

e-Tax Invoice Implementation Guideline

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27.07.2017 - ETDA Thailand

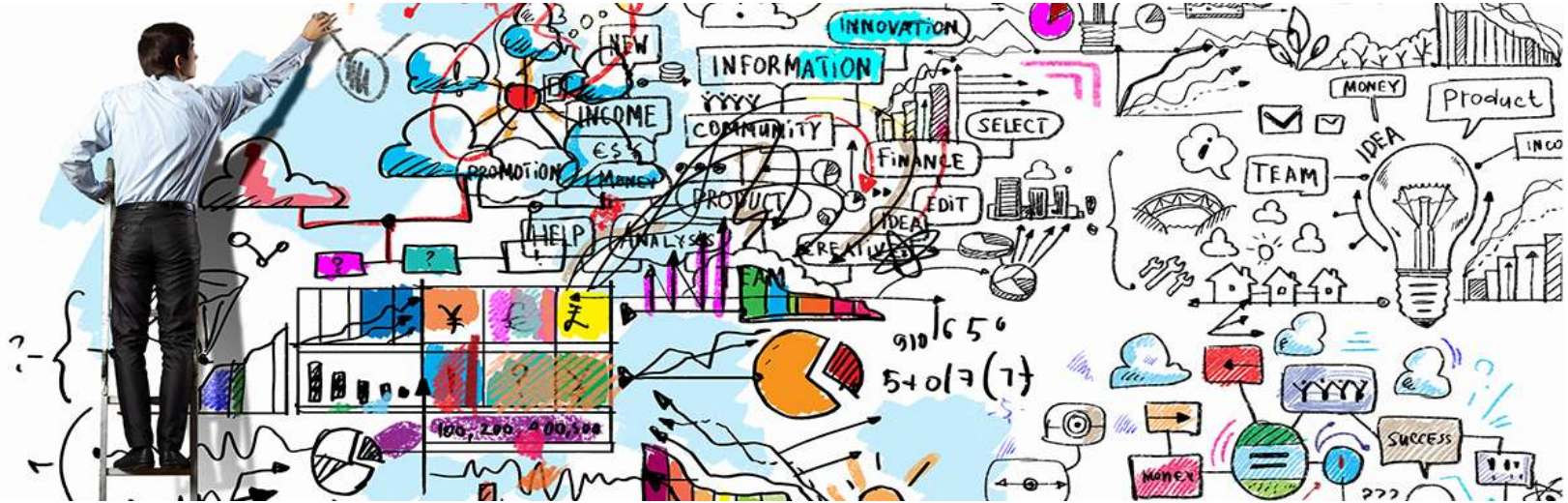
Overview of e-Invoicing

- ≡ Many existing standards for e-Invoicing
 - ≡ All incompatible to each other
 - ≡ Country or industry specific
 - ≡ Still in progress
- ≡ Standardization would be the solution

XML for the Enterprise

- ≡ ISO 15000 (by OASIS and UN/CEFACT)
 - ≡ ebXML: Electronic Business using eXtensible Markup Language
 - ≡ ISO 15000-5:2014 Core Components Specification (CCS)
 - A common set of semantic building blocks that represent general types of business data
 - Provides for the creation of new business vocabularies / restructuring of existing business vocabularies
- ≡ OASIS (Organization for the Advancement of Structured Information Standards)
 - ≡ UBL: Universal Business Language
 - 20% of documents and business objects are used by 80% of electronic business partners
 - PO, ship notice, goods receipts, invoice, bill of lading, price catalog,...
- ≡ UNECE (United Nations Economic Commission for Europe)
 - ≡ UN/CEFACT (United Nations Centre for Trade Facilitation and Electronic Business)
 - CCL: Core Components Library
 - CII: Cross Industry Invoice
 - NDR: XML Naming and Design Rules
- ≡ CEN (European Committee for Standardization)
 - ≡ MUG (Message User Guides) CWA 16356 (CEN Workshop Agreement)
 - Guide for a European Core Invoice data model with UN/CEFACT CII Implementation Guide

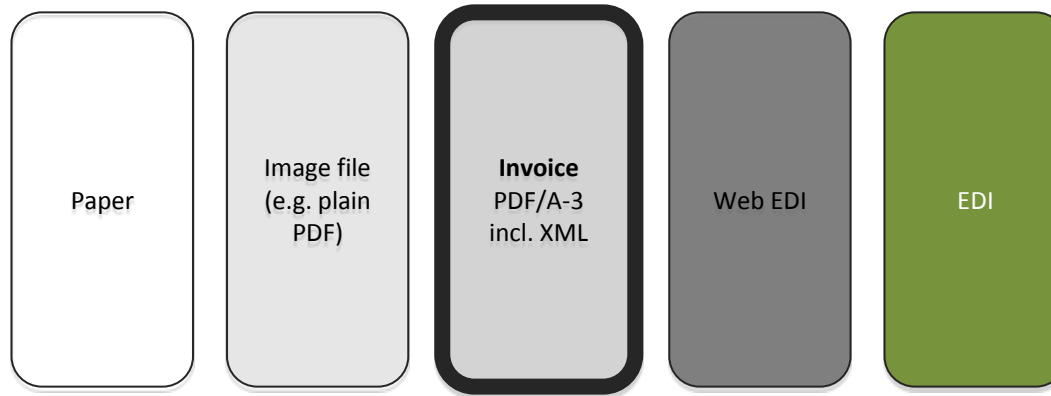
COMPLEXITY OF UN/CEFACT



Is XML sufficient?

- ≡ Not for human consumption
- ≡ EDI requires predefined business relationship
- ≡ Not well suited for SMEs

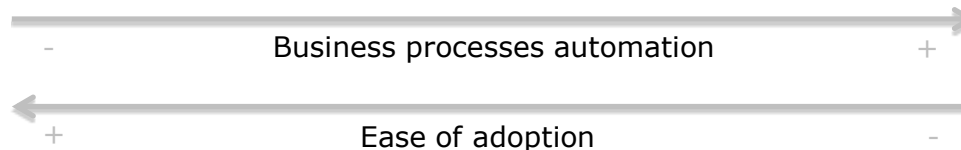
PDF/A3 –XML Invoices – bridging the gap ...



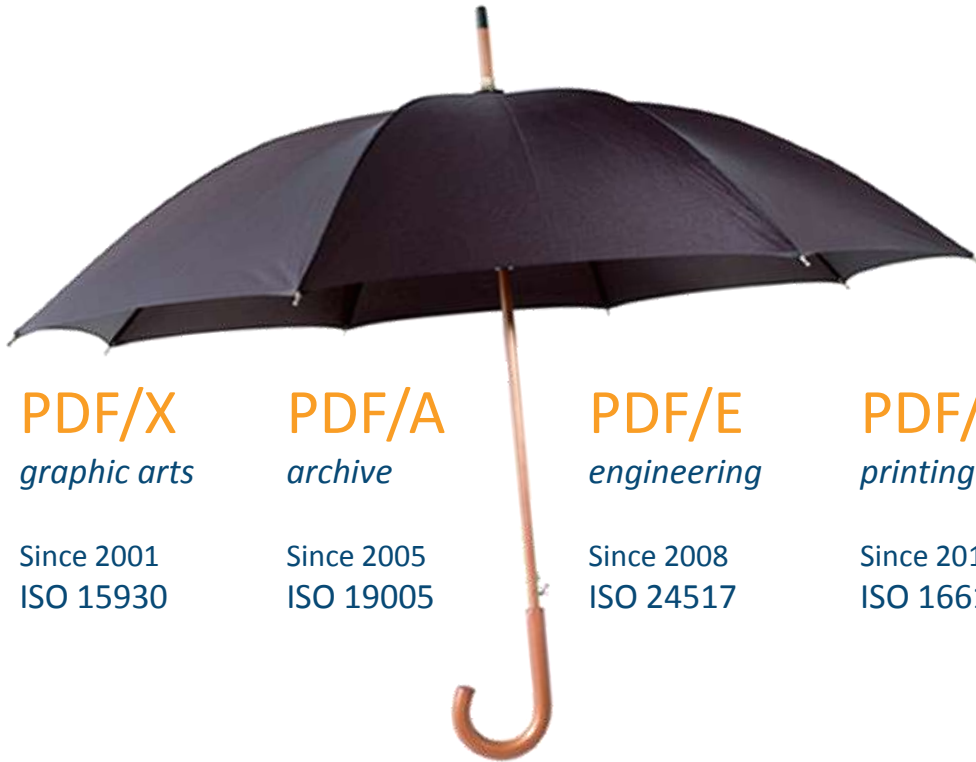
- Free to use
- No structured information
- OCR possible
- In the future probably heavily used due to new VAT law.

- **Joint approach**
- **Cross Sector alignment**
- **No bilateral agreements**
- **Simply start!**

- No change
- Still growing
- Sector-specific solutions for defined processes



PDF: an umbrella of standards



PDF/X

graphic arts

Since 2001
ISO 15930

PDF/A

archive

Since 2005
ISO 19005

PDF/E

engineering

Since 2008
ISO 24517

PDF/VT

printing

Since 2010
ISO 16612

PDF/UA

accessibility

Since 2012
ISO 14289

PDF

Portable Document Format

First released by Adobe in 1993

ISO Standard since 2008

ISO 32000

Related:

- XFDF (ISO)
- EcmaScript (ISO)
- PRC (ISO)
- PAdES (ETSI)

Is PDF sufficient?

- ≡ Parsing / scanning PDF is not trivial
- ≡ Accessible PDF is mandatory for Section 508
- ≡ Tagged PDF wasn't designed for "the business"



- FeRD (Forum elektronische Rechnung Deutschland) is the **national E-Invoicing platform** in Germany (founded in 2004).
- It is the German representation in the **European Multi-Stakeholderforum** with members from ministries and other governmental bodies and all important industry associations.
- Aim is to **foster electronic invoicing** in the public and private sector.

ZUGFeRD

- ≡ Zentraler User Guide des Forums elektronische Rechnung Deutschland (June 2014)
 - ≡ Developed by FeRD (Forum elektronische Rechnung Deutschland) founded in March 2010
 - ≡ Based on PDF/A-3: Archiving + Attachment
 - ≡ Imposes an XML schema based on CII
- ≡ Goal: electronically exchange invoices
 - ≡ Reduce invoicing cost
 - ≡ Optimise processing cost
 - ≡ For humans as well as for machines
 - ≡ For SMEs as well as big corporations



Status on E-Invoicing in Germany

- ≡ Classic **EDI well established** in private sector, e.g. Consumer Goods, Automotive etc.
- ≡ According to German Federal Statistical Office in 2011 only **27%** of German companies (more than 9 employees) are using electronic invoices, **7%** are using structured formats.
- ≡ **Signature was hindering** broad adoption in the past, especially with SME involvement.
- ≡ **Easy-to-use standards are necessary** to foster structured invoicing.

New opportunities in Thailand due to the new legislation in Europe

Two main elements:

≡ **Wet ink signature was skipped, Paper = Electronic**

Internal Controls are relevant for paper invoices as well, so no big deal when changing to E-Invoices

≡ **Identical Representations of an invoice are allowed**

Two or more invoices with the same VAT-relevant content can be transmitted. This means invoices can be sent in different formats without marking one of them as copy.

Vision for electronic invoicing

- ≡ In future, it should be just as easy to send and receive electronic invoices as paper invoices
 - ≡ Everyone involved should be able to exchange electronic invoices without prior consultation or agreement.
- ≡ Business process optimization by using structured data
 - ≡ To enable the invoice recipient to exercise this option, the sender should include structured data even if they are not used by the sender itself.
 - ≡ The invoice recipient may select the option to optimise its business process by using structured data.
- ≡ Particular consideration should be given to the needs of SMEs
 - ≡ Many SMEs outsource their bookkeeping to tax consultants.
 - ≡ In these cases, the tax consultant is responsible for archiving in compliance with German law (especially GdPDU – Principles of Data Access and Verifiability of Digital Documents).
 - ≡ Tax consultants could act as multipliers for SMEs.

The Opportunity

≡ Important Players are on board through e-Tax Invoice standard (ZUGFeRD) in Germany:

≡ Industry: e.g. GS1, VDA (Automotive)

≡ ERP-Providers: BITKOM (SAP up to SAGE)

≡ Invoicing-Service-Providers: VeR (eInvoice Alliance)

≡ Public Sector: Ministries of Economy, Internal Affairs, Finance, State of Hesse (States), City of Cologne (municipalities)

≡ Tax consultants: Datev (IT service provider of the majority of tax consultants in Germany)

≡ Banks: BdB (Association of German Banks) – Value-add services

≡ Possible enhancement in electronic invoicing to connect non-EDI partners

... with an hybrid approach

- ≡ The e-Tax invoice standard is based on a hybrid approach, using
 - ≡ a document complying with PDF/A-3 for the visual representation of the invoice data and
 - ≡ an embedded XML file containing the invoice data

```

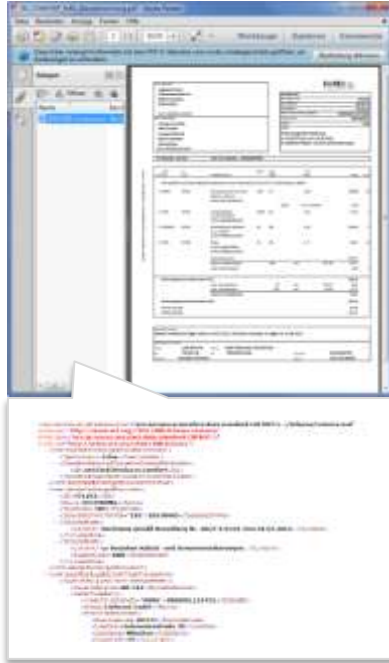
<?xml:namespace prefix="urn:un:unesco:unefact:data:standard:CEFACT:5" ../Schema/Invoice.xsd"
xmlns:si="http://www.w3.org/2001/XMLSchema-instance"
xmlns:un="urn:un:unesco:unefact:data:standard:CEFACT:5"
xmlns:ec="http://www.w3.org/2001/XMLSchema" >
  <!-- SpecifiedExchangeDocumentContext -->
  <TestIndicator>false</TestIndicator>
  <GuidelineSpecifiedDocumentContextParameter>
    <ID>unefact:invoice:rc:context</ID>
  </GuidelineSpecifiedDocumentContextParameter>
  </!-- SpecifiedExchangeDocumentContext -->
  <!-- HeaderExchangeDocument -->
  <ID>471102</ID>
  <Name>RECHNUNG</Name>
  <TypeCode>300</TypeCode>
  <IssueDateTime format="102">20130605</IssueDateTime>
  <!-- IncludedNotes -->
  <Content>Rechnung gemäß Bestellung Nr. 2013-471331 vom 01.03.2013.</Content>
  </IncludedNotes>
  <!-- IncludedNotes -->
  <Content>Es bestehen Rabatt- und Bonusvereinbarungen.</Content>
  <SubjectCode>AAK</SubjectCode>
  </IncludedNotes>
  </!-- HeaderExchangeDocument -->
  <!-- SpecifiedSupplyChainTradeTransaction -->
  <ApplicableSupplyChainTradeAgreement>
    <BuyerReference>AB-312</BuyerReference>
    <SellerTradeParty>
      <GlobalID schemeID="0088">4090901123452</GlobalID>
      <Name>Lieferant GmbH</Name>
      <PostalTradeAddress>
        <PostcodeCode>80333</PostcodeCode>
        <LineOne>Lieferantstraße 20</LineOne>
        <CityName>München</CityName>
        <CountryID>DE</CountryID>

```

The screenshot shows a PDF/A-3 invoice rendered in Adobe Reader. The interface includes a menu bar (Datei, Bearbeiten, Anzeige, Fenster, Hilfe), a toolbar with navigation and zoom controls (51,5%), and a status bar with 'Werkzeuge', 'Signieren', and 'Kommentar' options. The main content area displays the invoice details, including a table of items and a summary section. The invoice is titled 'RECHNUNG' and includes a header with 'Lieferant GmbH' and 'Lieferantstraße 20, München, DE'. The table lists items with columns for 'Menge', 'Einheit', 'Beschreibung', 'Preis', 'Menge', 'Preis', and 'Betrag'. The summary section shows 'Netto-Gesamtwert (inkl. USt.)', 'USt. (Umsatzsteuer)', and 'Brutto-Gesamtwert (inkl. USt.)'.

What does this practically mean?

ONE output format



Manual processing

Semi-Automatic processing

Automatic processing

MANY ways to work with it



No prerequisites – just mail.



Full-featured EDI processing capabilities



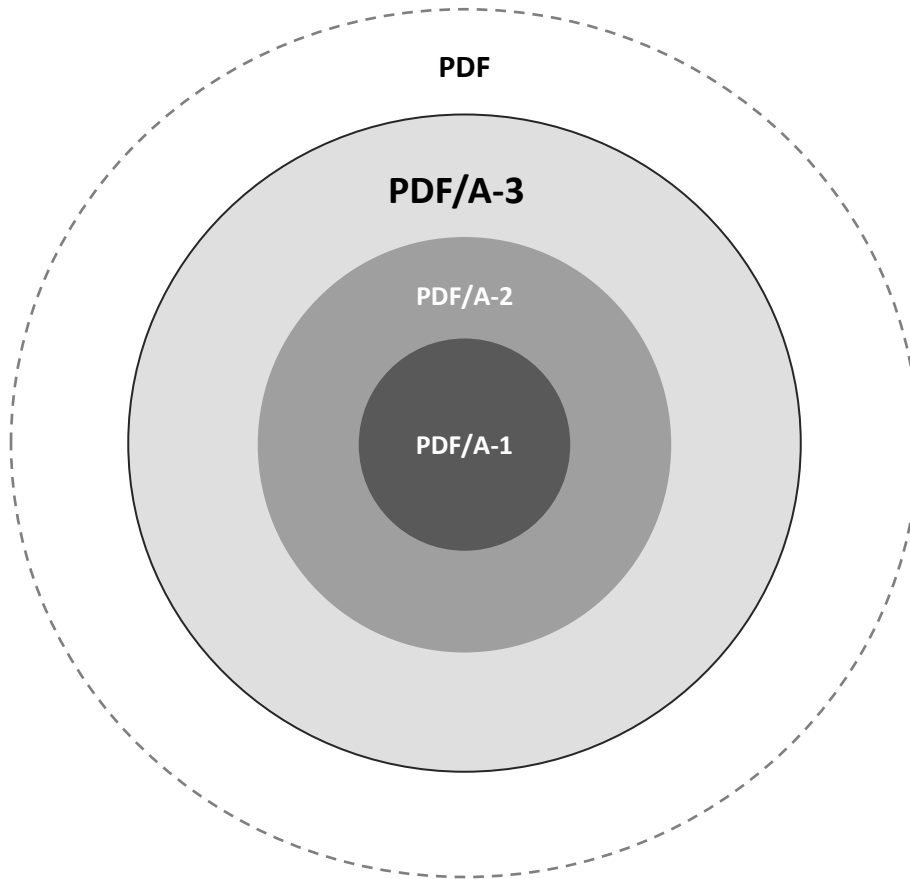
Benefits

- ≡ PDF/A is an established archiving format (ISO 19005)
- ≡ Easy to integrate into existing business processes (e.g. printing)
- ≡ Easy to use in terms of further processing and archiving
- ≡ Inexpensive tools available
- ≡ The sender does not need to care about receivers' capabilities to handle the electronic formular
 - Small SMEs may print them for their established internal process
 - bigger companies process XML-file full or semi-automatically

Nobody must change, but everyone can take advantage

- Simply start! -

PDF/A-3 as a container format



■ PDF/A-3 (ISO 19005-3)

- Released in October 2012
- Based on ISO 32000/PDF 1.7
- Any file format can be embedded

■ PDF/A-2 (ISO 19005-2)

- Based on ISO 32000/PDF 1.7
- PDF/A-1 and PDF/A-2 can be embedded
- Transparency allowed

■ PDF/A-1 (ISO 19005-1)

- Based on PDF 1.4
- **No** external references, esp.
 - » Fonts
 - » images
 - » color schemes
- **No** active scripting
- **No** encryption
- **No** transparency

PDF/A-3 inside

PDF/A-3 Document

Logical structure

- /Root
- /Pages
- /Names
- /AcroForm
- /Metadata
- /OutputIntents
- /AF

Content

Visual part

non-visual part

The image displays a PDF/A-3 document. On the left, the 'Visual part' shows a Thai tax invoice form with fields for invoice number, date, and amounts. On the right, the 'non-visual part' shows the XML metadata, including details like invoice number (2013-471311), date (04.01.2013), and various tax-related parameters.

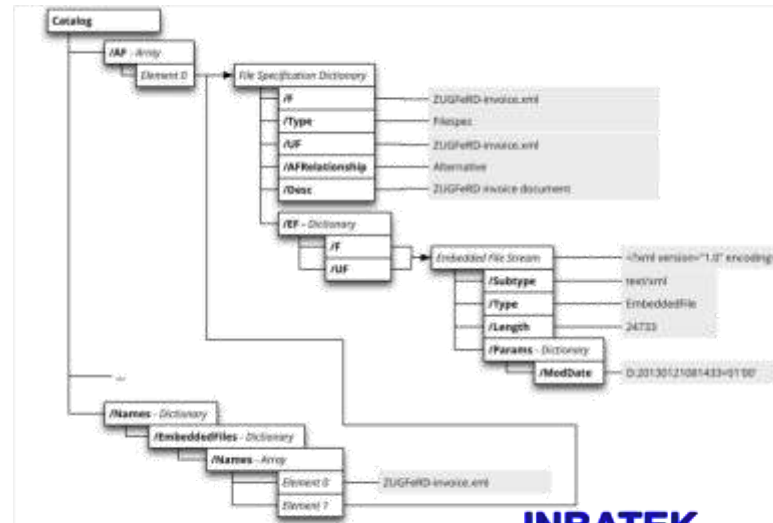
XML in ZUGFeRD, E-Tax-Invoice

≡ In order to simplify mapping in future, E-Tax-Invoice data model comes directly from the CCL. At the semantic model level, a data model is created which is defined as being more straightforward and CII-compatible. In order to produce XML schemas from the semantic data model, the Naming and Design Rules (NDR) are applied. Using these rules, XML data types are created from the semantic definitions.



PDF/A-3 and E-Tax XML

- ≡ Specific XMP extension schema for ETDA-Invoice with identification of profile
- ≡ PDF/A-3 gives visual representation of invoice that is human-readable
 - ≡ Level of conformance doesn't matter
- ≡ Invoice data is embedded as XML in the PDF/A file: 1 document = 1 invoice
 - ≡ Name of the file must be “ETDA-invoice.xml”
 - ≡ Mime-type text/xml; encoding UTF-8
 - ≡ Relationship: “Alternative”
 - ≡ Params must at least contain a ModDate
 - ≡ Other attachments (e.g. “Data”) are allowed



Benefits

- ≡ Save costs on printing, envelopes and postage
- ≡ No need to copy, scan, OCR invoices (less errors)
- ≡ Approval process can be done digitally (*)
- ≡ Faster processing = faster payment?
- ≡ No need to file invoices as paper documents
- ≡ Different software systems only need to understand a single format (choice!)
- ≡ SMEs can meet requirements of large corporations without former agreement
- ≡ Mails with XML attachment could be detected and filed automatically
- ≡ Banks could read XML invoices and process them immediately
- ≡ ...

E-Tax-Invoice requirements for PDF/A-3

≡ The resulting PDF/A-3 document must contain the following elements to ensure conformity:

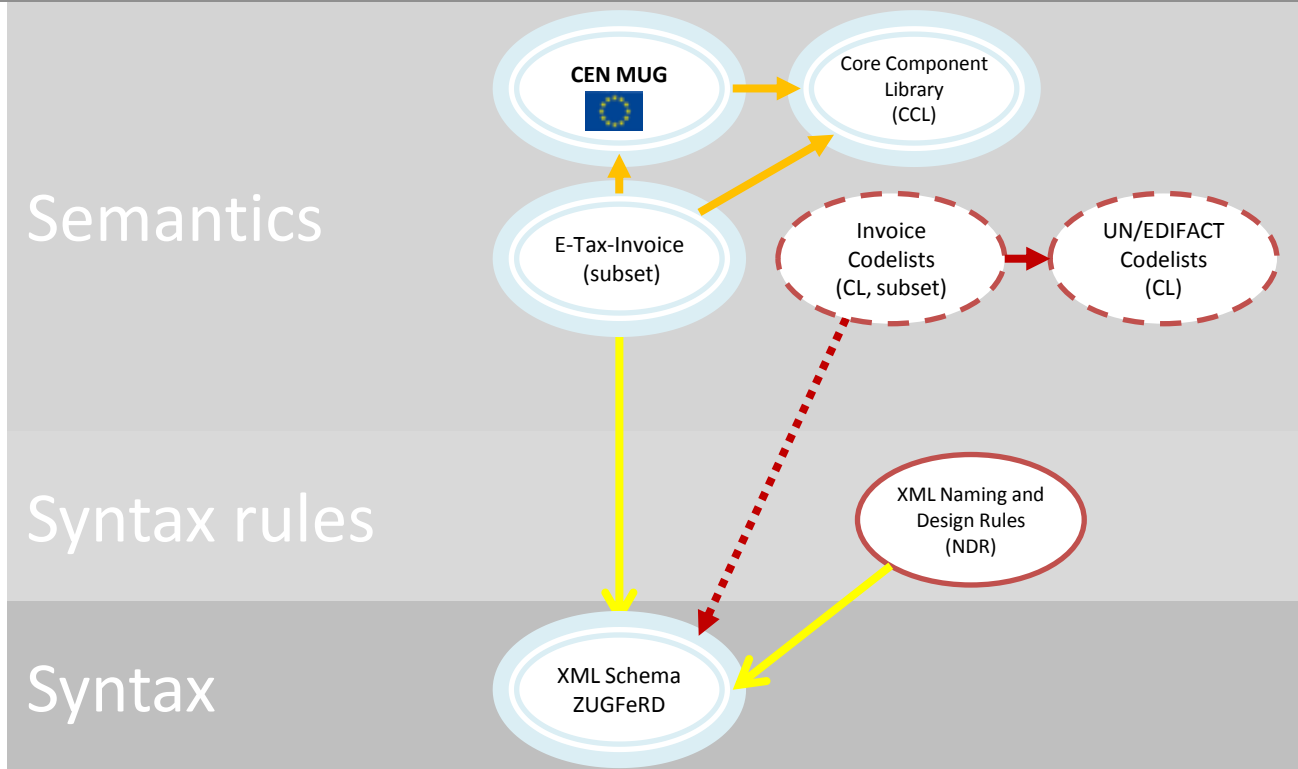
≡ a structure compliant to PDF/A-3, i.e. the PDF document itself (without the embedded data) must be conformant to PDF/A-3. The level of conformity (i.e. 3a, 3b or 3u) is of no importance.

≡ an XML file named “ETDA-invoice.xml” which is embedded using the “Alternative” relationship and which is related to the complete document.

≡ the presence of a specific XMP extension schema which describes the document as a standard conformant invoice and which contains the respective XMP metadata

```
<rdf:Description rdf:about=""  
    xmlns:zf="urn:ferd:pdfa:invoice:rc#">  
  <zf:DocumentType>INVOICE</zf:DocumentType>  
  <zf:DocumentFileName>ZUGFeRD-invoice.xml</zf:DocumentFileName>  
  <zf:Version>RC</zf:Version>  
  <zf:ConformanceLevel>BASIC</zf:ConformanceLevel>  
</rdf:Description>
```


E-Tax Invoice XML



Sample invoice

Company Name 
tagline/slogan here

ใบกำกับภาษี 423-612

วันที่ออก: 2549-05-04

ผู้ขาย: คุณสมหญิง ใจดี
เดอะมอลล์บางกะปิ
ลาดพร้าว 99
TH-10240 กรุงเทพมหานคร

ผู้ซื้อ: คุณอภิชาติ ชัยแสง
40/20 อาคารเบญจจินดา
กำแพงเพชร 6
TH-10400 กรุงเทพมหานคร

ลำดับที่	รายละเอียดสินค้า	ราคา/หน่วย	จำนวน	ราคารวม	ภาษี(%)	มูลค่าภาษี	ราคาสุทธิ	หน่วยเงินตรา
1.	Notebook	90000.00	2.00	180000.00	7.00%	12600.00	192600.00	THB
2.	Shipping	500.00	1.00	500.00	0.00%	0.00	500.00	THB

```
<ram:BuyerCITradeParty>
  <ram:Name>คุณอภิชาติ ชัยแสง</ram:Name>
  <ram:SpecifiedCIILegalOrganization>
    <ram:ID schemaID="TaxID" schemaName="Tax Registration Number">
    </ram:SpecifiedCIILegalOrganization>
  <ram:PostalCITradeAddress>
    <ram:PostcodeCode>10400</ram:PostcodeCode>
    <ram:BuildingName>อาคารเบญจจินดา</ram:BuildingName>
    <ram:LineOne>40/20 อาคารเบญจจินดา</ram:LineOne>
    <ram:LineTwo>ถนนสุขุมวิท 5</ram:LineTwo>
    <ram:StreetName>พหลโยธิน 5</ram:StreetName>
    <ram:CityName>กรุงเทพมหานคร</ram:CityName>
    <ram:CitySubDivisionName>เขตจตุจักร</ram:CitySubDivisionName>
    <ram:CountryID>TH</ram:CountryID>
    <ram:CountrySubDivisionID>10</ram:CountrySubDivisionID>
    <ram:BuildingNumber>40/20</ram:BuildingNumber>
  </ram:PostalCITradeAddress>
</ram:BuyerCITradeParty>
```

```
<rsm:CIIExchangedDocument>
  <ram:ID>423-612</ram:ID>
  <ram:Name>ใบกำกับภาษี</ram:Name>
  <ram:TypeCode>388</ram:TypeCode>
  <ram:IssueDateTime>2006-05-04T18:13:51.0</ram:IssueDateTime>
  <ram:GlobalID>2.16.764.1.0.x</ram:GlobalID>
  <ram:CreationDateTime>2006-05-04T18:13:51.0
</ram:CreationDateTime>
  <ram:IncludedCINote>
    <ram:Subject>หมวกเหล็ก</ram:Subject>
    <ram:Content>บรรทัดที่ 1</ram:Content>
    <ram:Content>บรรทัดที่ 2</ram:Content>
  </ram:IncludedCINote>
</rsm:CIIExchangedDocument>
```

Sample invoice

ภาษี	ภาษี(%)	ราคารวม	ราคาภาษี	ราคาสุทธิ	หน่วยเงินตรา.
VAT	7	180000.00	12600.00	192600.00	THB
	ราคารวมสุทธิ:	180000.00	12600.00	193100.00	THB
	ราคารวมสุทธิ (ตัวอักษรไทย):	หนึ่งแสนเก้าหมื่นสามพันหนึ่งร้อยบาทถ้วน			

กรุณาชำระค่าสินค้าและบริการตามราคารวมสุทธิที่แสดงบนใบกำกับภาษีฉบับนี้ ไปยังบัญชีธนาคารที่แสดงดังรายละเอียดต่อไปนี้:
12345-6789

Please pay the amount due to our bank account using the following reference: 12345-6789

ธนาคาร-สาขา

KASIKORNBANK-CHOLBURI

รหัส Swift/BIC

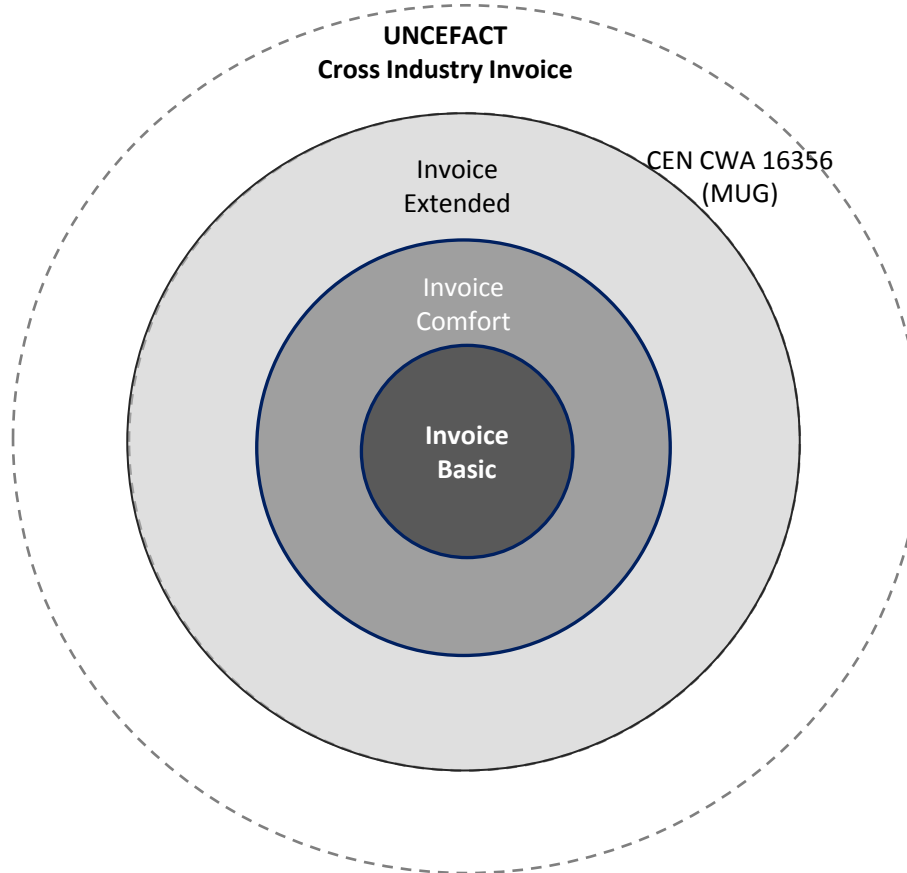
KASITHBKLM

เลขที่บัญชี

123-456-789

```
<!-- xml:id="KASITHBKLM" /-->  
<!-- xml:id="KASIKORNBANK-CHOLBURI" /-->  
<!-- xml:id="TradeSettlementPaymentMeans" /-->  
<!-- xml:id="TradeTax" /-->  
<!-- xml:id="TradeTaxTypeCode" /-->  
<!-- xml:id="TradeTaxApplicablePercent" /-->  
<!-- xml:id="TradeTaxCalculatedAmount" /-->  
<!-- xml:id="TradeTaxBasisAmount" /-->  
<!-- xml:id="TradeTaxMonetarySummation" /-->  
<!-- xml:id="TradeTaxLiveTotalAmount" /-->  
<!-- xml:id="TradeTaxChargeTotalAmount" /-->  
<!-- xml:id="TradeTaxAllowanceTotalAmount" /-->  
<!-- xml:id="TradeTaxTaxableTotalAmount" /-->  
<!-- xml:id="TradeTaxTotalAmount" /-->  
<!-- xml:id="TradeTaxTotalAmount" /-->  
<!-- xml:id="TradeTaxTotalPrepaidAmount" /-->  
<!-- xml:id="TradeTaxDuePayableAmount" /-->  
<!-- xml:id="TradeSettlementMonetarySummation" /-->  
<!-- xml:id="TradeSettlementSupplyChainTradeSettlement" /-->
```

Invoice data profiles



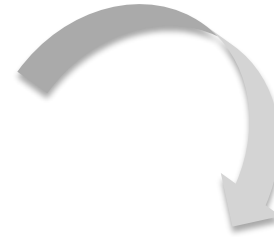
- **Basic**
Focuses on legal requirements + broad adaptation of the standard
- **Comfort**
Focuses on fully-automated invoice processing in regards to invoice verification, payment, and booking
- **Extended**
Focus on broad coverage of cross-industry requirements
- **Industry**
Focus on extensibility for industry specific requirements without losing the capability for cross-industry invoice processing

ZUGFeRD adoption in Germany



Demand for
ZUGFeRD constantly increases

- Certain parts of **public administration** in Germany already **require ZUGFeRD-compliant invoices**
- **First live implementations**, e.g. at GS.1, Storck, ...



Supply for
ZUGFeRD constantly increases

- Important **standard software providers** support ZUGFeRD, e.g. Sage, DATEV, ... / Add-ons for SAP and Microsoft Navision available
- **Free Tools** available for broad adoption at SMEs
 - Create ZUGFeRD out of Microsoft Office document
 - Free Open Source invoicing software supports ZUGFeRD



Usage Aspects of E-Tax-invoicing

≡ PDF/A-3 Invoice Validation

- ≡ Schema validation
- ≡ Verification
- ≡ Auditing

Real world PDF/A-3 XML invoice example

☰ GS1 invoice and reminder

E-Invoice Validation

Different ways to validate electronic Invoices

XSD Schema and Validation

- ≡ XML validation: XML part of the invoice has to be proper XML
- ≡ All elements used in the XML file have to be defined by proper namespace declarations.
- ≡ The namespace declarations should point to either valid XSD schema files or to URNs which should map to valid XSD schema files
- ≡ All XML elements should be validated according the XSD schema files
- ≡ XSD validation verifies the structure and syntax of the XML file and can make sure, that required elements exists

Schematron

- ≡ Schematron is a rule based validation language which allows more detailed validations of XML
- ≡ Schematron typically compiles to XSLT files, which return the error and assertions in case a validated XML files doesn't follow the defined rules
- ≡ Schematron is in use by ETDA to validate more features of the ETDA XML standards.

Example for Schematron

```
≡ <sch:rule
context="rsm:AbbreviatedTaxInvoice_CrossIndustryInvoice/rsm:CIIHSupplyChainTrade
Transaction/ram:ApplicableCIIHSupplyChainTradeAgreement/ram:SellerCITradeParty"
>   <sch:report test="not(ram:Name)">       Name must be present because
SellerCITradeParty is present.   </sch:report>
≡ <sch:report test="not(ram:SpecifiedCILegalOrganization)">
SpecifiedCILegalOrganization must be present because SellerCITradeParty is present.
</sch:report>   <sch:report test="not(ram:PostalCITradeAddress)">
PostalCITradeAddress must be present because SellerCITradeParty is present.
</sch:report> </sch:rule>
```

Plausibility validation

- ≡ Beside the technical validations from before, business related validations make sense to confirm that an invoice is correct and valid for further processing or payment
- ≡ Some of these validations could also be covered by Schematron:
 - ≡ A schematron rule could check for example if the sum of all items in an invoice is equivalent to the sum of the invoice
 - ≡ Schematron could check that the tax amounts in the invoice are fitting to the specified tax percentage
- ≡ Other plausibility validations that are common can not be validated by schematron, since it requires more context, which is not included in the invoice directly.
 - ≡ Validation if the address of the sender or recipient is a valid address
 - ≡ Check if the order/PO number specified resolves to an order with the same values

Verification: Compare the visual and XML invoice

≡ Reasons for difference between XML and visual invoice

- ≡ Technical reasons

- ≡ Failure to setup the generation correctly

- ≡ Someone on purpose modified the visual invoice and forgot to modify the XML file

≡ By concept the XML and visual invoice should contain the same information

≡ Most of the values found in the XML should be able to be located in the text of the visual PDF aswell

≡ Example: If we search for the value of ram:GrandTotalAmount in the visual invoice text we should definitely be able to find that.

Validate against an existing booking in ERP

- ≡ Nowadays most documents in the business process are generated by ERP systems
- ≡ These systems do validation of documents automatically during the data entry process.
- ≡ Since the XML already contains all information, data entry can be skipped and just the validation of the ERP systems is remaining
- ≡ ERPs would for example compare sender and recipient information with existing records and also match PO numbers, dates and other information given with existing once in the ERP database.
- ≡ If enough fields automatically match the whole booking and payment can happen completely automatic without human interaction
- ≡ In case of validation error a workflow would be triggered which involves the traditional validation by a person

- ≡ “Grundsätze zum Datenzugriff und zur Prüfbarkeit digitaler Unterlagen (GDPdU)”
 - ≡ German law requires that any electronic document or system needs to allow auditing in proper way
 - ≡ Invoices need to be archived for at least 10 years
 - ≡ System/process needs to make sure, that invoices are not modified or manipulated within the time of archiving
 - ≡ POS systems are required by law for B2C and require an SD card slot
- ≡ Archiving has to happen with the original invoice received or sent to customer
- ≡ In case of e-Invoice including the XML attachment and visual PDF
- ≡ A common way for archiving is to burn the data to CDROM or DVD since these media are read-only and can't be manipulated
- ≡ Auditor must be given a suitable way to do the validation, either by standardized file format or system, where the auditor can check each invoice easily

DEMO TIME

≡ E-Tax-Invoice generation in code

For questions or inquiries contact us

About E-Tax-Invoice, our solutions shown here or any **iText** related topic including iText licensing and offers contact us at:

≡ [INBATEK CO.,LTD](http://INBATEK.CO.,LTD)

≡ Johannes@inbatek.com,

≡ Sujira@inbatek.com

≡ +66-21074027

≡ +66-9170 11159

≡ English Skype: johannesdoering/ Thai Skype:nhing.phd

≡ Whatsapp: +491713488981/Line: infinity001nhing

Thank you for your attention