Regulation F: EDI communication

Appendix report 2:

Principles and rules of acknowledgement

April 2007

Rev. 1

In case of any discrepancy between the Danish text and the English translation, the Danish text shall prevail

memorandum

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1. Principles and rules of acknowledgement

The general principle of using EDI in Denmark is that the receiver of data must send a reply in the form of an acknowledgement or an error message (report). To ensure that electronic messages are sent and received correctly and that any errors are found and processed, players must comply with the rules for using acknowledgements and errors messages as described in this document.

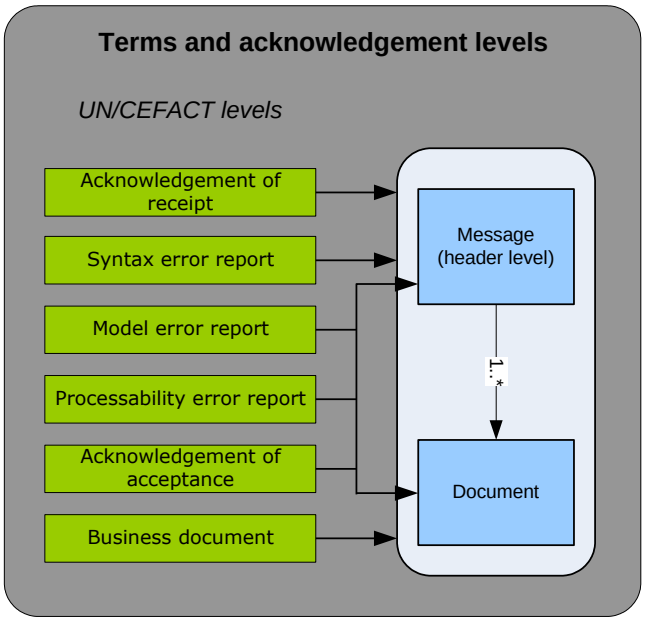
UN/CEFACT specifies three overall levels of acceptance:

- Acknowledgement of acceptance (sent from communications software/EDI converter)
- Acceptance of EDI messages (sent from an EDI and/or business application)
- Message reply (sent from the business application).

Message replying is used only in accordance with a business process and so not for simple messages. Message replying will not be addressed any further in this document, but is described in the individual business processes. Furthermore, there are several levels of error messages sent when an error occurs at the counterpart's end. Generally, the purpose of acknowledgements and error messages is to notify the message sender of the receiver's response.

1.1 Terms[1]

The following figure describes the connection between terms used in the principles of acknowledgement.



Message: Describes general information (header information) applying to all underlying documents such as sender and receiver.

[1] See Appendix report 1 'Syntax and structure in EDI messages' for a more specific description of individual terms.

Document: Repeated message information such as one time series out of all message time series.

1.2 Description of acknowledgement and error message levels

The following tables specify the principles of and rules for using acknowledgements. The principles are identical irrespective of the data format used. However, the detail rules differ for XML and EDIFACT. The following sections are therefore divided into specific rules for EDIFACT and XML.

Acknowledgement of receipt

Description	Message type
An acknowledgement of receipt is used only if required by a business process or in critical processes. The purpose of using this type of acknowledgement, which is sent from the EDI converter, is to verify that the syntax is correct. An acknowledgement of receipt can also be used for testing purposes.	**EDIFACT**: Positive CONTRL **XML**: Not used

Syntax error report

Description	Message type
A syntax error report is sent from the EDI converter and is used in cases where a message has reached its receiver, but the syntax used is incorrect.	**EDIFACT**: Negative CONTRL **XML**: Acknowledgement document on the basis of an XML schema validation

Model error report

Description	Message type
A model error report is syntax-neutral and is used for validating a message against a business information model (class diagram, etc., described in the business transactions). One purpose is to verify the correct use of attributes. At document level, a model error report refers to a business document (such as a notification, regulating power bid or regulating power order), if possible. If no reference can be made to the underlying document level, the entire message will be rejected.	**EDIFACT**: Negative APERAK **XML**: Acknowledgement document on the basis of an XML schema validation

Processability error report

Description	Message type

A processability error report is syntax-neutral and is used for acknowledging the content at document level (such as the validation of a metering point ID). The content of this report depends of the content of the message acknowledged. The rules governing when and how to use a processability error report are described in the business transactions in which this type of report is included.	**EDIFACT**: Negative APERAK **XML**: Acknowledgement document

Acknowledgement of acceptance

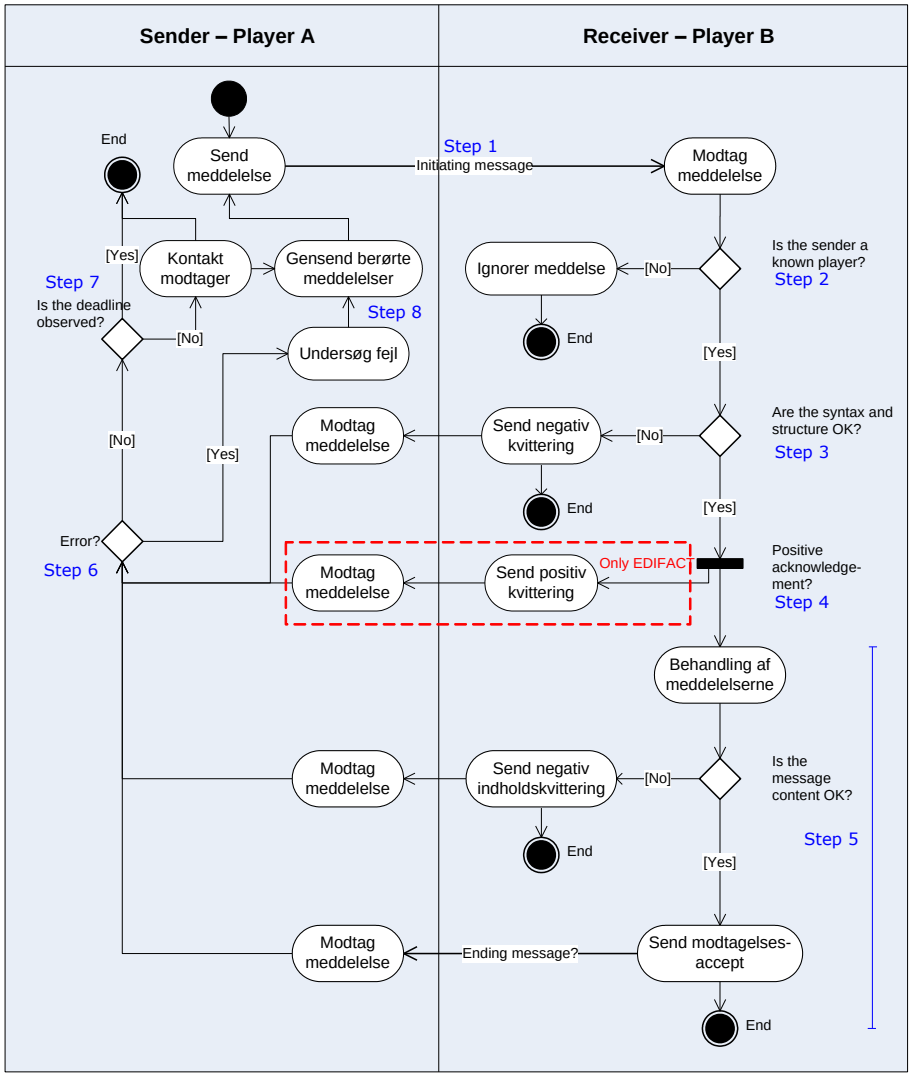
Description	Message type
An acknowledgement of acceptance must always be sent at document level. Having acknowledged acceptance means that the receiver has received, validated (syntax) and processed the content positively. Acceptance covers the full message received.	**EDIFACT**: Positive APERAK **XML**: Positive acknowledgement document

Business document

Description	Message type
A business document is a reply to a query message and has a business document layout. A business document ends the entire business transaction.	The current business transaction specifies the business documents used.

1.3 Generic principles of acknowledgement

The following figure describes the generic principles of exchanging messages and acknowledgements. The tables in the following sections list requirements and recommendations in respect of the individual steps in the figure.



TRANSLATION:

```
Kontakt modtager = Contact receiver
Send meddelelse = Send message
Gensend berørte meddelelser = Resend affected messages
Undersøg fejl = Check errors
Modtag meddelelse = Receive message (4 gange)

Ignorer meddelelse = Ignore message
Send negativ kvittering = Send negative acknowledgement
Send positiv kvittering = Send positive acknowledgement
Send negativ indholdskvittering = Send negative processability error report
Modtag meddelelse = Receive message
Behandling af meddelelserne = Processing messages
```

Send modtagelsesaccept = Send acknowledgement of acceptance

1.3.1 Step 1 – General

All acknowledgement processes begin with an initiating message. A message can also be used as an acknowledgement.

1.3.2 Step 2 – Is the sender a known player?

The receiver (player B) must be capable of identifying the sender (player A) and validating that party against the valid senders contracted with. The validation process has the following two possible outcomes:

- The sender (player A) is invalid or unknown. In this case, the process will end.
- The sender (player A) is valid. In this case, the process will continue.

Req. 2.1	The receiver must validate the sender.
Req. 2.2	The sender and the receiver must keep an updated index of valid players.

1.3.3 Step 3 – Are the syntax and structure OK?

The receiver (player B) validates the syntax and structure of the received message and its content. The validation process has the following two possible outcomes:

- The syntax and structure are incorrect. The receiver (player B) sends a negative acknowledgement (syntax error report/model error report). This negative acknowledgement should refer to the initiating message of the sender (player A) to allow that party to identify the incorrect message without problems.
- The syntax and structure are correct and the process will continue.

Req. 3.1	The EDI system of the receiver (player B) must be capable of automatically validating a message on the basis of the following criteria: 1. Basic structure (UN/CEFACT message for EDIFACT, schema for XML) 2. Syntax
Req. 3.2	In case of errors, the receiver (player B) must be capable of sending a negative acknowledgement that refers to the initiating message.
Req. 3.3	The sender of the initiating message **must** regularly check incoming negative acknowledgements.
Rec. 3.4	If the syntax and structure validation process generates an error, the receiver (player B) must reply within five minutes of receipt.
Req. 3.5	Only one acknowledgement may be sent per message (positive or negative).

1.3.4 Step 4 – Positive acknowledgement? (only EDIFACT)

A positive acknowledgement (acknowledgement of receipt) can be used in two circumstances: For example, during a test process or if the practice is that the acknowledgement of acceptance is sent at a much later time than the acknowledgement of receipt.

Two situations are involved:

- The sender does not want an acknowledgement of receipt. In this case, such acknowledgement must not be sent.
- The sender wants an acknowledgement of receipt. In this case, this must appear from the initiating message. The acknowledgement of receipt must refer to the initiating message.

Rec. 4.1	Do not use an acknowledgement of receipt unless at least one of the following conditions is present: 1. The sender and the receiver participate in a test process. 2. The time difference between sending the acknowledgement of receipt and the acknowledgement of acceptance is considerable.
Req. 4.2	The receiver (player B) must be capable of sending an acknowledgement of receipt that refers to the initiating message.
Req. 4.4	The receiver must return an acknowledgement within five minutes.
Req. 4.5	An acknowledgement must be sent for each message.
Rec. 4.2	If player A asks for an acknowledgement, that party must regularly check whether the acknowledgement has in fact been received.

1.3.5 Step 5 – Processing the message

Once the syntax of a message has been validated, the EDI system can forward the contained documents to the current applications for message and document validation. Content validation may be performed in part by the EDI converter, depending on the EDI system used. The validation process has the following two possible outcomes:

- The data content is not correct. In this case, the receiver (player B) must send an acknowledgement of receipt containing a reference to the initiating message and the specific document. The acknowledgement of receipt must specify the error and its location in the message/documents. The level of the acknowledgement must enable the sender of the initiating message (player A) to identify and correct the error without having to contact the sender of the error message (player B).
- The message/documents have been validated positively (no data content errors). In this case, the receiver (player B) must send a positive processability error report. The application processes the message and the process of exchanging documents will end.

Req. 5.1	The application (or EDI system) of the receiver (player B) must be capable of automatically validating a message with relevant documents on the basis of the following criteria: 1. Class diagrams and code lists for the current business transaction. 2. General data format rules for the entire market. This will ensure that the sender can always expect the same validation.
Req. 5.2	The receiver (player B) must be capable of sending a processability error report at an information level enabling the sender (player A) to identify the initiating message/document and to find the cause of a negative processability error report, if any.
Rec. 5.3	Unless otherwise specified by the business transactions of the individual message/document, the receiver (player B) must send a processability error report within two hours of receipt of the message/document.
Req. 5.4	Only one processability error report may be sent per document.

1.3.6 Step 6 – Error?

Step 6 performs the same procedure as steps 2-4. This means that the individual type of acknowledgement received (acknowledgement of receipt, syntax error report, model error report or processability error report) or the acknowledgement of acceptance will be validated in relation to syntax and structure. The difference in relation to steps 2-4 is that an acknowledgement cannot be verified by another acknowledgement.

Replies to an initiating message are as follows:

- The reply is negative. In this case, efforts must be made to find the reason for the negative reply.
- The initiating message has been approved, and the process will continue.

Req. 6.1	An acknowledgement cannot be verified by another acknowledgement.

1.3.7 Step 7 – Is the deadline observed?

All messages must be replied as specified by the relevant business transaction. The receiver (player A) is under an obligation to ensure that all messages sent are replied in due time.[2]

Replies are as follows:

- No reply is sent. In this case, the sender (player A) must check its own systems before contacting the receiver (player B).
- A reply is sent in due time. If the reply is sent before the deadline expires, the process will end.

[2] This can be ensured, for example, in connection with a 'timer' in the application that can adjust the time from dispatch

Rec. 7.1	All messages sent should be monitored. If no reply is given in due time, the relevant player must respond, see Regulation F, section 8.1.
Rec. 7.2	If the deadline is not observed, the sender (player A) should check its own systems for errors before contacting player B.

1.3.8 Step 8 – Error processing

Player A must look into and correct the error in question.

Req. 8.1	Efforts must be made to look into the error and correct it within a time frame that allows transmission of changes in due time.

1.4 EDIFACT acknowledgement

Generally, there are two types of reply to an EDIFACT message:

1. **CONTRL** approves or rejects the entire message. The structure and syntax of the message will be validated according to current rules.
2. **APERAK** (Application Error and Acknowledgement Message) approves or rejects the message at message and/or document level. The business content of the message and its underlying documents will be validated on the basis of the rules specified in the current business transaction.
   - In the event of a header error, the entire message, including any underlying documents, will be rejected.
   - In the event of no header error, a reply must be sent to each individual document.

If the EDIFACT message submitted contains two or more documents (such as time series), the receiver may choose to send separate APERAKs for the individual documents or to send one overall APERAK for all documents.

The EDIFACT data format uses the following types of acknowledgement:

Level	Type of acknowledgement	Covers the following steps from section 1.3
Message level (acknowledgement of receipt/syntax error report/ model error report)	CONTRL	1-4
Message level (processability error report)	APERAK	5
Document level (processability error report)		

1.4.1 CONTRL

A CONTRL acknowledgement specifies whether a given message has been approved or rejected in relation to the indicated syntax and structure. A CONTRL message is a standard EDIFACT message capable of acknowledging all EDIFACT messages.

The converter generates the CONTRL message on receipt of an EDIFACT message, and CONTRL messages always have the same structure. The acknowledgement can be positive or negative. The standard EDIFACT syntax rules apply to CONTRL acknowledgements. These are described in CONTRL – Syntax and Service Report Message – Danish Ediel Message Implementation Guide[3].

Example of a CONTRL acknowledgement

```
UNA:+.? '
UNB+UNOC:3+5790000432752:14+5790001062231:14+070124:0725+6649'
UNH+1+CONTRL:2:2:UN:EDIEL2'
UCI+M2865462+5790001062231:14+5790000432752:14+1'
UNT+3+147'
UNZ+1+6649'
```

1.4.2 APERAK

An APERAK serves two general purposes:

1. Inform the sender that the target application has received the individual message or parts of the message and rejected the content because of an error.
2. Inform the sender that the message or parts of the message have been successfully received and processed.

- An APERAK will be sent only if the EDIFACT syntax is valid.
- An APERAK will always be sent to acknowledge a message if it appears from the business transaction. This is the case even if the sender requests an APERAK in BGM segment element 4343 in the original message.
- Partly generated in the application layer, an APERAK can thus verify the content of a message.
- An APERAK indirectly accepts the EDIFACT syntax as it will be sent only if the message has been processed by the application and so has been positively validated in syntax terms. For this reason, positive CONTRL acknowledgements should not be used.

As described in section 1.4, the receiver may choose to send one overall APERAK in reply to the entire message and all underlying documents or to send separate APERAKs for the individual documents. Each document must be acknowledged by an APERAK message that, irrespective of level, must refer to the original message. Text indicating the cause of an error in the negative APERAK must be clearly worded and help find and correct the error quickly.

[3] http://www.ediel.dk/ny/elmarked/dok/levskift_dok_146.pdf

The standard EDIFACT syntax rules apply to APERAK acknowledgements. These are described in APERAK – Application Error and Acknowledgement Message – Danish Ediel Message Implementation Guide[4].

1.4.3 Negative APERAK

A negative APERAK will be sent if the EDIFACT message received is erroneous. Acknowledgement can be made in various ways, depending on whether the header section or the document contains errors.

Errors at header level

The following conditions will be validated at header level:

- The message ID has not previously been received.
- The required attributes as specified in the business transaction are present, including UNB attributes.
- The business transaction and the version are supported (UNH/0068). Must also be used if the receiver has not implemented the business scenario initiating the message.
- The version of the implementation guide (UNH/S009) matches the business transaction.
- The message function is consistent with the business transaction.
- The receiver is capable of processing documents for 'interchange recipient'.
- The time zone is UTC unless otherwise bilaterally agreed.
- The encoded value is included in the list of accepted values.

In the event of header-level errors, processing will stop and the negative APERAK will be generated and sent according to the following rules:

Segment group. segment.element	Value	Description
BGM.4343	27	Rejected.
SG3.ERC.C901.9321	Error code (see the above table)	The error code must appear from the element in the ERC segment.
SG3.FTX.C108.4440	Text description	Error description in Danish and English separated by a slash ('/'). The name of the element containing an error (for example, a start date).
SG1.RFF.C506.1154	Message ID	Contains a reference to the message ID from the message validated.

Example of APERAK specifying a header error

```
UNA:+.? '
UNB+UNOC:3+5790000701278:14+5790000432752:14+070118:1447+4471+
+DK-TIS-MET++1+DK'
UNH+1+APERAK:D:96A:UN:E2DK02+DK-BT-008-002'
BGM+++27'
DTM+137:200701181445:203'
RFF+ACW:7179'
NAD+FR+5790000701278::9'
```

[4] http://www.ediel.dk/ny/elmarked/dok/levskift_dok_146.pdf

```
NAD+DO+5790000432752::9'
ERC+42::ZZZ'
FTX+AAO+++Forkert meddelelsesnavn / Wrong Message Name'
UNT+9+1'
UNZ+1+4471'
```

Errors at document level
Messages containing a number of repeated documents such as time series in MSCONS and UTILTS must be acknowledged individually in the form of one overall APERAK or separate APERAKs for the individual documents. A valid header level is required for documents to be validated. The following conditions will be validated:

- The required attributes as specified in the business transaction are present.
- The encoded value is included in the list of accepted values.
- The values are correctly formatted as specified in the implementation guide.
- The attributes observe the number of repetitions.

Irrespective of the number of errors, all documents will be validated, and an APERAK will subsequently be sent, providing detailed information about such errors, according to the following rules:

Segment group. segment.element	Value	Description
BGM.4343	34	Approved with comments.
SG1.RFF.C506.1154	Message ID	Contains a reference to the message ID from the message validated.
SG3.ERC.C901.9321	Error code (see the above table)	The error code must appear from the element in the ERC segment.
SG3.FTX.C108.4440	Text description	Error description in Danish and English separated by a slash ('/'). The name of the element containing an error (for example, a start date).
SG1.RFF.C506.1154	Transaction ID, series ID or metering point ID	The business transaction specifies data requested in relation to the message referred to in the APERAK.

The receiver of a negative APERAK is under an obligation to respond to the acknowledgement.

1.4.4 A positive APERAK
Acceptance will always be sent at document level and must meet the following rules:

Segment group. segment.element	Value	Description
BGM.4343	34	Approved with comments.

SG1.RFF.C506.1154	Message ID	
SG3.ERC.C901.9321	100	The object has been approved.
SG3.FTX.C108.4440	Text description	Use the description only if the business transaction (BT) says so. If this is the case, include the description in Danish and English separated by a slash ('/').
SG1.RFF.C506.1154	Transaction ID, series ID or metering point ID	The business transaction specifies data requested in relation to the message referred to in the APERAK.

An APERAK can contain both positive and negative replies to documents from the same message.

1.5 XML acknowledgements

This section contains a specific description of the rules for XML acknowledgements used in connection with XML messages.

The following two types of acknowledgement are used for XML messages:

Level	Type of acknowledgement	Covers the following steps from section 1.3
Message level (syntax error report/ model error report)	Acknowledgement document *Validation as specified in XML schema*	1-5
Document level (syntax error report/ model error report)		

Only one type of acknowledgement is used in an XML context, reflecting the use of ETSO's Acknowledgement Document[5]. The message will be validated on receipt compared with an XML schema and furthermore with content validation. An acknowledgement document will subsequently be returned. This document will be positive or negative depending on the outcome of the validation.

All messages/documents must thus be acknowledged by one and only one acknowledgement document referring to the original message.

When a player calls an Energinet.dk web service, the XML message received will be validated according to the XML schema related to the current web service. The validation process will check whether the XML message is well formed, ie whether its content complies with the W3C standard for XML message structure. A check will also be performed to see whether the elements making up the XML message are permitted according to the XML schema. Furthermore, the schema may also define rules for the content of the individual elements. If the XML content is not consistent with the related XML schema, a negative acknowledgement will be returned, and the acknowledgement process will end.

[5] http://www.edi.etso-net.org/acknowledgement-v4r0/acknowledgement-document-v4r0.zip

If schema validation generates no problems, the next step will be to validate the semantics (the outcome of application validation). The result is a negative acknowledgement if the application check or the content somehow does not comply with the rules specified for semantics (see the validation table for the current business process).

At message level, the acknowledgement will contain general information about the message (message ID, sender and receiver) as well as a reason consisting of a code and a relevant description. When an acknowledgement document is used as a positive acknowledgement, the reason will be attached with reason code A01 (message fully accepted).

The acknowledgement thus serves three purposes:

- Inform the sender that the message content has been rejected because of a syntax error (message level).
- Inform the sender that the message has been successfully received and that processing the entire message will continue (message and document level).
- Inform the sender that the target application has received the individual message or parts of the message and provide details of content errors, if any.