Instruction regarding exchange of data between the transmission system operator

OGP GAZ-SYSTEM S.A. and network users with the application of the AS4 protocol

(Specification)

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1. General Introduction

1.1. ENTSOG

The purpose of ENTSOG (European Network of Gas Transmission System Operators) is promotion of development of the internal gas market and facilitation of effective gas circulation and gas transmission within the European Union. For this purpose, ENTSOG, as specified in the Regulation of the European Parliament and Council (EC) no. 715/2009 of 13 July 2009 on conditions for access to the natural gas transmission networks, is to support the growth of integration of the internal market by the fulfilment of the tasks specified in Art. 8 section 6 Those tasks include, among others: establishment of Polish network codes (which are then implemented as Regulations of the European Commission), development of a ten-year plan of network development, development of gas supply forecasts and establishment of common operational tools.

1.2. Interoperability

One of the areas which require harmonization according to Art. 8 section 6 of Regulation 715/2009 is the code devoted to interoperability and data exchange. Taking the foregoing into account, on 30 April 2015, the European Commission approved the Regulation of the (EU) Commission 2015/703 establishing the network code concerning the rules of interoperability and data exchange. The code describes, in chapter V, what solutions must be applied by transmission gas pipeline operator in order to ensure secure data exchange with regard to the accompanying business processes described in the Regulation. The Regulation specifies common solutions regarding data exchange protocol, data and network format. In the event of data exchange in the form of documents, the required solutions is the protocol: AS4, data format: Edig@s-XML or the equivalent data format ensuring the identical degree of interoperability, providing that ENTSOG is obliged to publish such equivalent data format and the network must be the Internet. In view of the above, GAZ-SYSTEM which is obliged to implement the Regulation by 1 May 2016, for identified contractors and data exchange processes specified in Art.20 created, for the purpose of information exchange, an instruction for contractors describing the requirements in this regard.

1.3. AS4

AS4 (Applicability Statement 4) is a standard describing safe and reliable transmission of messages via the Internet. The protocol was built on the basis of tested solutions, such as HTTP and SSL protocols, and cryptographic functions. Wishing to create one Internet Engineering Task Force standard, the AS protocol as designed – a safe, reliable protocol using generally-accessible Internet connections. AS4 is a compliance profile of OASIS EBMs 3.0 specification and it represents an open standard for safe B2B (Business-to-business) document exchange using the Web (Web services). Safe exchange of documents is regulated by WS-Security aspects, including coding and digital signatures for XML documents. The types of documents transmitted in the AS4 standard are not connected with any defined action or SOAP operation. The AS4 protocol became the standard in 2013. In the profile of EBMs 3.0 specification, AS4 uses many requirements regarding communication services, specified in this standard. The safety of transmitted information is subject to WS-Security specification with the function of load compression. In the area of scenarios, AS4 document exchange serves both the PUSH and PULL operations, it also

contains, analogously to AS2, business mechanisms of non-repudiation of receipt.

1.4. Why does GAZ-SYSTEM implement AS4 and expects the same from its customers

According to point 1.2. of the aforementioned instruction, GAZ-SYSTEM is obliged to implement data exchange solutions which are described in Regulation 2015/703 of 1 May 2015. Therefore, GAZ-SYSTEM will implement a new system and will require its contractors to apply the same solution or develop a solution compatible with AS4 or Edig@s-XML.

1.5. Solutions certified by Drummond group

By implementing communication with market participants in AS4 standard, GAZ-SYSTEM, according to the recommendation of ENTSOG, declares the application of solutions only certified by Drummond group. GAZ- SYSTEM also undertakes, in the event of replacement of IT technologies in the future, to apply only solutions certified by Drummond group.
GAZ-SYSTEM recommends its clients the use, for the purpose of communication with the application of the AS4 protocol, of solutions certified by Drummond group. This will help to avoid or at least minimize the probability of occurrence of problems with solution compatibility.
GAZ-SYSTEM reserves that in the event of application by the clients of solutions others than those certified by the Drummond group, any problems connected with data exchange in AS4 standard will be by default treated by the services of GAZ-SYSTEM as problems on the part of the customer's solution.

The up-to-date list of certified IT solutions, including a report on the conducted tests may be found at the website of the Drummond group:

http://drummondgroup.com/b2b-certified-products/certified-products/as4

Below is the up-to-date list of IT solutions certified by Drummond group and supporting the AS4 standard:

Company Name	Product Name	ebHandler	Light Client
Axway	Axway B2Bi 2.1 / Axway Interchange 5.12 / Axway Activator 5.12	X	X
Flame Computing	FMS Server 5.3.2 Release 14	X	
Flame Computing	FMS Client and API – 5.3.3		X
IBM	IBM® B2B Advanced Communications 1.0.0	X	X
Oracle	Oracle SOA Suite 12c	X	
Software AG	webMethods Module 9.5 for AS4	X	

Company Name	Product Name	ebHandler	Light Client
Axway	Axway B2Bi 1.5 /Axway Interchange 5.10 / Axway Activator 5.10		X
Flame Computing Enterprises	FMS ebHandler version 5.3	X	
Flame Computing Enterprises	FMS ebHandler version 5.3		X
Oban Pty Ltd	SmartStream Version 2.0	X	
TIBCO Software Inc.	TIBCO BusinessConnect™ ebXML Protocol 6.0.0	X	

2. Communication

2.1. Purpose of the implementation

The solution will provide for communication with external entities with regard to:

- Access to measurement data with regard to archive data, emergency data and operative and settlement aggregates.

- Submission of nominations/renominations via ZUP, transport forecasts via OSD, checking the compliance of nominations with OSW and other information exchanged with the use of edig@s messaging systems).

Communication will meet the following requirements:

The first type of communication will enable the customers of GAZ-SYSTEM to inquire about archive data and emergency data, as well as about operative and settlement aggregates. In the case of archive data and emergency data, the inquiry should take place with 24-hours' delay, which means that the latest available data will be the data from the last ended gas day (between 06:00 and 06:00) . In the event of operational and settlement aggregates, it offers a possibility of inquiring about the data from the previous and current day.

As far as submission of nominations/renominations and transport forecasts is concerned, we provide our clients with a possibility of sending edig@s-XML files, which will be transmitted to the relevant IT systems for the purpose of their service and feedback communication to the client.

2.2. Assumptions

1. It is assumed that in the communication between internal IT systems of GAZ- SYSTEM and external entities, a data rail (B2B instance) will be an intermediary tool.

2. To enable communication between the data rail and external entities, the AS4 standard will be used, which will provide for sale communication with the use of WebServices (SOAP over HTTP), independent of the exchanged data.

3. The interface providing for the submission of nominations made available to external entities will be based on EDIG@S 5.1 v1 messages.

4. Sequences and semantics of listed messages is defined by the EDIG@AS 5.1 process: Nomination and Matching Process Document version: 3

5. API made available to external entities will be independent of API made available by internal IT systems

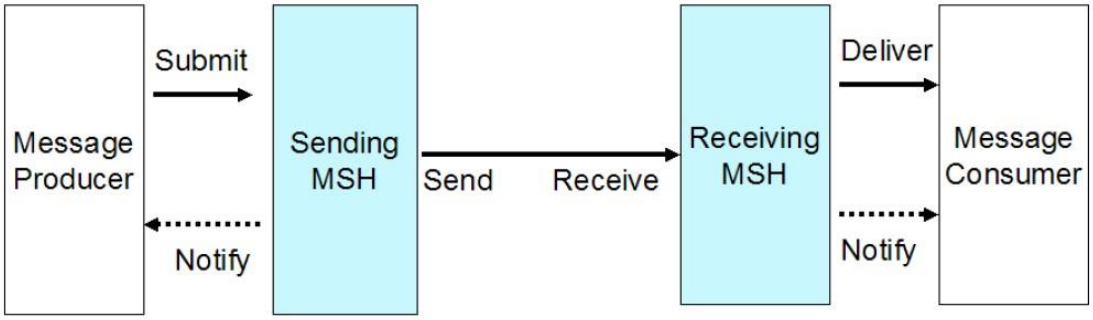
6. Inquiries about data, inquiry statuses and measurement metadata (archive and emergency), as well as aggregate data (operative and settlement aggregates), exchanged between external

entities and GAZ-SYSTEM will be represented as XML documents. Measurement data will be represented as files in the CSV or similar format, whereas aggregated data will be represented as XML files.

7. The <soap:Body> elements in SOAP messages is always empty. All data is transmitted in the form of MIME pieces with the use of SOAP-with-Attachments extension

2.3. AS4 messages exchange model

The model of data exchange for the AS4 profile limits connections of message exchange channels between two partners (MSH), one acting as the sender and the other as the recipient. The following diagram presents various variants of message exchange.

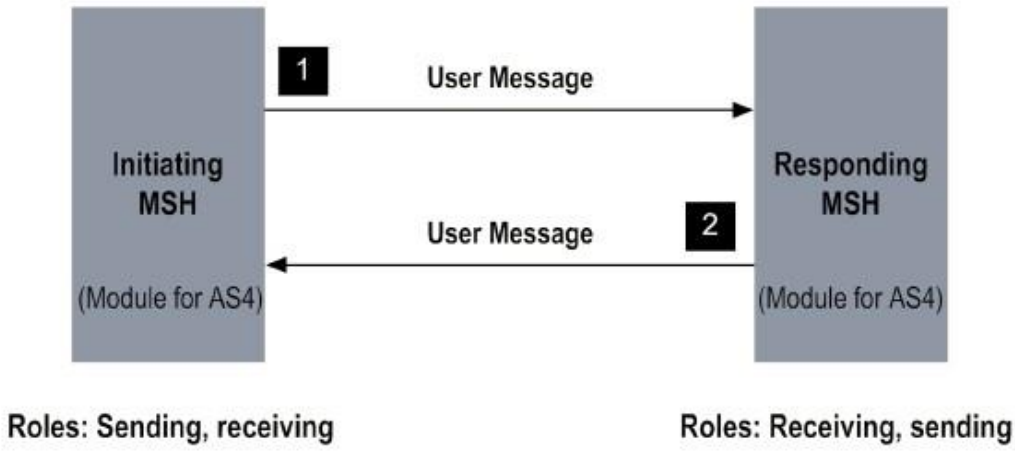


2.4. Technical description of the solution for making available the measurement and aggregated data

The implemented solution will support the following communication patterns available in the AS4 standard (MEPs):

2.4.1. Two-Way/Sync MEP

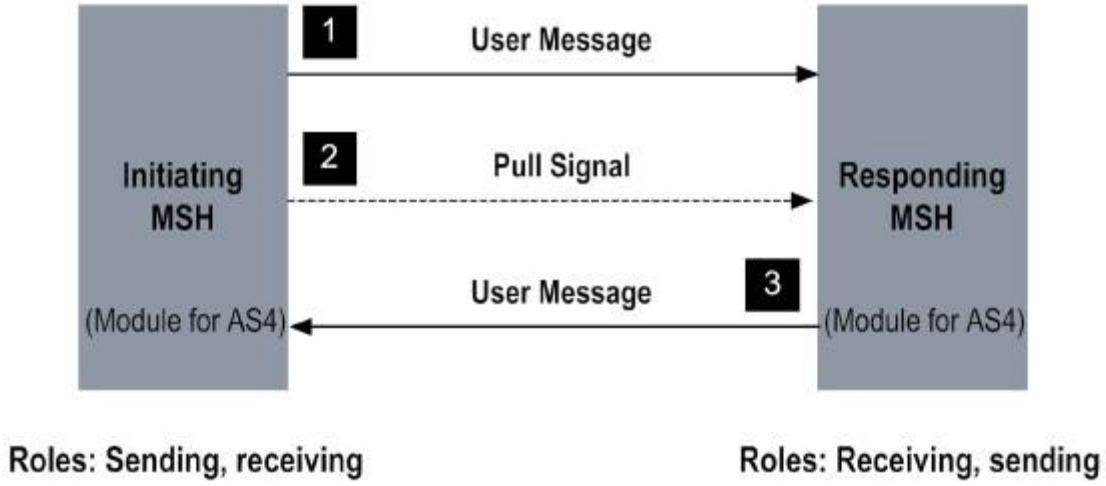
In this communication pattern, an initiating partner (initiating MSH - an external entity - 1) in a feedback message from the responding partner (responding MSH - GAZ-SYSTEM - 2), receives a synchronic result of the submitted inquiry (classical request-reply communication). This pattern is illustrated by the following diagram:



This communication pattern should be used in exceptional situations (when the external entity is unable to serve the second pattern) with the assumption that the client will not ask about large scopes of data.

2.4.2. Two-Way/Push-Pull MEP

In this communication pattern, an initiating partner (initiating MSH - an external entity - 1) sends an inquiry to the responding partner (responding MSH - GAZ-SYSTEM - 2) and receives only information about the inquiry acceptance (response status HTTP). The the initiating partner (initating MSH – external entity - 1) asks the responding partner (responding MSH – GAZ- SYSTEM) about the availability of the inquiry result. When the inquiry result is available, it is returned (only on a single occasion) by the responding partner (responding MSH – GAZ-SYSTEM - 3), synchronically to the inquiry about result availability. This pattern is illustrated by the following diagram:



2.4.3. SOAP messages in AS standards for the aforementioned communication patterns

We assume that in the specified messages only the name of the external partner should change as well as EIC codes of the partners. The business contents of messages is not visible in the following messages, because it is attached as independent MIME pieces in HTTP inquiries and responses (only references to those messages are visible).

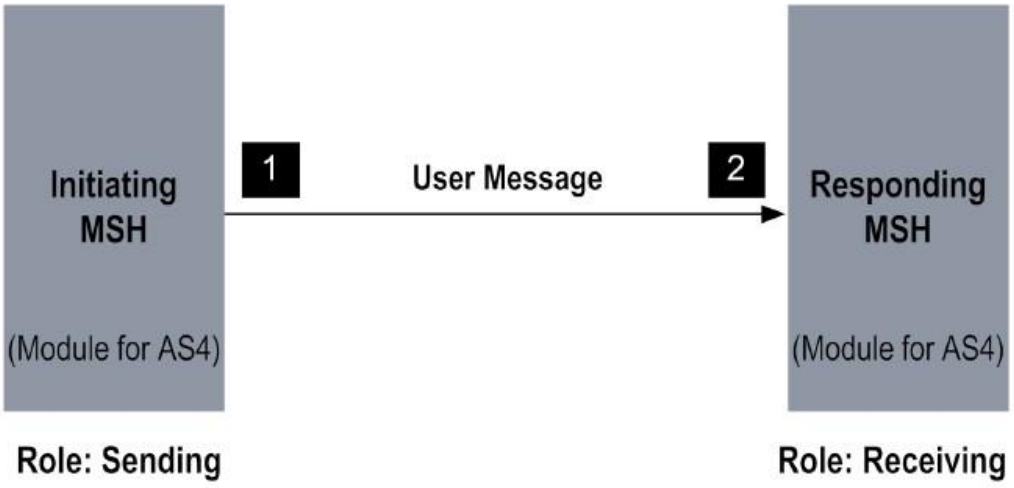
2.5. Technical description of the solution of edig@s message exchange

As regards the balance traffic which is a solution of the time-critical type, being in compliance with the ENTSOG AS4 profile, we apply the One-Way/Push communication pattern (detailed information in point 2.2.2 of the following document):

http://www.entsog.eu/public/uploads/files/publications/INT%20Network%20Code/2015/int0488%20131206%20as4%20usage%20profile%20v2r0.pdf

2.5.1. One-Way/Push MEP

In this communication pattern, an initiating partner (initiating MSH - an external entity or GAZ-SYSTEM - 1) sends a message to the responding partner (responding MSH - an external entity or GAZ-SYSTEM - 2) and synchronically receives information about the HTTP response status (202). This pattern is illustrated by the following diagram:



According to this pattern, all edig@s messages should be sent from the external partner to GAZ-SYSTEM and from GAZ-SYSTEM to the external partner. SOAP messages in the AS standard for the aforementioned communication patterns.

We assume that in the specified messages only the name of the external partner should change as well as EIC codes of the partners. The business contents of messages is not visible in the following examples, because it is attached as independent MIME pieces in HTTP inquiries and responses (only references to those messages are visible). Detailed requirements concerning MIME envelope were described by ENTSOG in the AS4 profile (in point 2.2.3, and in particular in 2.2.3.1):

http://www.entsog.eu/public/uploads/files/publications/INT%20Network%20Code/2015/int0488%20131206%20as4%20usage%20profile%20v2r0.pdf

All of the following messages are listed as part of the service (S4 Service): **A06.**

The ACKNOW message is an optional message for the **Edigas 5.1 Nomination and Matching Processes** process. Its use is a question of an arrangement between GAZ-SYSTEM and the external entity. GAZ-SYSTEM sends ACKNOW messages to contractors under the nomination process, transport forecasts in response to the received NOMINT message, but it does not expect the ACKNOW message from contractors in response to the NOMRES sent by GAZ-SYSTEM (such approach is consistent with the Edig@s 5.1. documentation)

2.5.2. Edig@s 5.1.

As part of the nomination process, the following edig@s v.5.1. messages will be applied:

NOMINT (type 01G) – Nomination (nomination, transport forecast),

NOMRES (type 08G) – Potwierdzenie (information about approved nomination, accepted transport forecast)

NOMRES (type AND) – Interruption notice (information about possible limitation of nominations as part of an interruption functionality)

DELORD (type ANC) - Forwarded single sided nomination (a message used to transfer received single-sided nomination to the co-operating operator)

DELORD (type 26G) – Callup notice (a message initiating the compliance of nomintaion (matching))

DELRES (typ 27G) – Callup response (a message with information about the result of the verification of

compliance of the nomination)

ACKNOW (typ 294) - Application error and acknowledgement (a message used to confirm the receipt of the edig@s message and to inform about errors).

edig@s specification (Message Implementation Guidelines including XSD schemes) is available at http://www.edigas.org

NOMINT, NOMRES, DELORD, DELRES messages are described in the document entitled “Nomination and Matching Process”, ACKNOW message – in the document entitled “General Service Processes”.

A detailed description of the interpretation of the contents of messages is specified at the website of GAZ- SYSTEM: http://www.gaz-system.pl/strefa-klienta/do-pobrania/edigs/

2.6. Security of transmitted data

2.6.1. Communication security at the transport level

Requirements concerning the security of the transport level (TLS) are specified by ENTSOG in the AS4 profile (in point 2.2.6.1 of the following document):

http://www.entsog.eu/public/uploads/files/publications/INT%20Network%20Code/2015/int0488%20131206%20as4%20usage%20profile%20v2r0.pdf

2.6.2. Communication security at the SOAP messaging level

SOAP messages will be secured with the use of the following Web Services Security standards version 1.1.1 OASIS,:

- Web Services Security SOAP Message Security
- Web Services Security X.509 Certificate Token Profile
- Web Services Security SOAP Message with Attachments (SwA) Profile

3. Procedure of connection of a new entity

3.1. On the part of GAZ-SYSTEM

1. Transfer of the EIC code of GAZ-SYSTEM to the entity and arrangement of the data exchange pattern (MEP).
2. Establishment of a profile for the partner, including a definition of certificates used to code and certify messages.

3. Establishment of the client's configuration specifying the client's rights to the data.
4. Transfer to the entity of a certificate providing confidentiality of information and authenticity of the server on which API is posted on the part of GAZ-SYSTEM (security of the transport level).
5. Provision of an external partner with the certificates used to sign and code SOAP messages (SOAP message security).

3.2. On the part of the connected entity

1. Transfer of the EIC code of the entity to GAZ-SYSTEM and arrangement of the data exchange pattern (MEP).
2. Ensuring that the certificate of the GAZ-SYSTEM server or its CA is a trusted certificate
3. Provision of GAZ-SYSTEM with the certificates used to sign and code SOAP messages (SOAP message security).
   Optionally, in order to enable collection of measurement data (with regard to archive data, emergency data and operative and settlement aggregates), it is necessary to implement the WebService of the client - on the basis of the available WSDL file servicing the request and response messages.

3.3. Test service

Clients will be provided with a test AS4 service providing for testing of the connection at the network level and at the level of AS4 handlers themselves. The description of the interface and the method of its operation will be made available at the website of WWW GAZ-SYSTEM.

Implementing the test service of GAZ-SYSTEM, I declare that its specification and functionality will be consistent with the ENTSOG AS4 profile (according to point 2.3.6 of the following document):

http://www.entsog.eu/public/uploads/files/publications/INT%20Network%20Code/2015/int0488%20131206%20as4%20usage%20profile%20v2r0.pdf

4. Source documentation

The most important legal acts addressing the issue of data exchange between transmission system operators and their contractors:

1. Regulation of (EU) Commission 2015/703 of 30 April 2015 establishing a network code on interoperability and data exchange rules
   http://www.gaz-system.pl/fileadmin/pliki/do_pobrania/pl/Inne_dokumenty/INT_NC_pl.pdf

The most important technical specifications of the applied technical solutions:

2. OASIS ebXML Messaging Services Version 3.0: Part 1, Core Features
   http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/core/ebms_core-3.0-spec.pdf

3. ENTSOG AS4 Profile
   http://www.entsog.eu/public/uploads/files/publications/INT%20Network%20Code/2014/int0488%20131206%20as4%20usage%20profile%20v1r0.pdf

4. ENTSOG AS4 Mapping table
   http://www.entsog.eu/public/uploads/files/publications/INT%20Network%20Code/2015/INT0698_150625_ENTSOG_AS4_Mapping%20Table_1r0.xls

5. Nomination and Matching Process
   http://www.edigas.org/v5-release-3/
   http://www.edigas.org/wp-content/Downloads/nominationAndMatchingv51r3.pdf

6. General Service Processes
   http://www.edigas.org/v5-release-2/
   http://www.edigas.org/wp-content/Downloads/8GeneralServiceProcess2-0.pdf

Moreover, GAZ-SYSTEM, for the purpose of ensuring full compliance with the standard while implementing AS4 communication
relies on the source documentation of ENTSOG. He following can be found at the links specified below:

7. AS4 Usage profile approved for GAZ-SYSTEM
   http://www.entsog.eu/public/uploads/files/publications/INT%20Network%20Code/2015/int0488%20131206%20as4%20usage%20profile%20v2r0.pdf

8. AS2 set up profile
   http://www.entsog.eu/public/uploads/files/publications/INT%20Network%20Code/2015/INT0697_150625_Setting%20up%20an%20AS4%20System%20v1r0.pdf