



# Decentralized architecture with Linked Data and JSON-LD

## From a document-based Web to a Web of meaningful interlinked data

When we retrieve some data from the Web, we are unlikely to have accessed all the relevant information about that resource. Additional data or content may be available from both the original source, as well as other third-party sources on the Web. The Semantic Web, through Linked Data initiative, links together resources on the Web and allows applications to find more information by repeatedly following links to discover those additional sources.

**ONE Record standard is built on the principles of Linked Data and aims at creating a digital ecosystem for the supply chain in which data is exchanged efficiently and transparently.**

### Overview of JSON

[JSON](#) (JavaScript Object Notation) is an open standard and lightweight file format for storing and transporting data that is easy for machines to parse and generate.

JSON is defined as a collection of name/value pairs, as in the example below:

```
{
  "firstName": "Jane",
  "lastName": "Doe",
  "contact": {
    "emailAddress": "email@example.com",
    "phoneNumber": "4123456476553"
  },
  "jobTitle": "Developer"
}
```

Example 1

Considering that the JSON format is text only, it can conveniently be sent to and from a server and used as a data format by all the programming languages.

### Introduction to Linked Data

Linked Data is a way to structure and exchange information by using links and it allows creating a network of machine-readable data across the Web. It enables an application to start at one piece of Linked Data and follow embedded links to other pieces of Linked Data that are hosted on different servers across the Web (called "[Follow-Your-Nose effect](#)").

As presented in a previous [ONE Record Tech Insight](#), the principles of Linked Data are:

1. Use URIs as names for things;
2. Use HTTP URIs so that people can look up those names;
3. When someone looks up a URI, provide useful information through RDF links;
4. Include links to other URIs, so that they can discover more things.

Linked Data enables a decentralized architecture as it is built on URIs that lead directly to the source of the data, even if the data is found on a different server. Consequently, as the data is decentralized, it usually remains at source, which means that it is copied less, and the cost of hosting it is reduced.



## JSON + Linked Data = JSON-LD

[JSON-LD](#) (JSON for Linked Data) is a method of encoding Linked Data using JSON. It is easy for humans to read and write it and it is compatible with various programming environments, REST Web services, and unstructured databases. JSON-LD it was built in such a way that it requires minimum effort from developers to transform their existing JSON.

JSON by itself is often meaningless outside its creator's context. Its meaning can be only interpreted from documentation or technical specifications shared by its creator. JSON-LD encodes contextualized meaning to JSON, by adding a vocabulary to define its attributes and allowing search engines and applications to directly understand what a particular entity is about.

You can find a simple example of JSON-LD below:

```
{
  "@context": "https://onerecord.iata.org",
  "@id": "https://somewebsite/janeDoe",
  "@type": "Person",
  "firstName": "Jane",
  "lastName": "Doe",
  "contact": {
    "@id": "https://somewebsite/janeDoe/contact",
    "@type": "Contact",
    "emailAddress": "email@example.com",
    "phoneNumber": "4123456476553"
  },
  "jobTitle": "Developer"
}
```

Example 2

The differences between Example 1 and Example 2 are in the following elements:

- **@context** element, which means: "Hey Browser, the vocabulary I am referencing can be found at [onerecord.iata.org](https://onerecord.iata.org)";
- **@id** element, which identifies the node at which the data about Jane Doe can be found. This means "Hey Browser, the information about Jane Doe can be found at [somewebsite/janeDoe](https://somewebsite/janeDoe)";
- **@type** element, which means "Hey Browser, I am using the **Person** type, which can be found at [onerecord.iata.org/Person](https://onerecord.iata.org/Person)". When typing this sort of URL in the browser, the full documentation and technical specifications of the **Person** type should be returned.

## ONE Record and Linked Data

ONE Record standard is built on the principles of Linked Data and its API specifications fully support JSON-LD. You can find the latest ONE Record ontology on [Github](#) and some ONE Record compliant JSON-LD files [here](#).

## Conclusion

The main takeaway of using Linked Data and JSON-LD is that structuring your data makes it easier for other applications and search engines to discover and understand it.

ONE Record promises a new digital era for logistics and transport supply chain, and Linked Data is one of its key enablers as the industry will fully benefit by the efficiency and transparency it provides in sharing data.

More info at <https://www.iata.org/one-record/>.