IEC TS 62325-504

Edition 1.0 2015-05

TECHNICAL SPECIFICATION

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Framework for energy market communications – Part 504: Utilization of web services for electronic data interchanges on the European energy market for electricity

IEC TS 62325-504:2015-05(en)

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Framework for energy market communications – Part 504: Utilization of web services for electronic data interchanges on the European energy market for electricity

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 33.200

ISBN 978-2-8322-2694-0

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FRAMEWORK FOR ENERGY MARKET COMMUNICATIONS –

Part 504: Utilization of web services for electronic data interchanges on the European energy market for electricity

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- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 62325-504, which is a technical specification, has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
57/1520/DTS	57/1567/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62325 series, published under the general title *Framework for energy market communications*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

FRAMEWORK FOR ENERGY MARKET COMMUNICATIONS –

Part 504: Utilization of web services for electronic data interchanges on the European energy market for electricity

1 Scope

This part of IEC 62325, which is a technical specification, defines the services needed to support the electronic data interchanges between different actors on the European Energy Market for Electricity (EME) in a fast (near-realtime), and secure way. At the same time, this Technical Specification can also be applied to integration problems outside the scope of IEC 62325-451, such as to the integration of gas market systems or general enterprise integration.

Web Services (in WSDL) will be specified for the defined services, applying the Basic Web Service Pattern implementation profile from IEC 61968-100.

The services needed to support the electronic data interchange on the European energy market for electricity are:

- List Messages. This service is used by a client application identified with the credentials of an EME Actor to request a list of messages available on the server for retrieval.
- Get Message. This service is used by a client application identified with the credentials of an EME Actor to request a specific message available on the server.
- Put Message. This service is used by a client application to send a message, usually providing data related to a Market Participant in the energy market for electricity, to the server for processing.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61968-100, *Application integration at electric utilities – System interfaces for distribution management – Part 100: Implementation profiles*

IEC 62325-451-1, *Framework for energy market communications – Part 451-1: Acknowledgement business process and contextual model for CIM European market*

ISO/IEC 40210, *Information technology – W3C SOAP Version 1.2 Part 1: Messaging Framework* (Second Edition)

WSDL, *Web Services Description Language (WSDL) 1.1*

XML Schema 1.0, XML Schema Language Part 1: Structure, W3C Recommendation 28 October 2004; XML Schema Language Part 2: Data Types, W3C Recommendation 28 October 2004

XML Signature Syntax and Processing (Second Edition) http://www.w3.org/TR/xmldsig-core

RFC 6176, *Prohibiting SSL 2.0* http://tools.ietf.org/html/rfc6176

RFC 5280, *Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile* http://tools.ietf.org/rfc/rfc5280

RFC 6818, *Updates to the Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile* http://tools.ietf.org/rfc/rfc6818

RFC 4346, *The Transport Layer Security (TLS) Protocol V1.1* http://www.ietf.org/rfc/rfc4346

3 Terms, definitions and namespaces

For the purposes of this document, the following terms and definitions apply.

3.1 Terms and definitions

3.1.1
message identification
alphanumeric string that represents the name of a message in the system

3.1.2
version
number that represents the message version

Note 1 to entry: The range of values is from 1 to 999.

3.1.3
application time interval
time interval when the message payload applies

3.1.4
server timestamp
date when the message is received by the server (input messages) or when it is made available by the server (output messages).

3.1.5
message type
type of the message payload as defined in IEC 62325-451-n (Schedule_MarketDocument, Acknowledgement_MarketDocument, etc.)

Note 1 to entry: As a general rule the message type is the local name of xml root element.

3.1.6
message code
number identifying a message in the server in a unique way

Note 1 to entry: For a given pair of message codes “x” and “y”, if “y” > “x” then “y” is a newer message. If “y” < “x” then “y” is an older message. Finally if “y” = “x”, then both messages are the same.

3.1.7
data owner
person or entity that is responsible for the information contained in the message (payload)

Note 1 to entry: Usually corresponds with the sender_MarketParticipant.mRID field in the IEC 62325-451-n series.

3.1.8
data provider
person or entity that is responsible for establishing a connection with the server and sending the message (payload)

3.1.9
M/O/C
Mandatory / Optional / Choice (choose one)

Note 1 to entry: Cn indicates “Choice n” and if several optional attributes have the same number “n” in Cn, it means all of them shall be present if this is the selected choice.

3.1.10
status
indication of the acceptance or validity of a message as per 61968-100

Note 1 to entry: The status of messages without Acknowledgement (publication or incoming message still being processed) will be “OK”.

Note 2 to entry: In exchanges where IEC 62325-451-1 applies, the “fully accepted reason code” is associated with a status “OK”. The rest of the reason codes are associated with “FAILED”.

3.2 Namespaces

This Technical Specification uses these prefixes and namespaces (see XML Schema 1.0 Parts 1 and 2):

a) cmsg (urn:iec62325.504:messages:1:0): The target namespace of the messages defined in this Technical Specification.

b) wss (urn:iec62325.504:wss:1:0): The WSDL target namespace for this Technical Specification.

This Technical Specification refers to these other prefixes and namespaces:

a) wsdl (http://schemas.xmlsoap.org/wsdl): This contains the W3C WSDL 1.1 schema.

b) xs (http://www.w3.org/2001/XMLSchema): This contains the W3C XML Schema definition.

c) soap (http://schemas.xmlsoap.org/wsdl/soap): This contains the W3C SOAP bindings for WSDL 1.1.

d) soap12 (http://schemas.xmlsoap.org/wsdl/soap12): This contains the W3C SOAP bindings for WSDL 1.2 (see ISO/IEC 40210).

e) ds (http://www.w3.org/2000/09/xmldsig#): This contains the XML Digital Signature Schema definitions (see XML Signature Syntax and Processing 2nd Edition).

f) msg (http://www.iec.ch/TC57/2008/schema/message): This contains the IEC 61968-100 schema definitions.

4 Conformance

4.1 General

This clause specifies the conformance requirements for a client application and a server to conform to this Technical Specification.

4.2 Client application conformance

In order to conform to this Technical Specification a client application shall:

a) Support the following services as a client:
   - List Messages and all of the mandatory aspects of this service as specified in Clause 5
   - Get Message and all of the mandatory aspects of this service as specified in Clause 5
   - Put Message and all of the mandatory aspects of this service as specified in Clause 5.

b) Send and receive XML Instance documents according to the XML Schema specified in Clause 7 in this Technical Specification for the services listed in a).

c) Use the WSDL definitions, SOAP bindings, and operations specified in Clauses 8 and 9.

d) Be able to access the server via HTTPS, using a client digital certificate recognized by the server for the purposes of establishing the https communication and creating the digital signature as specified in Clause 10.

4.3 Server conformance

In order to conform to this Technical Specification a server shall:

a) Support the following services as a server:
   - List Messages and all of the mandatory aspects of this service as specified in Clause 5
   - Get Message and all of the mandatory aspects of this service as specified in Clause 5
   - Put Message and all of the mandatory aspects of this service as specified in Clause 5.

b) Send and receive XML Instance documents according to the XML Schema specified in Clause 7 in this Technical Specification for the services listed in a).

c) Use the WSDL definitions, SOAP bindings, and operations specified in Clauses 8 and 9.

d) Provide access to the server via HTTPS, and be able to asses that the client digital certificate is valid and that the digital signature as specified in Clause 10 is correct.

5 Service definitions

5.1 List messages

5.1.1 General

The List Messages service is used to obtain a list of available messages for the client according to a given filter (parameters).

The main filter shall be one of the following:

- Application Date of the returned messages
- Server Timestamp of the returned messages
- internal numerical Code of the returned messages

Additional optional filters include:

- Message Identification
- Message Type
- Data Owner

The returned list of messages shall comply with the main filter selected and also with all the optional filters requested, and shall include the following information related to each message:

- Internal numerical code representing the message in the server
- Message Identification
- Message Version
- Status
- Application Time Interval
- Server Timestamp
- Message Type
- Data Owner

5.1.2 Service Request

Parameter Name	Type	M/O/C	Description
StartTime	dateTime	C1	Specifies that the list of messages returned shall only include messages whose end of their Application TimeInterval (Document TimeInterval) or Server Timestamp comes after the provided date.
EndTime	dateTime	C1	Specifies that the list of messages returned shall only include messages whose start of their Application TimeInterval or ServerTimestamp (when the message was received or published in the server) comes before the provided date.
IntervalType	String	C1	Indicates whether the StartTime and EndTime refer to Application TimeInterval or to Server Timestamp. Permitted values: "Application" (default), "Server".
Code	number	C2	Specifies that the list of messages returned shall only include messages with an internal identification number higher than the provided code. This means that the list will contain messages that are newer to the given one. For optimization purposes, if this filter is used, only messages available since the 00.00 of D-1 (day before) are guaranteed to be included in the response list.
MessageIdentification	string	O	Specifies that the list of messages returned shall only include messages whose Message Identification is compliant with the pattern provided in this parameter. ("*" can be used as a wildcard).
MsgType	string	O	Specifies that the list of messages returned shall only include messages of the provided type.
Owner	string	O	Specifies that the list of messages returned shall only include messages belonging to the provided Owner.

5.1.3 Service Response

If there is no message according to the provided filters, the service shall return an empty list. Otherwise, a list of message descriptors will be returned. Each message descriptor shall include the following parameters:

Parameter Name	Type	M/O/C	Description
Code	Position Type (number)	M	Specifies the internal identification number of the message
MessageIdentification	Identification Type (string)	M	Specifies the Message Identification. Messages defined in IEC 62325 Part 451-X series include this information. For additional messages not included in that standard, the server shall have a way of assigning a MessageIdentification to those messages.
MessageVersion	VersionType	O	Specifies the Message Version. Messages defined in IEC 62325 Part 451-X series include this information. For additional messages not included in that standard, the server may have a way of assigning a Message Version to those messages.
Status	String	O	Specifies the status of messages. Corresponds with the main reason code of the Acknowledgement message associated with this message as per IEC 62325-451-1. Possible values are: OK, FAILED. The status value “OK” corresponds with the IEC 62325-451-1 ReasonCode “A01”, and the status value “FAILED” corresponds with the rest of ReasonCodes.
ApplicationTimeInterval.Start	dateTime	M	Specifies the start of the message Application Time Interval. Messages defined in IEC 62325 Part 451-X series include this information. For additional messages not included in that standard, the server shall have a way of assigning an Application TimeInterval to those messages.
ApplicationTimeInterval.End	dateTime	O	Specifies the end of the message Application Time Interval. Messages defined in IEC 62325 Part 451-X series include this information. For additional messages not included in that standard, the server shall have a way of assigning an Application TimeInterval to those messages. When this information is missing, the message Application Time Interval is “from ApplicationTimeIntervalStart on” without an explicit end.
ServerTimestamp	MessageDateTime Type	M	Specifies the server timestamp (when the message was received or published in the server) of the message.
Type	LongIdentification Type (string)	M	Specifies the Message Type (see Terms and definitions).
Owner	LongIdentification Type (string)	M	Specifies the Data Owner of the message.

5.1.4 Functional requirements

Confidentiality rules of the European energy market for electricity shall be observed, thus the list of messages available to a client will only include those messages to which he/she is entitled (either completely or partially).

A client shall be able to see all his available previously submitted messages to the server, their responses sent from the server (acknowledgements), and any publications that are available to the client.

When the service is called with an invalid filter (e.g. malformed application dates) a Fault message shall be returned.

5.2 Get Message

5.2.1 General

The Get Messages service is used to obtain the message associated to the given parameter (filter).

The filter shall be one of the following:

- Message identification and version
- Message code
- Queue indication

5.2.2 Service Request

Parameter Name	Type	M/O/C	Description
MessageIdentification	Identification Type (string)	C1	Specifies the Message Identification of the requested message.
MessageVersion	VersionType	C1O	Specifies the Message Version of the requested message. If more than one message in the server have the same MessageIdentification and MessageVersion, the most recent one will be returned. If the requested message has no version this parameter is optional.
Code	Position Type (number)	C2	Specifies the internal identification number of the requested message.
Queue	String	C3	Indicates that the server will decide which message will be returned. Its value shall be “NEXT”.

5.2.3 Service Response

Parameter Name	Type	M/O/C	Description
[First child of Payload]	Any[1]	C1	The XML message that is being returned to the client.
BinaryContent	Base64Binary	C2	Optionally binary content may also be returned depending on the type of the requested message.
BinaryName	String	C2	Optionally, the name of the requested binary file.

5.2.4 Functional requirements

Only one message will be retrieved for each Get Message service invocation.

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1 Any: any document with any namespace.

A client shall be able to retrieve all his available previously submitted messages to the server, their responses sent from the server (acknowledgements), and any publications that are available to the client.

Servers are entitled to filter parts of the retrieved xml message for confidentiality reasons, when that message, which is available for retrieval, includes information that should not be available to the client.

If the retrieved message is a binary File, then the content is expressed as base 64 encoded wrapped by the tag “BinaryContent”.

When the service is called with an invalid message (e.g. missing or invalid code) a Fault message will be returned.

If a user requests a message to which he/she is not entitled, the system will return a Fault message as if he/she had requested a non-existing message.

The Queue parameter can be used when the server keeps an ordered list of messages for each client to retrieve. A server not supporting this feature will return a fault message.

5.3 Put Message

5.3.1 General

The Put Message service is used to send a message to the server for further processing following the rules of the European energy markets for electricity.

A series of standard XML messages related to the European energy market for electricity are defined in the IEC 62325-451-n series, but this Technical Specification allows servers to process additional XML messages not defined in said series.

Optionally, binary files may also be sent, if supported by the server.

5.3.2 Service Request

Parameter Name	Type	M/O/C	Description
[First child of Payload]	Any[2]	C1	The XML message that is being sent to the server.
BinaryContent	Base64Binary	C2	Optionally binary content may also be sent to the server.
BinaryName	String	C2	Optionally, the name of the binary file sent to the server.

5.3.3 Service Response

The response from the server will be in the form of an XML message indicating the technical and/or functional acceptance or rejection of the message. For the messages described in the IEC 62325-451-n series, the response from the server should be an acknowledgement message as defined in IEC 62325-451-1.

5.3.4 Functional requirements

For each XML message received the server needs to be able to identify each individual message. The IEC 62325-451-n series define such a way via the elements DocumentIdentification and optionally DocumentVersion.

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2 Any: any document with any namespace.