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Often considered too technical and hard to implement, Linked Open Data is actually not something outside business and free exchange as usual. It is connectivity but on a data level.

Global connectivity transformed the way we live and work with one single, yet profound, step – it facilitated information sharing, exchange and retrieval. With the advent of the World Wide Web, myriads of interlinked content revolutionized our knowledge discovery journey. Hyperlink by hyperlink, today we travel across and explore "a large universe of documents", searching for facts, comparing views, finding insights in ways that 27 years ago were not imaginable.

But what about the universe of data unfolding with the speed of light before our eyes? Would data on the Web ever be freely navigated, used and shared the way documents are?

Is it possible that data publishers and consumers transform the Web into a medium for data exchange?

It is. And in a powerful way. Through Open Data.

Opening up for Change: Open Data

Open data makes the world an amazing place, buzzing with opportunities for innovation and growth. Freely available for anyone to access, use and re-use, these data bring immense transformation to the table: from better-informed people, through more transparent governments to safer and highly-efficient living environments. With the increasing number of big companies, governments and nonprofit organizations publishing datasets openly, the volumes of data available online are soaring.

There are thousands of open datasets available: DBPedia, Geonames, Government Open Data Sources (Data.gov, European Data Portal), Open Data from global organizations (The WHO, UNESCO), corporate datasets (Open Data Institute, OpenOil), etc.

The billions of facts they contain can be used as a source for countless creative business opportunities, based on the relationships these facts exist in.

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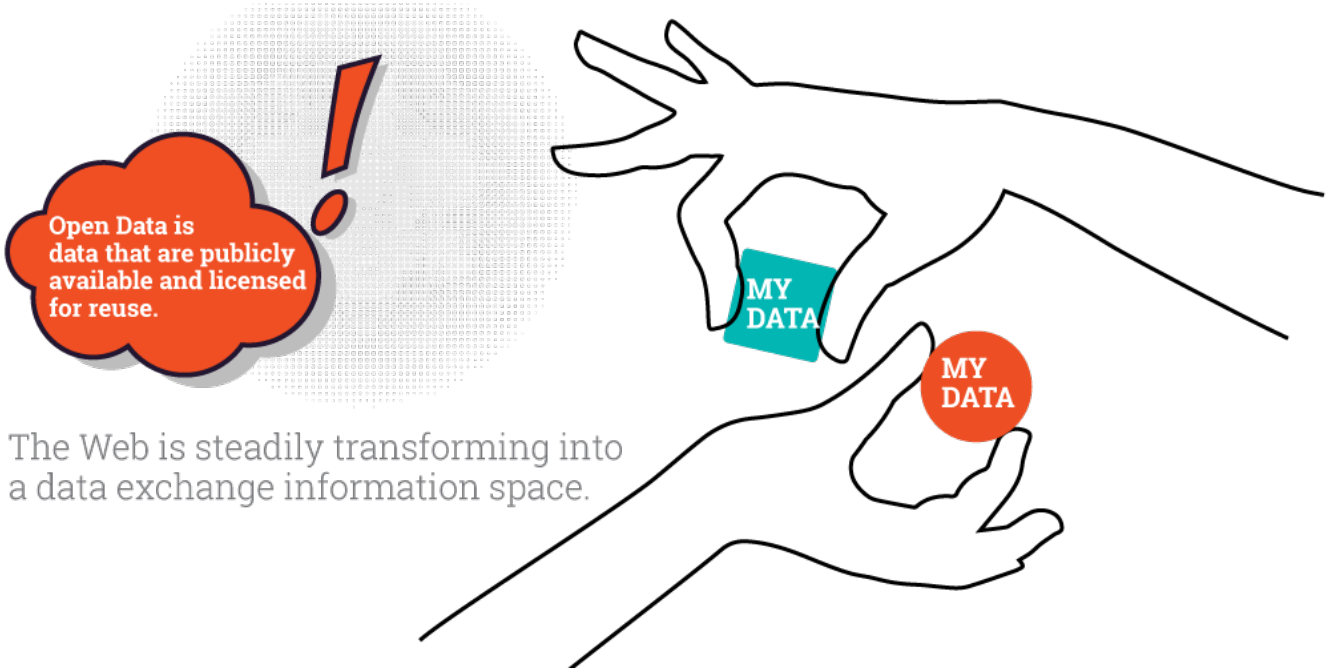

The Web is steadily transforming into a data exchange information space.

> The growth in online sharing of open data by governments across the world [OKFN-INDEX] [ODB], the increasing online publication of research data encouraged by organizations like the Research Data Alliance [RDA], the harvesting, analysis and online publishing of social media data, crowd-sourcing of information, the increasing presence on the Web of important cultural heritage collections such as at the Bibliothèque nationale de France [BNF] and the sustained growth in the Linked Open Data Cloud [LODC], provide some examples of this growth in the use of Web for publishing data.
>
> Cit.Data on the Web Best Practices

The openness of data impacts every aspect of our lives, fostering the creation of brand new products and services. Open data also enable innovative tools and applications, to mention just a few:

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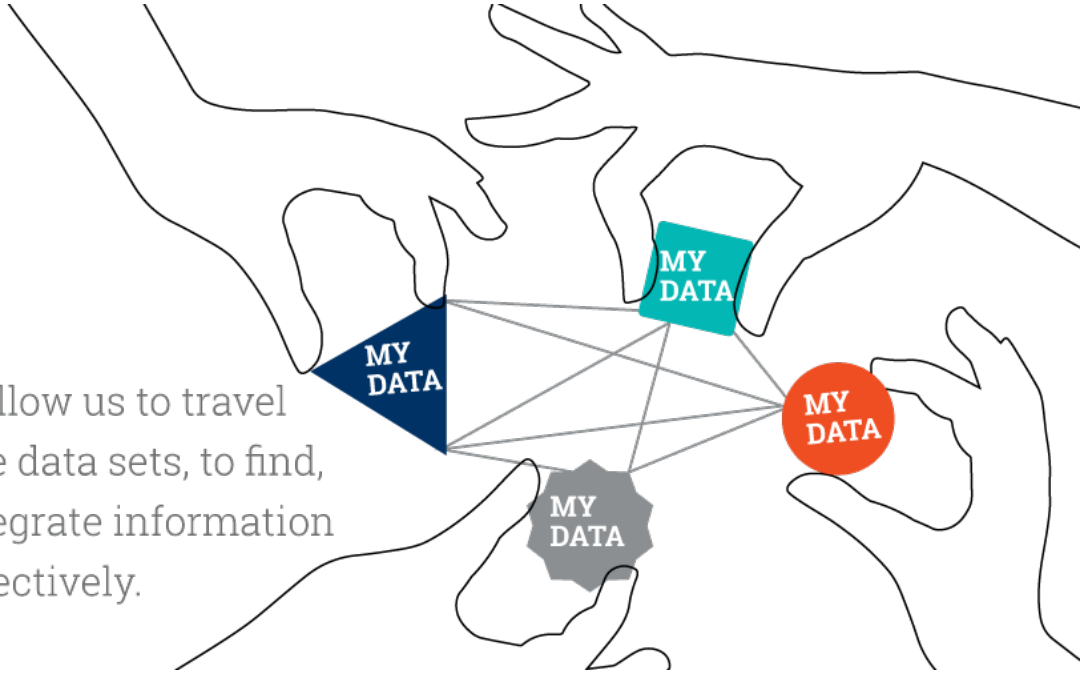
- Notifyre – an application for real-time fire alerts;
- NextBus – an application helping people with information about their bus;
- Archimedes – a tool providing quantitative models for doctors and patients to search and analyze effective interventions;
- Shoothill – a tool that shows rivers at risk of flooding.

More and more industries are using Open Data to open up to the potential of public freely shared information. The use of Open Data in Sports Journalism is an example of how Semantic Technology has turned into a magnifying glass for seeing deep connections.

Now that Open Data activities and initiatives have gone mainstream (ref. Open Data Barometer), they slowly but steadily disrupt the data management and sharing status quo by bringing more connectivity, transparency, and accountability and thus transforming markets, economies, democracies. And just when it seems that things can't get more disruptive, Linked Open Data comes into play.



Linked Data allow us to travel across diverse data sets, to find, share and integrate information easily and effectively.

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Linked Data as an Infrastructure for Open Data, Who Could Ask for Anything More?

Open Data is powerful but it can become even more powerful if the lack of connectivity and consistent approach to managing these data didn't bury their enormous potential. As Steven Adler, currently a co-chair of the W3C Data on the Web Best Practices Working Group, puts it:

> Open Data is spreading across the globe and transforming the way data is collected, published, and used. But all of this is happening without well-documented standards, leading to data published with inconsistent metadata, lacking official documentation of approval processes, corroboration of sources, and with conflicting terms of use.
>
> Cit. Open Data Standards

Briefly, what hinders data interconnectedness and their free exchange at Web scale are:

- Lack of "open" culture for sharing;
- Proprietary formats;
- Machine-unreadable formats;
- Walled-off data.

What can transform the exchange between Open Data publishers and consumers are Open Data standards and in the best scenario – data being published on the Web using Linked Open Data standards.

Applying Linked Data principles to Open Data can help solve complex problems, analyze patterns, make data driven in a cost-efficient way.

Linked Data, as the term suggests, is about creating links between data. W3C open standards like RDF (a generic data model to describe things) and URI (a generic way to identify things) are the building blocks of Linked Data principles and make connections between data explicit, with meaning that computers can process.

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Linked Data technologies are unique for they allow us (via our software agents) to travel across diverse data sets, to find, share and integrate information easily and effectively. Share on X

When the Linked Data paradigm is put in a Web context and meets the Open Data paradigm, the opportunities for data use, reuse and exchange become endless.

Openness Times Interconnectedness: Linked Open Data

Linked Open Data (LOD) is about Linked Data principles applied to publishing freely available data on the Web. The LOD cloud diagram shows the datasets that have been published in Linked Data format since 2007 when enterprises and the government started adopting the Linked Data principles.

The publicly available data collections that adhere to the Linked Data principles are nearly 600. Among the most richly interconnected are DBpedia (the data version of Wikipedia), GeoNames (a dataset with more than 7,500,000 geographical features worldwide) and LOV (a

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set of vocabularies describing Linked Data).

Not All Data Are Created Open, Neither Are All Linked

Although the more data are put on the Web, the richer an information space it would be, not all data have to be open. There are commercial, private and sensitive data that should be protected and exchanged in environments with limited access. Also, as good as the value proposition of Linked Open Data is, not all the Open Data across the Web will be linked. But when (and if) it is, it will be the 5-star data that will transform the Web and the way we navigate data.

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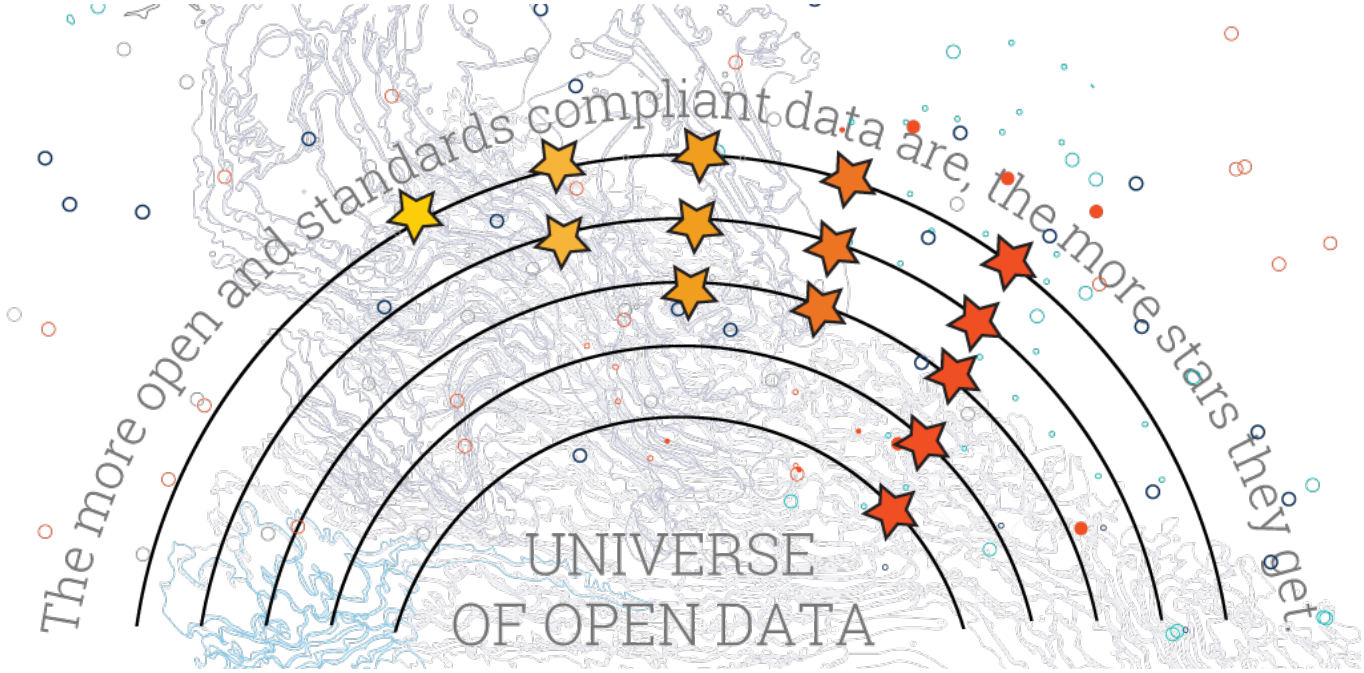

Starry Open Data

The road to useful open data is paved with stars, each of them representing the level of openness and usability of data.

In 2010, Sir Tim Berners-Lee developed a 5-star rating system for publishing data on the Web. The more open and standards compliant data are, the more stars they get. The inventor of the World Wide Web created this rating to encourage data providers to take the first step towards opening their data and, ultimately, publishing their data according to the Linked Data principles.

The Linked Open Data stars system reads:

★ Available on the web (in whatever format) but with an open license, to be Open Data.

★★ Available as machine-readable structured data (e.g., Excel instead of an image of a table).

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★★★ Same as ★★ plus non-proprietary formats (e.g., CSV instead of Excel).

★★★★ All of the above plus using open standards from W3C (RDF and SPARQL) to identify things so that people can point at your stuff.

★★★★★ All of the above plus links to other people's data to provide context.

The Web Is About Linking Data

Cit. Jim Handler, Wither OWL

The social, economic and cultural implications of freely available data are immense. They grow even bigger when Open Data becomes 5-star Open Data (Linked Open Data). Businesses are increasingly becoming aware of this effective combination and have started to represent their data in a uniform, standard and compliant way.

In this way, enterprises not only enrich and interlink their own datasets of different topical domains but also contribute to an ever-growing (in quality and quantity) Open Data ecosystem. Tasked with the developing a working business integration strategy in a hyperconnected world, enterprises would benefit immensely from getting their data right, that is making the digital representation of their business records speak a universal language.

Linked Open Data standards are such a universal language.

Making information easy to integrate and bracing it with interoperability, Open Data published according to the Linked Data principles are a powerful tool for revolutionizing the way business is done. Share on X

Often considered too technical and hard to implement, LOD is actually not something outside business and free exchange as usual. It is connectivity but on a data level.

Connectivity that allows for effectively manageable and managed data to be shared seamlessly and used and reused freely.

Adding value through connections – as simple as that. Just little pieces loosely joined. As

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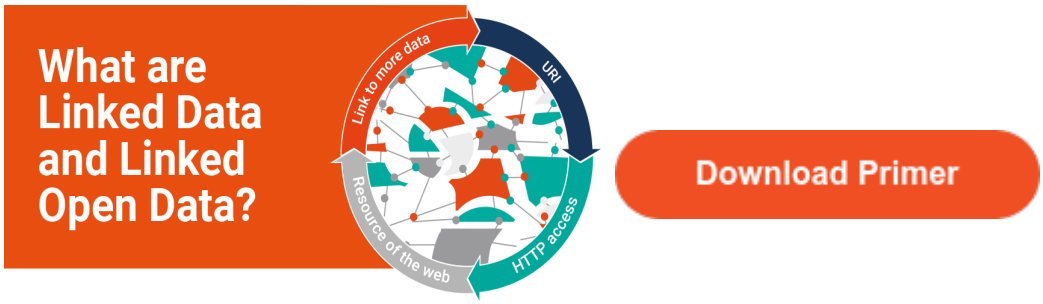
simple as a bag of chips.



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