Understanding the
European Data Portal
High level presentation of the architecture

data.europa.eu/europeandataportal

What we do

More and more volumes of data are published every day. The amount of data across the world is increasing exponentially. A substantial amount of this data is collected by the public sector. But for the data to be re-used, it needs to be accessible.

The first official version of the European Data Portal is available since February 2016. The Portal harvests the metadata available on public data and geospatial portals across European countries. Portals can be national, regional, local or domain specific. They cover the EU Member States, EFTA countries and countries involved in the EU's neighbourhood policy. But how does the Portal function? This factsheet provides a summary of the architecture of the European Data Portal.
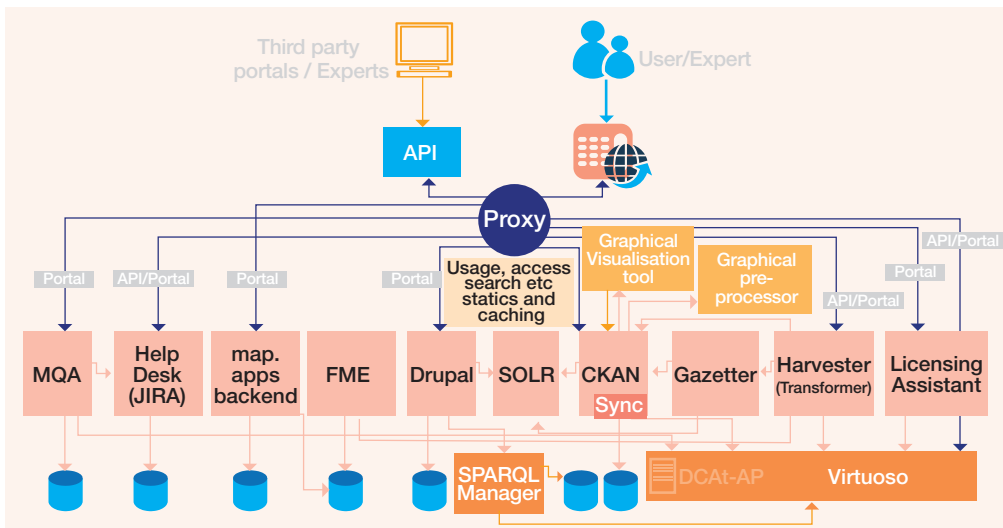
The architecture

For a better understanding of the integration of the components into the overall architecture, each component's functionality as well as interactions from different perspectives (user/system) are described and published on GitLab.
The figure at the bottom of this page provides a high level overview diagram of the European Data Portal architecture.

Access to the Portal

The access to the Portal is provided in two ways: a **machine-readable API** and **a human readable web site (GUI).** The API enables its users to search, create, modify and delete metadata on the portal.

The GUI is basically built on two components: **CKAN and DRUPAL.** CKAN manages and provides metadata content (datasets) in a central repository. DRUPAL provides the Portal's Home Page with editorial content (e.g. Portal's objectives, articles, news, events, tweets, etc.) and links to an **Adapt Framework** based training platform. In addition it offers extended functionalities to registered users via user login by ECAS.

Both systems are used in a side-by-side architecture. A proxy is responsible for delivering the web pages requested by the user. Both systems are equally themed with the same Look & Feel so that the user is not aware on which system he/she is currently browsing.

Multilingualism

The Portal GUI will support all 24 official EU languages for main editorial and main metadata content (using MT@EC). Training content will be available in English and French only. Additional material will be made available in English or in the source language.

Searching the Portal

The portal uses the SOLR search engine in order to separately search for editorial content in DRUPAL and for datasets in the CKAN repository. The GUI includes a Licensing Assistant component that supports the user by providing legal information on the usage of a specific dataset in terms of licenses that apply to the dataset.

The SPARQL Manager component allows the user to enter and run SPARQL queries on the Virtuoso linked data repository. It also allows the logged-in user to store and re-run SPARQL queries and notifies the user when a query has finished running.

Geo spatial data

Using the map.apps backend application, Geo spatial data is visualised on geographical maps. The application is a proprietary solution that comes with different tooling and thematic focus, a graphical configuration interface, supports responsive web-design and internationalisation files.

The application also implements the OSGI specification on the client side (in JavaScript) allowing sharing and re-usage of the bundled application logic as well as a straightforward maintenance. Statistical data that is linked

to datasets can be visualised in tabular (tables) and graphical (charts) form using a D3.js library.

> " The Portal architecture includes three additional components to enhance the quality "

Harvesting Data

On the Harvesting side, the portal follows a two-fold architecture too. CKAN is used as the central metadata repository for storing, browsing and searching datasets in a POSTGRES relational database.

In order to also support a linked data functionality the CKAN metadata is replicated into a Virtuoso quad store repository via a CKAN synchronisation extension, in order to ensure that both repositories have the same set of metadata.

The Harvester is a separate component that is able to harvest data from multiple data sources with different formats and APIs. The harvester is acting as a single point of entry for all metadata that gets harvested,

transformed into the CKAN JSON schema and pushed into the CKAN repository.

The Gazetteer component is used by the Harvester to enhance the metadata with geo-spatial data and information (geo-coordinates, names, places, etc.). The Gazetteer is mainly used to improve the search functionality. It uses the FME component as a universal spatial ETL tool (Extract-Transform-Load) that supports the accessing, processing and outputting

of all spatial file/database formats and that is used for harvesting the sources for geographical names.

Enhancing quality

The Portal architecture includes three additional components to enhance the quality of the metadata and the portal. A Helpdesk handles user support requests and feedback.

The Metadata Quality Assistant (MQA) periodically generates reports on the quality of the harvested

metadata and creates tickets for the Helpdesk in case of harvesting issues.

The third component is the monitoring component based on PIWIK and located at the Proxy in the architecture. In the full respect of data privacy, it records requests and user interactions on the portal in order to generate anonymised user traffic statistics that will help enhancing the usage of the Portal.

Component	Description
API Access	Machine-readable (SOAP / REST) API
GUI Access	Portal website graphical user interface
CKAN	Portal's central metadata (dataset) repository
DRUPAL	Portal's Home Page managing editorial content
ECAS	European Commission Authentication System used for user registration and login in order to provide extended functionalities of the Portal
Adapt Framework	Online platform used for Portal Training Modules (available in EN + FR)
Proxy	Routing of (HTTP(S)) user requests to corresponding components
SOLR Portal Search (editorial data)	Search engine used for searching portal editorial content
SOLR Dataset Search (metadata)	Search engine used for searching and filtering datasets in the CKAN metadata repository
Licensing Assistant	Component to provide legal information on (re-)usage of specific datasets
SPARQL Manager	SPARQL query editor allowing to run SPARQL queries on linked data in the Virtuoso repository

Component	Description
Virtuoso	Linked data quadruple store that is synchronized with the CKAN repository
map.apps: Geo-spatial Data Visualisation	Proprietary application to visualize geo-spatial data and information using geo-maps. It comes with different tooling and thematic focus, a graphical configuration interface, supports responsive web-design, i18n internationalization files, client side implementation of the OSGI specification (JavaScript)
Graphical Data Visualisation	Recline.js/D3.js JavaScript libraries to visualize (statistical) data in tables and graphical charts
Pre-processor	RESTFUL web API, running on a Node.js server which analyzes and transforms XSL/XLSX files into CSV format in order to be used from the Visualisation tool
Harvester	Single entry point component for harvesting data from multiple data sources in different formats and from different APIs
Gazetteer	Component providing geo-spatial data and information
FME	Component used by the Gazetteer as a universal spatial ETL tool (Extract-Transform-Load) that supports the accessing, processing and outputting of, all spatial file / database formats and that is used for harvesting the sources for geographical names
smart.finder	Component used by the Gazetteer and simplifying searches for spatial data, services and documents. It enables fast and structured access to extensive, distributed and heterogeneous data stores
Helpdesk	Portal offers a user request/feedback form via the JIRA-API and generates JIRA tickets for follow-up by helpdesk
Metadata Quality Assistant (MQA)	Component to report on the quality of the harvested metadata and to alert helpdesk in case of issues
Monitoring	PIWIK component that provides Traffic Analytics of portal usage
Multilingual Support	Web pages + core editorial content + dataset descriptions available in all 24 official EU languages
MT@EC	Machine Translation Services of the European Commission used for translation of the metadata into all of the supported languages by the portal

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For more information, please visit the European Data Portal or contact us via email.

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The European Data Portal initial content has been collected by harvesting national public data and geospatial portals. Progressively, the portal will harvest additional metadata collected from regional, local and domain specific portals. Do you want your portal or website to be harvested by the European Data Portal? Read the requirements on the website.

Share your story about how you make use of Open Data. Are you an entrepreneur? A non-governmental organisation? A civil servant responsible for publishing data? A local authority? Tell us your story! The purpose of the collection of use cases is to assemble interesting European stories about the benefits and efficiency gains that result from the use of Open Data. Contact us via the website and fill out the form.

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