen Science data, the STApplus extension to the OGC SensorThings API was developed. STApplus simplifies the re-use of existing data via a common (generic) data model and the power of the SensorThings API as the data model and the API originates from Microsoft's ODATA, re-use of citizen science data accessible via STApplus comes from GeoJSON based viewer applications to Microsoft Excel (version 2019 or better).

**About Cos4Cloud**  
Cos4Cloud is a H2020 project that develops technologies to improve Citizen Science.

**Acknowledgement**  
Work on this application is funded by the European Commission under Grant Agreement No. 863463.

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### Viewer App

Pl@ntnet provided via STApplus. The demo data is a partial export from Natusfera data (yellow markers) and Pl@ntnet data (red marker): <https://mymerais.cirad.fr/cos4cloud/api-test/v1.1>

Visualization of citizen science data coming from different operators

**Rignano sull'Arno**

- species name: *Capparis spinosa* L.
- group name: 900279498
- description: Pl@ntNet Observation
- identifier: organismal and current
- determination (PIN): 16100347498
- creation time: 2018-07-19T22:00:00Z
- assurance: research quality

**Visualization**

- view image
- observed time: 2018-07-19T22:00:00Z
- author: alexis joly
- license: CC BY-SA 3.0
- organ: flower

EGI Infrastructure was used during validation and performance testing

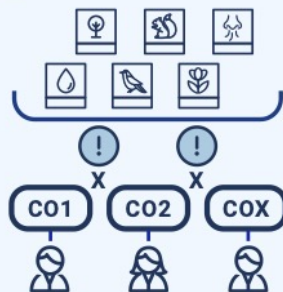
# Interdisciplinary requires Interoperability

## STApplus Why should you use it?

STApplus aims to standardise citizen science data and make it accessible, interoperable and reusable among different citizen observatories (COs) and services. In particular, STApplus is an extended data model for the Sensor Things API\*.

### 01 THERE IS A HUGE AMOUNT OF CITIZEN SCIENCE DATA STORED IN THE CLOUD

The problem is that it is usually extremely difficult to exchange data among different citizen science platforms - known as citizen observatories (COs) - or to reuse their data, as they don't speak a 'common language'.

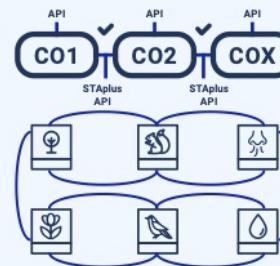


### 02 STApplus STANDARDISES THE DATA STRUCTURE

To tackle this 'communication problem', STApplus has extended the Sensor Things API's data structure to make it applicable for citizen science. In particular, it has added these aspects: ownership of the observations, citizen science project or campaign, relation of the observations-author-project and observation.



### 03 COs USING STApplus ARE ABLE TO EXCHANGE AND REUSE ITS DATA

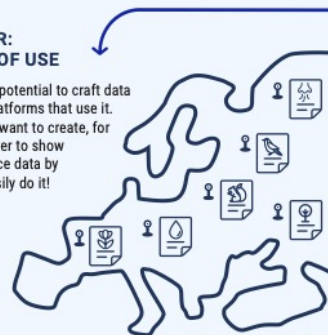


### 04 TO USE IT, YOU ONLY HAVE TO ADAPT YOUR DATA TO THE STApplus DATA STRUCTURE

Even if you already have an API, you can add STApplus API and have both.

### 05 A MAP VIEWER: AN EXAMPLE OF USE

STApplus has a great potential to craft data requests from the platforms that use it. API. This way, if you want to create, for example, a map viewer to show certain citizen science data by location, you can easily do it!



### STApplus: SCENARIOS IN Cos4Cloud

Natusfera & Pl@ntNet, two of the biodiversity citizen observatories participating in Cos4Cloud, are already using this API.

# STApplus Future Work

- STApplus follow-up in Horizon Europe project CitiObs
  - HORIZON-CL6-2022-GOVERNANCE
  - CitiObs starts January '23
  - Evaluate with other Citizen Science data (not only biodiversity)
    - Air quality
    - Water quality
- Standardization
  - STApplus as OGC standard (SensorThings extension)
- Enhance and Improve
  - Support for import of common data formats like CSV
  - Scalability
- EOSC
  - Register STApplus service in EOSC



Thank you very much  
Muchas Gracias  
Vielen Dank

Please contact us for more information

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