ZUGFeRD 2.1
Specification

Consolidated English Version
ZF 2.1 ONLY / GL-01

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1 Introduction

This document describes the standard ZUGFeRD 2.1. It is the specification for ZUGFeRD only, it is not consolidated with the French specification text for Factur-X.

ZUGFeRD 2.1 represents the standard of the hybrid electronic invoice, in accordance with the requirements of the European norm EN 16931-1[1]. The structure of ZUGFeRD 2.1 is identical to its French equivalent Factur-X in v. 1.0.05. **Factur-X is now the leading identifier.** To retain downwards compatibility, we have also included the ZUGFeRD reference as a secondary identifier.

The French FACTUR-X is being developed by the French „Forum National de la Facture Electronique et des Marchés Publics Electroniques“ (FNFE-MPE), ZUGFeRD by the German „Forum elektronische Rechnung Deutschland“ (FeRD). Both institutions have collaborated in the past with the aim to develop a common format for invoices for the French and German market[2]. It combines the XML-schema of the existing standard Cross Industry Invoice (CII) by UN/CEFACT and the ISO standard PDF/A-3 to produce a unified hybrid invoice format. In order to harmonise the two standards, the profiles MINIMUM and BASIC WL have been included in ZUGFeRD 2.1, even though they do not meet the demands of fiscal legislation in Germany. They can, however, serve as useful accountancy aids, particularly for small businesses or sole traders – thus reflecting the original intention of the developers of ZUGFeRD.

The demands on invoicing documents vary a lot, depending on the respective business scenario, from simple receipts to completely digitalised business processes. Therefore, we shall define the following profiles: EXTENDED, EN 16931 (COMFORT), BASIC, BASIC WL, MINIMUM. These profiles as well as their embedding into PDF/A-3 are technically identical both in FACTUR-X and ZUGFeRD 2.1. Hence, the technical specifications are identical, even though the explanatory text of the specification documents may vary.

In this document, the profile EN 16931 (COMFORT) represents the requirements of the European norm EN 16931-1 via a hybrid format. In accordance with EN 16931-1, is a “fully compliant” [3] Core Invoice Usage Specification (CIUS), because its data model and their respective business rules fit exactly EN 16931-1. Because the profile EN 16931 (COMFORT) is „fully compliant“, it is possible to represent all other CIUS of EN 16931 by it, in so far as they are to be transmitted as a hybrid invoice format.

Because profile EN 16931 (COMFORT) does not limit or rule the data model itself, every CIUS compliant to EN 16931-1 is equally compliant to profile EN 16931 (COMFORT). This is particularly true for the CIUS XRechnung, which has been designed to match the

[1] When mentioning EN 16931 in this document, it is a reference to the norm sequence. Where we want to reference only the data model itself, we shall use the abbreviation EN 16931-1.

[2] And further markets if there is an interest to cooperate.

[3] Cf. section 1.6

requirements of German administration. At the time of publishing this specification we can state that every XML-instance corresponding to XRechnung version 1.2 is equally a valid instance according to profile EN 16931 (COMFORT).

We shall describe in this document how XML-instances are being generated for the different profiles and how they are embedded in a PDF/A-3. We assume that image representation and data representation are multi-documents with identical content of the same invoice. The standardised way described in this specification about how to generate a hybrid invoice is supported by CEN/TR 16931-4.

The ZUGFeRD-profiles can technically also be utilised for the exchange of fully structured data. However, ZUGFeRD was designed by default for the exchange of hybrid formats, which necessitates a bilateral agreement for the transfer of pure XML.

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- Sample Invoices

2 Document Information

2.1 Document Information and History of Changes

Document's title	ZUGFeRD 2.1 specification version 1.2 Final DRAFT
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Status	Release
Version of the specification's identifier and of the schema (cf. section 5.3.3)	1p0

2.2 Referenced Documents

2.2.1 Normative References

- EN 16931-1:2017, Electronic Invoicing – Part 1: Semantic data model of core elements of an electronic invoice
- CEN/TS 16931 -2:2017, Electronic Invoicing – Part 2: List of syntaxes fulfilling EN 16931-1
- CEN/TS 16931-3-1:2017, Electronic Invoicing – Part 3-1: Methodology for the conversion of an electronic invoice's core elements into a syntax
- CEN/TS 16931-3-3:2017, Electronic Invoicing – Part 3-3: Conversion into the syntax UN/CEFACT XML Cross Industry Invoice D16B
- CEN/TR 16931-4:2017, Electronic Invoicing – Part 4: Reference manual about the interoperability of electronic invoices on the level of transmission
- CEN/TR 16931-5:2017, Electronic Invoicing – Part 5: Reference manual about the use of the extensions of EN 16931-1 specific to countries or business sectors, including a methodology applicable in a real environment
- CEN/TR 16931-6, Electronic Invoicing – Part 6: Result of testing EN 16931-1 with regard to its practicability for an end-user
- UN/CEFACT XML Schemas 16B (SCRDM – CII), uncoupled[4]
- ISO 19005-1: Document management — Electronic document file format for long-term preservation — Part 1: Use of PDF 1.4 (PDF/A-1)
- ISO 19005-3:2012: Document management - Electronic document file format for long-term preservation — Part 3: Use of ISO 32000-1 with support for embedded files (PDF/A-3)

[4] Cf. http://www.unece.org/fileadmin/DAM/cefact/xml_schemas/D16B_SCRDM__Untermenge__CII.zip

2.2.2 Other Referenced Documents

In addition, the following documents have been referred to while generating the specification:

- Factur-X Franco-German Standard for Hybrid Invoices[5]
- Standard XRechnung, Version XRechnung 1.2
- Schematron rules published on GitHub „Schematron binding rules: Data binding to CII syntax for EN16931“[6]

The complete specification of „XRechnung“ is available from its publisher[7]:

Koordinierungsstelle für IT Standards (KoSIT)
Freie Hansestadt Bremen
Senatorin für Finanzen
Rudolf-Hilferding-Platz 1
28195 Bremen

2.3 Maintenance of this Specification

The profiles of this specification as described in the technical supplement are being developed and maintained in collaboration between the German „Forum elektronische Rechnung Deutschland“ (FeRD), a working party of the „Arbeitsgemeinschaft für Wirtschaft und Verwaltung e.V.“ (AWV), as well as the French „Forum National de la Facture Électronique et des Marchés Publics Électroniques (FNFE-MPE).

Contact the AWV for questions relating to the comprehension of aspects of this specification. Such questions are to be published together with their answers as FAQs. The contact details can be found on the following site: http://www.ferd-net.de .

If you would like to suggest changes, please refer to the requirements for the maintenance process as defined by the AWV, which can be found in the following document:

- Measures to Ensure Sustainable and Lasting Maintenance of the AWV-Format „ZUGFeRD“, published January 27, 2015: https://www.ferd-net.de/upload/Anlage_1_ZUGFeRD_Standardpflegeprozess.pdf

Principally, this specification is not limited to Germany and France; other countries and organisations are welcome to join the FACTUR-X/ZUGFeRD-initiative for the development of future versions.

[5] Because the harmonised versions of ZUGFeRD 2.0 and Factur-X may not always be published at the same time, we shall refer to the latest version of the French Factur-X.

[6] https://github.com/CenPC434/validation/blob/master/cii/schematron/CII/EN16931-CII-model.sch

[7] Further information can be found online at the following address: https://www.xoev.de/die_standards/xrechnung-14741 (as of 18.05.2018)

2.4 Disclaimer

The specification of ZUGFeRD 2.1 is based on the European norm EN 16931. The German standardization institution DIN grants the use free of charge of the parts EN 16931-1:2017-06 and CEN/TS 16931-2:2017-06 of the norm under the following conditions:
Neither CEN nor DIN will assume any responsibility regarding the use of content and the use of such derived an application such as ZUGFeRD 2.0. Neither will they give any explicit or implicit warranties for any use of such a derivative. In the case of doubt, the users must always refer to the content of the DIN's publication (EN 16931-1:2017-06, CEN/TS 16931-2:2017-06) where the official and authoritative text of the European norm can be found (https://www.beuth.de).

The documentation of the ZUGFeRD-format has been undertaken with reasonable diligence and to the best of our knowledge. All necessary measures were taken to assure that the information compiled regarding the ZUGFeRD-format was correct and free of errors at the time of publishing. The AWV checks and updates the information regarding the ZUGFeRD-format on a regular basis. Despite of the care taken, information can change. The AWV e.V. reserves the right to make changes or additions to the documentation of the ZUGFeRD-format provided.

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The AWV will explicitly not take any responsibility for timeliness, accuracy and completeness of transferring of the ZUFeRD-format into an application destined to transfer, identify or generate invoice data.

2.5 Licence

The term „ZUGFeRD 2.1 Artefacts "subsumes the following results:

- The text of this document together with the Technical Supplement and the description of sample invoices is called the „ZUGFeRD 2.1 Specification".
- The term „ZUGFeRD 2.1 Technical Artefacts" subsumes: Schema, Schematron

We presume the following prerequisites for the definition of the right of use of the ZUGFeRD 2.1 artefacts:

- The artefacts published by the UN/CEFACT are the basis for the development of the ZUGFeRD 2.1 specification. The documents and information objects published by UN/CEFACT for general use are subject to the condition of UN/CEFACT.

- The code lists quoted in the Technical Supplement of the ZUGFeRD 2.1 specification are subject to the right of use of the organisation respectively responsible for the code lists (such as ISO, UN/CEFACT, CEF etc.).
- The ZUGFeRD 2.1 specifications quotes parts of the norm EN 16931-1, for instance the definition of business terms and respective business rules. The DIN imposes the following rules for the use of the norm: The users may use this publication for the purpose of further developments. Such developments must contain an explanation which makes it obvious for the user that this is an application of the publication, stating while its reproduction has been made with the permission of the owners of the Copyright, the CEN and the DIN.

The Technical Supplement of the ZUGFeRD-specification contains a CIUS of EN 16931-1, as well as a mapping of the CII-syntax in a ZUGFeRD-specific form of representation. The mapping of the syntax is based on the freely available schema by UN/CEFACT. Copyright and right of use of this specific representation is owned by the AWV; it respects the copyright and rights of use of the CEN/DIN and UN/CEFACT.

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This licence does not include the essential patents of members of the FeRD who have been or still are involved in the development of ZUGFeRD 2.1 artefacts. Essential patents are such world-wide patents and patent applications which entail one or more patent claims, and which are necessary claims. Necessary claims are solely such claims of essential patents which necessarily would be infringed by the implementation of the specification of ZUGFeRD 2.1.

2.6 Terms and Definitions

CIUS	Core Invoice Usage Specification: The CIUS is a set of guidelines for use or restriction of the core invoicing model which nevertheless generate an invoicing instance which is fully compliant with the core invoicing

	model defined in EN 16931-1.
Compliant	No business rules of the data model are being infringed, nor further fields of information added. For instance, it is permitted for a CIUS to define a field as mandatory, even though it may only be optional according to the norm.
Conformant	No business rules of the data model are being infringed. However, further fields of information may be added.
Fully compliant	The data model and the relevant business rules comply exactly with the EN 16931-1. Neither restrictions nor additions are permitted.
Hybrid invoice	The hybrid invoice complements a structured set of data by its pictorial representation as a PDF-envelope, defined by a given methodology. The creator assures, that pictorial representation and data representation are substantially identical multi-units.
substantially identical multi-unit	Pictorial representation and data representation are substantially identical multi-units in the context of value added tax if VAT-relevant data are identical in both representations.

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3 Scope

The data model as defined in EN 16931-1 only represents the core elements of an invoice. However, in practice, further details may be required for the fully automated processing of invoices and its resulting gain in efficiency, dependent for instance on business sector or legal requirements. Consequently, ZUGFeRD does not only define the representation of invoices compliant to EN 16931-1 but also cross-sector extensions (EXTENDED profile of ZUGFeRD).

3.1 Application Profiles

Like Factur-X[8], the French norm for e-invoicing, the specification of ZUGFeRD covers five profiles. Two of those (MINIMUM, BASIC WL) have been included to ensure technical identity of both norms, although they are not regarded as complete invoices in the sense of § 14 UStG (German Law on VAT). They may therefore only be used as accountancy aid. .

This specification of application defines the following profiles: EXTENDED, EN 16931 (COMFORT), BASIC, BASIC WL and MINIMUM.

EXTENDED	The EXTENDED profile constitutes an extension of EN 16931-1 aimed at supporting complex business processes (i.e. invoices which are being billed across multiple deliveries or delivery locations, structured terms of payment, further details at item level to facilitate warehousing etc.)
EN 16931 (COMFORT)	The profile EN 16931 (COMFORT) is fully compliant to EN 16931-1, focussing on the core elements of an electronic invoice.
BASIC	The profile BASIC constitutes a subset of EN 16931-1 and may be used for simple invoices which are conformant with applicable VAT-requirements.
BASIC WL	The profile BASIC WL does not contain any invoicing information and therefore does not represent VAT-conformant invoices. However, on document level it contains all necessary details for any accounting entry. Hence, it may be used as accountancy aid.
MINIMUM	The profile MINIMUM includes essential information about the buyer and seller, the total amount of an invoice and the total amount of VAT. On item level, only the reference of the buyer may be displayed. The breakdown of the VAT is not supported. It, therefore, merely constitutes an accountancy aid for.

Table 1: ZUGFeRD 2.1 - profiles

[8] http://fnfe-mpe.org/factur-x/

3.2 Compliance and Conformance of the Application Profiles

3.2.1 Definition Compliance (CIUS) and Conformance with EN 16931-1

The rules for the generation of a CIUS in the EN 16931-1 are described in chapter 7. One will find here especially the definition of the criteria about what to observe when generating a CIUS.

A CIUS is a set of guidelines for the use or limitations of the core invoice model, which still produce an invoicing instance which is fully compliant with the core invoicing model as described in EN 16931. This means that the recipient of an invoicing instance will always be able to receive and to process it in accordance with the rules defined for the core invoicing model, provided it has been created in compliance with a CIUS.

The requirements for the development of an extension are described in TR 16931-5. Particularly the criteria are defined here, which need to be observed when developing such extensions.

3.2.2 Conformance of this specification with UN/CEFACT Cross Industry Invoice

The mapping of the syntax of all profiles is conformant to the requirements of the UN/CEFACT Cross Industry Invoice Stand D16B version 100, uncoupled set of schemas (CII). The rules of conformity of the UN/CEFACT apply.

3.2.3 Compliance and Conformance of this specification with EN 16931-1

The profile EN 16931 (COMFORT) is a „fully compliant“ CIUS; the profile BASIC is a „compliant“ CIUS of the EN 16931-1.

Any CIUS compliant with EN 16931-1 is equally compliant with the profile ZUGFeRD EN 16931 (COMFORT) (as well as the profile EXTENDED) and can therefore be represented by it, because the profile EN 16931 (COMFORT) does neither limit the rules nor the data model itself.

The profiles „BASIC WL“ and „MINIMUM“, however, are NOT compliant with EN 16931-1 and do not represent an invoice in accordance with the German Law on VAT (UStG; Umsatzsteuergesetz).

The profile EXTENDED, on the other side, is an extension conformant with EN 16931-1.

3.3 Basic Conditions

3.3.1 Geographic Scope and supported industry sectors

Although this specification has been designed with European requirements in mind, is not limited to European applications. The concept described here is globally and cross-sectoral applicable .

3.3.2 Supported business processes

The business processes supported by this specification can be found in chapter 5.2 of the EN 16931-1.

3.3.3 Supported functions

The functions supported by this specification can be found in chapter 5.3 of the EN 16931-1.

3.3.4 Participating business partners

The participating business partners defined by this specification can be found in chapter 5.1 of the EN 16931-1.

4 Legal Requirements

4.1 Hybrid Invoice

One core aspect of the development of EN 16931-1 was the need to represent the existing European legal requirements relating to VAT. It is principally possible to represent these requirements in a structured format.

Apart from these, other legal requirements may be applicable for invoices. This may necessitate the use of fields for free text to be legally compliant.

In the context of implementing the hybrid invoice, there is to date no consistent definition or legislation in Europe about how to handle identical multi-unit of an invoice.

The ZUGFeRD specifications assumes the subsequent understanding, in accordance with German legislation: the representations both of image and data of a hybrid invoice constitute identical multi-units of the same invoice in line with para. 14 sec. 4 UStG (sec. 14c 1. UStAE). In view of the financial risks resulting from faulty invoices (multiple VAT), the issuer of an invoice is likely to have a keen self-interest to ensure an analogy of contextual components is safe. The receiver of an invoice, on the other hand, must check incoming invoices and to verify that the contextual parts of the document (either PDF or XML), and that they are being properly recorded if found correct.

The recipient of an invoice must ascertain through a check of incoming invoices that the substantive part of the document (either PDF or XML) is being verified and, once found correct, entered in the ledgers. The decision taken at the point of checking the incoming invoices cannot be modified later.

The Federal Ministry of Finances (BMF) stated in its paper “Draft Position Statement of AP7 about the Processing of Hybrid Invoices” *(“Entwurf eines Positionspapiers des AP7 zur Verarbeitung hybrider Rechnungen“)* of April 10, 2018[9] the following:

> *The paragraphs 14 ss. of the law on VAT (UStG) and the administrative directives related to them, do **not stipulate the explicit obligation to collate the contents of formats XML and PDF** respectively. The Ministry’s writ about VAT (Umsatzsteuer-Anwendungserlass or UStAE) only assumes that the entrepreneur will implement a process to ensure that only those invoices are settled, which he has a duty to settle (section. 14.4 para. 5 line 1 UStAE).“*

At the time of publishing this text of specification, the above question had not yet been fully exhausted by federal and regional governments.

[9] Geschäftszeichen IV A 4 - S 0316/10/10001-08

4.2 XRechnung

For the exchange of invoices with administrative institutions of Germany, usually the directives of the XRechnung apply.

XRechnung is the national shaping of the European Norm EN 16931-1 for the German (federal) administration. XRechnung is a CIUS („Core Invoice Usage Specification“) just like the French Factur-X or its German analogue ZUGFeRD 2.0, thus representing for the administration in Germany the European norm for electronic invoicing. It complements the invoice by further national fields, containing further relevant provision important for the administration in Germany, for instance by declaring originally optional fields to be compulsory in XRechnung, which have to be filled with specific content. That way, the administration can request specific details to be given in an invoice, which may be important for the processing of invoices by the administration.

ZUGFeRD 2.0-Profil EN 16931 (COMFORT) is fully compliant with EN 16931-1. In the Technical Appendix, we shall point at the business rules of the XRechnung. These references are based on the mapping of syntax of the EN 16931-1 of the Cross-Industry Invoice by UN/CEFACT, in line with TS 16931-3-3. It is the duty of the invoicing party to ensure full compliance with the requirements of the XRechnung. We would like to refer in particular to the current up-to-date version of the XRechnung’s specification.

5 Specification

We shall use the terms „Must“, „Shall“ and „Can“ in the following way:

- Must A Must-instruction has to be obeyed under any circumstances.
- Shall A Shall-requirement represents a strong recommendation which ought to be obeyed unless there is a good reason not to do so.
- Can: An option which depends on each individual case.
-

5.1 Business Rules

In this specification, no additional business rules relating to EN 16931-1 will be defined. The business rules defined in EN 16931-1 can be found in the technical appendices of the business concepts of the business rules in question.

Business rules relating to the codes of tax categories were not included in the Technical Appendix; they can be found directly in section 6.4.3 “VAT rules” of the norm EN 16931-1.

5.2 Specific Business Rules

No additional business rules are being defined in this specification for specific business sectors, branches, processes or functions relating to EN 16931-1.

5.3 Technical Appendix: The Profiles

5.3.1 General Rules

The basic pattern for the generation of ZUGFeRD-instance files shall be the collection of patterns of the UN/CEFACT Cross Industry Invoice D16B version 100 uncoupled. Character set UTF-8 is mandatory.

The decimal places in decimal numbers must be separated by a full stop. The attribute `xsi:schemaLocation` should not be included in an instance file because the path names therein are likely not to correspond with the local file structure at the recipient’s end. The receiving system can run a pattern verification, whether this attribute is given or not.

5.3.2 Technical Specification

The 5 profiles, including profile EN 16931 (COMFORT) and UN/CEFACT Cross Industry Invoice 100 (D16B, SCRDM, decoupled schemas) is being illustrated in the Technical Appendix. It contains a structured representation of all elements which appear in the different profiles, in accordance with the CII.

Each element will not only be **named** (top right), but also be **described**, and **additional information** will be supplied, provided it has been described in EN 16931-1. In the case where a different term was used for ZUGFeRD 1.0, this term will be registered in the field called “**Synonym**”.

The semantic data model uses a **cardinality** which is principally derived from the business requirements as defined in EN 16931-1. The respective target element of the syntax used for

the XML-schema, however, sometimes has a different cardinality, which results from the syntax mapping on the CII. Some elements which were not defined in the data model of EN 16931-1 have been added to the syntax mapping of the CII because they were required for the technical mapping of the core data model of the EN 16931-1. The ID of the business terms (BT) or of the business group (BG) is given in the field **"EN 16931-1-ID"** if an element has been defined in the core data model of the EN 16931-1. Beyond that, further elements were added for the extensions in the EXTENDED profile.

The cardinality specified in the Technical Appendix is principally the one for all profiles. An "X" indicates whether a certain element is supported by the respective profile. This applies to all five profiles. In addition, the cardinality of any profile will be specified under the "X" if it is different from the general cardinality of the profiles.

The cardinality for attributes is specified as "required" if they are mandatory for the related element.

The business rules relevant for the respective element are defined in the field called **"Business Rules".** Every business rule has a unique identifier, a title and a description.

Suggestions relating to the usage of a respective element are summarised in the field **"Application".** Usually, it refers to information about the validity of the codes.

The respective **code list** is specified for elements whose data type is tied to a code list; in addition, it contains information about whether it may be used in full or whether its use is restricted. The code lists are defined analogous to CEN/TS 16931-3-3. The norm EN 16931-1 references code lists exclusively based on their semantics. Where necessary, the code format is also specified (e.g. Alpha-2 in code list EN ISO 3166-1). It is only at the point of syntax mapping that specific values are being allocated. CEN/TS 16931-3-3 defines the minimum requirements of the relevant code lists.

Where the context of EN 16931-1 leads to restrictions, the codes suggested there will be specified explicitly. Other than that, the complete code lists are contained in the technical artefacts which can be retrieved on the AWV's website.

5.3.3 Versioning

The version indicated in the specification's identification (BR-24) corresponds with the respective version of the underlying schema. The versioning of the specification text is not tied to the versioning of the specification's identification or schema, respectively. However, it is imperative to specify unequivocally which version of the specification's identification or schema the continuous text is referring to.

The following versions form the basis for this specification text:

	Factur-X / ZUGFeRD 2.1	**ZUGFeRD**
	Specification text	
	Factur-x 1.0.05	ZUGFeRD 2.0
	Specification ID	
EXTENDED	urn:cen.eu:en16931:2017#conformant #urn:factur-x.eu:1p0:extended	urn:cen.eu:en16931:2017#conformant #urn:zugferd.de:2p0:extended
EN 16931 (COMFORT)	urn:cen.eu:en16931:2017	urn:cen.eu:en16931:2017
BASIC	urn:cen.eu:en16931:2017 #compliant#urn:factur-x.eu:1p0:basic	urn:cen.eu:en16931:2017#compliant #urn:zugferd.de:2p0:basic
BASIC WL	urn:factur-x.eu:1p0:basicwl	Urnzugferd.de:2p0:basicwl
MINIMUM	urn:factur-x.eu:1p0:minimum	Urn:zugferd.de:2p0:minimum
	Schema	
EXTENDED	factur-x_1p0_extended.xsd	zugferd_2p0_extended.xsd
EN 16931 (COMFORT) and BASIC	factur-x_1p0_en16931.xsd	zugferd_2p0_en16931.xsd
BASIC WL and MINIMUM	factur-x_1p0_basic-wl.xsd	zugferd_2p0_basic-wl.xsd

Table 2: Versions of specification-IDs and schemata for the profiles of ZUGFeRD 2.1

As a matter of principle, releases of the profiles of Factur-X are published with a version number, composed in the following way: M**p**N. ***M*** stands for a main version, ***N*** for a sub version and, ***p*** for the separating full-stop, since the period "." in a URN is defined as domain separator. For legacy reasons only we keep the versioning rules of ZUGFeRD 2.0.

The primary urn-path for ZUGFeRD 2.1 is now *#urn:factur-x.eu*. For reasons of downward compatibility for ZUGFeRD we also retain *#urn:zugferd.de* as secondary identifyer.
All releases within a major release are downward compatible. All newly added elements are optional. Consequently, an invoice will be able to be received and processed by an application which is already using a newer subversion, even it was originally created with a software using a minor sub-version.

Example:
A sender forwards an invoice in ZUGFeRD v. 2.0 to a recipient who is already employing v.2.1. The latter will have no problems to process it. The reverse action will (usual) not work,

because the invoice in v.2.1 might contain additional information which cannot be processed by a system with an older version.

If it is necessary to create a version which is neither upward nor downward compatible, for instance because of required amendments or because of legal changes, the number of the main version must be changed. This may be the case where structural changes must be applied, or where it is necessary to include a further mandatory piece of information which cannot be represented in any other way.

5.3.4 Validation

In addition to the Technical Appendix, this document will provide three schemata:

- factur-x_1p0_extended.xsd for Profil EXTENDED
- factur-x_1p0_en16931.xsd for Profile EN 16931 (COMFORT)
- factur-x_1p0_basic.xsd for Profil BASIC
- factur-x_1p0_basic-wl.xsd for Profil BASIC WL
- factur-x_1p0_minimum.xsd for Profil MINIMUM

as well as a Schematron file for each profile as well:

- e. g. factur-x_1p0_EN16931.sch

A complete validation will require two steps:

1. Testing against the schema which also contains the permitted codes and code lists will ensure the structural and syntactical validity of an instance file. On this level, cardinalities are being checked which are always valid, regardless of business rules.

2. Testing against the Schematron file in order to validate the business rules. This also includes checking specific cardinalities which can be deduced from the business rules.

The ZUGFeRD specification will provide no further aids for validation.

6 Differences between ZUGFeRD 1.0 and ZUGFeRD 2.1

The specification of ZUGFeRD 2.1 has had a number of modifications with respect to version 1.0:

Design principles of EN 16931-1

- The design principles of the norm, namely that one invoice may only refer to exactly one purchase order and to exactly one delivery apply to the profiles up to profile EN 16931 (COMFORT). This can lead to a need for change in the invoicing procedures on the side of the biller and to modifications of the processing procedures on the side of the recipient.
- In order to process collective invoices, i.e. invoices with multiple order references, delivery addresses etc., it is mandatory to choose the EXTENDED profile.
- Other than known in ZUGFeRD 1.0, the net price is a binding price information according to EN 16931, and it is therefore mandatory in ZUGFeRD 2.1. The net price of a product here is the price of that product ex VAT, after any rebate on the original product price. The net value of the invoice line item is its “net” value, i.e. without VAT but including all supplement charges or reductions and all other taxes which may apply. The basic amount for the percentual calculation of any supplement charges or reductions on the level of the line item must be given as an absolute figure. The EN 16931-1 does not impose any demands on how this basic price is to be calculated.

Deviations in the profiles

- Certain elements had to be added or omitted, because the profile COMFORT of ZUGFeRD 1.0 is not compliant to the data model of EN 16931-1 (see attachment).
- Changes in profile EN 16931 (COMFORT) of ZUGFeRD 2.1 have an impact on the profile EXTENDED, because it is a “conformant” extension of EN 16931-1. Particularly mandatory statements of profile EN 16931 (COMFORT) must be mandatory statements in profile EXTENDED.
- The two profiles BASIC WL and MINIMUM of ZUGFeRD 2.1 were adapted from Factur-X. In Germany, these serve only as accountancy aids, i.e. only the document type “751” may be employed. In France, on the other hand, BASIC WL and MINIMUM may be used for all available document types designed for invoices, because there is no obligation that all invoice data of the visual instance must also be contained in the data instance (XML-instance).
- All sums in EN 16931-1 are declared in the invoicing currency. This is specified at document level. The sole exception is the total sum of the VAT which may also be declared in a second currency, if this is relevant for the accountancy. The same principle applies also to the EXTENDED profile.
- In analogy to EN 16931-1, invoicing periods of ZUGFeRD 2.1 may no longer be specified at document level, only at position level. This also applies to the profile EXTENDED.
- The German sort code (“Bankleitzahl”) is no longer supported by payment instruments. In analogy to EN 16931-1, national bank account numbers or sort codes will only be supported for bank transfers.

- The EN 16931-1 only supports rebates on the *gross* price of a product. The profile EXTENDED also supports supplements to the gross price of a product. That is why it is necessary to employ the „Charge Indicator“ when using this element of information in the EXTENDED profile. This way one indicates whether it is a rebate or a supplement. The „Charge Indicator“ may be used as an option up to profile EN 16931 (COMFORT), then however always by setting its value to “false” when referring to a rebate (reduction).

Business Rules

- The business rules have been formalised by the norm EN 16931-1; they are being explicitly stated in the description of the technical supplement, when mentioning the respective business terms. In ZUGFeRD 1.0, those rules were described in the basic document.
- Business rules which refer to the to the various tax categories must be taken directly from the EN-16931-1.
- No separate business rules are being defined for the profile EXTENDED (neither in ZUGFeRD 1.0 nor in ZUGFeRD 2.1).
- To test these rules, Schematron files are being published for ZUGFeRD 2.1.

Method of Calculation

- The methods of calculation can be found in the business rules.
- Examples of calculation can be taken directly from the norm EN 16931; they have not been included in the running text of the specification of ZUGFeRD 2.1.

Permitted Types of Tax

- Up to profile EN 16931 (COMFORT), ZUGFeRD 2.1 only supports the tax type “VAT” (“Umsatzsteuer”) with the code “VAT”.
- The EXTENDED profile must be used in order to apply other kinds of tax, such as insurance tax or mineral oil tax. The applicable code for the type of tax in question must then be selected from code list UNTDID 5153.

Other Tags in the Syntax Mapping

- The tags derived from the Supply Chain Reference Data Model (a subset of the Core Component Library) show variations, since the UN/CEFACT took decisions with the aim to simplify „Name and Design Rules“.
- The schema ZUGFeRD 2.1 has therefore a new structure based on the schema CII 16B, which results for example in a new root element such as `CrossIndustryInvoice`.

Code Lists

- The supported codes are not described in a separate document anymore; they are now assigned to the data types collated in the technical supplement.
- Code lists which are fully supported by ZUGFeRD 2.1 will only be referenced to.
- The final list of supported codes can be found in the technical supplement of the relevant business terms where the data types support only a selection of codes.

- The code lists will be published in Gericode format together with the schema.
- The code list for the type of tax which can only have the fix value “VAT” up to profile EN 16931 (COMFORT) has been extended to the entire code list UNTDID 5153.

Embedding in PDF/A-3

- The embedded file is called factur-x.xml.
- The metadata extension schema of ZUGFeRD PDF/A has changed; this in now referred to as factur-x version 1p0.
- Documents serving as invoicing aids which are embedded in the PDF are referenced to via a relative path from within the XML-file.

7 Appendix

7.1 Bibliography

EN 16931-1	Electronic invoicing – Part 1: Semantic data model of the core elements of an electronic invoice
CEN/TS 16931-2	Electronic invoicing – Part 2: List of syntaxes that comply with EN 16931-1
CEN/TS 16931-3-1	Electronic invoicing – Part 3-1: Methodology for syntax bindings of the core elements of an electronic invoice
CEN/TS 16931-3-3	Electronic invoicing – Part 3-3: Syntax binding for UN/CEFACT XML CII D.16B
CEN/TR 16931-4	Electronic invoicing – Part 4: Guidelines on interoperability of electronic invoices at the transmission level
CII 16B	UN/CEFACT XML Schemas 16B (SCRDM – CII), uncoupled, http://www.unece.org/fileadmin/DAM/cefact/xml_schemas/D16B_SCRDM__Untermenge__CII.zip
IS19001	ISO 19005-1: Document management — Electronic document file format for long-term preservation — Part 1: Use of PDF 1.4 (PDF/A-1), www.iso.ch
IS19002	ISO 19005-2: Document management — Electronic document file format for long-term preservation — Part 2: Use of ISO 32000-1 (PDF/A-2), www.iso.ch
IS19003	ISO 19005-3: Document management — Electronic document file format for long-term preservation - Part 3: Use of ISO 32000-1 with support for embedded files (PDF/A-3), www.iso.ch
IS32001	ISO 32000-1, Document management — Portable document format — Part 1: PDF 1.7, www.iso.ch
T0008	TechNote 0008: Predefined XMP Properties in PDF/A-1, PDF/A Competence Center, www.pdfa.org/doku.php?id=pdfa:en:techdoc
T0009	TechNote 0009: XMP Extension Schemas in PDF/A-1, PDF/A Competence Center, www.pdfa.org/doku.php?id=pdfa:en:techdoc
BMF 2018-04-10	Bundesministerium der Finanzen: Entwurf eines Positionspapiers des AP7 zur Verarbeitung hybrider Rechnungen“, 10. April 2018, GZ IV A 4 - S 0316/10/10001-08

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7.2 Index of the Tables

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7.3 Index of Abbreviations

AWV	Arbeitsgemeinschaft für wirtschaftliche Verwaltung e.V. (Association for economic administration, Germany)
B2A	Business to Administration
B2B	Business to Business
B2C	Business to Consumer
BG	Business Group
BT	Business Term
CEN	Commité Européen de Normalisation
CII	Cross Industry Invoice
CIUS	Core Invoice Usage Specification; the application specification of a core invoice, which is compliant with EN 16931-1
DIN	Deutsches Institut für Normung e.V. (German Institute for Standardization)
EN	European Norm
FeRD	Forum elektronische Rechnung Deutschland
FNFE-MPE	Forum Nationale de la Facture Electronique et des Marchés Publices Electroniques
ISO	International Organization for Standardization
KoSIT	Koordinierungsstelle für IT Standards (German institute for the coordination of IT Standards)
TR	Technical Report
TS	Technical Specification
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
UStAE	Umsatzsteuer-Anwendungs-Erlass (Decree about the application of VAT or sales tax)
UStG	Umsatzsteuergesetz (VAT Act)
XML	Extended Markup Language

7.4 Associated Technical Artefacts

The following technical artefacts are being published together with this specification:

- Schemata
- Code lists
- Schematron file

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