

# **SCRREEN & the RMIS 2.0**

## **Raw Materials Week**

Annual Critical Raw Material Event

Daniel Cassard - BRGM

07 November 2017, Brussels



Funded by the Horizon 2020  
Framework programme of the European Union  
(Grant Agreement Number 730227 )

# SCRREEN knowledge management

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- ➔ SCRREEN manages both structured data (from database) and unstructured data (reports, stats, images...).
- ➔ SCRREEN is developing a CRM Knowledge Data Platform, the EU-CRMKDP. This is the **SCRREEN DATA/DOCUMENT MANAGEMENT SYSTEM or DMS**.
- ➔ This CRMKDP is connected to the MICA Expert System. This is the **SCRREEN DECISION SUPPORT SYSTEM or DSS**.
- ➔ SCRREEN builds on former and ongoing projects, taking advantage on the developments made in Minerals4EU, EURare, ProSUM and MICA, and implementing new techniques like Data Augmentation.



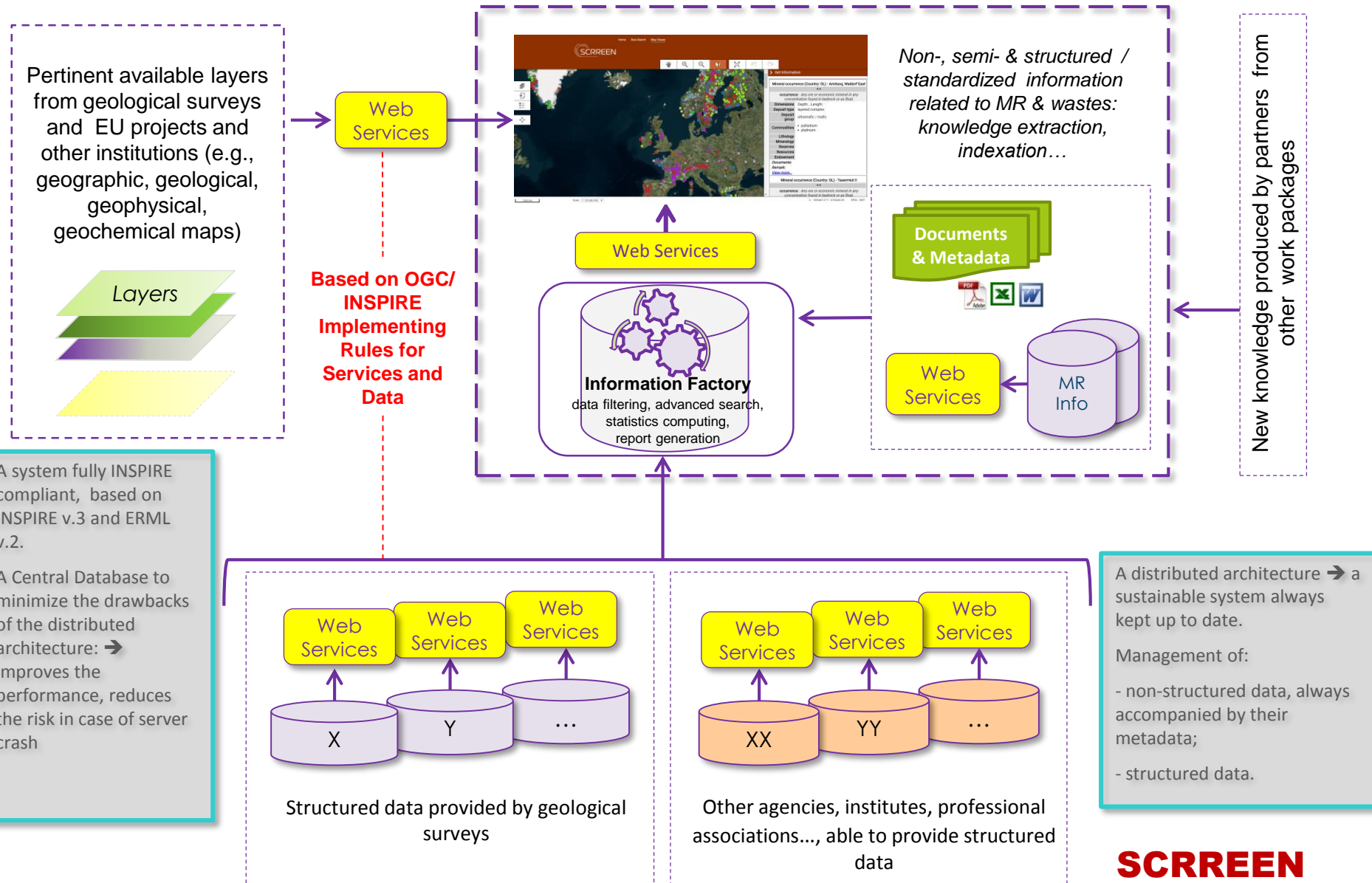
**SCRREEN**

# The DMS: data / documents management system

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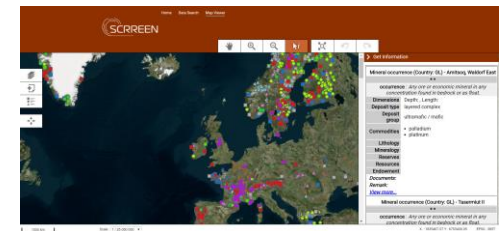
- ➔ What is a distributed architecture? Pros & cons...
- ➔ How to feed the Knowledge Base?
- ➔ How to retrieve information?

## General simplified architecture of the EU-CRMKDP



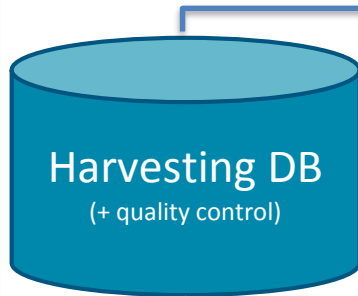
# EU-CRMKDP detailed architecture

## Based on a « production-diffusion schema »



A professional architecture: ➔ A Central Harvesting Database synchronized with a Central Diffusion Database. The first one controls data quality and the second one is optimized for diffusion. Synchronization is made using SQL scripts.

### DB SYNCHRONIZATION



Harvesting DB  
(+ quality control)

Harvesting mechanism  
(ETL process)

EU level

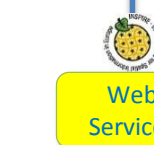
Country level



Web Services



Web Services



Web Services

Deegree 3



Project DB



National DB

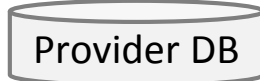


National DB

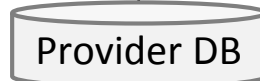
Standardized data models  
(INSPIRE MR, ERML)

Mapping (ETL process and code lists)

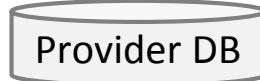
Provider's own format



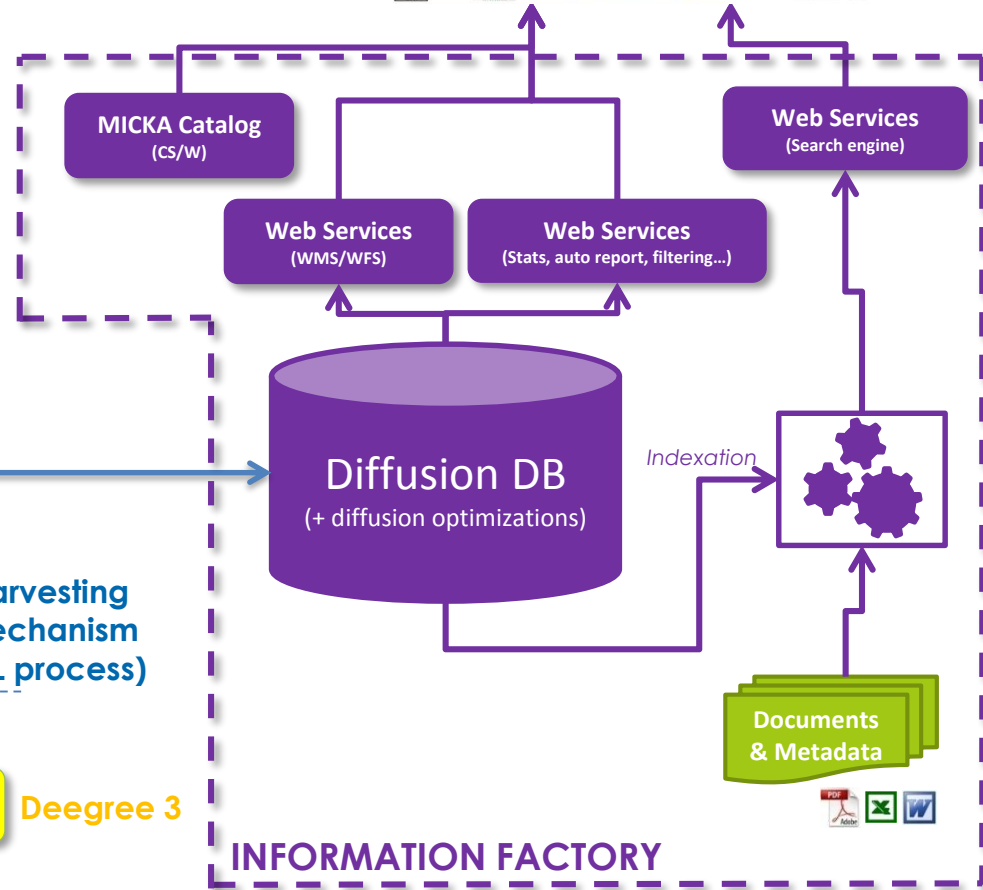
Provider DB



Provider DB



Provider DB




INFORMATION FACTORY

**SCREEN**

# The dedicated application for feeding the Knowledge Base and retrieving information (1/5)

HomeAdd a DocumentData SearchMap Viewer

Solution for Critical Raw Materials  
a E

Add a document

From an XML file : click here

From a blank form :

Title

Feed

File

Choisissez un fichier

Aucun fichier choisi

Select a file from your local system.

File

Add a new file

Choisissez un fichier

Aucun fichier choisi

Files must be less than 50 MB.  
Allowed file types: .txt .doc .xls .docx .xlsx .pdf .sxc .sxw .odt.

Distant File

Other Title

Other Title

The name given to the resource. Typically, a Title will be a name by which the resource is known.

Description

An account of the content of the resource. Description may include but is not limited to the content. [More](#)

Creator

An entity primarily responsible for making the content of the resource. Examples of entities that can indicate the entity. [More](#)

Subject


The topic of the content of the resource. Typically, a Subject will be expressed as key words. It is to select a value from a controlled vocabulary or formal classification scheme. [More](#)

Publisher

Rights

Information about rights held in and over the resource. Typically a Rights element will contain a rights management statement for the resource, or reference a service providing such information. Rights information often encompasses Intellectual Property Rights (IPR), Copyright, and various Property Rights. If the rights element is absent, no assumptions can be made about the status of these and other rights with respect to the resource. [More](#)

Coverage



Use the icons to select what type of feature to draw. Each map can contain one simple feature. Pan and zoom with arrows and the zoom bar.


ADD ANOTHER ITEM


ADD ANOTHER ITEM

PREVIEW

SAVE

Project Link



The SCRREEN project has received funding from the European Union's Horizon 2020 Research and Innovation Program under Grant Agreement 730227.

BROM Logout

A dedicated application to upload (or link) documents and their metadata (Dublin Core format – 15 mandatory fields)

# Solution for Critical Raw Materials a European Expert Network



SCRREEN - Strengthening EU Critical Raw Materials Strategy capitalising on EU initiatives, associations, clusters, and projects working on CRMs into along lasting Expert Network.

## Data Search

Search into the Knowledge Base to find  
the best information



## About

SCRREEN aims at gathering European initiatives, associations, clusters, and projects working on CRMs into along lasting Expert Network on Critical Raw Materials, including the stakeholders, public authorities and civil society representatives.

SCRREEN will contribute to improve the CRM strategy in Europe by (i) mapping primary and secondary resources as well as substitutes of CRMs, (ii) estimating the expected demand of various CRMs in the future and identifying major trends, (iii) providing policy and technology recommendations for actions improving the production and the potential substitution of CRM, (iv) addressing specifically WEEE and other EOL products issues related to their mapping and treatment standardization and (vi) identifying the knowledge gained over the last years and easing the access to these data beyond the project.

## Front News


No News

[all the news](#)

# The dedicated application for feeding the Knowledge Base and retrieving information (3/5)

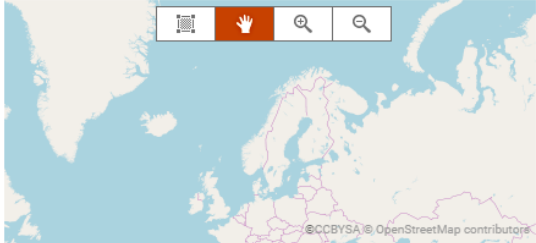
The Data Search capability allows searching like in Google (full text), using specific fields, geographically (drawing a polygon), and also in structured data (Ore deposit database – currently under development)

[Home](#) [Data Search](#) [Map Viewer](#)

 **Solution for Critical Raw Materials  
a European Expert Network**

**DATA SEARCH**



**What**

**Where**  


**More search field**  

<input type="text" value="Terms in title"/>	<input type="text" value="Creator"/>
<input type="text" value="Publisher"/>	<input type="text" value="Contributor"/>

- Check if your spelling is correct, or try removing filters.
- You can use \* as a wildcard to search an incomplete word or expression: process\* will match process, processes, processing and processed.
- Remove quotes around phrases to match each word individually: "blue drop" will match less than blue drop.
- You can require or exclude terms using + and -: big +blue drop will require a match on blue while big blue -drop will exclude results that contain drop.


The SCREEN project has received funding from the European Union's Horizon 2020 Research and Innovation Program under Grant Agreement 730227.

[Login](#)



# The dedicated application for feeding the Knowledge Base and retrieving information (4/5)

HomeAdd a DocumentData SearchMap Viewer

Solution for Critical Raw Materials  
a European Expert Network

DATA SEARCH

Refine search

Language

English (2)

Type

table (2)

text (2)

Results 1 to 2 of 2

On the 2017 list of Critical Raw Materials for the EU

BRGM - 10/05/2017 - 12:49

Creator European Commission


Publisher European Commission

Tackling the challenges in commodity markets and on raw materials

BRGM - 10/05/2017 - 13:11

Creator European Commission

Publisher European Commission



On the 2017 list of Critical Raw Materials for the EU

BRGM - 10/05/2017 - 12:49


Creator European Commission

Publisher European Commission

Format text/pdf - table/pdf

Source <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2017:0490:FIN>

VIEW MORE



Publisher:  
European Commission

Date:  
Wednesday, September 13, 2017

Type:  
text  
table

Format:  
text/pdf  
table/pdf

Identifier:  
COM:2017:0490:FIN

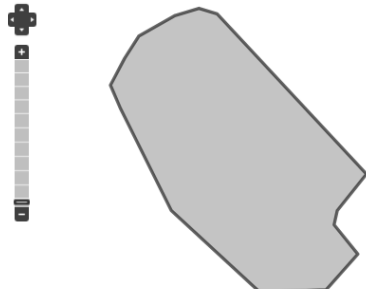
Source:  
<http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2017:0490:FIN>

Language:  
24 official EU languages

Relation:  
InformaOf Communication from the commission to the European Parliament, the council, the european economic and social Committee and the committee of the regions.  
COM(2017) 490 final, Brussels, 13.9.2017, 8 p. (2017)

Rights:  
EUR-Lex: free access to anybody  
<http://eur-lex.europa.eu/content/welcome/about.html>


Coverage:




Distant File:  
<http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM%3A2017%3A0490%3AFIN>

Description:  
The 27 raw materials listed are critical for the EU because risks of supply shortage and their impacts on the economy are higher than those of most of the other raw materials. The table indicates the existence of domestic production of certain critical raw materials in the EU, notably hafnium. However, China is the most influential country in terms of global supply of majority of critical raw materials, such as rare earth elements, magnesium, tungsten, antimony, gallium and germanium among others. Several other countries have dominant supplies of specific raw materials, such as Brazil (niobium) or USA (beryllium and helium). Supply of platinum group metals is concentrated in Russia (palladium) and South Africa (iridium, platinum, rhodium and ruthenium). The risks associated with the concentration of production are in many cases compounded by low substitution and low recycling rates. The 2017 criticality assessment was carried out for 78 raw materials. The extended scope includes nine new materials as compared to 2014 assessment.

Project Link



The SCREEN project has received funding from the European Union's Horizon 2020 Research and Innovation Program under Grant Agreement 730227.

BRGM - Logo

Retrieve documents, see related metadata and get the document

**SCREEN**

# The dedicated application for feeding the Knowledge Base and retrieving information (5/5)

The screenshot displays the SCRREEN application interface. At the top, there is a navigation bar with links for Home, Data Search, and Map Viewer. The SCRREEN logo is prominently displayed. Below the navigation bar, a toolbar contains icons for map navigation and information retrieval. The main area is a map of Europe, densely populated with colored markers representing various mineral occurrences. On the left side, there is a sidebar with a legend for 'Mineral Occurrences (by Commodities)' and a 'Localisation' section with a search bar. The right side features a detailed information panel for a specific mineral occurrence (Country: FR - FRA-00163) titled '\*Egreuil\*'. This panel includes a prospect description, dimensions, deposit type, commodities, lithology, mineralogy, reserves, resources, and endowment details. A 'Documents' section at the bottom of the panel lists related documents and a remark.

Mineral occurrence (Country: FR) - FRA-00163  
\*Egreuil\*

**prospect** : An area that is a potential site of mineral deposits preliminary exploration, previous exploration. A geologic anomaly, especially one recommended for additional exploration.

**Dimensions** : Depth: 0 m, Length: 0 m

**Deposit type** : carbonate-hosted

**Deposit group** : sediment-hosted

**Commodities** :

- baryte
- fluorite: medium sized deposit

**Lithology** :

- limestone -- host-rock;

**Mineralogy** :

- Baryte -- ore;
- Fluorite -- ore;
- Galena -- ore;
- Pyrite -- ore;
- Sphalerite -- ore;

**Reserves** :

- inaccessibleDocumentation: 0t
- baryte: 0t
- fluorite: 0t

**Resources** :

- inferredMineralResource: 0t
- baryte: 0t
- fluorite: 280000t

**Endowment**

**Documents**

**Remark** :

- Geologic Unit name : Assise de Chitry
- ID PROMINES: FRA-00163; Company: null; Province: Bourgogne; Dept: 58; Geology: null; Economy: null; (FI): CP: 0; Res: 800000t CaF2 @ 35 % CaF2. Enct: Assise de Chitry, cal dolomitiques silicifiés. ; / , feuille 1/50000 Châteaur-Chin
- Other ID, from null : null

[View more...](#)

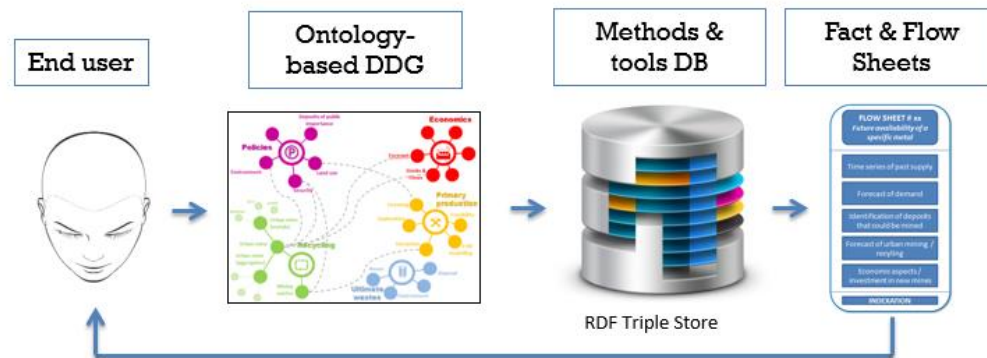
Mineral occurrence (Country: FR) - FRA-01132  
X: -3126947.10 Y: 6459056.36 EPSG: 3857

Get the info related to a deposit directly from the viewer

**SCRREEN**

# The DSS: decision support system

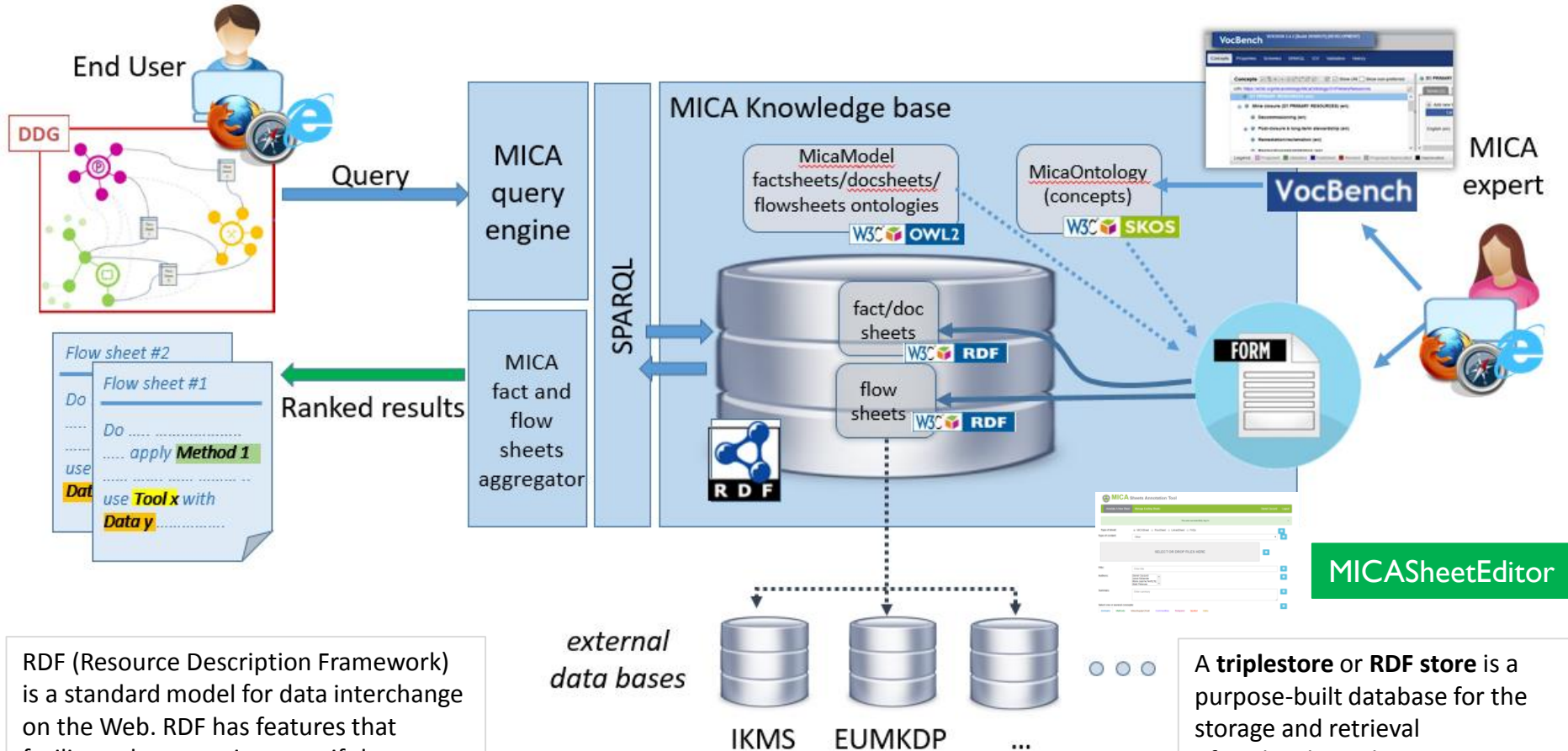
➡ Will use and improve the H2020 MICA ontology-based Dynamic Decision Graph (DDG). *An ontology allows specifying in a formal language (machine understandable) the concepts of a domain of interest and their relationships.*



➡ The DDG allows the end user to search for the most appropriate method(s) and tool(s) to use for resolving his problem.

➡ The first functionality of the DDG is not to be a 'pure' search engine. However, data, information and knowledge being strongly and cleverly connected, the DDG and its side applications can play the role of an 'intelligent' search engine in the Raw Materials domain, and also act as a powerful decision-aid tool.

# RMICP Architecture



RDF (Resource Description Framework) is a standard model for data interchange on the Web. RDF has features that facilitate data merging even if the underlying schemas differ.

The MICA Main Ontology actually covers 7 thematic domains: 'Primary' and 'Secondary Mineral Resources', 'Industrial Processing and Transformation', 'Raw Materials economics' (including CRMs), 'Raw materials Policy & Legal Framework', 'Sustainability of Raw Materials' and 'International Reporting', representing about 300 concepts and sub-concepts.

A **triplestore** or **RDF store** is a purpose-built database for the storage and retrieval of triples through semantic queries. A **triple** is a **data entity composed of subject-predicate-object**, like "Bob is 35" or "Bob knows Fred".

**SCREEN**

# The Dynamic Decision Graph

Value/Supply:



Nothing selected

Temporal:

Nothing selected

Spacial:

Nothing selected

Commodities:

Nothing selected

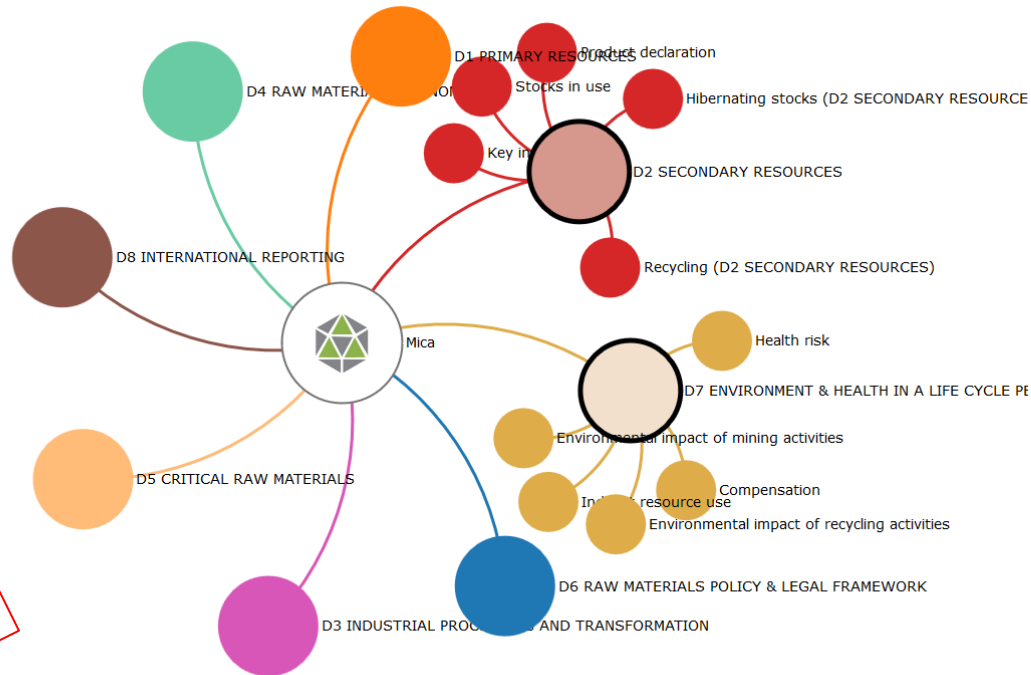
Apply

Reset

Filter the results by drilling down into the Mica Ontologies

D2 SECONDARY RESOURCES

D7 ENVIRONMENT & HEALTH IN A LIFE  
CYCLE PERSPECTIVE



Results:

- ☐ FactSheets
- ☐ DocSheets
- ☐ Legislation
- ☐ Data
- ☐ Question
- ☐ FlowSheets

Filter Title

Title

- FactSheet 1 title
- FactSheet 10 title
- FactSheet 11 title
- FactSheet 12 title
- FactSheet 13 title
- FactSheet 14 title
- FactSheet 15 title
- FactSheet 2 title
- FactSheet 3 title
- FactSheet 4 title

Title

Show 10 entries

Showing 1 to 10 of 15 entries

First Previous 1 2 Next Last

Still under  
development

**SCREEN**





Filter

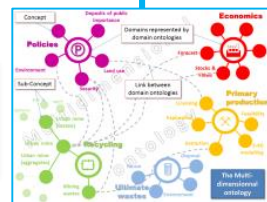
Filter

Filter

Filter

Applications

e-Minerals Yearbook  
e-ProSUM Stat Module  
e-SCREEN applications



The MICA  
Expert  
System

EURare  
Minerals4EU  
SCREEN

Methods & Tools  
descriptions

MICKA Catalog  
(CS/W)

Web Services  
(WMS/WFS)

Web Services  
(Stats, auto report, filtering...)

Web Services  
(Search engine)

Knowledge bases

Diffusion DB  
(+ diffusion  
optimization)

Indexation

DB synchronization (SQL scripts)

'Minerals4EU'  
Harvesting DB  
(+ quality control)

ProSUM  
Harvesting DB  
(+ quality control)

HARVESTING  
FTP

Portrayal

Portrayal

ProSUM unified data model

ProSUM

Urban mine:  
- WEEE  
- ELV  
- Spent batteries

Documents &  
Metadata

- REE
- Continental primary and secondary resources
- Continental resources at depth
- Marine/offshore resources
- CRM

Standardized data  
models (INSPIRE MR,  
ERML)

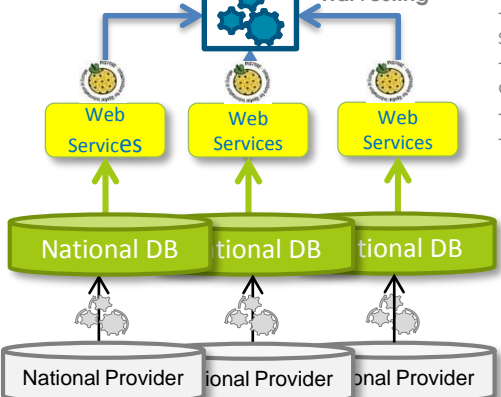
Mapping (ETL  
process and  
code lists)

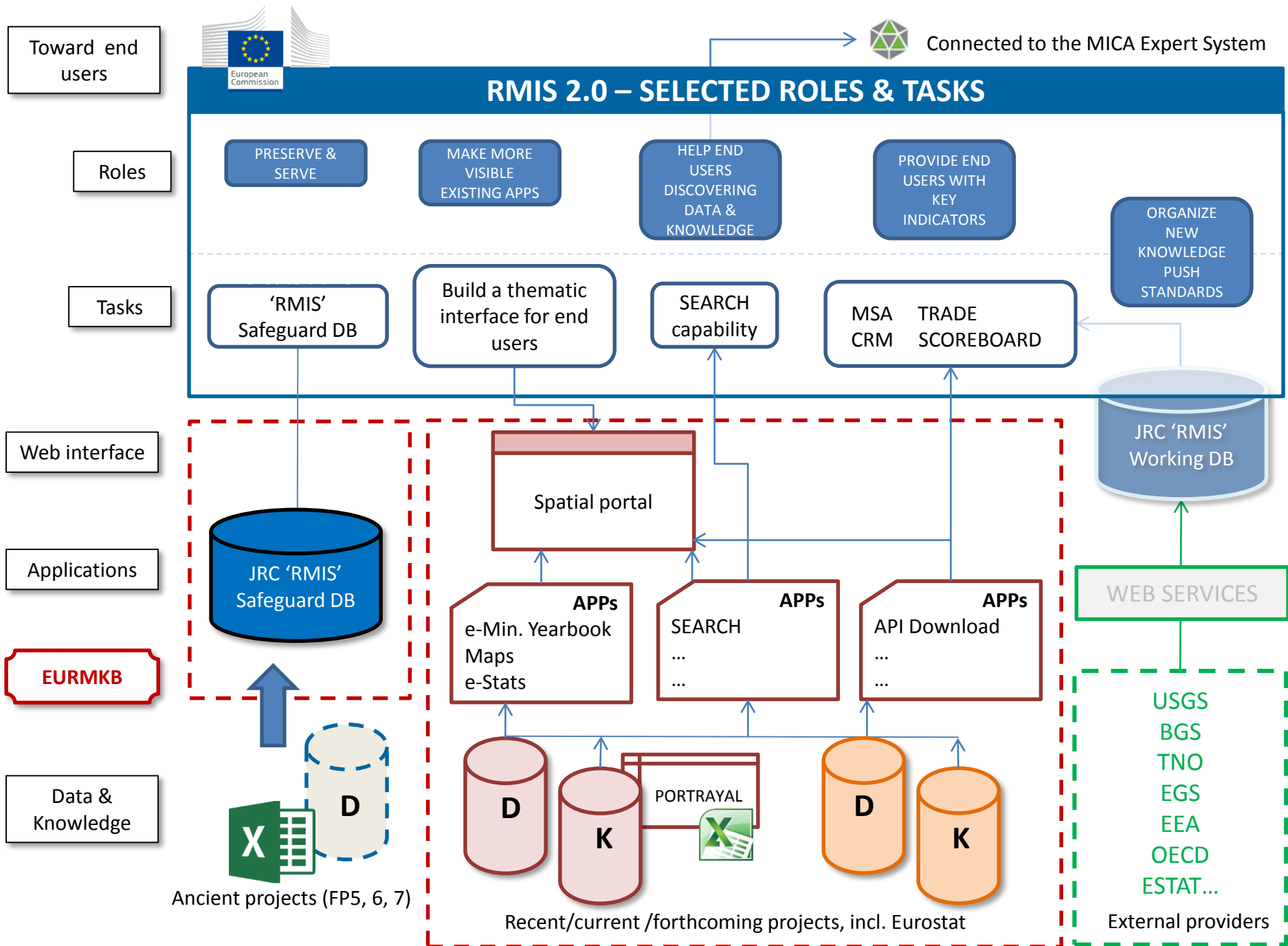
European  
provider (e.g.,  
Eurostat)

Direct extraction

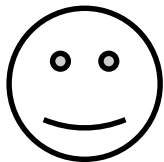
Scattered data

**Toward the EURMKB:  
A unified vision of  
Knowledge  
Management**



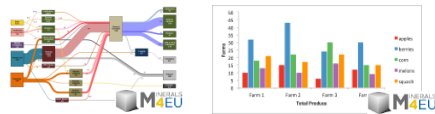


I'm a satisfied  
End User



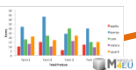
Ask a question  
Search for an information

Answer with a smart response



Can also directly call  
a dedicated system

Answer retrieved from  
the dedicated system



Query dispatched to the dedicated system

EU-MKDP

IKMS

EU-UMKDP

EU-CRMKDP

EU-RMICP

OTHER

**ORAMA recommendations** (SC5-15c-2017)



**GeoERA**



Other possible  
databases



Eurostat

Funded by the Horizon 2020  
Framework programme of the European Union  
(Grant Agreement Number 730227)





- . Continental geology
- . Marine geology
- . Mineral resources
- . Geophysics...

# The European Geological Data Infrastructure and the RMIS 2.0

## ORAMA – DATASETS OPTIMISATION



- ▶ Common governance
- ▶ Common architecture
- ▶ Based on standards
- ▶ Harmonised datasets
- ▶ Optimized for diffusion

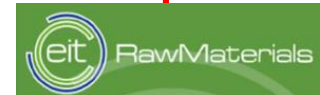
Extending the EGDI



WMS, WFS

RMIS 2.0  
Thematic Interface

Other projects...



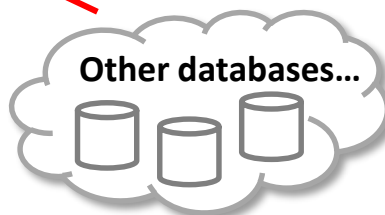
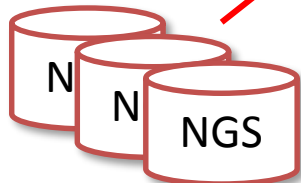
<http://data.geus.dk/egdi/>

**SCREEN**

## RMIS 2.0



Other datasets



# SCREEN

**Thank you for your attention!**

Contact: [d.cassard@brgm.fr](mailto:d.cassard@brgm.fr)

Coordinator: [stephane.bourg@cea.fr](mailto:stephane.bourg@cea.fr)