



BIBLIOTECA NACIONAL DE ESPAÑA

# *Putting Linked Data to work: [datos.bne.es](http://datos.bne.es), from the National Library of Spain*

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Biblioteca Nacional de España / National Library of Spain

## **Linked data and international standards for cultural heritage**

Koninklijke Bibliotheek van België (KBR) / Royal Library of Belgium  
September 2022, 13-14th

# Datos 1.0 (2011)

## **PRIMARY GOAL:**

Publish data according to IFLA models and vocabularies: FRBR, ISBD

## **CONTENT:**

2.4 millions bib records (ancient and modern monographs, printed music and sound recordings) and authority records

## **AVAILABILITY:**

Datadumps and Sparql end-point access

## **TARGET AUDIENCE:**

Developers, LOD experts, data consumers

# Datos 2.0 (2014)

## **PRIMARY GOAL:**

Build an innovative gateway to collections, profiting from Linked Data technology and FRBR model

## **CONTENT:**

All the catalogue (bib, aut and holding records)

## **AVAILABILITY:**

Human interface, Sparql end-point access and datadumps

## **TARGET AUDIENCE:**

Common users, researchers, reference librarians

# Datos.bne.es

## **MAIN FEATURES:**

Allow users to experiment with new ways of discovering and searching resources

Goal: surface the relationships already existing in library data, with LRM as model of reference

Tools to function as an autonomous catalogue: request reproductions, request in advance of documents, request items for interlibrary loan

Access to content from the digital library

Data enriched and linked to outside sources

Discoverability from search engines

All the URIs (resources and search results) are stable and shareable

# WHAT IS DATOS.BNE?

A fully functioning linked-data based gateway into the library resources.

- Library resources (as any other catalogue)
- Data about authors
- Data about subject vocabularies
- Data about items and provenance
- Connected to usual library services (digital library items, loan services, document reproduction services, reading room services)

**BUT:**

It does not intend to substitute the “official” catalogue.

Data is synchronized once a month (data workflows takes 5-7 days)

# MAIN FEATURES

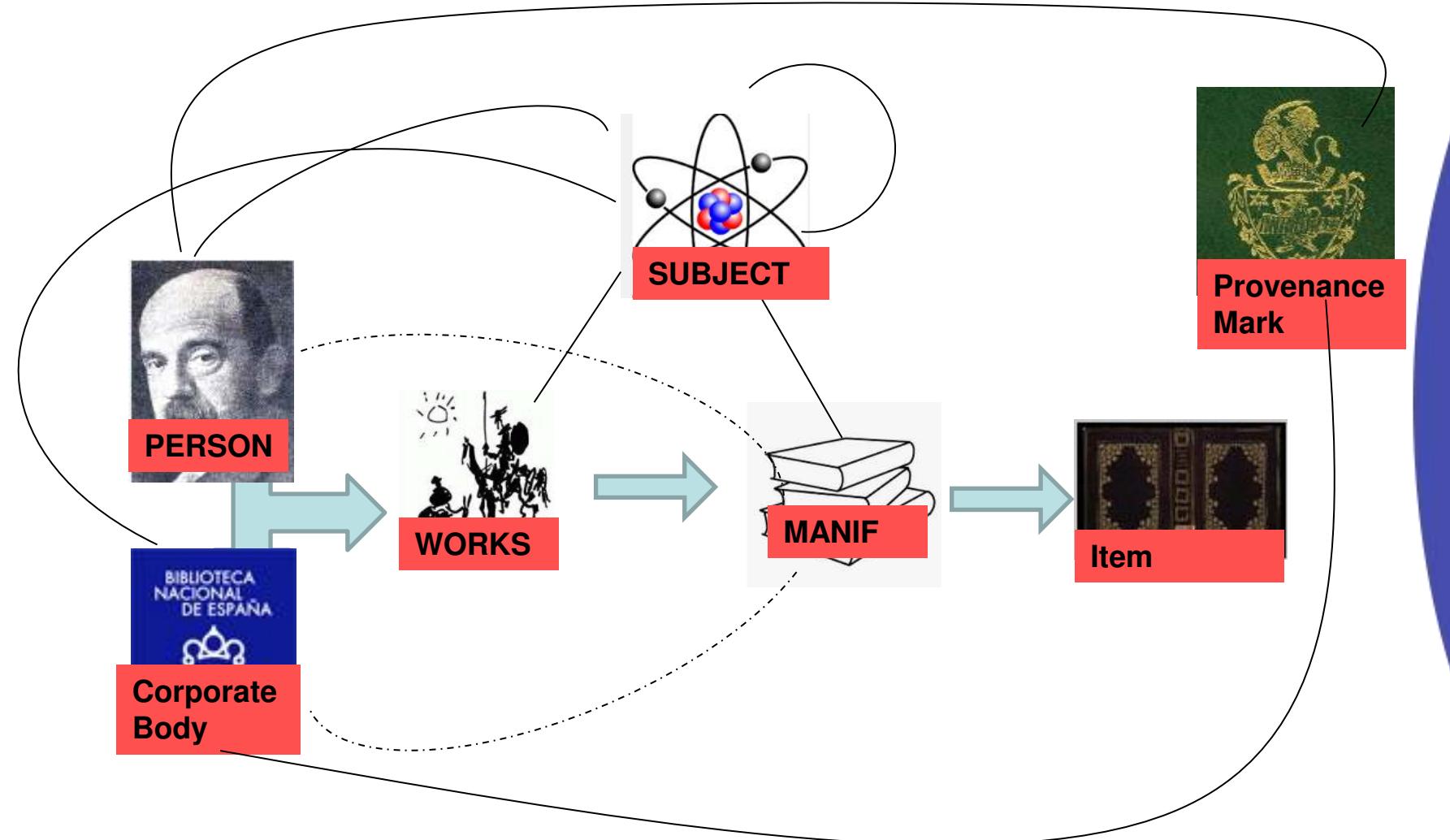
## LRM-Based

- Entity based
- Entity driven search
- Entity-based search results ranking

## Linked and enriched

- Interlinks between LRM entities
- Linked to prominent equivalent concepts/entities
- Enriched with outside data

# BASIC DATA MODEL



Works: 2.175.975  
Persons: 1.482.827  
Corporate Bodies: 353.069

# BASIC NAVIGATION FEATURES

rotterdam 

(249 resultados)

Filtrar por tipo (249 resultados)

146 Ediciones | 51 Obras | 36 Entidades | 13 Temas | 3 Personas

Filtrar ediciones por tipo

110 Libros | 9 Grabados | 8 Materiales cartográficos | 5 Dibujos, grabados y fotografías | 5 Registros sonoros musicales | 4 Dibujos | 2 Fotografías

2 Manuscritos | 1 Música impresa

21 de 249

Ordenar ▾

Erasmus, Desiderius (1467-1536)

Obras destacadas

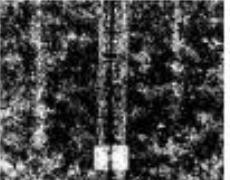
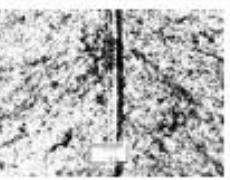
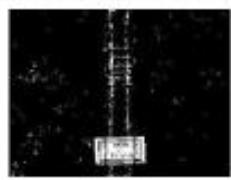
A field in the sky : Rotterdam-88  
Lozano-Piatis, Mariano  
D.L. 1987  
Grabaciones Accidentales  
Registro sonoro musical

Adaptación transcultural y validación de la ...  
2017  
Edita  
Libro

# BASIC NAVIGATION FEATURES

Sus obras (Ver todas las ediciones) 1

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<p>Moriae encomium Erasmus, Desiderius (101 ediciones)</p> <p><a href="#">Obra</a></p>		<p>Colloquia Erasmus, Desiderius (12 ediciones)</p> <p><a href="#">Obra</a></p>	
<p>Adagia Erasmus, Desiderius (15 ediciones)</p> <p><a href="#">Obra</a></p>		<p>Enchiridion militis christiani Erasmus, Desiderius (8 ediciones)</p> <p><a href="#">Obra</a></p>	

# BASIC NAVIGATION FEATURES

Erasmus, Desiderius (1467-1536) / Moriae encomium

## Moriae encomium

[Publicaciones sobre esta obra](#)

[← Volver a la Busqueda](#)

Latín

(En otros idiomas) ▾

Catalán

Español

Español-Latín

Gallego

Inglés

Lugar de  
publicación

Apud Indytam Basileam

Editorial

apud Io. Frob.

Fecha de  
publicación

mense Iulio anno 1522

(7 ediciones)

Solo digitalizaciones

Ordenar por fecha ▾

Libro

um ab ipso autore religiose recognitu[m], una cum aliis aliquot libellis,  
his, quorum omniu[m] titulos, proxima pagella loquetur ([Ver registro](#))

inc postremum ab ipso autore religiose recognitu[m], una cum aliis aliquot libellis, no[n] minus eruditis quam  
iniu[m] titulos, proxima pagella loquetur ;

# BASIC NAVIGATION FEATURES

## PERSONS' ADVANCED SEARCH

NAME

Ordenar

Alfabéticamente Asc

BIRTH DATE

DEATH DATE

PLACE OF BIRTH

PLACE OF DEATH

TITLES

OCCUPATION

FIELD OF ACTIVITY

ASSOCIATED GROUP

# BASIC NAVIGATION FEATURES

## PROVENANCE MARKS

Foppens, Jean François (1689-1761)

← Volver a la Busqueda

← Anterior | Siguiente →

Año de nacimiento:

1689

Lugar de nacimiento:

Studium Generale Lovaniense, Bélgica, Bruselas Capital (Región), Bruselas

Año de fallecimiento:

1761

Lugar de fallecimiento:

Bélgica, Flandes (Bélgica), Amberes (Provincia), Malinas

Categoría profesional:

Historiadores, Profesores universitarios, Sacerdotes,

Enlaces relacionados:

[http://catalogo.bne.es/uhtbin/cgisirsi/0/x/0/05?searchdata1=Jean%20Fran%C3%A7ois%20Foppens%20\(1689-1761\)%20\(561,%20980\)](http://catalogo.bne.es/uhtbin/cgisirsi/0/x/0/05?searchdata1=Jean%20Fran%C3%A7ois%20Foppens%20(1689-1761)%20(561,%20980))

Otros datos: Sacerdote, biógrafo e historiador belga. Profesor de filosofía en la Universidad de Lovaina

## Marcas



Descripción: Ex libris heráldico-artístico que representa el escudo de armas de Jean François Foppens, sostenido por un ángel. Bajo él, filacteria con el lema "Quod vis videre esto". Bajo el ex libris, etiqueta con la inscripción "Ex bibliotheca Joannis Francisci Foppens, Bruxell, S.T.L. Ecclesiae Metrop. S. Rumoldi Mechlin. Canonici Graduati ac Poenitentiariorum"

Tipo: Exlibris

Datación: S. XVIII

# BASIC NAVIGATION FEATURES

## ***DATA ENRICHING AND LINKING***

Simenon, Georges (1903-1989)

← Volver a la Busqueda

Georges Joseph Christian Simenon ([ʒɔʁʒ simnɔ̃] Lieja, 13 de febrero de 1903-Lausana, 4 de septiembre de 1989) fue un escritor belga en lengua francesa. Su vida comienza regida por el misterio, pues en realidad nació el viernes 13 de febrero, pero fue declarado como nacido el 12, por superstición. Simenon fue un novelista de una fecundidad extraordinaria, con 192 novelas publicadas bajo su nombre y una treintena de obras aparecidas bajo 27 seudónimos. Los tirajes acumulados de sus libros alcanzan 550 millones de ejemplares. André Gide, y Robert Brasillach fueron los primeros en reconocer que se trataba de un gran escritor.

Información extraída de Wikipedia



Wikidata

<https://www.wikidata.org/wiki/Q128790>

ISNI

<http://www.isni.org/isni/0000000122755410>

Lugar de nacimiento:

Lieja

VIAF

<http://viaf.org/viaf/17564>

# Data services

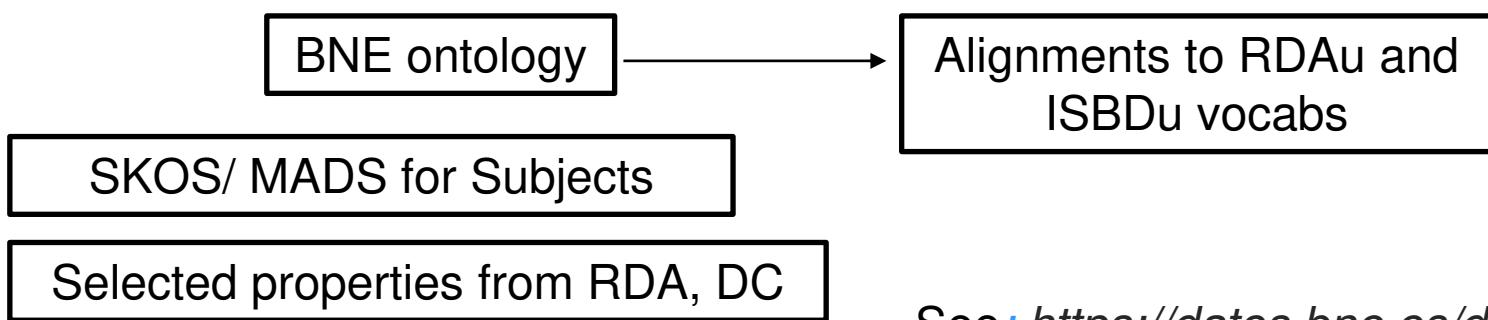
- ✓ SPARQL end-point
- ✓ Search API
- ✓ Content negotiation (Turtle, JsonLD, RD/XML)
- ✓ Data dumps

# Ontology

## DATOS 1.0



## DATOS 2.0



See: <https://datos.bne.es/def/index-en>

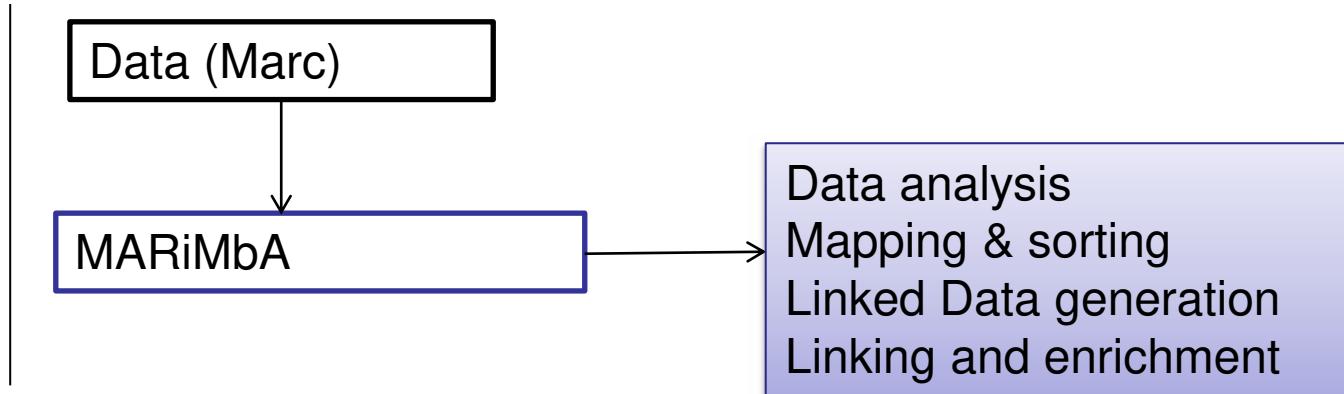
# Behind the scenes: From MARC to LRM entities

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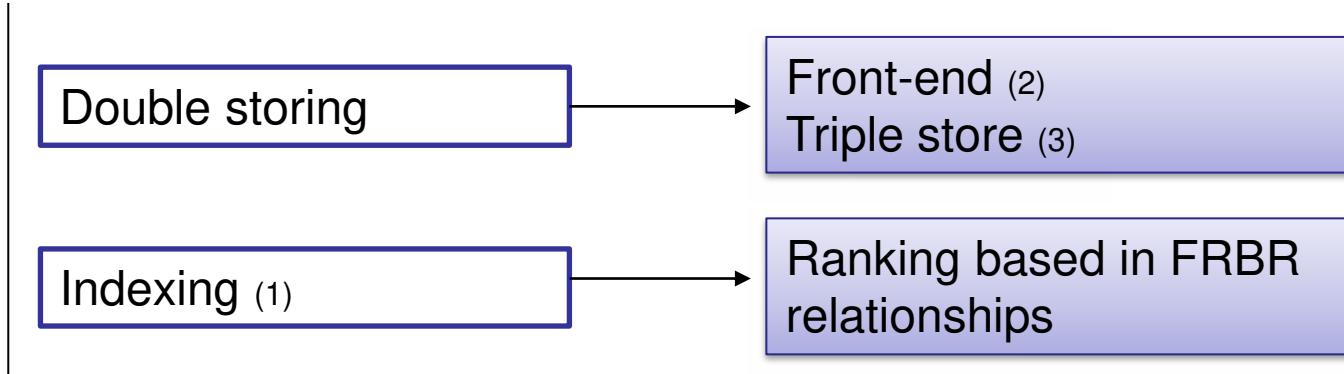


# Behind the scenes

Data generation



Publication pipeline



(1) Elasticsearch

(2) MongoDB

(3) Virtuoso

# Peeking inside Marimba

Ingestion and analysis of  
MARC21 records

Mapping 1: sorting

Mapping 2: model entity linking

Mapping 3: data properties

Linking and enrichment

RDF generation

1	Subfield	Property	Class
2	046q	RDAa:P50022	C1006
3	110a	BNE:P6001	C1006
4	264a	BNE:P3003	C1003
5	264b	BNE:P3001	C1003
6	264c	BNE:P3006	C1003
7	374a	RDAa:P50104	C1005
o			

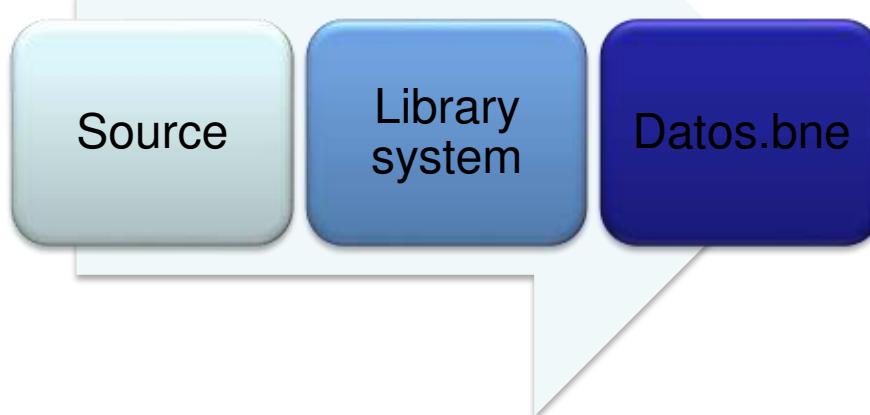


Data properties are based on  
**subfields**:  
260 \$a → P3003 (place of  
publication)

# Enrichments and data imports

Main enrichment: EVERYDAY JOB : Guide cataloguing policies toward making data more suitable for processing

Other enrichments and imports:



Sources: Libraries and beyond

Data imported: identifiers, equivalencies and attributes

Main import: more than 80.000 persons authority records enriched with data from Wikidata. See: <https://swib.org/swib19/programme.html>

# Outcomes

**datos.bne.es as:**

Source for data consuming applications  
Links to datos.bne from various services

Reference tool  
Integrating device for information resources: Digital library, provenance marks

New ways to access and discover resources  
Access from search engine results → discoverability

**Expert users**

**Librarians**

**Common users**

**RESULTS &  
FEEDBACK**

# Internet exposure

People coming straight from search engine results

A screenshot of a Google search results page. The search query "galeria isalo arte" is entered in the search bar. The results are filtered by "Web". Below the search bar, it says "Aproximadamente 9.020 resultados (0,46 segundos)". The first result is a news article from Deia about galleries in Bilbao closing, mentioning Galería Isalo. The second result is from the BNE website, listing an exhibition by Ian David Reynard at Galería Isalo Arte. The third result is from the BD-ARTEDER website, listing individual exhibitions at the Museo de Bellas Artes de Bilbao.

Google galeria isalo arte

Web Imágenes Maps Noticias Vídeos Más ▾ Herramientas de bús

Aproximadamente 9.020 resultados (0,46 segundos)

[Las seis galerías comerciales de Bilbao pierden vida. Deia ...](#)  
www.deia.com/.../las-seis-galerias-comerciales-de-bilbao-pierden-vida ▾  
31 mar. 2015 - De las seis, solo la **galería Isalo** –comunica a través de los bajos de un edificio las calles Ercilla y Licenciado Poza– sigue conservando la ...  
Falta: arte

[Galeria Isalo Arte presenta la exposición de óleos de Ian ...](#)  
datos.bne.es/edicion/a5280161 ▾  
Título, Galeria Isalo Arte presenta la exposición de óleos de Ian David  
Reynard ;(inauguración, del 3 al 15 de mayo 1976; Lugar de publicación, [Bilbao].

[Exposiciones individuales - Museo de Bellas Artes de ...](#)  
www.bd-arteder.com/cgi-bin/BRSCGI?CMD... ▾  
Donostia-San Sebastián, Galería de Arte, 5 - 19 abril 1942? ... Madrid, Galería Estilo,  
11 - 23 marzo 1946. ... Bilbao, **Galería Isalo Arte**, marzo - abril 1973.

Specially in the “long tail” resources

# Internet exposure : contents

RESULTS &  
FEEDBACK



- *Hidden resources made visible. (You got pictures of my town!!, That's the weird out-of-print issue I've been looking for!!)*
- *Errors warning*



- *Misconceptions about services (I want to buy / download this item !!!)*
- *False expectations.*

# Internet exposure : people

RESULTS &  
FEEDBACK



- Hey; That's me on the Internet!. Do you want more data? Do you want more of my books?
- I know that author!!!. Do you want more data?
- Other libraries “donating” data to be more visible through datos.bne



- What are my personal data doing up there?
- Hey; That's me on the Internet!. And I don't want to be on the Internet!!!!

# LRM for users

RESULTS &  
FEEDBACK

Useful for:

- Grouping related things
- As a general model for establishing relationships

Lessons learned:

- Use FRBR, don't talk FRBR.
- Simple relationships are harder to explain.

# To be continued

MORE

Content  
Entities  
Relationships  
Data sources  
Data enrichment

BETTER

Entities descriptions  
Catalogue procedures  
Search capabilities  
Ontology alignments  
LOD services & documentation

# The players



→ Technical Processes

→ Catalogue and Library Data  
Department / IT

## *Technological partners*



*Ontology Engineering Group (2011-2017)*



*Memorandum Multimedia (2017-2022)*

# **Datos.bne in the context of the BNE open data policy**

BNE follows an expansive and exhaustive policy of free and open data:

Regular services: records from OPAC, Z39.50, OAI

Bulk MARC21 downloads

Bulk downloads in reusable formats (CSV, XML, XLS, ODS, JSON) from catalog, digital library, web harvesting...

Special projects with other institutions or research groups  
(e. g.: *Maria*: First massive Artificial Intelligence system in the Spanish language, with Barcelona Supercomputation Centre)



**Many thanks for your attention**

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