Introduction to the ENTSOG Common Data Exchange Solutions

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1   *Introduction*

The role of ENTSOG (the European Network of Transmission System Operators for Gas, (https://entsog.eu/) is to facilitate and enhance cooperation between national gas transmission system operators (TSOs) across Europe in order to ensure the development of a pan-European transmission system in line with European Union energy goals.

ENTSOG's tasks are defined within European Gas Regulation (EC) 715/2009 ((CR2009/715). Among the defined tasks is the development of so-called "Network Codes". These Network Codes set out the rules for gas market integration and system operation and development. The process of developing network codes begins with a request from the European Commission (EC) to ACER (Agency for the Cooperation of Energy Regulators, http://www.acer.europa.eu/ to submit a Framework Guidelines. ENTSOG then develops the related network code in line with the ACER Framework Guidelines, conducting extensive public consultations throughout the development process. On the EC's approval, the network code becomes legally binding, being adopted in accordance.

ENTSOG Network Codes cover various subjects, including processes such as nomination and matching, capacity allocation and congestion management. To support the implementation of Network Codes, ENTSOG has further developed a number of so-called "Common Network Operation Tools" (or *CNOTs*).

This document provides an overview of the data exchange solutions related to the various CNOTs developed by ENTSOG to support the implementation of the requirements emanating from the Network Code on Interoperability and Data Exchange Rules (INT&DE NC) ((CR2015/703). The main purpose of this document is to explain the types of data exchange identified in the regulation and the "common data exchange solutions" defined for them. The document provides the user with an overview of the documentation for these common data exchange solutions, which are published on the ENTSOG site. These publications include the various "Usage Profiles" that are provided for the common solutions, supporting documents related to these profiles, and the common data exchange solution table.

This document is a high-level introductory document which aims to provide a first, quick overview for users new to the subject area, new to the publications developed by ENTSOG in the area, or new to the technologies used. For detailed guidelines and specific information users are referred to the CNOTs published and maintained by ENTSOG.

2   *Common Data Exchange Solutions*

The INT&DE NC was published in April 2015 as Commission Regulation 2015/703 ((CR2015/703) and entered into force in 1 May 2016. Article 21 of the regulation defines three types of data exchange:

(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

For each of these three types of data exchange, the Article specifies a "common specified data exchange solution".

For each of the three common data exchange solutions the Article specifies three aspects:

(i) the protocol

(ii) the data format and

(iii) the network

For the three types of data exchange, for the first two of these three aspects, the Article specifies the following solutions:

(a) For the document-based data exchange:

(i) protocol: AS4;

(ii) data format: Edig@s-XML, or an equivalent data format ensuring identical degree of interoperability. ENTSOG shall publish such an equivalent data format.

(b) For the integrated data exchange:

(i) protocol: HTTP/S-SOAP;

(ii) data format: Edig@s-XML, or an equivalent data format ensuring identical degree of interoperability. ENTSOG shall publish such an equivalent data format.

(c) For the interactive data exchange, the protocol shall be HTTP/S.

For all data exchange types set out in points (a) to (c), the network shall be the internet.

It should be noted that the choice of protocol and data format is tied to the type of document exchange. It is not the case that any of the three protocols can be used for any of the three types of data exchange. The regulation therefore does not, for example, allow the use of HTTP/S-SOAP as the protocol to be used for data exchanges that the common data exchange solution is defined as document-based. Furthermore, Article 23 of the regulation allows existing data exchange solutions to continue to apply after consultation with network users and subject to the approval of the national regulatory authority. A Common Data

Exchange Solution has been defined for each relevant data exchange and that is the solution that has to be offered by TSOs in respect of their interconnection points (see section 3.5 of this document explains this further).

The third aspect of a data exchange solution is the network to be used. For all common data exchange solutions, this is specified to be the Internet.

3   Network Code and Common Data Exchange Solutions

As is common with regulations and other legal documents, the INT&DE NC ((CR2015/703) provides very little technical details for the selected common solutions. To implement the Network Code effectively and consistently, more technical parameters need to be specified. Those details are specified in "Usage Profiles" that specify in more detail, how the selected solutions are to be used and implemented. These Usage Profiles complement and provide technical details to the regulation.

This section provides an overview of the Usage Profiles for the three protocols and of related complementary documentation that has been published. It also explains the Common Data Exchange Solution Table. All referenced documents can be accessed from the ENTSOG site, https://entsog.eu/publications/common-data-exchange-solutions. Detailed references are also provided in section 5, page 11, of this introductory document.

3.1   The Usage Profile Concept

Communication protocols are highly configurable and can be used in many different ways. This was the case for older protocols like AS2 as it is for the newer AS4 standard (AS4, which is the standard selected in the Network Code as the common protocol for document-based data exchange. To use such protocols effectively, interoperably and securely, in production among large numbers of companies, it is common for users of communication protocols to define "Usage Profiles" that specify in more details how they are to be used. These profiles are also useful for providers of solutions, as they can make sure the selected functionality is supported in their products, well tested for conformance and interoperability, and ready to be configured according to the specifications. To support its members, ENTSOG has therefore developed and published such Usage Profiles for each of the three common solutions.

3.2   AS4 Usage Profile for Document Based Data Exchange

The AS4 Usage Profile was the first of the Usage Profiles developed by ENTSOG. AS4 specifies multiple conformance profiles, of which the most appropriate one (called "ebHandler") is selected in the Usage Profile. The feature set of this conformance profile is then further reviewed and detailed guidance is provided on how the features are to be used. For example, AS4 specifies that messages can be encrypted, but does not require it and does not specify which algorithms are to be used for encryption. The ENTSOG AS4 Usage Profile specifies that they must always be encrypted and states which specific algorithms are to be used. Finally, in AS4 some headers are mandatory but the AS4 standard provides no fixed value set. The ENTSOG AS4 Usage Profile specifies which values are to be used, reflecting the use of AS4 for gas business related data exchanges.

The current version of the ENTSOG AS4 Usage Profile is the 3.5 version, which is in production use with ENTSOG members across Europe. The specification was published in March 2017 and obsoletes all previous versions. It is stable and to be used to implement the network code for document-based exchange. It can be downloaded from the ENTSOG site ((AS4UP).

Additional documents were created to help implementers of the ENTSOG AS4 Usage Profile. For example, there is a document that describes how to set up an AS4 system ((HOWTO) and on how to use the AS4 agreement feature for certificate rollover ((AS4AGR).

3.3 Usage Profile for Integrated Data Exchange

Similarly, to the ENTSOG AS4 Usage Profile, a profile was developed for Integrated Data Exchange. This profile defines common profiling for using HTTP/S-SOAP, as well as specific profiling for three subcategories of integrated data exchange covering three different types of use of integrated data exchange: anonymous access to public information, authenticated access to public information and authenticated access to private information.

The current and only version was approved and published in March 2017. It can be downloaded from the ENTSOG site ((WSUP).

3.4 Usage Profile for Interactive Data Exchange

The third type of data exchange is Interactive Data Exchange. Like the Integrated Data Exchange Usage Profile the Interactive Data Exchange Usage Profile consists of common guidelines and more usage scenario-specific guidelines. In this case, the specific usage scenarios relate to four different security options: an option without authentication, an option with username/password authentication, and an option with two factor authentication and a fourth option that uses token-based authorisation.

As this usage profile is about use of portals accessed by humans, interoperability issues and the issue of consistency of configuration that are essential to machine-to-machine communications do not apply. This profile is therefore less technical than the other two profiles.

The current and only version was approved and published in March 2017. It can be downloaded from the ENTSOG site ((INTUP).

3.5 Common Data Exchange Solution Table

The Network Code defines three types of data exchange and, for each type, the protocol, data format and network to be used. The network code does not strictly specify which type of exchange applies to a particular gas business related data exchange. The ENTSOG Common Data Exchange Solution Table provides this information.

For each process area for which an ENTSOG Business Requirements Specification (BRS) is defined, it specifies, for each identified information flow, the Common Data Exchange Solution. For example, it specifies that a "Nomination" from a "Registered Network User" to an "(Initiating) Transmission System Operator" is to use document-based exchange as Common Data Exchange Solution. For a "Capacity Bid" from a "Registered Network User" to an "Auction Office", the Common Data Exchange Solution to use is interactive data exchange. It also specifies an Optional Data Exchange Solution, which TSOs may offer in addition to the common solution. For example, a TSO may also allow nominations to be

submitted interactively. An Auction Office may also allow capacity bids to be submitted using document-based exchange.

The current version of the Common Data Exchange Solution Table can be downloaded from the ENTSOG site ((CDEST).

4 Revision History

Revision	Date	Editor	Changes Made
Rev_0.1	2017-07-11	PvdE	First Draft for discussion
Rev_0	2017-08-16	JM	ITC KG reviewed and approved for INT WG approval
Rev_0	2017-09-27	JM	INT WG reviewed and approved for publication

5   References

(AS4)   AS4 Profile of ebMS 3.0 Version 1.0. OASIS Standard, 23 January 2013.
               http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/profiles/AS4-profile/v1.0/

(AS4AGR)   ENTSOG AS4 Agreements and Agreement Updates. Revision 1. 2017-01-09.
               https://entsog.eu/publications/common-data-exchange-solutions#ENTSOG-
               AS4-AGREEMENTS-AND-AGREEMENT-UPDATES

(AS4UP)   ENTSOG AS4 Profile. Current Version 3 Revision 5, 2016-03-28.
               https://entsog.eu/public/uploads/files/as4/pdf/INT0488-
               170328%20AS4%20Usage%20Profile_Rev_3.5.pdf

(CR2009/715) REGULATION (EC) No 715/2009 OF THE EUROPEAN PARLIAMENT AND OF THE
               COUNCIL of 13 July 2009 on conditions for access to the natural gas
               transmission networks and repealing Regulation (EC) No 1775/2005.
               http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32009R0715

(CR2015/703) COMMISSION REGULATION (EU) 2015/703 of 30 April 2015 establishing a
               network code on interoperability and data exchange rules.
               http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015R0703

(EDIG@S)   EASEE-gas EDIG@S. Version 5.1. https://www.edigas.org/new-version-edigs-
               version-5/

(HOWTO)   Setting up an AS4 System. Version 2. 2016-11-16.
               https://entsog.eu/public/uploads/files/publications/INT%20Network%20Code/
               2016/INT0697-161115%20Setting%20up%20an%20AS4%20System_Rev_2.pdf

(WSUP)   ENTSOG Integrated Data Exchange Usage Profile. Current Version 0 Revision 0.
               2017-03-28.
               https://entsog.eu/publications/common-data-exchange-
               solutions#INTEGRATED-DATA-EXCHANGE-USAGE-PROFILE

(INTUP)   ENTSOG Interactive Profile. Current Version 0 Revision 0.
               https://entsog.eu/publications/common-data-exchange-
               solutions#INTERACTIVE-DATA-EXCHANGE-USAGE-PROFILE

(CDEST)   ENTSOG Common Data Exchange Solution Table.
               https://entsog.eu/publications/common-data-exchange-solution-
               table#COMMON-DATA-EXCHANGE-SOLUTION-TABLE