



EU Core Vocabularies in action:

Using Core Business Vocabulary
in the EU Business Registers
Interconnection System (BRIS)

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05 May 2015

Business Registries Interconnection System (BRIS)

What is BRIS

The limited cross-border access to information about business that is often not up-to-date, results in a risky business environment for consumers and business partners, and reduces legal certainty.

“ Efficient cross-border cooperation between the European business registers is essential for a smooth functioning of the Single Market within the EU ”

The European Commission is setting up a **European Central Platform**, i.e. BRIS, to provide **access to company data** and to ensure an **interoperable communication of company data between interconnected registers** (Directive 2012/17/EU[1]).

BRIS facilitates the distribution of information from each of the Member States' business registers to the registers of other Member States in a **standard message** format and in the **relevant language version**.

[1] <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32012L0017&from=EN>

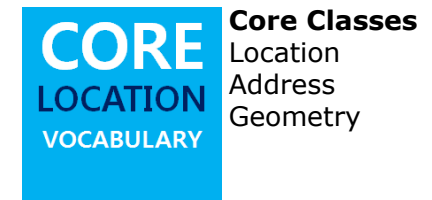
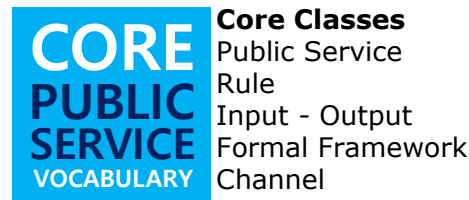
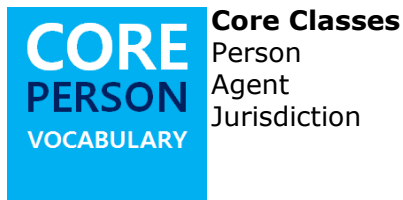
The Core Vocabularies

“ ***The Core Vocabularies are simplified, re-usable and extensible data models that capture the fundamental characteristics of a data entity in a context-neutral and syntax-neutral fashion [1]*** ”

The ISA Programme facilitated international working groups to forge consensus on 4 Core Vocabularies.

The Core Vocabularies have been endorsed by the EU Member States and are free to be used.

The latest release of the Core Vocabularies can be retrieved via the European Commission Joinup platform [2].



[1] https://joinup.ec.europa.eu/asset/core_vocabularies/description

[2] https://joinup.ec.europa.eu/asset/core_vocabularies/asset_release/core-vocabularies-v11#download-links

Core Vocabularies as enablers of semantic interoperability

In Europe, citizens and businesses move across borders. This increases the demand for **cross-border** public services. To deliver such services, public administrations must be capable to interact efficiently and effectively through seamless information exchange.

Seamless information exchange is **hampered** by **semantic interoperability conflicts**, which are caused by the **lack of commonly agreed data models**, the **absence of universal reference data** (e.g. codelists), etc.

The Core Vocabularies can help public administrations to reduce semantic interoperability conflicts in two ways:

- By extension: **designing new exchange models** based on Core Vocabularies to create:
 - Harmonised (via mappings) domain data models
 - Information exchange messages
- By **mapping: Existing data models** can be mapped to the Core Vocabularies. These mapping can be used for:
 - Alignment of the data models
 - Reconciliation of data sources.

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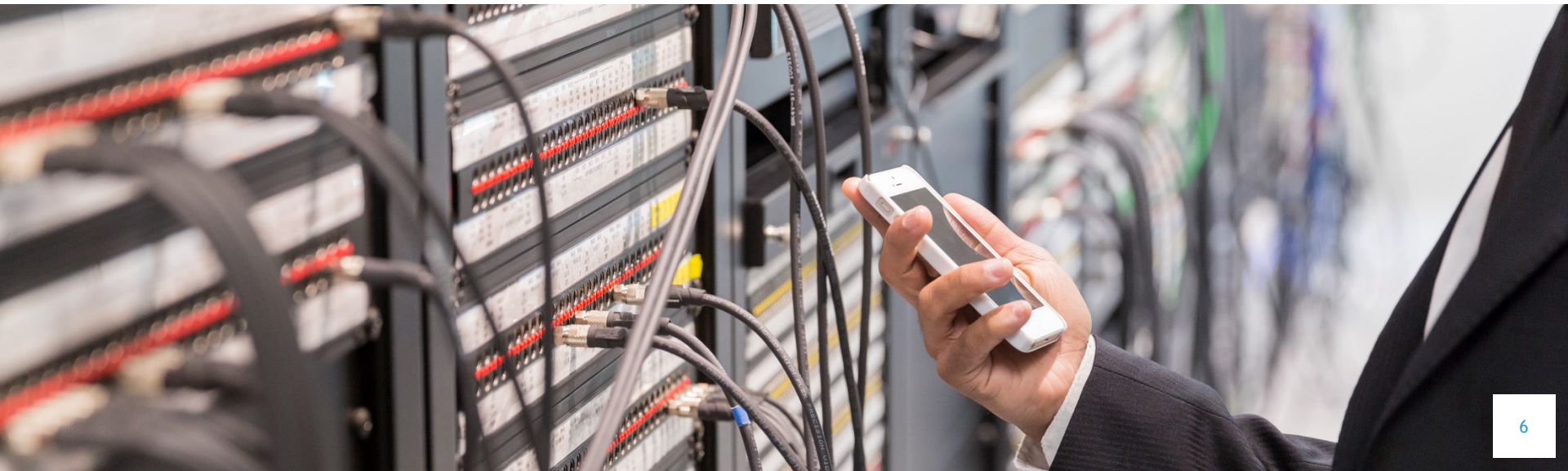
What is this case study about?

“ We demonstrate how **we have aligned the BRIS data models**, i.e.:

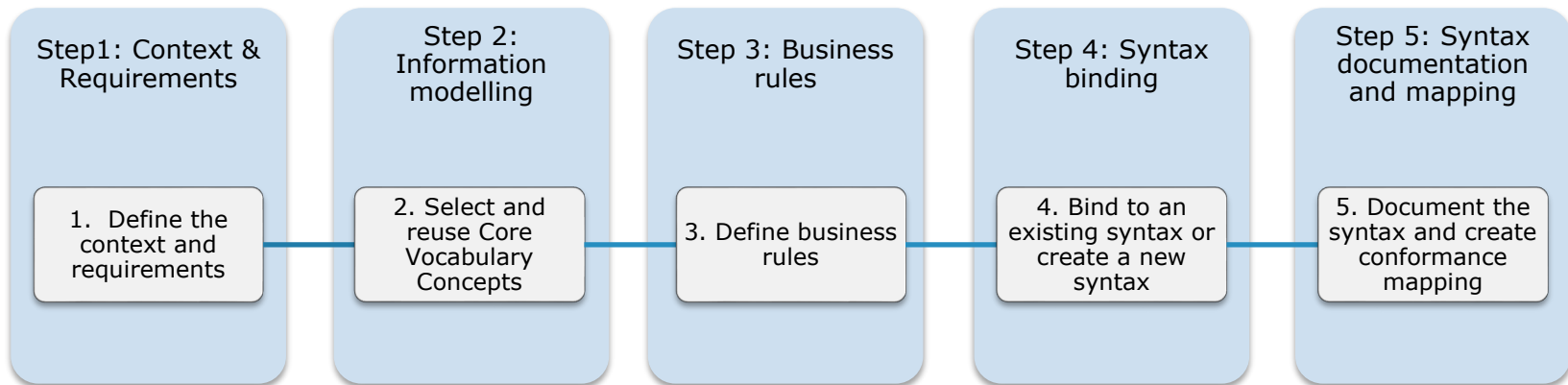
- **The BRIS entity model**; and
- **The BRIS messaging model**;

using the **Core Vocabularies** as the base data standard to enable the **interoperable communication of company data between interconnected registers** of the Member States.

”



How to design the BRIS models using the Core Vocabularies



Step 1: Context and requirements

Define the context and elicit a set of requirements for the data model to be designed.

Step 2: Information modelling

Document information requirements. At this step, the conceptual data model of the Core Vocabularies is used as a starting point that can be customised.

Step 3: Business rules

An enhanced data model with the cardinalities, constraints and the lists of sets of values that restrict the possible values for coded elements.

Step 4: Bind to an existing syntax or create a new syntax

When there is a standard syntax supporting a conceptual data model the existing standard syntax is used. If no, then a new syntax element can be created.

Step 5: Syntax documentation and mapping

Create documentation of the syntax that allows users to implement it and owners to claim conformance.

Step 1: BRIS Context & Requirements

Define the context

- BRIS constitutes the **European Central Platform** that will facilitate the execution of **queries** for the **acquisition of information on companies and their branches** opened in the Member States;
- The **main objective** of the pilot is to harmonise existing BRIS entity model with the **ISA Core Business Vocabulary** for enhancing semantic interoperability.

Define the requirements

The following business requirements were defined:

- **Search and retrieval:** search for a company via the e-Justice portal;
- **Notify a branch disclosure event:** notify the register of a branch of a status change of a foreign mother company in the foreign business register (insolvency, winding-up, striking-off);
- **Notify a cross-border merger event:** The registration in a business register of a merger between two (or more) companies that are registered in the business registers of two (or more) other Member States.

Step 1: BRIS Context & Requirements

The main building blocks of BRIS Solution Architecture

e-Justice Portal

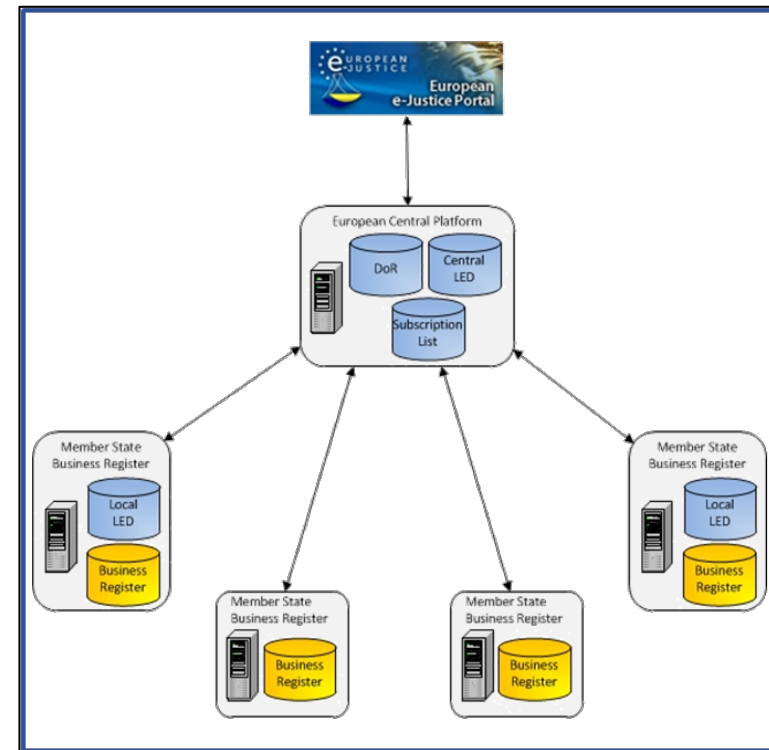
- **Access Point** for providing an interface (GUI) for end-users to search for companies.

European Central Platform (ECP)

- **Directory of Registers (DoR)** contains the list of domestic business registers with information on how to access them.
- **Subscription list** that contains the **EUID** [1] of the parent companies, it allows sending a branch disclosure event notification about a company to and only to those business registers interested in receiving such notification.
- **Legal Entity Data (LED)** contains – only for the Member States that are willing to participate – an indexed copy of the common free data of all registered companies. The Member States that do not participate in the central LED should create a local LED.

Business registers of the Member States

- **Business Register**
- **Legal Entity Data (LED)** – optional



[1] European Unique Identifier. This is the unique identifier assigned to companies and branches as required by Art. 3(1) of Directive 2009/101/EC and Art. 1(4) of Directive 89/666/EEC.

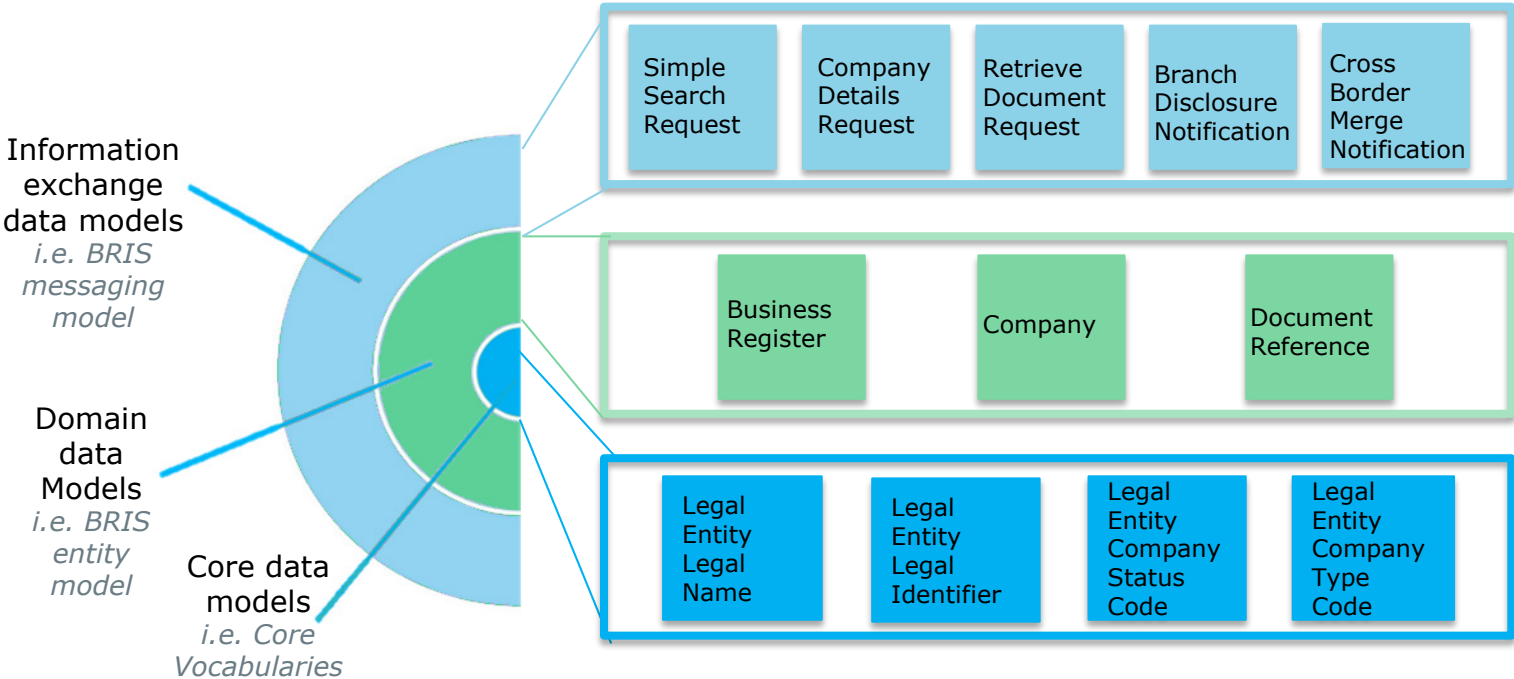
Step 2: Information modelling

BRIS Conceptual Data Model

BRIS messaging model to define the information exchanged (e.g. simple search operation).

BRIS entity model:

to define the domain data model (e.g. Company definition);
builds upon the **Core Business Vocabulary** (Legal Entity definition).



Step 2: Information modelling

Align the BRIS entity model with the Core Vocabularies

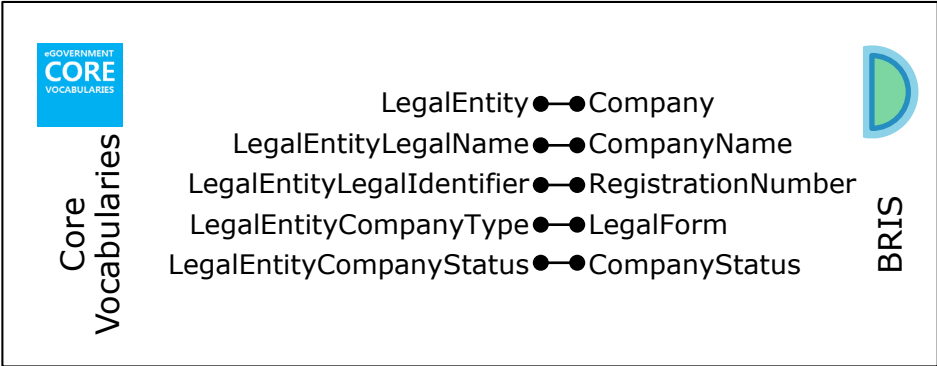
The BRIS entity model comprises three core entities:

- **Business Register**
- **Company**
- **Document Reference**

The **BRIS** data model was developed and mappings between these entities and the Core Business Vocabulary Legal Entity were performed.

These mappings **were used for:**

- **Alignment of the data models.** After analysing the existing relationships between BRIS and Core Business Vocabulary, the two data models were aligned in order to resolve semantic interoperability conflicts;

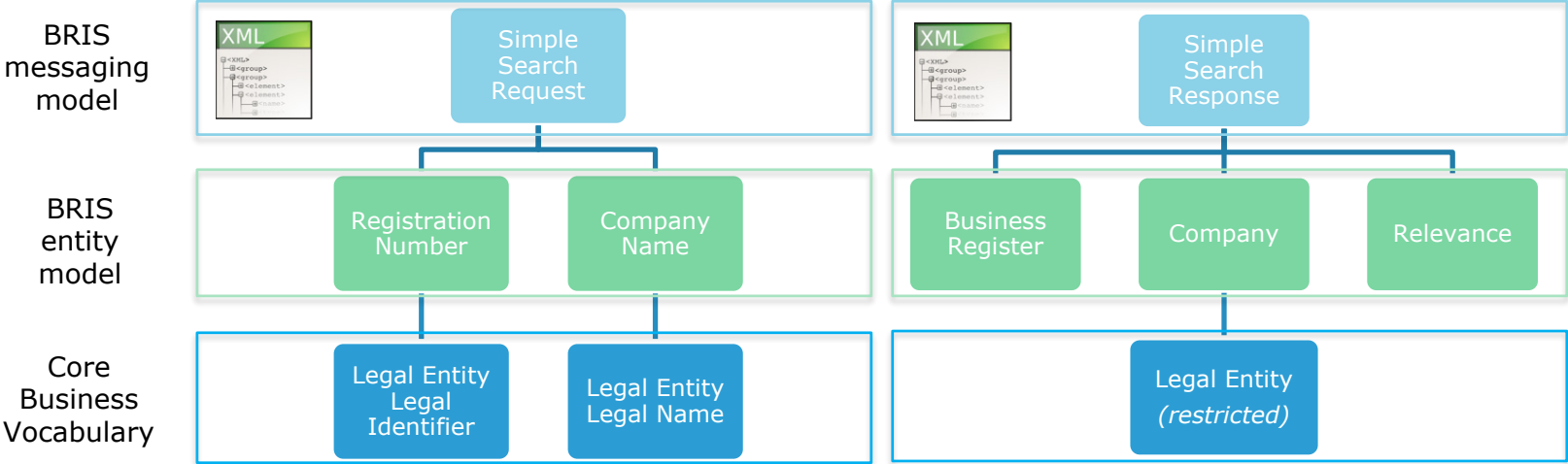


Step 2: Information modelling

Design BRIS XML messages based on Core vocabularies

In total, **14 messages** are defined.

The example below shows the design of two of those messages, i.e. the **“Simple Search Request”** and the **“Simple Search Response”**, which reuse elements of the Core Business Vocabulary that have been aligned previously with the BRIS entity model.



Step 2: Information modelling

Customising and extending the Core Vocabularies

The **Core Vocabularies** are **not meant to be complete** to fit the requirements of any domain.

Core Vocabularies can be used by public administrations to **attain a minimum level of semantic interoperability** for e-government systems, by agreeing on and reusing a common set of core classes and properties.

To customise the Core Vocabularies to your context, you can:

Add new classes or properties or associations to a class.

- The BRIS entity model introduces extra classes e.g. **“Document”**, **“Attachment”** and **“Business Register”**.

Specialise classes, properties, or associations.

- **“Company”** class of the BRIS entity model has a narrow match with the **“Legal Entity”** class of Core Business Vocabulary and
- **“Registration-Number”** element of the BRIS entity model has a narrow match with the **“Legal Identifier”** attribute of the **“Legal Entity”** class of Core Business Vocabulary .
- In practice, each of these classes include restricted properties of the Legal Entity class.

Step 2: Information modelling

Restricting the Core Vocabularies in BRIS

Removing irrelevant properties and associations from a class.

- In BRIS, the following properties and associations were removed from the “Legal Entity” class of the Core Business Vocabulary:
 - Alternative Name;
 - Company Activity.
- The direct consequence for interoperability is that a system might be missing information that it would expect from Core Vocabularies-conformant models.
- if no new properties are added and only some properties are removed, as in the case of the BRIS entity model, there is a guarantee that systems will understand all the remaining properties.

Replacing existing classes, properties, or associations with new ones.

- Sometimes, an element from the Core Vocabularies might be semantically close to the requirements of a data model, but still not match them exactly. So, one might replace the element with a new one;
- The following elements of the “Legal Entity” class were replaced in BRIS:
 - **“Company Type”** is replaced by **“Company Legal Form”**;
 - **“Identifier”** and **“Legal Identifier”** are replaced by **“Company Registration Number”**;
 - The association **“Registered Address”** is replaced by the property **“Company Registered Address”**.
- Replacing elements of the Core Vocabularies with the BRIS elements has a huge impact on interoperability and is discouraged unless the business requirements justify this.

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Step 3: BRIS Business Rules

The BRIS entity model defines the following assertions, constraints and derivations:

- Integrity constraints on the information model (cardinalities); and
- Conditional business rules and co-occurrence constraints.

Component Name	Property Term	Cardinality	Definition
Attachment			A class to describe an attached document. An attachment can refer to an external
EmbeddedDocumentBinaryObject	Document	0..1	A binary large object containing an attached document.
ExternalReference	External Reference	0..1	A reference to an attached document that is external to the document(s) being
BusinessRegister			A business register
RegisterID	Identifier	1..1	An identifier of the register.
RegisterName	Name	0..1	The name of the register.
RegisterCountry	Country	0..n	The country in which the register is operating.
Company			A company
LegalEntityLegalID	Legal Identifier	1..1	An identifier of the company.
LegalEntityLegalName	Legal Name	0..1	The name of the company.
LegalEntityCompanyTypeCode	Company Type	0..1	The legal form of a company.
LegalEntityCompanyStatusCode	Company Status	0..1	The status of the company.
LegalEntityRegisteredAddress	Registered Address	1..1	The registered address of the company.
Country			A class to describe a country.
IdentificationCode	Identification Code	1..1	A code signifying this country.
Name	Name	1..1	The name of this country.
DocumentReference			A class to define a reference to a document.
ID	Identifier	1..1	An identifier for the referenced document.
LanguageID	Language	0..1	An identifier for the language used in the referenced document.
DocumentName	Name	0..1	The name of the document.
DocumentFormatCode	Format	0..1	The format of the document.
DocumentFeeAmount	Fee	0..1	The amount to be paid for the document.
Attachment	Attachment	0..1	The referenced document as an attachment to the document from which it is referenced.
ExternalReference			A class to describe an external object, such as a document stored at a remote location.
UriID	Uri	0..1	The Uniform Resource Identifier (URI) that identifies the external object as an Internet
ExpiryDateTime	Expiry Date Time	1..1	Date and time when the message was sent.

Step 4: BRIS Syntax binding

- 1. Representation format:** BRIS adopts the **XML Schema representation format** to describe the information exchange model or domain model;
- 2. Standard syntax bindings:** BRIS chooses the **Core Vocabularies standard syntax bindings**;
- 3. Naming and design rules:** BRIS follows **standard naming and design rules (NDRs)** based on UBL methodology and CEFACT methodology;
- 4. Use of existing mappings where available:** BRIS uses the following mappings:
 - Core Vocabularies XML schemas;
 - OASIS Universal Business Language 2.1;
 - UN/CEFACT CCL 13B.

- 5. Use standard syntax where available:** BRIS uses **Core Vocabularies standard syntax**: The information requirements that do not have a correspondence to a Core Vocabulary concept are mapped to the proper element in the standard syntax. Use the semantics of the standard syntax to identify the mapping;
- 6. Mint new terms where needed:** BRIS defines **new terms if an information requirement cannot be bound to the standard syntax** (e.g. Country);
- 7. Create specific schema (validation artefacts):** BRIS creates **specific schema (XML schema) and XSD validation artefacts schema** that defines the new syntax.

Step 5 : BRIS syntax documentation and mapping

Mapping spreadsheet

To claim conformance of the data to the Core Vocabularies, the syntax documentation must be done using the spreadsheet that is included in release version 1.1 of the Core Vocabularies [1].

Documenting the mappings is important as it allows domain experts and software developers to **understand, interpret and share** them more easily and efficiently.

Core Vocabulary Identifier	Mapping relation	BRIS Core Entity Model
LegalEntity	Has narrow match	Company
LegalEntityLegalName	Has narrow match	CompanyName
LegalEntityLegalIdentifier	Has narrow match	RegistrationNumber
LegalEntityCompanyType	Has narrow match	LegalForm
LegalEntityCompanyStatus	Has narrow match	CompanyStatus

Step 5 : BRIS syntax documentation and mapping

Schema annotations

BRIS will provide documentation by using XML Schema annotations as part of the validation artefacts.

The example below shows how the XSD Schemas in BRIS will use **xsd:annotation** to describe the semantic meaning of the Core Vocabularies components.

```
<xsd:element ref="cxb:LegalEntityID" minOccurs="0" maxOccurs="1">
  <xsd:annotation>
    <xsd:documentation>
      <ccts:Component>
        <ccts:ComponentType>BBIE</ccts:ComponentType>
        <ccts:DictionaryEntryName>Branch Disclosure Notification. Legal Entity_ Identifier. Identifier</ccts:DictionaryEntryName>
        <ccts:Definition>An identifier of the company.</ccts:Definition>
        <ccts:Cardinality>0..1</ccts:Cardinality>
        <ccts:ObjectClass>Branch Disclosure Notification</ccts:ObjectClass>
        <ccts:PropertyTermQualifier>Legal Entity</ccts:PropertyTermQualifier>
        <ccts:PropertyTerm>Identifier</ccts:PropertyTerm>
        <ccts:RepresentationTerm>Identifier</ccts:RepresentationTerm>
        <ccts:DataType>Identifier. Type</ccts:DataType>
      </ccts:Component>
    </xsd:documentation>
  </xsd:annotation>
</xsd:element>
```

Lessons learnt

Benefits

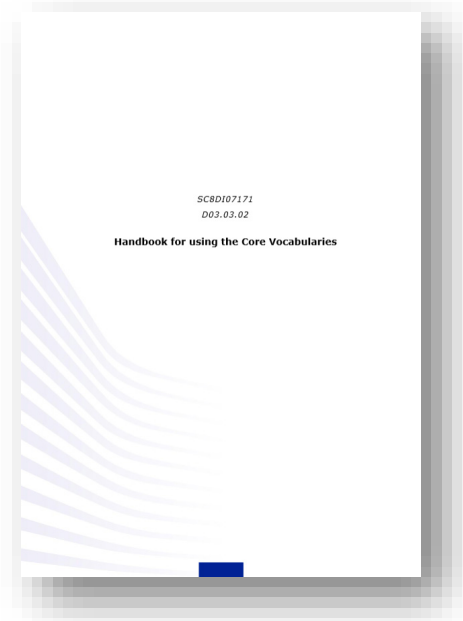
Building the BRIS model based on the Core Vocabularies and their associated syntax mappings leads to a number of **benefits**:

- **Reduced the development costs** of the project as the Core Vocabularies can be used as a pattern for the common classes
- **Improve the integration of BRIS information** with data from other systems that also use the same Core Vocabulary, e.g. State Aid notification data.
- Provided a set of techniques that **improved the efficiency** of the project team. During the adoption process, the BRIS team gained experience by:
 - following **standards** which has enhanced interoperability of the resulting data model;
 - following **naming and design conventions** and achieving semantic interoperability i.e. renaming data model elements based on the Core Vocabularies naming conventions;
 - **solving technical issues** and conflicts by following the Handbook for the Core Vocabularies;
 - converging towards a **common mind-set** for achieving semantic interoperability.
- The adoption of the Core Vocabularies will allow BRIS to be easily extendible in the future.

The Core Vocabularies

Start developing your system using the Core Vocabularies

The Core Vocabularies can be used by public administrations to attain minimum level of semantic interoperability for e-Government systems. Access and download the Core Vocabularies Handbook on Joinup [1].



“Use the Core Vocabularies to define a new conceptual data model and bind it to an existing standard syntax.

The Core Vocabularies provide the semantics layer for the core concepts, and are used to identify the mappings between the conceptual data model concepts and the syntax elements. The standard syntax relies on existing international standard syntax, and the Core Vocabularies provide the mappings from the semantic layer to the syntactical data elements. The Core Vocabularies are available in two formats: XML and RDF schema.

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[1]https://joinup.ec.europa.eu/site/core_vocabularies/Core_Vocabularies_user_handbook/Handbook-for-using-the-Core-Vocabularies_v0.50.pdf

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An action supported by ISA

The SEMIC action is supported by ISA, the European Commission's programme for interoperability solutions for European public administrations.

Why ISA?

Administrative procedures have the reputation of being lengthy, time-consuming and costly. Electronic collaboration between public administrations can make these procedures quicker, simpler and cheaper for all parties concerned, in particular when transactions need to be carried out cross-border and/or cross-sector. ISA supports this type of electronic collaboration. With more than 40 actions it provides tools, services and frameworks for the modernisation of public administrations in Europe, across e-borders and sectors.



More on the programme:

<http://ec.europa.eu/isa/>



More on the SEMIC action:

http://ec.europa.eu/isa/actions/01-trusted-information-exchange/1-1action_en.htm

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