Energy Community Workshop

Interoperability Network Code – Update on Common Network Operation Tools (CNOTs)

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System Operations
1. Introduction to Network Code INT&DE

Common Data Exchange Solutions:

Legal Background
REGULATION (EC) No 715/2009 - Conditions for access to the natural gas transmission networks -

Article 8

Tasks of the ENTSO for Gas

1. The ENTSO for Gas shall elaborate network codes in the areas referred to in paragraph 6 of this Article upon a request addressed to it by the Commission in accordance with Article 6(6).

2. The ENTSO for Gas may elaborate network codes in the areas set out in paragraph 6 with a view to achieving the objectives set out in Article 4 where those network codes do not relate to areas covered by a request addressed to it by the Commission. Those network codes shall be submitted to the Agency for an opinion. That opinion shall be duly taken into account by the ENTSO for Gas.

3. The ENTSO for Gas shall adopt:

(a) common network operation tools to ensure coordination of network operation in normal and emergency conditions, including a common incidents classification scale, and research plans;
Introduction - Regulation

COMMISSION REGULATION (EU) 2015/703 - Network code on interoperability and data exchange rules - Recitals

(3) The lack of harmonisation in technical, operational and communication areas could create barriers to the free flow of gas in the Union, thus hampering market integration. Union interoperability and data exchange rules should allow the necessary harmonisation in those areas, therefore leading to effective market integration. For that purpose and for facilitating commercial and operational cooperation between adjacent transmission system operators, this Regulation should address interconnection agreements, units, gas quality, odourisation and data exchange. It should provide rules and procedures to reach an appropriate level of harmonisation towards efficient gas trading and transport across gas transmission systems in the Union.

(8) Chapter V of this Regulation should ensure the appropriate degree of harmonisation of data exchange for supporting the completion and functioning of the European internal gas market, security of supply and appropriate and secure access to information, facilitating cross-border transmission activities.

- Article 24

Development process for common network operation tools

1. For each data exchange requirement under Article 20(2), Entsoé shall develop a common network operation tool in accordance with Article 8(3)(a) of Regulation (EC) No 715/2009 and shall publish it on its website. A common network operation tool shall specify the common data exchange solution relevant for the respective data exchange requirement. A common network operation tool may also include business requirement specifications, release management and implementation guidelines.

2. Entsoé shall establish a transparent process for the development of all common network operation tools. Entsoé shall conduct a consultation for each common network operation tool.

**Article 20**

General provisions

1. For the purposes of this Chapter, "counterparties" means network users active at:
   (a) interconnection points; or
   (b) both interconnection points and virtual trading points.


**Article 21**

Common data exchange solutions

1. Depending on the data exchange requirements under Article 20(2), one or more of the following types of data exchange may be implemented and used:
   (a) document-based data exchange: the data is wrapped into a file and automatically exchanged between the respective IT systems;
   (b) integrated data exchange: the data is exchanged between two applications directly on the respective IT systems;
   (c) interactive data exchange: the data is exchanged interactively through a web application via a browser.
Article 23

Implementation of the common data exchange solutions

1. Depending on the data exchange requirements under Article 20(2), transmission system operators shall make available and use the common data exchange solutions defined in Article 21.

2. Where data exchange solutions between a transmission system operator and concerned counterparts are in place on the date of entry into force of this Regulation and provided that the existing data exchange solutions are compatible with Article 22 and with data exchange requirements under Article 20(2), the existing data exchange solutions may continue to apply after consultation with network users and subject to the approval of the national regulatory authority of the transmission system operator.
**GOAL**

- Remove barrier for free flow of gas in EU through harmonisation
- Harmonised operational procedures at IPs and VTPs
- Harmonised ICT communication standard between TSO’s and TSO – NU (network user)

**OUTCOME**

- Faster implementation (configuration – avoid coding)
- Cost efficiency (use of –limited number- standard solutions; avoid tailor made implementations)
- Multiple vendor solutions (free available standards – ENTSOG profiles & Edig@s)
- Existing (local) solutions can still be used (with NRA approval)
2. Introduction to Network Code INT&DE

Common Data Exchange Solutions:

Types of data exchanges - Common data exchange solution
Data Exchange - WHAT and HOW

WHAT

Business

HOW

Information Technology (IT)

Business Logic
(process and activities)

Document structure and content

Reliable Message Delivery
Transparency
Security
Integration

Communication Protocols

Network Infrastructure

Market rules

Implementation Guide

Communication program

IT standards (e.g. HTTPS/SOAP)

e.g. Internet, private network, virtual private network
Data Exchange types

- **Components for Data Exchange**
  - Data Content (**WHAT**) → Business related
  - Data Network → Internet
  - Data Protocol (**HOW**) → IT technology

- **Types of Data Exchanges** – INT NC Art 21 (1)
  - **Document based (AS4 – Edig@s XML)**
    The data is wrapped into a file and automatically exchanged
  - **Integrated (HTTPS – SOAP - Edig@s XML)**
    The data is exchanged directly between two applications
  - **Interactive (Web Browser)**
    The data is exchanged interactively via a browser
3. Introduction to Network Code INT&DE

Common Data Exchange Solutions:

Business Requirement Specifications (BRS)
Data Exchange – Common solution

Process for the selection of the Common Solution

- Develop Business Requirement Specifications (BRS)
  - Identify data exchanges between parties due to NC obligations
  - Use case and sequence diagrams in BRS
  - Study criticality, confidentiality, frequency, security, operational cost, business risks, availability, reliability ...
- Optional/additional functionalities (not directly related to NC) will be identified as “Recommendations“ without an implementation lead time (dead line)
- For each identified interchange; select one of the three types for data exchanges as the common data exchange solution

- Under discussion: Do we also propose „optional“ solution in addition to the common solutions (to be negotiated with each individual TSO) → decision November 2016
Introduction – CNOT BRS
- UML (unified modelling language) \(\rightarrow\) translate NC into a process description

1. Define Use cases with use case diagrams - Example
Introduction – CNOT BRS
- UML (unified modelling language) → translate NC into a process description

2. Identify operational sequences with sequence diagrams
3. Establish workflow with activity diagrams - Example

Introduction – CNOT BRS
- UML (unified modelling language) \( \rightarrow \) translate NC into a process description
Introduction – CNOT (M)IG (EASEE-gas)

Translate Information model → Edig@s-XML message document

- Detailed description of the structure and elements of each message
Introduction – CNOT (M)IG (EASEE-gas)

Translate Information model → Edig@s-XML message document

- XSD files - XML schema that defines the structure of an XML document

```xml
<?xml version="1.0" encoding="utf-8"?>
  <xs:include schemaLocation="urn:easeegas.eu:edigas:nominationAndMatching:nominationDocument:5.1-restricted-codes.xsd"/>

  <xs:element name="Nomination_Document" type="Nomination_Document"/>

  <xs:simpleType name="AccountType-base" sawSDL:modelReference="http://easee-gas/edigas#String">
    <xs:restriction base="xs:string">
      <xs:maxLength value="35"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="Account" sawSDL:modelReference="http://easee-gas/edigas#Account">
    <xs:complexContent>
      <xs:extension base="AccountType-base">
        <xs:attribute name="codingScheme" type="TsoCodingSchemeTypeList" use="required"/>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>

  <xs:complexType name="PartyType-base" sawSDL:modelReference="http://easee-gas/edigas#String">
    <xs:restriction base="xs:string">
      <xs:maxLength value="16"/>
    </xs:restriction>
  </xs:complexType>

  <xs:complexType name="PartyType" sawSDL:modelReference="http://easee-gas/edigas#PartyType">
    <xs:complexContent>
      <xs:extension base="PartyType-base">
        <xs:attribute name="codingScheme" type="EicCodingSchemeTypeList" use="required"/>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>

  <xs:complexType name="Account internal Tso" sawSDL:modelReference="http://easee-gas/edigas#Account internal Tso"/>

  <xs:complexType name="Account external Tso" sawSDL:modelReference="http://easee-gas/edigas#Account external Tso"/>

</xs:schema>
```
Data Exchange – Common solution

- **BRS documents**
  - Common solution inserted in the process description
    - Balancing and INT NC: BAL0453_160412_BRS on nominations
  - CAM/CMP NC: CAP0554_160412_BRS_CAM+CMP

- **Overview table (draft)**
  Overview table with all identified communications
  - INT0878_20160906_Common_Data_Exchange_Solution
    - Table contains a reference to the BRS (document name, chapter, line number) where each interchange is described
Basis for NOM BRS

Business Requirement Specification for the Nomination and Matching Procedures, based on three Network Codes

**NC BAL**
- Provides rules for the exchange of nominations and re-nominations at IPs (Article 12 – 17)
- Adopted by the European Commission on 26 March 2014

**NC CAM**
- Includes obligation to allow single nomination for bundled capacity at IPs (Article 19.7)
- Adopted by the European Commission on 14 October 2013

**NC INT**
- Provides rules on matching process and data exchange between TSOs and NUs at IPs (Article 8 and 21)
- Adopted by the European Commission on 30 April 2015
Nomination process (at IPs) in BAL NC

Chapter IV of the BAL NC (Articles 12 – 17) provides general rules for the submission of nominations at IPs from network users to TSOs:

- **Standardised units** to be used in nominations/re-nominations
- **A set of minimum information** to be included in nominations/re-nominations
- **Procedures** for nominating at IPs (including deadlines, confirmations, etc.)
- **Procedures for re-nominating at IPs** (including deadlines, confirmations, etc.)
- **Reasons for rejecting** nominations/re-nominations

**BAL NC:**
Defines general rules and minimum requirements to be applied in nomination & matching process

**Business Requirement Specification:**
Defines detailed process for harmonised transmission of information between parties involved in nomination & matching process

The processes defined in the BRS document are only referring to Nominations at interconnection points.
Nominations process (at IPs) in BAL NC

The Balancing Network Code standardises the nomination procedure at IPs

Shippers submit **nominations** to TSO no later than the **nomination deadline**: 13:00 UTC (12:00 UTC when daylight saving time is applied)
NTSO sends the **confirmation notice** to shippers no later than the **confirmation deadline**: 15:00 UTC (14:00 UTC when daylight saving time is applied).
**Single-sided and Double-sided process**

**Single-Sided Nomination**

1. Nomination of transport at IP from NU to active/initiating TSO.

2. (a) Forwarding of single-sided nomination and (b) Information on processed quantities to passive/matching TSO.

3. Information about matching results from passive/matching TSO to active/initiating TSO.

4. Confirmation of transport from both TSOs to respective NU.

**Double-Sided Nomination**

1. Nomination of transport at IP from NUs to both respective TSOs at the IP.

2. (a) ------- (b) Information on processed quantities to matching TSO.

3. Information about matching results from matching TSO to initiating TSO.

4. Confirmation of transport from both TSOs to respective NU.
Nomination & matching processes
Information Flows for SSN and DSN

NU 1

TSO 1
(active/initiating TSO)

TSO 2
(passive/matching TSO)

NU 2

1. Nomination

2a. Forward Single-sided Nomination

2b. Processed Quantities

3. Matching Results

4. Confirmation

5. Interruption Notice

* Valid only in case of double-sided nominations.
** Valid only in case of single-sided nominations.
*** the process only occurs in case a TSO has introduced an interruption to the NU nomination.
## Nomination & Matching process

**Common Data Exchange Solution**

<table>
<thead>
<tr>
<th>Information Flow</th>
<th>From Role</th>
<th>To Role</th>
<th>Confidentiality Level</th>
<th>Common Data Exchange Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nomination authorisation *</td>
<td>Registered NU</td>
<td>TSO</td>
<td>Private</td>
<td>Recommendation* Document Based</td>
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<tr>
<td>Nomination (SSN)</td>
<td>Registered NU</td>
<td>(Initiating) TSO</td>
<td>Private</td>
<td>Document Based</td>
</tr>
<tr>
<td>Nomination (DSN)</td>
<td>Registered NU</td>
<td>(Matching) TSO</td>
<td>Private</td>
<td>Document Based</td>
</tr>
<tr>
<td>Forward Single Sided Nomination</td>
<td>(Active) TSO</td>
<td>(Passive) TSO</td>
<td>Private</td>
<td>Document Based</td>
</tr>
<tr>
<td>Processed Quantities (DSN)</td>
<td>(Initiating) TSO</td>
<td>(Matching) TSO</td>
<td>Private</td>
<td>Document Based</td>
</tr>
<tr>
<td>Matching Results</td>
<td>(Matching) TSO</td>
<td>(Initiating) TSO</td>
<td>Private</td>
<td>Document Based</td>
</tr>
<tr>
<td>Confirmation Notice</td>
<td>(Initiating) TSO</td>
<td>Registered NU</td>
<td>Private</td>
<td>Document Based</td>
</tr>
<tr>
<td>Confirmation Notice</td>
<td>(Matching) TSO</td>
<td>Registered NU</td>
<td>Private</td>
<td>Document Based</td>
</tr>
<tr>
<td>Interruption Information</td>
<td>(Initiating) TSO</td>
<td>Registered NU</td>
<td>Private</td>
<td>Document Based</td>
</tr>
<tr>
<td>Interruption Information</td>
<td>(Matching) TSO</td>
<td>Registered NU</td>
<td>Private</td>
<td>Document Based</td>
</tr>
</tbody>
</table>

**For all the Nomination and Matching processes, Document-Based is the mandatory Common Data Exchange Solution**

* Data exchange solution is not mandatory but recommended and has to be negotiated between the TSO and NU.
5. Introduction to Network Code INT&DE

Common Data Exchange Solutions:

Business Requirement Specification (BRS) for Capacity Allocation and Congestion Management Procedures
Basis for CAM & CMP BRS


**CMP Guideline**
- Provides rules for surrender of capacity and making available additional capacity (Article 2.2.2, 2.2.4 and 2.2.5)
- Adopted by the European Commission on 24 August 2012

**NC CAM**
- Includes requirements for Booking Platforms, capacity auctioning and bundling (Articles 5, 11 – 15, 19 and 27)
- Adopted by the European Commission on 14 October 2013

**NC INT**
- Provides rules on allocation process and data exchange between TSOs, Auction Office and NUs at IPs (Articles 9 and 21)
- Adopted by the European Commission on 30 April 2015
NC CAM and CMP guidelines

Network Code on Capacity Allocation Mechanism (NC CAM) defines:

- **standardised capacity allocation** mechanism as auction procedure for relevant Interconnection Points within Europe, including the underlying capacity products to be offered and the description of how cross-border capacity is to be allocated.

- the manner in which adjacent TSOs cooperate in order to facilitate capacity sales, taking into consideration general commercial as well as technical rules related to capacity allocation mechanisms.

Guidelines for Congestion Management Procedure (CMP Guidelines) defines:

- how congestion management procedures are put into place in the event of contractual congestion and how additional capacity is made available to the market.
BRS CAM & CMP – covered processes

- Network User registration
- Credit limit management
- Bookable Point registration
- Capacity right surrender
- Offered capacity determination
- Capacity auction
- Auction result publication
- Buyback auction
- Secondary market sales

Common data exchange solutions for interactions between involved parties

Two processes will be taken as an example in the following slides.
CAM & CMP processes & data exchange

List of actors

- Auction Office
- Network User
- Transmission System Operator
Offered capacity determination

Offered capacity may be either bundled or unbundled. Offered bundled and offered unbundled capacities may be distinguished. If they are not distinguished, the Auction Office may determine the bundled and unbundled values.

Includes reserve price, large price step and small price step when relevant.

This may be web based or an electronic document.

Network User

Auction office

Transmission System Operator

(1) Offered capacity data

(2) Offered capacity in auction

(3) Publication of offered capacity in auction

Network User

Auction Office

Transmission System Operator

Surrendered capacity

Define Offered Capacity

TSO Offered Capacity

Offered capacity for auction

Offered capacity may be either bundled or unbundled. Offered bundled and offered unbundled capacities may be distinguished. If they are not distinguished, the Auction Office may determine the bundled and unbundled values.
Offered capacity determination

3.3.1.6 Offered capacity

The capacity on offer shall be sent by each Transmission System Operator to the Auction Office in compliance with the business case defined in section 3.2.3.1.2.

The Auction Office assigns an auction Identification to the offered capacity provided by the Transmission System Operators.

The Auction Office informs the Transmission System Operators of the products that will be auctioned and publishes the information for use by the market along with any price step information if the auction concerns an ascending clock auction.

The data exchange solutions between the Auction Office and the Transmission System Operator are not part of the Network Code for Interoperability and Data Exchange Rules the data exchange solution is to be negotiated between the parties:

<table>
<thead>
<tr>
<th>Information Flow</th>
<th>From Role</th>
<th>To Role</th>
<th>Confidentiality Level</th>
<th>Common Data Exchange Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offered Capacity</td>
<td>Transmission System Operator</td>
<td>Auction Office</td>
<td>Private</td>
<td>Recommendation - Document Based</td>
</tr>
<tr>
<td>Offered Capacity</td>
<td>Auction Office</td>
<td>Transmission System Operator</td>
<td>Private</td>
<td>Recommendation - Document Based</td>
</tr>
</tbody>
</table>

The common data exchange solution with the registered network user for this data exchange is shown below:

<table>
<thead>
<tr>
<th>Information Flow</th>
<th>From Role</th>
<th>To Role</th>
<th>Confidentiality Level</th>
<th>Common Data Exchange Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offered Capacity</td>
<td>Auction Office</td>
<td>Registered Network User</td>
<td>Public</td>
<td>Interactive</td>
</tr>
</tbody>
</table>
CAM & CMP processes & data exchange

Auction Process

- Network User
- Auction Office
- Transmission System Operator

1. Capacity Bid
2. Allocation of capacity
3. Detailed capacity allocation
4. Aggregated auction results

Network User

- Transmission System Operator
- Auction Office
- Auction platform

Publication of auction results

Information about auction results

Capacity Bid

Information about allocated capacity
Auction Process

3.3.1.9 Allocated capacity
The Auction Office allocates offered capacity to a Network User’s bid and informs the Network User of the quantity and price allocated according to the given auction process. (refer to section 3.2.3.3)

The common data exchange solution for this data exchange is shown below:

<table>
<thead>
<tr>
<th>Information Flow</th>
<th>From Role</th>
<th>To Role</th>
<th>Confidentiality Level</th>
<th>Common Data Exchange Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocated Capacity</td>
<td>Auction Office</td>
<td>Registered Network User</td>
<td>Private</td>
<td>Interactive</td>
</tr>
</tbody>
</table>

3.3.1.10 Detailed capacity allocated

Once the capacity allocation has terminated the Auction Office transmits all the Network User allocations to the Transmission System Operator. (refer to section 3.2.3.4)

The data exchange solutions between the Auction Office and the Transmission System Operator are not part of the Network Code for Interoperability and Data Exchange Rules the data exchange solution is to be negotiated between the parties:

<table>
<thead>
<tr>
<th>Information Flow</th>
<th>From Role</th>
<th>To Role</th>
<th>Confidentiality Level</th>
<th>Common Data Exchange Solution</th>
</tr>
</thead>
<tbody>
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<td>Detailed Capacity Allocated</td>
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<td>Transmission System Operator</td>
<td>Private</td>
<td>Recommendation - Document Based</td>
</tr>
</tbody>
</table>

3.3.1.11 Aggregated auction results

This represents the total aggregated values for the auction (at least the clearing price and total capacity sold) and is intended for use by any market participant. (refer to section 3.2.3.4)

The common data exchange solution for this data exchange is shown below:

<table>
<thead>
<tr>
<th>Information Flow</th>
<th>From Role</th>
<th>To Role</th>
<th>Confidentiality Level</th>
<th>Common Data Exchange Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregated Auction Results</td>
<td>Auction Office</td>
<td>All</td>
<td>Public</td>
<td>Interactive</td>
</tr>
</tbody>
</table>
CAM & CMP processes & data exchange

### Common Data Exchange Solution Table

<table>
<thead>
<tr>
<th>Information Flow</th>
<th>From Party Role Value</th>
<th>To Party Role Value</th>
<th>Confidentiality Level</th>
<th>Common Data Exchange Solution</th>
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<tbody>
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<td>Bookable Point Registration</td>
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<td>Recommendation - Interactive</td>
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<tr>
<td>Network User Registration</td>
<td>Registered Network User</td>
<td>Transmission System Operator</td>
<td>Private</td>
<td>Recommendation - Interactive</td>
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<tr>
<td>Network User Registration to Auction Office</td>
<td>Network User</td>
<td>Auction Office</td>
<td>Private</td>
<td>Recommendation - Interactive</td>
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<tr>
<td>Approved Network Users</td>
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<td>Auction Office</td>
<td>Private</td>
<td>Recommendation - Interactive</td>
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<tr>
<td>Approved Network Users</td>
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<td>Recommendation - Interactive</td>
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<td>Surrender Capacity Rights</td>
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<td>Offered Capacity</td>
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<td>Auction Office</td>
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<td>Recommendation – Document Based</td>
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<td>Auction Office</td>
<td>Transmission System Operator</td>
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<td>Recommendation – Document Based</td>
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<tr>
<td>Offered Capacity</td>
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<td>Capacity Bid</td>
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<td>Allocated Capacity</td>
<td>Auction Office</td>
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</tr>
<tr>
<td>Aggregated Auction Results</td>
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<td>Public</td>
<td>Interactive</td>
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<tr>
<td>Surrendered Capacity Sold</td>
<td>Transmission System Operator</td>
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<td>Reverse Auction Bid</td>
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<td>Allocate Reverse Auction Results</td>
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<tr>
<td>Secondary Market Sales</td>
<td>Transmission System Operator</td>
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<td>Interactive</td>
</tr>
</tbody>
</table>

The recommended common solutions are not subject to the regulation covered by the Network Code for Interoperability and Data Exchange Rules and are provided for guidance.
# Common Data Exchange Solution Table

- **Recommendation**: Use column. It is used in cases where communications are identified in the BRS document (business requirement specification), and are then explicitly part of the network code. As such, the proposed solution is not enforceable but is to be considered as a “recommendation” to encourage harmonisation, and are to be negotiated bilaterally on a case-by-case basis.

- **Optional - Negotiable**: Use column. It is used in cases where counterparties would prefer to use a different data exchange solution rather than the common solution and where TSOs (or their representatives) and counterparties can negotiate the conditions of a potential use of an optional alternative common solution.

- **Date of Publication**: After a lead time of 12 months, starting from the date of publication, the TSOs or parties “acting on behalf of TSOs” shall make the Common Data Exchange Solution available for use with their counterparties (see also question on line 7 in the table below).

### Denominations:

In the case of Member States which are not connected to the interconnected EU network and hold a derogation (Art 15 of directive 2009/33/EC), the Common Data Exchange Solution should be made available not later than the time of the establishment of the connection with the interconnected EU network (see also Art 15/Network code interoperability).

<table>
<thead>
<tr>
<th>Process Area Value</th>
<th>BRS</th>
<th>Document Number</th>
<th>Document Line Number</th>
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<th>To Party Role Value</th>
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**Note:** The table provides a summary of common data exchange solutions, including the process area values, BRS document numbers, and details of information flow, from party role value, to party role value, confidentiality level, and common data exchange selection date.
Thank You for Your Attention

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