

Case study for Lot 1

“High Level analysis for a Central European Registry of Energy Market Participants (CEREMP)”

Table of contents

Table of contents	1
List of acronyms	2
1. Background information	3
2. Description of a scenario for the development of the CEREMP application	3
3. Scope of the case study	4
4. General description of CEREMP	4
2.1. The market participant registration process	4
2.2. National registers and the European register	6
2.3. Identification and supply of credentials to the individuals involved in the operations of CEREMP	7
3. Information stored in CEREMP	7
3.1. Common information	7
3.2. The CEREMP's coding system	8
3.3. Time validity of CEREMP information	8
3.4. Queries to the European register system	8
4.1. Interaction of CEREMP with other systems	9
4.2. Users' identification and credentials to access the system	9
5. Main use cases of CEREMP	10
5.1. Use case 1: Registration and identification of a new market participant	10
5.2. Use case 2: Update of a market participant's record	11
5.3. Use case 3: Asynchronous notification of a declaration of participation with a second market participant	12
5.4. Use case 4: Termination of a market participant	14
5.5. Use case 5: Consultation of CEREMP data	14
5.6. Use case 6: Initial population of the CEREMP database	15
6. Annexes	18
6.1. Database schema	18
6.2. Example of XML and XSD schemas	18

List of acronyms

Agency	Agency for the Cooperation of Energy Regulators
ACER	Agency for the Cooperation of Energy Regulators
BIC	Bank Identifier Code
CAS	Central Authentication Service
CEREMP	Centralized European Register of Market Participant
CRUD	Create, Read, Update and Delete (the four basic functions of persistent storage)
CSV	Comma Separated Value
DB	Data Base
EIC	Energy Identification coding scheme
ESMA	European Securities and Markets Authority
HR	Human resources
HTTPS	Hyper Text Transfer Protocol over Secure socket layer
IAC	Inter Application Communication protocol
IT	Information Technology
MP	Market participant
MTOM	Message Transport Optimization Mechanism
NRA	National Regulatory Agency
OTP	One-Time Password
PIN	Personal Identification Number
REMIT	Regulation on Energy Market Integrity and Transparency
RPC	Remote Procedure Call
SOAP	Simple Object Access Protocol
SQL	Search and Query Language
TAB	Tab Separated Value
UML	Unified Modelling Language
VAT	Value Added Tax
WS	Web Service
XLS	Microsoft Excel File Format
XML	eXtensible Mark-up Language
XSD	XML Schema Definition

1. Background information

The purpose of this case study is to allow the tenderers to list possible activities and work required to implement the Central European Registry for wholesale market participants (CEREMP) and to run a standard maintenance phase for a total duration of six (6) months after final acceptance of the product.

The tenderer shall provide:

- the technical approach they intend to adopt considering the Agency's constraints;
- the methodology they intend to use during the overall duration of the contract;
- a detailed planning;
- if applicable, propose changes to the described use cases.

2. Description of a scenario for the development of the CEREMP application

The case study aims to assess the tenderers' responses related to the implementation of the CEREMP database. The analysis is a non binding interpretation of article 9 of the Regulation (EU) No 1227/2011 of the European Parliament and the Council on wholesale energy market integrity and transparency (hereafter: REMIT)¹ and other related articles. The tenderer may propose change(s) to the scenario if supported by relevant arguments.

The tenderer shall, on the basis of the case study, provide the following three (3) deliverables:

- A detailed technical proposal;
- A master plan for the implementation which shall include:
 - human resources needs and a plan with human resources allocation
 - a detailed list of deliverables accompanied by a note per deliverable describing what the tenderer intends to do during the implementation of the deliverable
 - a detailed time planning, showing on the time line all the deliverables, the deliverables which can be done in parallel and the foreseen milestones
 - a detailed risk assessment plan;
 - a detailed quality plan
- A financial proposal for the implementation which should take into account any direct and indirect cost which involves the production of software.

For the purpose of this case study the tenderer shall take into account that the CEREMP application should be a distributed application, installed at a central location to be deployed in a hosting environment. The application shall cover the needs of 27 national regulatory authorities (NRAs) as well as the coordination needs of the Agency. The application itself should be developed to serve a front end in 23 languages with 28 separate corporate identities (in terms of background, text and foreground colours as well as a single logo per each corporate identity).

The deployment of the application shall be done with remote methods, in particular with the adoption of virtual private networks and with the use of remote desktop tools such as XTerm and/or terminal services.

¹ Regulation (EU) No 1227/2011 of the European Parliament and the Council on wholesale energy market integrity and transparency, OJ L 326, 08.12.2011, p.1

For the case study the following software infrastructure is available:

- Operating System Windows 2008 R2
- Main programming language: Java Core (please refer to J2EE for patterns and methodologies to use different kind of objects);
- Data Base: Oracle 11g
- Web Server: Apache
- Application Server: Oracle WebLogic 12c
- Middleware: Hibernate
- Other backend and front end technologies which could be used eventually
- Presentation layer must be based as much as possible on pure HTML which must be a result of XML adopting specifics XSLT, to improve the re-usability of the content.

In case a user needs to have a strong interaction with the platform the system can be implemented with Rich Internet Applications which should preferably use Secure Web Services.

Interfaces with other systems, when possible, should be implemented using synchronous web services, and each web service should provide an acknowledge mechanism.

The application will not be sensitive from a security perspective. Therefore a proposal for the application shall comply with at least with the following minimum standards:

- Communication channel must be encrypted; when using web services, the communication channel should be encrypted and the web services should request a specific authentication before serving data.
- The data do not need to be encrypted inside the database, as the level of confidentiality is not retained to be extremely high. Nonetheless, the tenderer must explain in the technical proposal all the security measures to be adopted. These should be reflected in the financial proposal.

3. Scope of the case study

According to REMIT, energy market participants must register with the NRAs in the Member State in which they are established. The Agency shall administer the Centralised European Register of market participants (CEREMP).

4. General description of CEREMP

The basic requirements for the CEREMP system are:

- (a) Single registration among all the Member States for each market participant;
- (b) Each market participant can have a unique identifier;
- (c) An exchange of data between national registers and CEREMP must be established;
- (d) The Agency should ensure access to data to all public authorities involved;
- (e) The Agency is responsible for the publication of CEREMP dataset, or a part of it;
- (f) Information in the registry must be kept up to date.

2.1. The market participant registration process

The Agency intends “market participant registration process” as the process which starts with the market participant submitting a registration request to a NRA of the Member State where the market participant is established (article 9(1) of REMIT).

The NRA has the obligation to collect and verify completeness and reliability of the information provided. The NRA:

- stores the information provided by the market participant in the national register system;
- transfers a copy of the information to CEREMP.

The national register system is the application that stores the information gathered by NRAs to enable energy market monitoring.

Once CEREMP receives the information from the national register, it:

- generates a unique code for the market participant,
- informs the national register of the Agency-code associated with the market participant,
- broadcasts to all the interested parties the registration records and any resulting control/link relationship which will be the result of a new registration,
- triggers the publication of non disclosed information regarding the market participant in question,

As a result:

- the involved NRA will notify to the market participant the associated Agency-code, confirming a successful registration;
- each party involved and interested in the broadcast of the information shall update the national register creating a control/link relationship.

The following picture provides a graphic presentation of the relations between the parties involved.

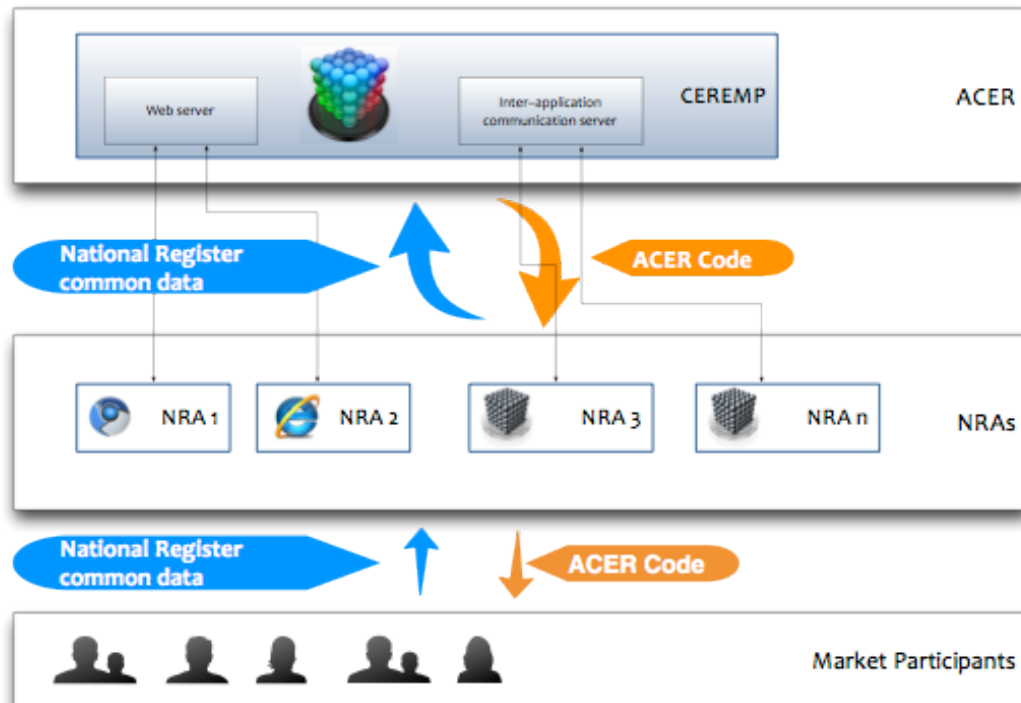


Figure 1. Parties involved in the registration of a market participant process

The non disclosed information related to market participants stored into the CEREMP must be available via a simple web-based query system, using a batch interface.

2.2. National registers and the European register

Two main requirements must be fulfilled when proposing and developing the project:

- The CEREMP must be easily integrated with the existing national registries and
- The NRAs must have the option to implement a national register system in a quick and efficient manner re-using the platform used by the Agency's IT systems with an ad-hoc configuration.

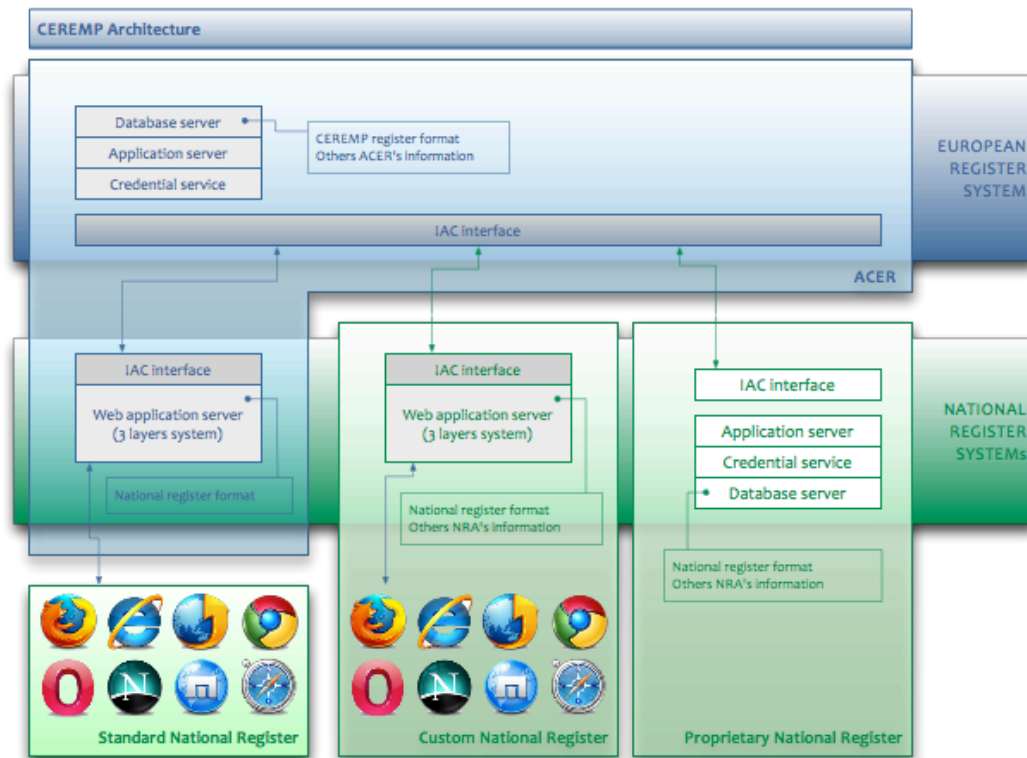


Figure 2. CEREMP architecture with 3 types of national registers

An Inter-Application Communication (IAC) layer must exist to support three potential types of national register systems.

- Type 1: Standard national register based on the Agency's platform which must assure the registration process at national level. The following functionalities must be provided:
 - (a) The submission of the registration data will be performed directly by the market participant.
 - (b) Submission of supporting documents as result of the operation described at point (a).
 - (c) Submission of additional information specific to the NRA.
 - (d) Update of the information described at points (a), (b) and (c).
 - (e) Search interface to retrieve information against the entire data set.
- Type 2 – Customised version of the solution as described in type 1 using a set of extensible Application Programming Interfaces and any external component.
- Type 3 – Home made solution owned by the NRA and interacting with the Agency in compliance with the IAC specifications issued by the Agency.

2.3. Identification and supply of credentials to the individuals involved in the operations of CEREMP

For the purpose of identification, authentication and authorization the following operators must be provided with working credentials:

- Market participants when submitting or updating information.
- NRAs when dealing with information received by market participants and third parties.
- Parties interested in accessing the register information to perform their duties imposed by the existing EU and national regulations.
- Staff of the Agency dealing with the information inside the register with the purpose to allow analysis of market monitoring data.

For each category, multiple operators will be identified and supplied with security credentials.

3. Information stored in CEREMP

3.1. Common information

The star (*) is used to identify compulsory fields as described under article 9 of REMIT.

Basic identification and contacts information:

- The Agency code: this code is generated and assigned to the market participant by the CEREMP system
- Company name
- Legal form
- VAT number*
- Place of establishment (headquarters)*
- Address details
- Contact details (headquarters contact details, person responsible for the registration*, persons in charge and responsible for trading activities*)

Control/link relations:

- the Agency code of the involved parties
- Type of relation (parental link (i.e. father to child, brother to brother), acquisition, merger, other)
- Any additional information

Ultimate controller or beneficiary:

- Contact details of the ultimate controller or beneficiary of the market participant's trading activities
- Description of the relationship between the market participant and the ultimate controller or beneficiary.

For each controller or beneficiary an identification and contact fields are filled, together with a free text field where the relationship between the legal entity and the ultimate controller or beneficiary is identified.

Parties delegated to provide information on behalf of the market participant:

- the Agency code of the delegated party
- Contact details of the delegated party

3.2. The CEREMP's coding system

The REMIT defines that the registration system shall give each market participant a unique identifier. This is achieved, in CEREMP, by assigning to each to the market an identifier-code, issues by the CEREMP system as part of the registration process.

This shall be achieved by assigning a unique identifier-code to each market participant during the registration process.

The Agency's code must be built around a numerical (integer) progressive code which shall be:

- unique for the whole CEREMP system
- of fixed length (with filler zeros)
- post-fixed by a country code
- pre-fixed by an entity-type code identifying the parties according to the types listed in article 8.4 of REMIT. Further entity-types may be added, if the Agency needs it.

The following figure illustrates the Agency-code.

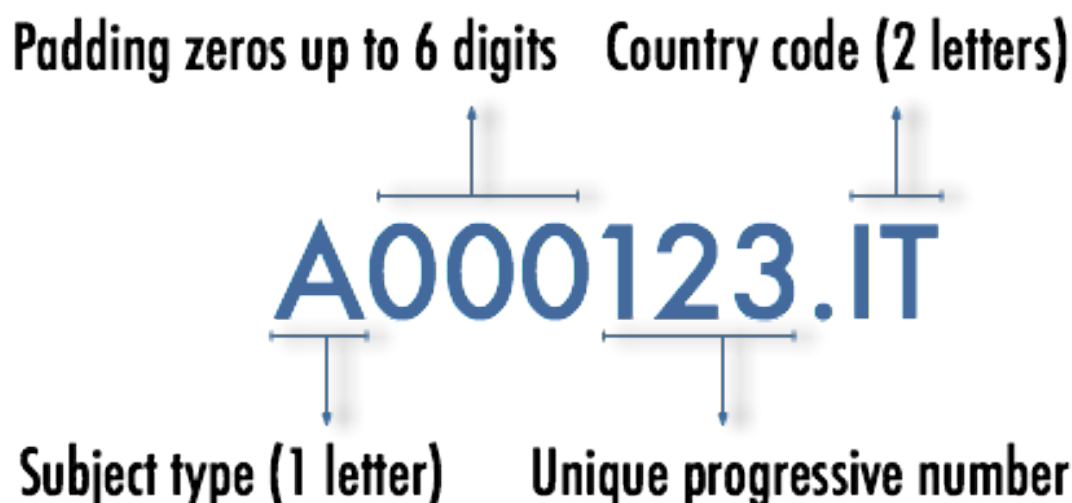


Figure 3. Format of the Agency's code

3.3. Time validity of CEREMP information

Any information in the CEREMP system must be marked with a version identifying the point in time when the information was valid and when the information expired.

3.4. Queries to the European register system

The system must ensure that information is served through a web internet browser of through an automatic system serving more records in a single request.

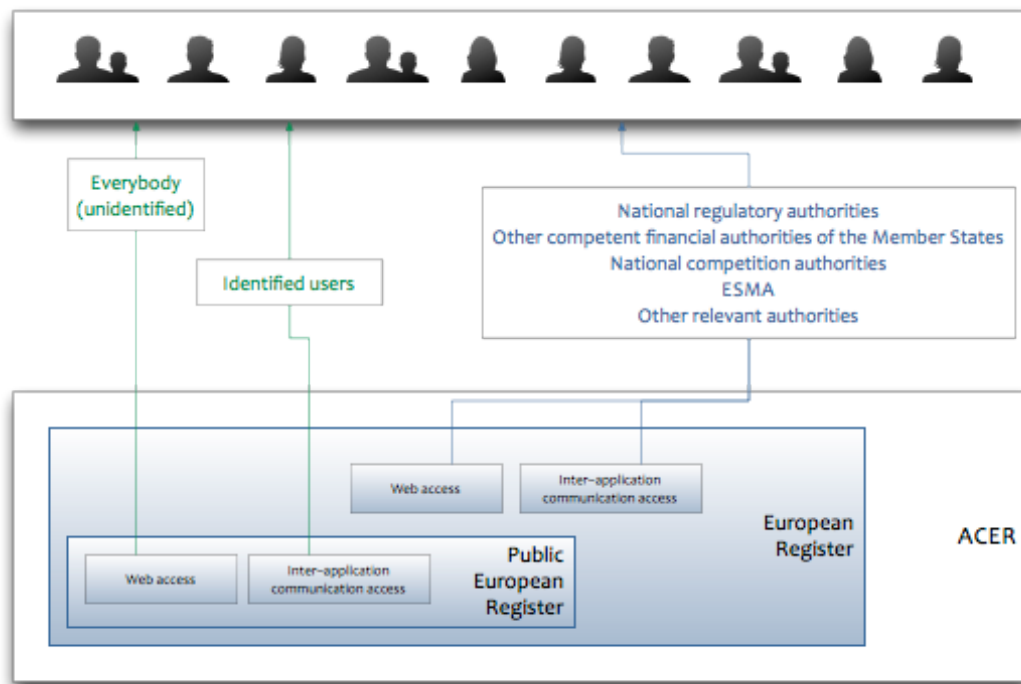


Figure 4. Accessing the CEREMP

4.1. Interaction of CEREMP with other systems

For the purpose of this case study, integration must be assured through a set of web-services which will interact with proprietary systems exposing the proper operations for the needs of CEREMP as well as the users.

The interaction with the CEREMP system will take place through the exchange of XML messages formatted according to the SOAP protocol over an http/s channel.

Performance issues must be taken into serious consideration since this could become a relevant issue due to the high transaction rates.

Updates of already registered market participants must take place in “real time” on the side of the Agency as well as the side of the NRAs. The system must send selective broadcasts to the interested parties when a change is made.

When drafting the case study, the following topics must be addressed:

- Confidentiality of data;
- Data integrity;
- Non repudiation of origin;
- Proposed authentication and authorization.

4.2. Users’ identification and credentials to access the system

For the purpose of this case study and to avoid duplication of credentials between the European and Member State level, a Central Authentication Service must be considered as an integral part of the CEREMP software infrastructure.

5. Main use cases of CEREMP

Below is a list of use cases related to the CEREMP system.

Use case ID	Use case name	Starter	Other actors	Complexity
1	Registration of a new market participant	Market participant	NRA, the Agency	High
2	Update of market participant's record	Market participant	NRA, the Agency	High
3	Asynchronous notification of a declaration of participation with a second market participant	The Agency	MP1, MP2, NRA1, NRA2	High
4	Termination of a market participant	Market participant	NRA, the Agency	Low
5	Access to the register procedure	External user	The Agency	High
6	Initial population of CEREMP database	NRA's with information in electronic form	The Agency	Middle

In the next paragraphs the use case with four basic functions of any persistent storage system are described: “Create”, “Read”, “Update” and “Delete” (CRUD) which form an integral part of this case study.

5.1. Use case 1: Registration and identification of a new market participant (create)

Market participants decide to comply with the existing EU and national registration and submit a registration.

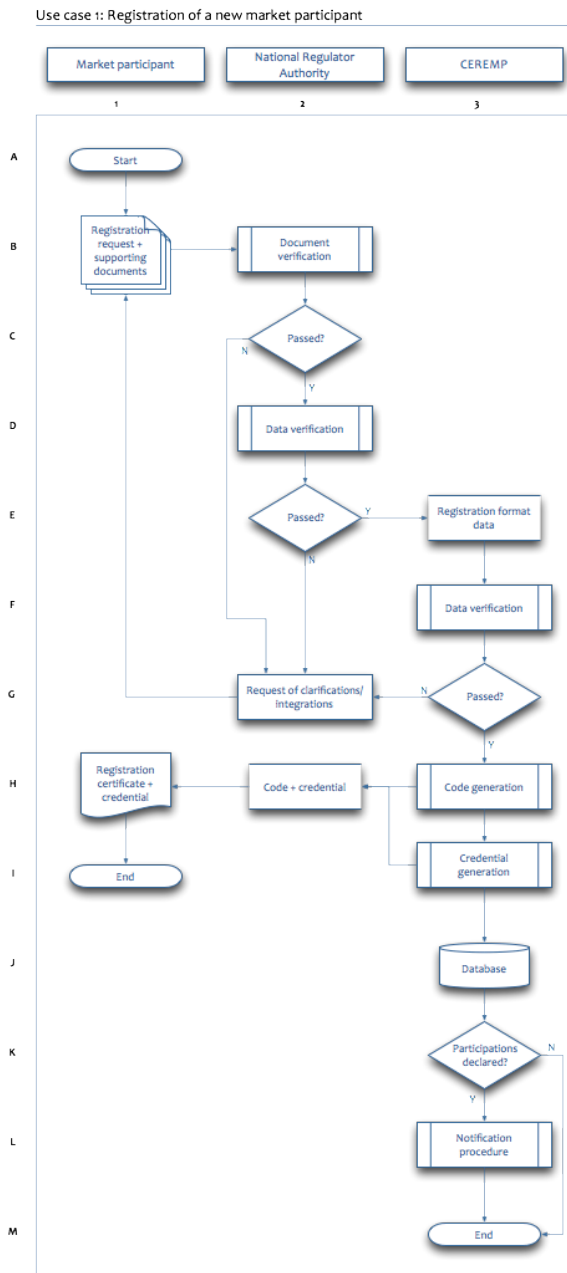
Other actors are the NRA and the Agency.

During this procedure the market participant submits to the NRA of the Member State in which it is established or where its place of residence a request for registration with the supporting documents. The NRA receives the documentation and validates them (B2). If the result of the evaluation is negative, a request for clarification/integration is sent back to the market participant (G2), otherwise data are validated and transferred from the National register system to CEREMP (D2). If the control is passed, data are sent to CEREMP that make its own verification (F3). If the test is positive, the Agency unique code for the market participant procedure is issued (H3). The code is sent back the NRA's system and the transaction is officially registered in CEREMP (I3). From this moment onwards the information is available for consultation from CEREMP.

The NRA receives the code (H2) and generates a registration certificate (H1) for the market participant.

If the market participant indicated another market participant as a parent undertaking or related undertaking (J3), CEREMP triggers the “use case number 3: asynchronous notification of a declaration of participation with a second market participant” described below. This procedure is asynchronous related to the registration one; this means that the market participant will for example receive the registration certificate before the result of the notification procedure (K3) will be available.

This high level procedure is the same if the NRA uses its own IT system or the Agency's web based one. In the latter case, data verification subroutines D2 and F3 are the same.



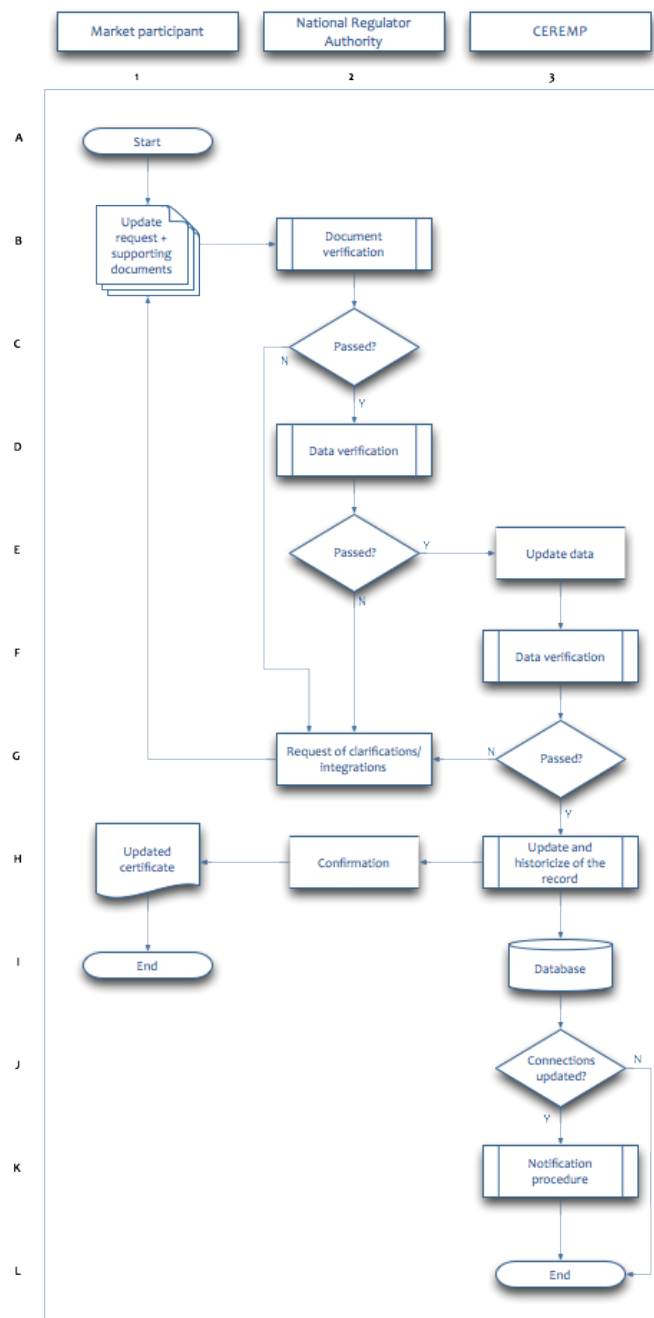
5.2. Use case 2: Update of a market participant's record (update)

This procedure applies when a market participant changed its own information. The market participant has the obligation to inform the NRA which will update the information in the CEREMP system.

The supporting documents (B1) are provided from the market participant to the NRA with the aim to prove the validity of information provided.

The Agency's activity (H3) is limited to the update of the record and the creation of an

Use case 2, 4: Update of a new market participant's record



obsolete version of the registration form.

If the update refers also to the list of connected companies (J3) the same routine of the registration and identification use case is triggered (K3).

5.3. Use case 3: Asynchronous notification of a declaration of participation with a second market participant

Conditions to trigger this use case are:

CEREMP system receives a notification of a control/link relation between market participants to create/update the information related to the participation/connection of the market participant (MP1) that triggered the procedure use case 1 or 2 with another market participant (MP2). During the registration process, or in the process of updating information concerning a registered market participant, a control/link relationship could be notified to CEREMP.

The control/link relationship declared by a market participant MP1 involves a market participant MP2. The two market participants can belong to the same or a different NRA (NRA1 for MP1 and NRA2 for MP2).

The procedure aims to allow MP2 to endorse the relationship declared by MP1.

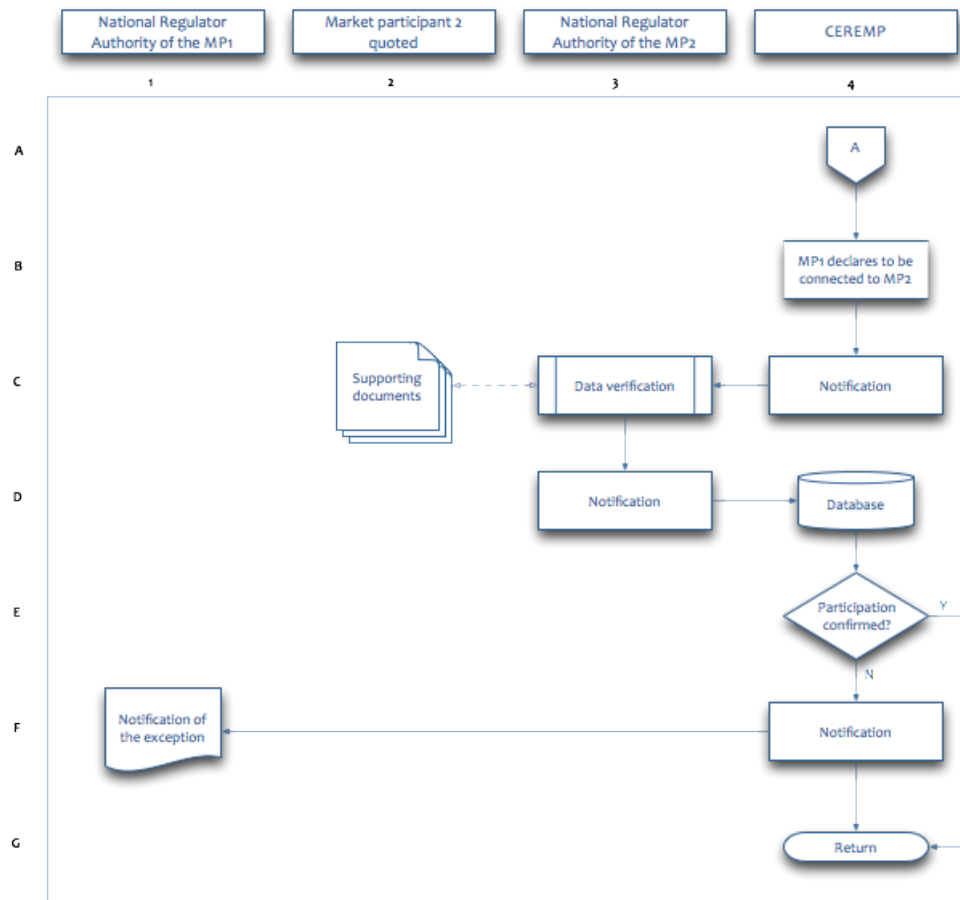
As soon as CEREMP receives the declaration of participation (B4), it sends a notification (C4) to the National register system (NRA2) of the market participant (MP2). NRA2 interacts with MP2 according to the national regulation, verifies the information (C3) and as the result of the verification process notifies CEREMP (D3).

CEREMP stores the information in the register (D4) and, if the declaration made by MP1 (B4) is confirmed, the procedure returns back to the main one; if the declaration (B4) is not confirmed, CEREMP will notify the NRA (NRA1) related to the market participant (MP1) that the provided information has not been confirmed by the counterpart (MP2).

Most likely this will start an internal procedure with NRA1.

If NRA1 and NRA2 are the same (MP1 and MP2 are established or resident in the same Member State) the last notification made by the Agency (F4) is redundant.

Use case 3: Asynchronous notification of a declaration of participation with a second market participant



5.4. Use case 4: Termination of a market participant (delete)

If a market participant wants to be deleted from CEREMP, “Use case 2: Update of a new market participant's record” will be triggered. The status contained in the record related to the market participant will be switched from ‘Active’ to ‘Inactive’.

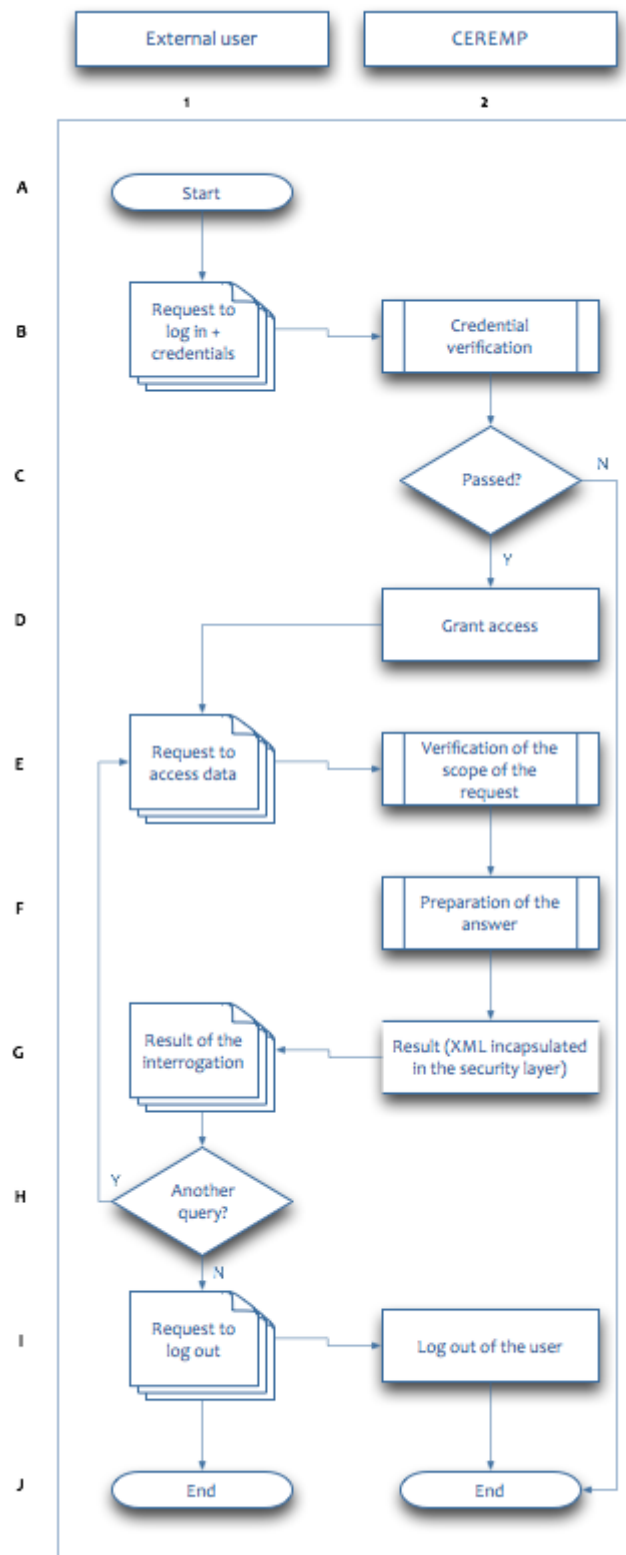
5.5. Use case 5: Consultation of CEREMP data (read)

A user logs on to CEREMP (B1). The access can be made via a web browser or through another communication channel.

The system verifies the user credentials (B2) and if the test is passed, access to the system is granted (D2); otherwise the process will cut the communication channel with an explanation message (J2).

After the user is authenticated, it is able to run a query in the CEREMP database (E1). CEREMP The system verifies the scope of access (E2), access the database to read the register and provide the answer (F2), encapsulating the XML in the security layer (G29).

The user can run multiple queries or request to log out (I1). Any activity is logged.



5.6. Use case 6: Initial population of the CEREMP database

The NRA willing to feed the national register via a batch procedure, after authentication, uploads the data file (E1) prepared, following the Agency's instructions on the format and logs out.

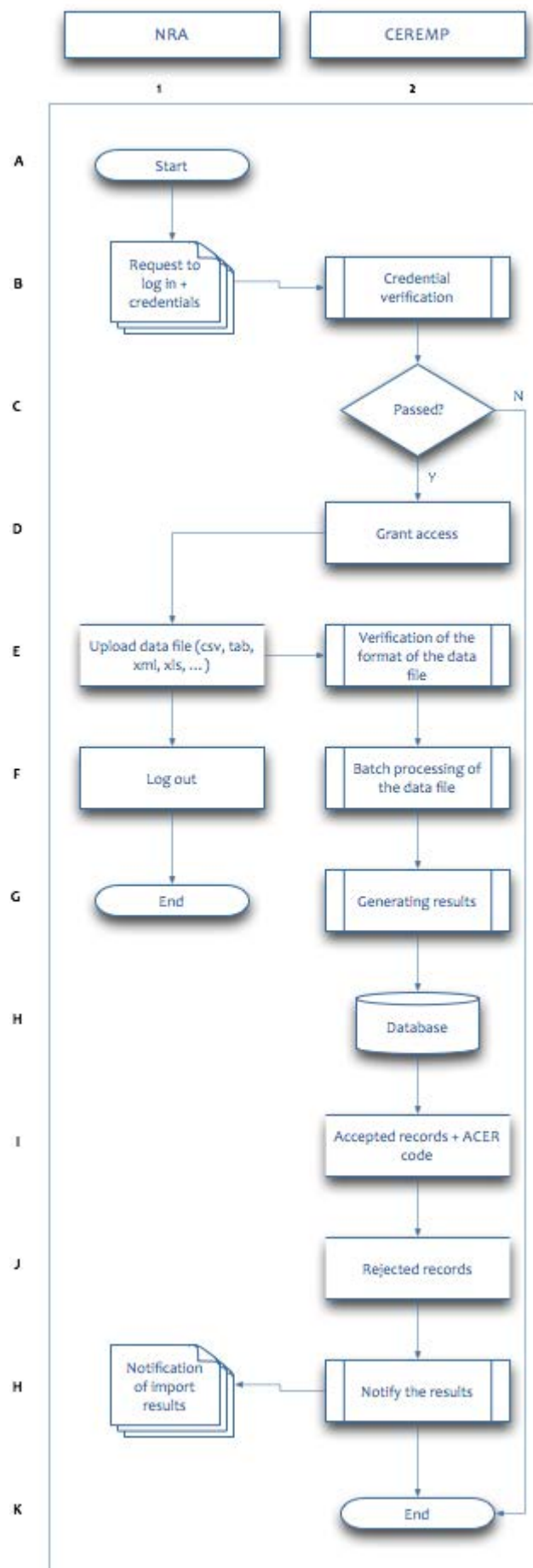
The data file can be in any format from the following list: CSV, TAB, XML, XLS.

The system will first verify (E2) the integrity of the uploaded data file and the respect of the format and then process its content (F2).

This procedure will generate 3 different results:

- the code-generation procedure to generate the Agency's code for the record and update the database (H2),
- an output file with accepted records; each accepted record of this file will contain the Agency's code as a result of the registration operation (I2),
- an output file with rejected records (J2).

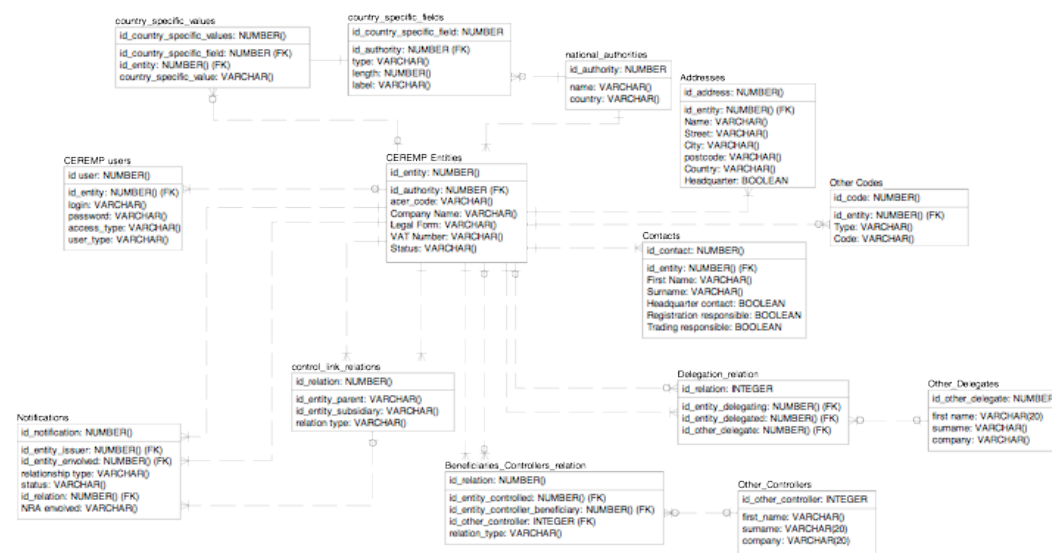
Output files generated in I2 and J2 will be notified to the NRA for further actions.



6. Annexes

6.1. Database schema

Below is the drawing of the physical model of the database schema proposed for this case study. The tenderers are requested to check and propose changes with the aim to optimise the use of information stored in the database schema.



6.2. Example of XML and XSD schemas

Below is a sample of XML file for registration and the related XSD schema, describing the registration format. The purpose of this sample is to give an additional and fast way to evaluate complexity of the application and the needed effort to implement the overall project.

```
<?xml version="1.0" encoding="UTF-8"?>
<CEREMPEntity xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="CEREMP_Entity_Registration_2.0.xsd">
  <CompanyName>CompanyName</CompanyName>
  <LegalForm>LegalForm</LegalForm>
  <VATNumber>VATNumber</VATNumber>
  <national_Authority>
    <national_Authority>
      <name>name</name>
      <country>country</country>
    </national_Authority>
  </national_Authority>
  <addresses>
    <address>
      <name>name</name>
      <street>street</street>
      <city>city</city>
      <country>country</country>
      <postcode>postcode</postcode>
      <headquarter>true</headquarter>
    </address>
  </addresses>
  <contacts>
    <contact>
      <firstname>firstname</firstname>
      <surname>surname</surname>
      <headquarterContact>true</headquarterContact>
      <registrationResponsible>true</registrationResponsible>
      <tradindResponsible>true</tradindResponsible>
    </contact>
  </contacts>
  <beneficiariesControllersRelations>
```

```

    <beneficiariesControllersRelation>
      <ACERcodeEntityRelated>ACERcodeEntityRelated</ACERcodeEntityRelated>
      <RelationType>RelationType</RelationType>
      <otherControllers>
    </otherController>
      <firstName>firstName</firstName>
      <Surname>Surname</Surname>
      <Company>Company</Company>
    </otherController>
      </otherControllers>
    </beneficiariesControllersRelation>
  </beneficiariesControllersRelations>
  <controlLinkRelations>
    <controlLinkRelation>
      <ACERcodeEntityRelated>ACERcodeEntityRelated</ACERcodeEntityRelated>
      <RelationType>RelationType</RelationType>
    </controlLinkRelation>
  </controlLinkRelations>
  <delegationRelations>
    <delegationRelation>
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      <RelationType>RelationType</RelationType>
      <otherDelegates>
    </otherDelegate>
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      <Surname>Surname</Surname>
      <Company>Company</Company>
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  </delegationRelations>
  <otherCodes>
    <otherCode>
      <Type>Type</Type>
      <code>code</code>
    </otherCode>
  </otherCodes>
  <countrySpecificFields>
    <countrySpecificField>
      <fieldType>fieldType</fieldType>
      <fieldValue>fieldValue</fieldValue>
    </countrySpecificField>
  </countrySpecificFields>
</CEREMPEntity>

```

XSD schema

```

<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema">

  <xsd:element name="CEREMPEntity" type="CEREMPEntityType"/>

  <xsd:complexType name="CEREMPEntityType">
    <xsd:sequence>
      <xsd:element name="CompanyName" type="xsd:string"/>
      <xsd:element name="LegalForm" type="xsd:string"/>
      <xsd:element name="VATNumber" type="xsd:string"/>
      <xsd:element name="national_Authority" type="National_Authorities"/>
      <xsd:element name="addresses" type="Addresses"/>
      <xsd:element name="contacts" type="Contacts"/>
      <xsd:element name="beneficiariesControllersRelations" type="BeneficiariesControllersRelations"/>
      <xsd:element name="controlLinkRelations" type="ControlLinkRelations"/>
      <xsd:element name="delegationRelations" type="DelegationRelations"/>
      <xsd:element name="otherCodes" type="OtherCodes"/>
      <xsd:element name="countrySpecificFields" type="CountrySpecificFields"/>
    </xsd:sequence>
  </xsd:complexType>

  <xsd:complexType name="BeneficiariesControllersRelations">
    <xsd:sequence>
      <xsd:element maxOccurs="unbounded" minOccurs="0" name="beneficiariesControllersRelation">
        <xsd:complexType>
          <xsd:sequence>
            <xsd:element name="ACERcodeEntityRelated" type="xsd:string"/>
            <xsd:element name="RelationType" type="xsd:string"/>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>

```

```

        <xsd:element name="otherControllers" type="OtherControllers"/>
    </xsd:sequence>
</xsd:complexType>
</xsd:element>
</xsd:sequence>
</xsd:complexType>

<xsd:complexType name="OtherControllers">
    <xsd:sequence>
        <xsd:element maxOccurs="unbounded" minOccurs="0" name="otherController">
            <xsd:complexType>
                <xsd:sequence>
                    <xsd:element name="firstName" type="xsd:string"/>
                    <xsd:element name="Surname" type="xsd:string"/>
                    <xsd:element name="Company" type="xsd:string"/>
                </xsd:sequence>
            </xsd:complexType>
        </xsd:element>
    </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="ControlLinkRelations">
    <xsd:sequence>
        <xsd:element maxOccurs="unbounded" minOccurs="0" name="controlLinkRelation">
            <xsd:complexType>
                <xsd:sequence>
                    <xsd:element name="ACERcodeEntityRelated" type="xsd:string"/>
                    <xsd:element name="RelationType" type="xsd:string"/>
                </xsd:sequence>
            </xsd:complexType>
        </xsd:element>
    </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="DelegationRelations">
    <xsd:sequence>
        <xsd:element maxOccurs="unbounded" minOccurs="0" name="delegationRelation">
            <xsd:complexType>
                <xsd:sequence>
                    <xsd:element name="ACERcodeEntityRelated" type="xsd:string"/>
                    <xsd:element name="RelationType" type="xsd:string"/>
                    <xsd:element name="otherDelegates" type="OtherDelegates"/>
                </xsd:sequence>
            </xsd:complexType>
        </xsd:element>
    </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="OtherDelegates">
    <xsd:sequence>
        <xsd:element maxOccurs="unbounded" minOccurs="0" name="otherDelegate">
            <xsd:complexType>
                <xsd:sequence>
                    <xsd:element name="firstName" type="xsd:string"/>
                    <xsd:element name="Surname" type="xsd:string"/>
                    <xsd:element name="Company" type="xsd:string"/>
                </xsd:sequence>
            </xsd:complexType>
        </xsd:element>
    </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="Addresses">
    <xsd:sequence>
        <xsd:element maxOccurs="unbounded" minOccurs="1" name="address">
            <xsd:complexType>
                <xsd:sequence>
                    <xsd:element name="name" type="xsd:string"/>
                    <xsd:element name="street" type="xsd:string"/>
                    <xsd:element name="city" type="xsd:string"/>
                    <xsd:element name="country" type="xsd:string"/>
                    <xsd:element name="postcode" type="xsd:string"/>
                    <xsd:element name="headquarter" type="xsd:boolean"/>
                </xsd:sequence>
            </xsd:complexType>
        </xsd:element>
    </xsd:sequence>
</xsd:complexType>

```

```

</xsd:sequence>
</xsd:complexType>

<xsd:complexType name="Contacts">
  <xsd:sequence>
    <xsd:element maxOccurs="unbounded" minOccurs="0" name="contact">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="firstname" type="xsd:string"/>
          <xsd:element name="surname" type="xsd:string"/>
          <xsd:element name="headquarterContact" type="xsd:boolean"/>
          <xsd:element name="registrationResponsible" type="xsd:boolean"/>
          <xsd:element name="tradindResponsible" type="xsd:boolean"/>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="National_Authorities">
  <xsd:sequence>
    <xsd:element maxOccurs="unbounded" minOccurs="0" name="national_Authority">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="name" type="xsd:string"/>
          <xsd:element name="country" type="xsd:string"/>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="OtherCodes">
  <xsd:sequence>
    <xsd:element maxOccurs="unbounded" minOccurs="0" name="otherCode">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="Type" type="xsd:string"/>
          <xsd:element name="code" type="xsd:string"/>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="CountrySpecificFields">
  <xsd:sequence>
    <xsd:element maxOccurs="unbounded" minOccurs="0" name="countrySpecificField">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="fieldType" type="xsd:string"/>
          <xsd:element name="fieldValue" type="xsd:string"/>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>
</xsd:schema>

```