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Elektronsko izdajanje računov - 3-4. del: Povezava sintakse za UN/EDIFACT INVOIC D16B

Electronic invoicing - Part 3-4: Syntax binding for UN/EDIFACT INVOIC D16B

Elektronische Rechnungsstellung - Teil 3-4: Umsetzung in die Syntax UN/EDIFACT INVOIC D16B

Facturation électronique - Partie 3-4 : Correspondance syntaxique pour les factures - Schéma D16B UN/EDIFACT

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TECHNICAL SPECIFICATION

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CEN/TS 16931-3-4

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Supersedes CEN/TS 16931-3-4:2017

English Version

Electronic invoicing - Part 3-4: Syntax binding for UN/EDIFACT INVOIC D16B

Facturation électronique - Partie 3-4 : Correspondance
syntaxique pour les factures - Schéma D16B
UN/EDIFACT

Elektronische Rechnungsstellung - Teil 3-4: Umsetzung
in die Syntax UN/EDIFACT INVOIC D16B

This Technical Specification (CEN/TS) was approved by CEN on 22 December 2019 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (CEN/TS 16931-3-4:2020) has been prepared by Technical Committee CEN/TC 434 "Electronic invoicing", the secretariat of which is held by NEN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TS 16931-3-4:2017.

The only change compared to the previous edition is the addition of a new annex, Annex A. This Annex defines the code lists to be used.

This document is part of a set of documents, consisting of:

— EN 16931-1:2017+A1:2019, *Electronic invoicing - Part 1: Semantic data model of the core elements of an electronic invoice*

— CEN/TS 16931-2:2017, *Electronic invoicing - Part 2: List of syntaxes that comply with EN 16931-1*

— CEN/TS 16931-3-1:2017, *Electronic invoicing - Part 3 - 1: Methodology for syntax bindings of the core elements of an electronic invoice*

— CEN/TS 16931-3-2:2020, *Electronic invoicing - Part 3 - 2: Syntax binding for ISO/IEC 19845 (UBL 2.1) invoice and credit note*

— CEN/TS 16931-3-3:2020, *Electronic invoicing - Part 3 - 3: Syntax binding for UN/CEFACT XML Cross Industry Invoice D16B*

— CEN/TS 16931-3-4:2020, *Electronic invoicing - Part 3 - 4: Syntax binding for UN/EDIFACT INVOIC D16B*

— CEN/TR 16931-4:2017, *Electronic invoicing - Part 4: Guidelines on interoperability of electronic invoices at the transmission level*

— CEN/TR 16931-5:2017, *Electronic invoicing - Part 5: Guidelines on the use of sector or country extensions in conjunction with EN 16931-1, including a methodology to be applied in the real environment*

— CEN/TR 16931-6:2017, *Electronic invoicing - Part 6: Result of the test of the European standard with respect to its practical application for an end user - Testing methodology*

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The European Commission estimates that "The mass adoption of e-invoicing within the EU would lead to significant economic benefits and it is estimated that moving from paper to e-invoices will generate savings of around EUR 240 billion over a six-year period"[1]. Based on this recognition "The Commission wants to see e-invoicing become the predominant method of invoicing by 2020 in Europe."

As a means to achieve this goal, Directive 2014/55/EU [5] on electronic invoicing in public procurement aims at facilitating the use of electronic invoices by economic operators when supplying goods, works and services to the public administration (B2G), as well as the support for trading between economic operators themselves (B2B). In particular, it sets out the legal framework for the establishment and adoption of a European standard (EN) for the semantic data model of the core elements of an electronic invoice (EN 16931-1).

In line with Directive 2014/55/EU [5], and after publication of the reference to EN 16931-1 in the Official Journal of the European Union, all contracting public authorities and contracting entities in the EU will be obliged to receive and process an e-invoice as long as:

— it is in conformance with the semantic content as described in EN 16931-1;

— it is represented in any of the syntaxes identified in CEN/TS 16931-2, in accordance with the request referred to in paragraph 1 of Article 3 of the Directive 2014/55/EU;

— it is in conformance with the appropriate mapping defined in the applicable subpart of CEN/TS 16931-3.

The semantic data model of the core elements of an electronic invoice – the core invoice model – as described in EN 16931-1 is based on the proposition that a limited, but sufficient set of information elements can be defined that supports generally applicable invoice-related functionalities.

This CEN Technical Specification CEN/TS 16931-3-4 defines the binding of the core elements of the invoice to the ISO 9735 syntax (UN/EDIFACT). Other subparts of this CEN Technical Specifications define the binding method (CEN/TS 16931-3-1) and map the core invoice model to other syntaxes such as ISO/IEC 19845 (UBL 2.1) (CEN/TS 16931-3-2) and the Cross Industry Invoice of UN/CEFACT XML (CEN/TS 16931-3-3).

By ensuring interoperability of electronic invoices, the European standard and its ancillary European standardization deliverables will serve to remove market barriers and obstacles to trade deriving from the existence of different national rules and standards – and thus contribute to the goals set by the European Commission

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[1] See https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0712:FIN:en:PDF.

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1 Scope

This documents specifies the mapping between the semantic model of an electronic invoice, included in EN 16931-1 and the ISO 9735 (UN/EDIFACT) syntax. For each element in the semantic model (including sub-elements or supplementary components such as Identification scheme identifiers) it is defined which element in the syntax is to be used to contain its information contents. Any mismatches between semantics, format, cardinality or structure are indicated.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9735 (all parts), *Electronic data interchange for administration, commerce and transport (EDIFACT) – Application level syntax rules*

EN 16931-1, *Electronic invoicing - Part 1: Semantic data model of the core elements of an electronic invoice*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

• IEC Electropedia: available at http://www.electropedia.org/

• ISO Online browsing platform: available at https://www.iso.org/obp/ui

3.1
electronic invoice
invoice that has been issued, transmitted and received in a structured electronic format which allows for its automatic and electronic processing

[SOURCE: Directive 2014/55/EU [5]]

3.2
semantic data model
structured set of logically interrelated information elements

3.3
information element
semantic concept that can be defined independent of any particular representation in a syntax

3.4
syntax
machine-readable language or dialect used to represent the information elements contained in an electronic document (e.g. an electronic invoice)

3.5
business term
label assigned to a given information element which is used as a primary reference

3.6
core invoice model
semantic data model of the Core elements of an electronic invoice

3.7
core elements of an electronic invoice
set of essential information elements that an electronic invoice may contain in order to enable cross-border interoperability, including the necessary information to ensure legal compliance

3.8
identifier
character string used to establish the identity of, and distinguish uniquely, one instance of an object within an identification scheme from all other objects within the same scheme

Note 1 to entry: An identifier may be a word, number, letter, symbol, or any combination of those

3.9
identification scheme
collection of identifiers applicable for a given type of object governed under a common set of rules

4   Syntax binding to UN/EDIFACT

4.1 Introduction

UN/EDIFACT (ISO 9735) is a syntax for electronic data interchange for administration, commerce and transport. UN/EDIFACT constructs are character strings in which the content of data elements is separated by tags and delimiters. UN/EDIFACT has a hierarchical structure where the top level is referred to as an interchange, and lower levels contain multiple messages which consist of segments, which in turn consist of composites. The final iteration is an element which is derived from the United Nations Trade Data Element Directory (UNTDED); these are normalized throughout the UN/EDIFACT standard[2].

The United Nations Economic Commission for Europe (UNECE), since the 1980s supported a number projects to enable trade based on electronic messaging – UN/CEFACT and specific Recommendations

In UN/CEFACT, standard messages using the UN/EDIFACT syntax (ISO 9735) were developed by various working groups across the globe to facilitate administration, commerce and transport. These messages mimicked standard paper documents used in everyday business transactions and were called United Nations Standard Message types (UNSMs). Today these UNSMs are the most widely used e-messages across the globe. UNSMs are built using the United Nations Trade Data Elements Directory (UNTDED) with reusable elements, code sets, standard composites and segments which can be configured to meet the function of a particular message such as an Invoice.

In the IT UNECE Trade Facilitation process, formal guidance is provided by publishing Recommendations. These Recommendations cover a wide variety of topics but some are specific to electronic messaging.

For more information please refer to http://www.unece.org/cefact/EDIFACT/welcome.html

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[2] http://www.unece.org/fileadmin/DAM/trade/untdid/texts/d423.htm

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4.2 Data types

XML based syntaxes have explicit semantic meanings included in the naming of the element (e.g. DueDate) and associate a specific data type to it (e.g. xs:DateTime). UN/EDIFACT does it the other way around. Having a set of clearly defined data types (e.g DTM for any kind of date or time information) the semantic meaning is added through a qualifier. The information is then given in so called data elements. This allows implementers to easily implement type checks and then map the information to the corresponding semantic context: First it is checked, if in this case the given date string forms a valid date and secondly the date gets a context for instance to be the actual delivery date. Data elements can be logically grouped into so called composites. This allows to create a logic bracket for instance to define the type of date or time information.

To allow efficient automatic processing the semantic meaning is added by using standardized code lists. The following example illustrates this with the invoice issue date.

DTM+2:20161214:102'

Table 1 — The DTM segment for the invoice issue date

Type	Name	Description	Example	Meaning
Segment	DTM	To specify date, and/or time, or period.	DTM	
Composite	C507	DATE/TIME/PERIOD		
Data element	2005	Date or time or period function code qualifier	137	Issue date/time
Data element	2380	Date or time or period text	20161013	13th October 2016
Data element	2379	Date or time or period format code	102	Format = CCYYMMDD

The combination of a qualifier for the date or time type (DTM) together with the corresponding data elements is called segment. Segments can be grouped in order to form a semantic container for instance to define a party (e.g. buyer).

A group or segment can be mandatory (M) or conditional (C) and can be specified to repeat (cardinality). Like a text document an UN/EDIFACT message is structures into header, details and summary section.

In order to allow a computer to recognize the difference between an XML instance and another text file XML defines so called processing instructions. In addition the XML based standards being relevant for the EN 16931 add groups of elements that define the type of message and the context where it is used in. In order to be processed an XML file needs to be well-formed.

In order to have a consistend UN/EDIFACT file the same concept is applied to the UN/EDIFACT instance. So called service segments form the outer brackets of the information being present in an UN/EDIFACT instance. They define for instance the used version, character sets and ensure the consistency of the message itself.

The following table shows the basic segment structure of an UN/EDIFACT invoice message. Only those segments are shown, that are relevant for the mapping of the EN 16931.

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Table 2 — UN/EDIFACT Invoice structure

Level	Name	Description	Cardinality	Example content
		Service segments for the start of the instance file		
+	UNA	Service string adice	1..1	Basic information on the syntax like separators
+	UNB	Interchange header	1..1	Character encoding used
		Header section		
+	UNH	Message header	1..1	Type of message, version
+	BGM	Beginning of message	1..1	Type of invoice, language
+	DTM	Date/time/period	1..35	Invoice issue date
+	FTX	Free text	0..99	Free text applicable to the whole message in general like Invoice note
+	SG1	Segment group 1	0..99999	References
++	RFF	Reference	1..1	Previous invoice
++	DTM	Date/time/period	0..5	Date of precious invoice
+	SG2	Segment group 2	0..99	Parties
++	NAD	Name and address	1..1	Buyer name and address
++	FII	Financial institution information	0..5	Account number
++	SG3	Segment group 3	0..9999	Party specific references
+++	RFF	Reference	1..1	Buyer reference
++	SG5	Segment group 5	0..5	Contact information
+++	CTA	Contact information	0..1	Contact point
+++	COM	Communication contact	0..5	Telephone number
+	SG 7	Segment group 7	0..99	Currency information
++	CUX	Currencies	1..1	Invoice currency
+	SG8	Segment group 8	0..10	Payment terms and conditions
++	PYT	Payment terms	1..1	Payment means
++	DTM	Date/time/period	0..5	Payment due date
++	PAI	Payment instructions	0..1	Payment means code
+	SG16	Segment group 16	0..9999	Document allowance or charges
++	ALC	Allowance or charge	1..1	Allowance
++	SG19	Segment group 19	0..1	Percentage
+++	PCD	Percentage details	1..1	Allowance percentage
++	SG20	Segment group 20	0..2	Monatary amounts
+++	MOA	Monetary amount	1..1	Allowance amount
++	SG22	Segment group 22	0..5	Tax information
+++	TAX	Duty/tax/fee details	1..1	VAT rate

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Level	Name	Description	Cardinality	Example content
+	SG26	Segment group 26	0..99	External files
++	EFI	External file link identification	1..1	File name
++	COM	Communication contact	0..9	External document location
++	RFF	Reference	0..9	Supporting document reference
	Detail section			
+	SG27	Segment group 27	0..9999999	Line item information
++	LIN	Line item	1..1	Invoice line identifier
++	PIA	Additional product id	0..25	Item Seller's identifier
++	IMD	Item description	0..99	Item name
++	QTY	Quantity	0..5	Invoiced quantity
++	ALI	Additional information	0..5	Item country of origin
++	DTM	Date/time/period	0..35	Invoice line period start date
++	FTX	Free text	0..99	Invoice line note
++	SG28	Segment group 28	0..99	Product related monetary amounts
+++	MOA	Monetary amount	1..1	Invoice line net amount
++	SG30	Segment group 30	0..25	Price information
+++	PRI	Price details	1..1	Item net price
++	SG31	Segment group 31	0..10	Line item references
+++	RFF	Reference	1..1	Buyer accounting reference
++	SG35	Segment group 35	0..99	Tax information
+++	TAX	Duty/tax/fee details	1..1	VAT information
++	SG40	Segment group 40	0..30	Allowances and charges on line level
+++	ALC	Allowance or charge	1..1	Charge indicator
+++	SG42	Segment group 42	0..1	Percentage information
++++	PCD	Percentage details	1..1	Item charge percentage
+++	SG43	Segment group 43	0..2	Amount information
++++	MOA	Monetary amount	1..1	Charge amount
	Summary section			
+	UNS	Section control	1..1	Separator for summary section
+	SG52	Segment group 52	1..100	Document totals
++	MOA	Monetary amount	1..1	Paid amount
+	SG54	Segment group 54	0..10	VAT breakdown
++	TAX	Duty/tax/fee details	1..1	VAT rate
++	MOA	Monetary amount	0..9	Tax amount
+	UNT	Message trailer	1..1	End of business document

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Level	Name	Description	Cardinality	Example content
	Service segments for the end of the instance file			
+	SG56	Segment group 56	0..99	Attached binary information
++	UNO	Object header	1..1	Start of included object
++	UNP	Object trailer	1..1	End of included object
+	UNZ	Interchange trailer	1..1	End of instance file

This clear hierarchical structure of an UN/EDIFACT message allows to create a path expression, that looks similar to a XPath of XML based messages. It allows to clearly identify each individual data element with its semantic meaning in the corresponding segment or segment group. For example the path for the invoice issue date can be given as:

INVOIC.DTM[D_2005 = "137"].C507.2380

The path always starts with the root message type (in this case INVOIC). Then all segments, composits and data elements, traversed through in the hierarchy are given and separated by a point. As with XPath filter values can be given in square brackets. The example above can be read as "Give me the *Date or time or period text* defined in Data Element 2380 that is part of composite C507 in segment DTM of the INVOIC message, where the *Date or time or period function code qualifier* defined in Data Element 2005 is equal to the code 137 that defines the issue date or time."

4.3 Codes and identifiers

In order to keep UN/EDIFACT up to date to new user semantic requirements as well as impacts by legislation UN/CEFACT publishes new libraries containing updated code lists normally twice a year. The important point is that the underlaying syntax itself (Syntax Version 3 or Syntax Version 4) is kept stable for many years to reduce system modifications to a minimum. Due to the underlaying methodology to have fixed data types (segments and data elements) that are combined with codes to define the semantic meaning structural changes are reduced to a minimum. Thus an instance file is normally backwards-compatible. In practice many systems are implemented based on a directory version, for example D01B (second publication of the year 2001), while they use the newest code lists are used if needed (for instance for currencies, countries or languages.)

UN/EDIFACT uses mostly codelists maintained by UN/ECE. Every code is mapped in a specific data element. Although for some of the code lists (e.g. Currency) the code list number is defined by UN/ECE, the codes as well as their semantic meaning is identical to the corresponding ISO code list. Due to this situation all codes from the model can be used as defined. The codes that have the described special situation are listed below:

Table 3 — UN/EDIFACT codes

Semantic model	UN/EDIFACT UNTDID
BT-5	UNTDID 6345
BT-6	UNTDID 6345
BT-18–1	UNTDID 1153
BT-21	UNTDID 4451

In BT-157-1 the EN 16931 references the semantic values of ISO 6523. All values that correspond to the identification of an item are used in EDIFACT with UNTDID 7143. If the semantic codes of ISO 6523 should be used that are not intended to identify an item, it should be requested to add to UNTDID 7143.

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4.4 Mapping the Invoice model

In the following table the semantic data model of the EN 16931 is mapped to the corresponding paths of the UN/EDIFACT INVOIC message structure, as explained above. The cardinality column for the UN/EDIFACT syntax represents the cardinality as it is defined by UN/CEFACT to illustrate differences between the semantic data model and the respective syntax. The cardinality of the data model is taken into account by the corresponding validation artefacts.

The model is mapped to UN/CEFACT INVOIC D14B S4. Although most existing implementations of UN/EDIFACT are made using Syntax 3 (S3), some specific requirements of the semantic data model necessitate using Syntax 4 (S4) for easier and more effective implementation. As no special features of S4, for example interactive EDI, are needed for implementing the semantic data model, the instances created using S4 will be compatible to S3 with the following differences:

— With the S4 version the service segments UNA, UNB and UNH have minor structural differences that specifically allow the use of UTF-8 for encoding. The usage of UTF-8 encoding brings the most possible interoperability in systems that need to implement all syntaxes from the short list. On the other hand S3 allows the usage of many different character sets based on ISO 8859 which is a subset of UTF-8 character set. If in cross border invoices local European languages are used the conversion from S3 to the receiving system needs some additional effort, although this is very common practice.

— S4 also allows the direct embedding of binary data (e.g. image files or PDF-files) with the usage of the UNO and UNP segments. With S3 it is common practice to put the UN/EDIFACT instance in an XML based Standard Business Document Header (SBDH), which is another standard from UN/ECE. This is for example done in the automotive industry[3]. S4 allows a One-Syntax-Only approach for this.

The implication of choosing S4 instead of S3 on existing implementations of UN/EDIFACT in respect to cost and effort are seen as minimal for the following reasons:

— The differences in the instance files of S3 and S4 for the data model are minor.

— As many organizations use service providers that generate or process the instance files and especially the service segments the implication on a users system by the choice of S4 are minor.

— Embedding of binary attachments is only relevant for specific business processes. If attachments are not embedded in the invoice process, the differences are even reduced.

— Upgrading an existing e-invoicing system to process the EN 16931 for the first time will require effort due to the new structure, the new code definitions, and the European harmonization of business terms, which are not common or used in every single member state.

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[3]   See   https://www.vda.de/en/services/Publications/4983-recommendation-on-the-transmission-of-attachments-and-signat.html

Table 4 — Semantic model to UN/EDIFACT syntax elements mapping

ID	Level	Card.	BT	Desc.	DT	Path	Card.	Match	Rules
BT-1	1	1..1	Invoice number	A unique identification of the Invoice.	I	INVOIC.BGM.C106.1004	1..1		
BT-2	1	1..1	Invoice issue date	The date when the Invoice was issued.	D	INVOIC.DTM[D_2005 = "137"].C507.2380	1..1		
BT-3	1	1..1	Invoice type code	A code specifying the functional type of the Invoice.	C	INVOIC.BGM.C002.1001	1..1		
BT-5	1	1..1	Invoice currency code	The currency in which all Invoice amounts are given, except for the Total VAT amount in accounting currency.	C	INVOIC.SG7[D_6347 = "2"].CUX.C504.6345	1..1		Use UN code list 6345
BT-6	1	0..1	VAT accounting currency code	The currency used for VAT accounting and reporting purposes as accepted or required in the country of the Seller.	C	INVOIC.SG7[D_6347 = "6"].CUX.C504.6345	1..1		Use UN code list 6345
BT-7	1	0..1	Value added tax point date	The date when the VAT becomes accountable for the Seller and for the Buyer in so far as that date can be determined and differs from the date of issue of the invoice, according to the VAT directive...	D	INVOIC.DTM[D_2005 = "131"].C507.2380	1..1		

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