# **Podcast of the report "How to use OGC APIs to enhance geospatial data interoperability".**

In this podcast we will focus on **promoting geospatial data interoperability**. Geospatial data is data that correlates to a specific geographic location, i.e. it corresponds to a specific place. This data may include information such as addresses, age, state, postcode, as well as GPS coordinates or satellite images.

The use of geospatial open data has **great potential**, as it allows **location-based patterns and relationships to be analysed**. This is useful in fields such as epidemiology - to track disease outbreaks -, agriculture - to optimise land use - or logistics - to find the best location for warehouses. But in order to be able to use these geospatial data from different sources, they need to be interoperable.

To further explore this issue, the interoperability of geospatial data, we have with us:

* **Maite Toscano**, Senior Consultant in technologies linked to the data economy and author of the report "How to use OGC APIs to enhance the interoperability of geospatial data" available at datos.gob.es.

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## **Summary of the interview**

## Why is interoperability important?

**Maite Toscano:** Interoperability is a very important concept because it **enables different systems and applications to communicate with each other**, i.e. to exchange data and use information effectively. This in itself is very important in all systems, but when we talk about spatial data or spatially located data, it is even more important because it allows us to exchange information from different agencies, to work with them together and to make decisions based on that data.

## What is the difference between interoperability and standards and what is the relationship?

**Maite Toscano:** Interoperability is the ability of systems to work together, to share data. However, **standards are those sets of rules, those guidelines, those guidelines or features** that ensure that products, services and data are secure, are reliable and work consistently. In other words, in the end, what standards facilitate is interoperability by providing a common framework for interoperable communication and data exchange.

## And this is exactly where [Open Geospatial Consortium](https://www.ogc.org/es/), known by the acronym OGC, comes in. It is an international non-profit organisation dedicated to developing and promoting open standards for geospatial data and services. What else can you tell us about your work?

**Maite Toscano:** As you say, it is an international organisation, with people all over the world. En realidad, el OGC, no es en sí un organismo, sino una unión de más de **500 organismos, universidades, empresas, etc. que se unen para crear esos estándares**, para promover que los datos, cumplan los [**principios FAIR**](https://datos.gob.es/es/blog/principios-fair-el-secreto-de-los-magos-de-los-datos). That is, they must be easy to locate, accessible, interoperable and reusable.

Therefore, since 1994, the OGC has joined forces for the entire geospatial sector, through **different tools**. In this way, they build **community and guidelines** to make data more interoperable. These include, for example, the **working groups** that create new formats and standards to ensure interoperability.

There are more examples, such as the **innovation programmes**, which are programmes both in Europe and in the United States, that connect us with the **latest spatial trends,** so that this knowledge is passed on to the working groups and we manage to standardise and standardise the latest spatial trends.

## One such tool is the OGC APIs, how do they work? What are their advantages and what do they bring?

**Maite Toscano:** OGC APIs may seem like a new concept, but they are not, because in the end they are the **new version** of standards already known by the geospatial sector, such as **WMS and WFS**. The OGC APIs are a new version of these standards, which bring new and very important advantages requested by the space sector. For example, **are based on the REST API, follow the Open API specifications, allow output in JSON or HTML and are also self-documenting**, i.e. they have a self-documenting API that is fully compatible with the latest versions of websites. In conclusion, they are a new standard that has evolved from the one we already knew and that allows us to **integrate better with other sectors** that have already been using this REST API for years.

## There are different types of OGC APIs, each with a different purpose. Could you briefly summarise what they are and what their uses are?

**Maite Toscano:** They all have a **Common API**, which provides the entry for the web page documenting the API and is the starting point of the API. Each of them also has certain characteristics depending on the data or the purpose of the API. For example, there are the **API Features** that allow us to exchange and access **vector data**. It is like the evolution of the WFS. We also have the **Coverage API**, which provides **satellite imagery**, or the **Tiles** which allow us to access and **exchange map tiles** -it's very similar to the ones we already had before-, but we also have the **Joins**, which allows us to **link two different data sources**s or, for example, what for me is one of the most powerful, the **Processes**, which are the ones that allow **spatial geoprocessing**, being able to make large workflows with the information.

These are the most prominent, but there are many more and more APIs will be created to complement all spatial information needs.

## And how are these APIs implemented? Are there any tools that can help us implement them?

**Maite Toscano:** Currently, the most important map services available are **GeoServer and pygeoapi**. GeoServer is a long-established open source platform for sharing geospatial information. It does not support all OGC standards, but it does support the main ones such as Features, the common API or the one that shares map images. Whereas pygeoapi is a new Python implementation that does address all OGC APIs and allows for more flexibility and easier integration of these APIs.

## And what does the choice between GeoServer and pygeoapi depend on?

**Maite Toscano:** The choice between these *open* and free software depends on the needs of the project. **GeoServer** is ideal for long-time users who have published their **data on this server**. It also allows a **very intuitive graphical interface** for **rapid publishing**. Sin embargo, GeoServer **no implementa todas las OGC API** y si quieres una implementación un poco más personalizada puedesutilizar **pygeoapi, que** ofrece una alternativa bastante más **ligera y configurable** basada en **Python**. But both servers implement part of the standard without any problems.

## Another tool that is also important for working with the OGC APIs is QGIS.

**Maite Toscano:** **QGIs** is a GIS *desktop* that allows us to consume this information from the OGC API. In the end, what we need is to work with the APIs, visualise them, perform spatial analysis, and so on. Therefore, we need to work in a GIS with this information and for that, there are different **desktop GIS** and one of the most powerful and **free software** that exists is QGIS. QGIS will connect to those APIs and we will be able to work with that information, allowing decision making based on the data from those APIs.

## Another interoperability-related concept that the OGC is working on is the *Building Block*concept. What is a *Building Blocks*?

**Maite Toscano:** *Building block* is a very innovative concept and one that I believe is here to stay in all standardisation and normalisation processes. A Bu*building Block* is nothing more than a **Lego piece**. It is like the minimal piece that we can combine with other pieces to create shapes or toys, just like when we were children. In this case, we create standards from those pieces or *blocks*. They are reusable and easy to design.

For example, a piece could be that common part that we have defined that all APIs have, the Common API, and then pieces are going to be put together depending on the type of data, which are adapted to the common one to create a new standard. For example, a part may be that of the reference system. All APIs are going to have a reference system, or they are going to be able to choose between different reference systems, and instead of introducing it within each of the standards, it is taken out as one piece so that it can then be combined with all the other standards. That way we isolate and make a module with each of these needs.

## What are the benefits of *Building Blocks*?

**Maite Toscano:** As I mentioned before, the main advantage is **modularity**, i.e. they allow new parts to be added and new standards to be created from the combination of these parts. But **re-use**is also important. Es decir, yo una pieza la puedo reutilizar en distintos estándares sin ningún problema, permitiendo esa **integración y** esa **compatibilidad**.

Also a very innovative point of the *blocks* is that they allow **collaboration**. In other words, each

of people or companies that are working with the OGC can develop their own *Building Block*, their own Lego piece and share it with the community. And, furthermore, if there is a problem with any of the developments in that part, it does not affect the entire standard, but rather the error can be solved or the implementation can be improved only in that module, without affecting all the others. Therefore, the **management of standards** is much easier because it is done piece by piece.

Para aquellos que quieran profundizar en la materia, puedes leer el informe completo [Cómo utilizar las OGC API para potenciar la interoperabilidad de los datos geoespaciales](https://datos.gob.es/sites/default/files/doc/file/informe-ogc_apis-accesibilidad_1.pdf).