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On-site workshop

# eInvoicing Implementation Workshop

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27 November 2017

Poland

Link to countrypage for the workshop:

<https://ec.europa.eu/cefdigital/wiki/display/EINV/COMMUNITY/Poland+-+Implementation+workshop>

 [#ConnectingEurope](#)

# Today's speakers

## **Christian Rasmussen**

Christian is an experienced eProcurement Expert specialized in the execution of large scale ICT projects with past experience from the Nordic region including Denmark, Norway and Sweden. Christian has also been involved in the past EU-funded large scale pilots PEPPOL.eu and eSENS.eu as Work packager leader including focus on new eProcurement and eDelivery development.

## **Martin Forsberg**

Martin Forsberg works as an expert in the area of electronic business, customs and financial processes. Martin was involved in the PEPPOL and eSENS Large Scale Pilots. He is active in standardization committees such as CEN TC434 and OASIS UBL.

# Agenda

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11<sup>00</sup> Welcome & Introduction to CEF eInvoicing and our services

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A few words on the Directive on electronic invoicing in public procurement

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eInvoicing from a user's perspective

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The development of the European standard

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12<sup>30</sup> Coffee break

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12<sup>50</sup> Key concept of the standard

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UBL / CII & Conversion issues

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Interoperability and validation

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14<sup>20</sup> Lunch break

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15<sup>20</sup> Usage specifications and compliance

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Infrastructure (eDelivery) in coherence with CEF eInvoicing

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Discussion

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17<sup>00</sup> Close

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Christian Rasmussen, DIGIT D3

Martin Forsberg, DIGIT D3

Irena Riviere-Osipov, GROW

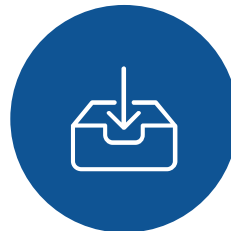
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# Highlights of the workshop

## DURING



Ask questions



Download other presentations at CEF Digital

## AFTER



Download our other webinar recordings



Interact with our online community

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## Objectives of this workshop

Participants will learn about:

- CEF eInvoicing and our services
- The **European norm** and the **Directive 2014/55/EU** on electronic invoicing in public procurement
- Presentation of the European norm and related **specifications**
- **Validation**
- The **XML formats** used with the European standard
- **Infrastructure** components in coherence with **CEF eInvoicing**

## Audience for this workshop

- Public authorities
- Private entities
- Policy makers
- Members of standardisation bodies
- eInvoicing implementers for:
  - Software services
  - Solution providers

**Who are you?**



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# CEF eInvoicing – Our services and how to get started

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**Christian Vindinge Rasmussen**  
DIGIT

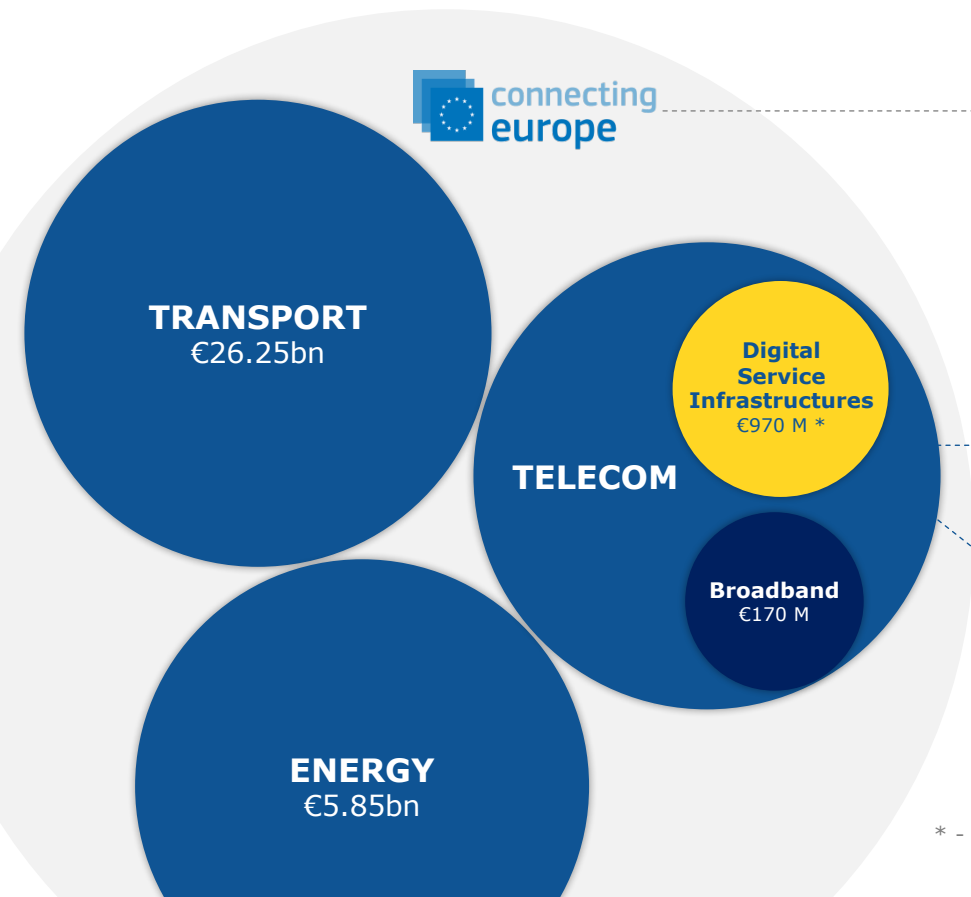


1

# What is CEF eInvoicing



# What is CEF?



## HOW IS IT REGULATED?

### CEF Regulation

The Connecting Europe Facility (CEF) is a regulation that defines how the Commission can finance support for the establishment of trans-European networks to reinforce an interconnected Europe.

### CEF Telecom Guidelines

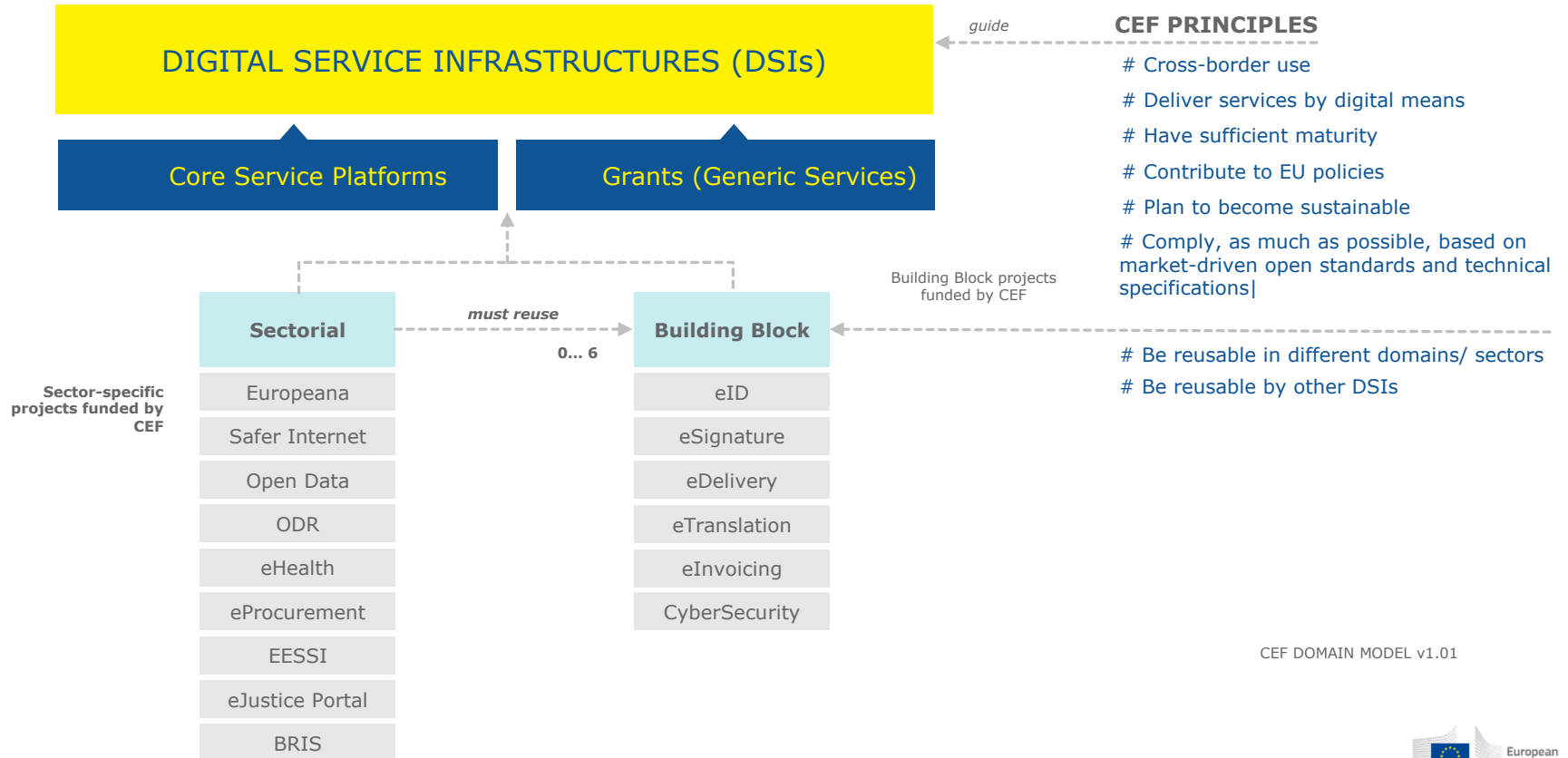
The CEF Telecom guidelines cover the specific objectives and priorities as well as eligibility criteria for funding of broadband networks and Digital Service Infrastructures (DSIs).

### CEF Work Programmes

Translates the CEF Telecom Guidelines in general objectives and actions planned on a yearly basis.

\* - 100 M Juncker Package

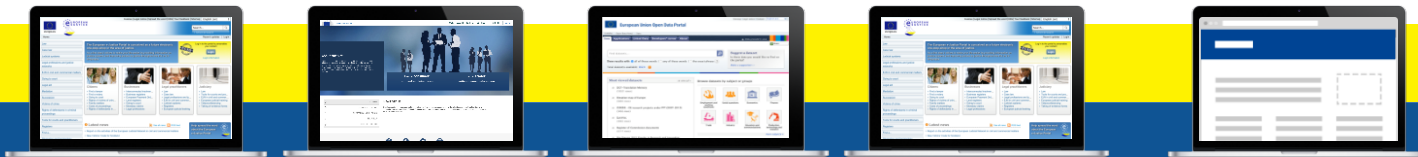
# What are Digital Service Infrastructures?



(\* ) A Building Block is a package of technical specifications, services and sample software that can be reused in different policy domains:

# The 'Big Picture'

Funding for the  
EUROPEAN COMMISSION



eJustice

ODR

Open Data

BRIS

EESSI, etc.

## CORE SERVICE PLATFORMS

Services offered by the  
European Commission



**IDENTIFY**  
with eID



**SIGN**  
with eSignature



**INVOICE**  
with eInvoicing



**EXCHANGE**  
with eDelivery



**TRANSLATE**  
with eTranslation

Funding for the  
MEMBER STATES

## GRANTS

Projects in the Member  
States



Typically 'deployment' projects at national level (up to  
75% of eligible cost)

## 2017 CEF Telecom calls

Call	Indicative budget	Launch date	Deadline
<b><u>CEF-TC-2017-1</u></b> BRIS EESSI eID & eSignature European e-Justice Portal	€2 million €17 million €7 million €1.5 million	17 February 2017	18 May 2017
<b><u>CEF-TC-2017-2</u></b> Cyber Security eDelivery eHealth eProcurement	€12 million €0.5 million €9 million €4 million	6 May 2017	21 September 2017
<b><u>CEF-TC-2017-3</u></b> eInvoicing eTranslation Europeana Public Open Data	<b>€10 million</b> €6 million €2 million €6 million	28 June 2017	28 November 2017

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# 2017-3 eInvoicing call

(2017 Work Programme - section 3.4)

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## 2017-3 eInvoicing call

**Launch date**

28 June 2017

**Deadline**

28 November 2017

**Who can apply?/Consortium composition**

Minimum 2 private or public entities from one or several Member States

**Budget**

€10 million

**Co-financing**

75% of the eligible costs

**Indicative duration**

12 months

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# 2017-3 eInvoicing call: **scope**

**Proposals must meet objective 1 or 2:**

**1. Uptake of eInvoicing solutions compliant with the EN and its ancillary deliverables by public entities**

**2. Update of eInvoicing solutions compliant with the EN and its ancillary deliverables by solution providers and public authorities**

**Promotion of eDelivery:**

Deployment of the eDelivery Building Block or use of eDelivery through a service provider

- Must be carried out in conjunction with objective 1 or 2

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# What is CEF eInvoicing?

- CEF eInvoicing was introduced to support the Directive 2014/55/EU on electronic public procurement and the European standard for eInvoicing
- On 16th April 2014 the Directive was approved in the European Parliament and Council to set up one single pan-European standard for eInvoicing
- The Directive was a direct consequence of the many standards for eInvoicing across European and as successor of the PEPPOL project initial work on eInvoicing.
- The standard and definition is maintained by CEN, but the European Commission will assist through its CEF work programmes – more on this later..



2

## **Background and history of CEF eInvoicing**



# Background and history of CEF eInvoicing – PEPPOL.eu

- In 2008 the PEPPOL project was initiated on the best practices within mandatory eInvoicing for public administrations in the Nordic countries
- During the PEPPOL project a good number of the approximately 500 different eInvoicing platforms in Europe was connected through a single infrastructure and with a common semantical standard for eInvoicing – the PEPPOL BIS
- PEPPOL initiated the process of interoperability and connectivity between the “Islands of Procurement” in Europe
- At the end of August 2012 the PEPPOL project was finalised, and all services was handed over to the new non-profit association “OpenPEPPOL”



The screenshot shows the PEPPOL website homepage. At the top left is the PEPPOL logo with the tagline 'PAN-EUROPEAN PUBLIC PROCUREMENT ONLINE' and the European Union flag. To the right are navigation links: 'About OpenPEPPOL', 'What is PEPPOL?', and 'Get involved'. Below the navigation is a large blue banner with the text 'Making procurement' in large white letters, followed by 'PEPPOL enables businesses across Europe to connect with public buyers in various stages of the procurement process'. Below the banner is a white search bar with a magnifying glass icon and the word 'SEARCH'. At the bottom of the banner are two buttons: 'Learn more' and 'Already a member'. In the bottom right corner of the page is the European Commission logo.

**PEPPOL** PAN-EUROPEAN PUBLIC PROCUREMENT ONLINE  [About OpenPEPPOL](#) [What is PEPPOL?](#) [Get involved](#)

## Making procurement

PEPPOL enables businesses across Europe to connect with public buyers in various stages of the procurement process

[Learn more](#) [Already a member](#)

 European Commission

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## Background and history of CEF eInvoicing – eSENS.eu



*moving  
services  
forward*★.eu

- In April 2013 a new project eSENS.eu was initiated again bringing in the public procurement domain and eInvoicing
- During the eSENS project lifetime the directive on public procurement was voted for by the European Parliament and Council
- Main focus for eSENS was further improvements to the common components and building blocks of the past Large Scale Pilots - including new transport components for eDelivery and conformance testing of new semantical mapping and eDocuments
- For eInvoicing this mainly meant piloting with existing PEPPOL BIS standards, as CEN was not ready with the new European standard for eInvoicing

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## Background and history of CEF eInvoicing - Now

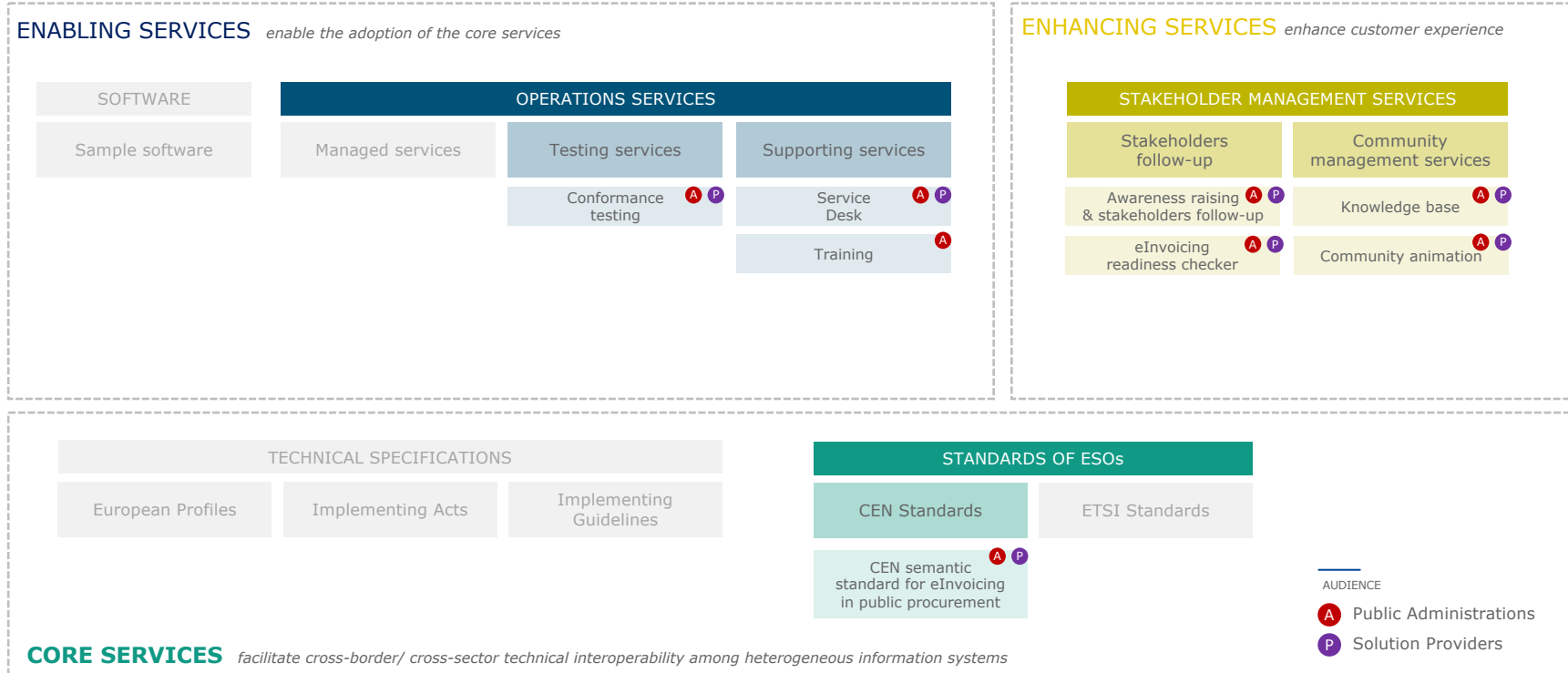
- At the end of March 2017 the eSENS was finalised, and most developed services and building blocks was handed over to the European Commission for further development, maintenance and support
- This included the testing of eInvoicing PEPPOL BIS on eSENS eDelivery AS4 results between the partners of eSENS including a number of eDelivery solution providers
- A number of the partners in eSENS and within the eInvoicing piloting has then applied for CEF eInvoicing funding through the grants made available by the European Commission – more on this later...

A decorative graphic consisting of three overlapping squares. The top square is white and contains the number '4'. The two squares below it are light blue and are slightly offset to the left and bottom, creating a layered effect.


4

## **Our services**

# CEF eInvoicing Service Offering



# CEF Digital



CEF Digital  
Connecting Europe

MENU ▾COMMUNITY

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CEF Digital Home

## eInvoicing

Helping public entities adopt the European standard on electronic invoicing.

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### Learn about eInvoicing

Everything you need to know about eInvoicing

+

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### Use eInvoicing

For public entities getting started with eInvoicing in public procurement

+

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### Make your solution conformant

For solution & service providers looking to adopt the European standard on eInvoicing

+

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### Join the community

Join one or more communities or help promote the uptake of eInvoicing


+


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### Featured





Call for [grants](#) opens 28 June 2017

### Communities

[eInvoicing User Community](#) 

[European Multi-Stakeholder Forum on eInvoicing](#) 

### Quick Links

-  [Contact support](#)
-  [All eInvoicing Services](#)
-  [Readiness Checker](#)
-  [Monitoring dashboard](#)

### Latest

[CEN Publishes eInvoicing Semantic Data Model](#)

The Innovation and Networks Executive Agency (INEA) launches grants of up to €10 million to support electronic invoicing (eInvoicing) in Europe.

# eInvoicing Readiness Checker

The screenshot shows the homepage of the eInvoicing Readiness Checker. At the top, there is a navigation bar with the CEF Digital logo and the text 'European Commission > CEF Digital > eInvoicing > Readiness Checker'. A search bar is located in the top right corner. Below the navigation bar, the main heading 'eInvoicing Readiness Checker' is displayed. A secondary navigation bar contains links for 'Home', 'Take the test', 'Find a Public Entity', 'Find a Solution & Service Provider', and 'Countries', along with a 'Login to the Readiness Checker' button. The main content area is divided into three columns: 'About', 'Public Entities', and 'Solution & Service Providers'. The 'About' section provides a brief overview of the tool's purpose. The 'Public Entities' section features a building icon and asks 'Is your administration ready for eInvoicing?', with a 'Take the test' button. The 'Solution & Service Providers' section features a person icon and asks 'Can you offer eInvoicing solutions that Public Entities need?', with a 'Create a profile' button. A 'Download User Manual' button is also present in the 'About' section. At the bottom, a dark banner contains three icons representing 'Public Entities', 'Solution & Service Providers', and 'Countries'.

Support [en](#) English

European Commission > CEF Digital > eInvoicing > Readiness Checker

## eInvoicing Readiness Checker

[Home](#) [Take the test](#) [Find a Public Entity](#) [Find a Solution & Service Provider](#) [Countries](#) [Login to the Readiness Checker](#)

### About

The eInvoicing Readiness Checker helps Public Entities assess their readiness status in accordance to the compliance of the EU Directive 2014/55/EU and enables Solution & Service Providers to present their eInvoicing software products and services.

[Download User Manual](#)

### Public Entities

Is your administration ready for eInvoicing?

[Take the test](#)

### Solution & Service Providers

Can you offer eInvoicing solutions that Public Entities need?

[Create a profile](#)

[Public Entities](#) [Solution & Service Providers](#) [Countries](#)

# eInvoicing User Community

CEF DIGITAL

## eINVOICING USER COMMUNITY

### FORUM

The CEF eInvoicing User Community **Forums** are a great place to post questions and share comments with fellow eInvoicing users, implementors and Service and Solution providers. Discuss a variety of topics, from implementing Directive 2014/55/EU to promoting the adoption of eInvoicing solutions.

Topic	Author	Creation date	
Implementations of the new European Norm in the Member States - What is your plans?	@Christian Vindinge RASMUSSEN	31-05-2017	🗨️ 3 🍊 2
Webinar # 1: CEF eInvoicing - What's in it for you?	@Ines COSTA	📅 08 May 2017	
CEF eInvoicing Implementation Workshops - register now!	@Ines COSTA	📅 02 May 2017	🗨️ 2
Standard Definitions for Techniques of Supply Chain Finance	@José VICENTE	📅 18 Apr 2017	
ZUGFeRD Developers meet in May 2017	@Stefan ENGEL-FLECHSIG	📅 20 Mar 2017	🗨️ 1 🍊 3

Prev 1 2 Next

[Visit Forum](#)

[Create new topic](#)

### CONTRIBUTE

The objective of the **Contribute** section in the CEF eInvoicing User Community is to allow eInvoicing stakeholders to participate in ongoing activities launched by CEF eInvoicing by providing information, feedback, comments or taking action in a different range of initiatives.

Title	Excerpt	Status	Deadline	
2016 eInvoicing Country Sheets	As national representatives you are asked to verify the eInvoicing situation in your country.	COMPLETED	📅 31 Dec 2016	🍊 4
2017 State of Play of B2G eInvoicing: Participate in an online survey	Participate in an online survey to help us to obtain input on the state of play of your country's B2G eInvoicing in public procurement	OPEN	Ongoing	
eInvoicing Pioneer Group	Are you active in eInvoicing from the public or private sector side? Join this group to provide feedback to the EC on eInvoicing matters and to drive activities to support the launch of the <a href="#">European Standard on eInvoicing</a> and compliance with <a href="#">Directive 2014/55/EU</a> .	OPEN	Ongoing	🗨️ 1 🍊 6
2017 State of Play of B2G eInvoicing: Bring your contribution!	Define what questions should be address in the state of play of B2G eInvoicing in public procurement study, and who should be invited to answer the questions.	COMPLETED	📅 28 Feb 2017	🗨️ 13 🍊 4
The future mandate of the forum	As the current European Multi-Stakeholder Forum on eInvoicing (EMSFEI) mandate is coming to an end, we warmly invite you to play an active role in the definition of the future mandate of this forum.	COMPLETED	📅 15 Feb 2017	🗨️ 1 🍊 1

### About the community

The eInvoicing User Community space enables stakeholders involved and interested in cross-border eInvoicing, to discuss eInvoicing in the EU public and private sectors. The space is also used for co-creative activities with the Advisory Group and Early Adopters of the upcoming eInvoicing Match-Making Website, which is designed to help public administrations implement electronic eInvoicing, as per the requirements of Directive 2014/55/EU.

#### Your space moderators





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# CEF eInvoicing Trainings



## Implementation workshops

- Typically at least one full or one half-day workshop;
- Possibly in combination with **bilateral meetings** b/w EC and MS;
- So far workshops in **Cyprus, Finland, Estonia** and **Poland**;
- Planned workshops in Greece, Croatia, Ireland, Malta and EESPA
- **Apply** here: [CEF-BUILDING-BLOCKS@ec.europa.eu](mailto:CEF-BUILDING-BLOCKS@ec.europa.eu)



## Remote trainings

- Live sessions on a focused eInvoicing topic for a specialised target audience;
- 1-3 hour-long sessions provided on-line;
- Focused training sessions on key areas derived from the on-site workshops.



## Webinars

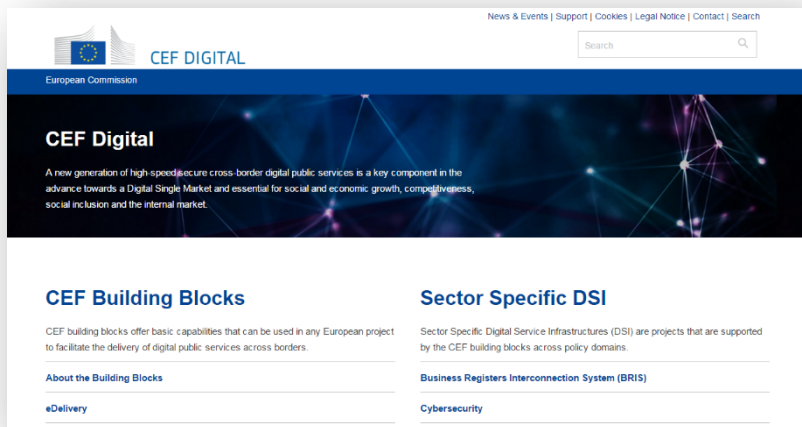
- About 1 hour-long sessions with core elements from on-site and remote trainings to gain expertise in key areas.

A decorative graphic consisting of three overlapping squares. The front square is white and contains the number '5'. The two squares behind it are light blue and are slightly offset to the left and top.

5

**How to get started**

## Interested to find out more?



The screenshot shows the CEF Digital website homepage. At the top, there is a navigation bar with links for 'News & Events', 'Support', 'Cookies', 'Legal Notice', 'Contact', and 'Search'. The CEF Digital logo is prominently displayed on the left, with the European Commission logo below it. A search bar is located on the right side of the header. The main content area features a dark blue background with a network diagram of nodes and lines. The text reads: 'CEF Digital' followed by a paragraph: 'A new generation of high-speed, secure cross-border digital public services is a key component in the advance towards a Digital Single Market and essential for social and economic growth, competitiveness, social inclusion and the internal market.' Below this, there are two columns of content. The left column is titled 'CEF Building Blocks' and includes a sub-section 'About the Building Blocks' with a list containing 'eDelivery'. The right column is titled 'Sector Specific DSI' and includes a sub-section 'Business Registers Interconnection System (BRIS)' with a list containing 'Cybersecurity'.

Visit the CEF Digital Single Web Portal

<https://ec.europa.eu/cefdigital/>

## DG GROW

Directorate-General for  
Internal Market, Industry,  
Entrepreneurship and SMEs

## DIGIT

Directorate-General for  
Informatics

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### Contact us



[CEF-BUILDING-BLOCKS@ec.europa.eu](mailto:CEF-BUILDING-BLOCKS@ec.europa.eu)

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**More webinars on eInvoicing**

# More Webinars Related to the Standard and the Directive

- September** ● Webinar #3 The European norm and its content (eInvoicing Directive)
- October** ● Webinar #4 Infrastructure based on CEF eDelivery DSI
- November** ● Webinar #5 eInvoicing from a user's perspective (incl. ordering & payments)
- December** ● } Webinar #6 Examples of Early Adopters of large scale eInvoicing
- January** ● } Technical webinars
- February** ● } Webinars #7, 8 & 9 Basic XML + XML Validation mechanisms + OASIS UBL 2.1 and UN/CEFACT CII D16B

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## Webinar # 6: Examples of Early Adopters of large scale eInvoicing

- December
- This webinar will provide information on the **benefits and business cases** of the early adopters of large scale eInvoicing

Participants will learn about:

- Introduction to the **Nordic countries**
- How eInvoicing was introduced and then made mandatory
- **Success** factors and **pitfalls** when implementing large scale eInvoicing

## Questions

**Do you have a profile at CEF  
Digital?**

**Do you see other areas  
where trainings or webinars  
could be of interest?**



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# Introduction to eInvoicing and the European standard

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**Martin Forsberg**  
DIGIT



**1. A few words from the Directive on electronic invoicing in public procurement**

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**2. eInvoicing from a user perspective**

---

**3. The development of the European standard on eInvoicing**

---

**4. Introduction to key concepts of the standard**

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**5. UBL & CII, Interoperability and validation**

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**6. Usage specifications and compliance**

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# Background

- Problems with **many standards**
- **Lack of normative contextualised standards** (only workshop agreements)
- **Different approaches and ambitions** in Member States to implementing eInvoicing and eProcurement
- The Directive on electronic invoicing in public procurement ([Directive 2014/55/EU](#)) was developed, setting a **minimum requirement** for the public sector

## From the Directive

*The benefits of electronic invoicing are maximised when the generation, sending, transmission, reception and processing of an invoice can be fully automated.*

...

*A mere image file should not be considered to be an electronic invoice for the purpose of this Directive.*

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# Requirements for the contracting authorities/entities

## From article 7

### ***Receipt and processing of electronic invoices***

*Member States shall ensure that contracting authorities and contracting entities **receive and process electronic invoices** which comply with the **European standard on electronic invoicing** whose reference has been published pursuant to Article 3(2) and with **any of the syntaxes on the list** published pursuant to Article 3(2).*

a list with a limited number of syntaxes which comply with the European standard on electronic invoicing

Semantic data model of the core elements of an electronic invoice

# Definitions

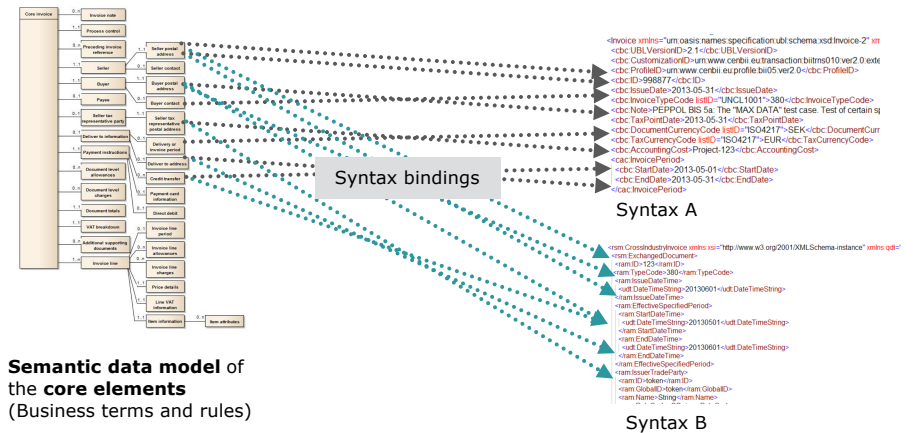
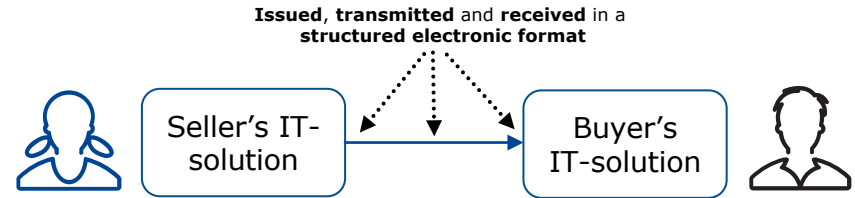
(1) **'electronic invoice'** means an invoice that has been issued, transmitted and received in a structured electronic format which allows for its automatic and electronic processing;

(2) **'core elements of an electronic invoice'** means a set of essential information components which an electronic invoice must contain in order to enable cross-border interoperability, including the necessary information to ensure legal compliance;

(3) **'semantic data model'** means a structured and logically interrelated set of terms and their meanings that specify the core elements of an electronic invoice;

(4) **'syntax'** means the machine readable language or dialect used to represent the data elements contained in an electronic invoice;

(5) **'syntax bindings'** means guidelines on how a semantic data model for an electronic invoice could be represented in the various syntaxes;



**Semantic data model of the core elements**  
(Business terms and rules)



**2**

## **eInvoicing from a user perspective**

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## Why eInvoice?

Quicker payments

Better quality

Good for environment

Saves time

Better security

Required by the customer

Cost saving

Required by law?



**2.a**

## **Issuing and transmission of an eInvoice**

*generation*  
*sending*  
*transmission*  
*reception*  
*processing*

## Many different options – creation of the eInvoice

### Creation of the eInvoice

- Directly from the ERP/Accounting system
  - Often internal format which is transformed into exchange format
- Through a web-portal
  - Provided by the customer
  - By supplier's own choice
- Printer capture/Virtual printer
  - Software installed as printer
  - When printing, the data is captured and transformed to an eInvoice
- Service provider
  - Offers many value added services such as transformation to the correct format

*Preferred option may depend on*

- *Volume of invoices*
- *Size of supplier*
- *Requirement from customer*



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# Many different options – transmission of the eInvoice

*generation*  
*sending*  
*transmission*  
*reception*  
*processing*

## Transmission of the eInvoice

- 4-corner model – often with help from a service provider
  - Connected to network of other service providers
  - Connected to eDelivery network
- 3-corner model – both trading partners are using the same platform
- Peer-to-peer, direct connection
  - FTP, web service/API
- E-Mail:
  - Challenging with structured format only
  - Hybrid/pdf

**Interconnectivity with the customers' solutions important!**

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## Important components to have in place

- Service for receiving eInvoices
  - The "inbox"/ or technical entry point (access point)
  - May support several formats
  - Important aspects: connectivity with other service providers, logging, validation and archiving
- Workflow for eInvoice/eProcurement solution
  - For handling the eInvoices in an efficient manner
  - Visualization, assessment/approval
  - Sometimes integrated in the ERP but often a separate service
- ERP/Accounting solution
  - For accounting and payment initiation

*generation*  
*sending*  
*transmission*  
*reception*  
*processing*

*generation*  
*sending*  
*transmission*  
*reception*  
*processing*

## Important components to have in place

- Service for receiving eInvoices
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  - Visualization, assessment/approval
  - Sometimes integrated in the ERP but often a separate service
- ERP/Accounting solution
  - For accounting and payment initiation

### Integration between above solutions



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# Centralized or decentralized handling of invoice assessment

*generation*  
*sending*  
*transmission*  
*reception*  
*processing*

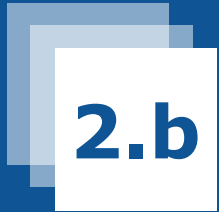
- For invoices which are not automatically matched, a manual assessment is necessary
- By using references, the invoice can be forwarded directly to the person/role responsible for assessing the invoice
  - Requires a workflow system
  - Important with data quality of the reference value
  - Sometimes hard to make the supplier to provide/enter the reference
- Without available references, all invoices are received by a single entry point
  - Person/function assessing or forwards the invoice to the relevant person

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# Straight through invoice processing

*generation*  
*sending*  
*transmission*  
*reception*  
*processing*

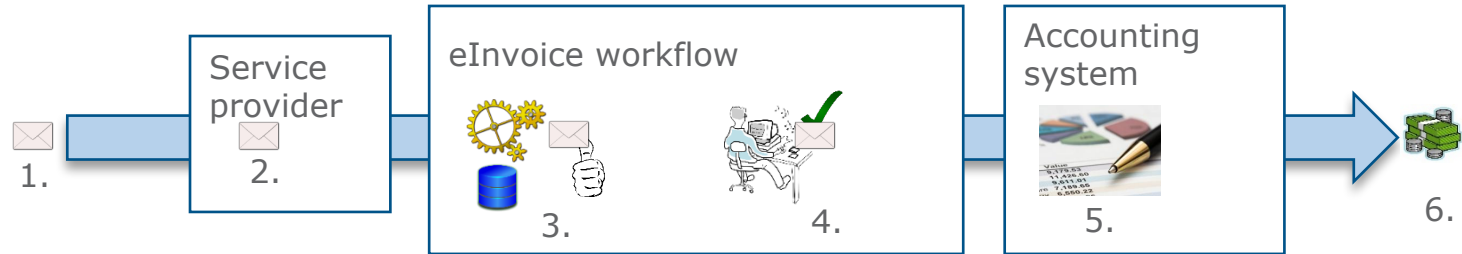
- Information in the invoice is used to automatically assess and approve the invoice
- Only invoices deviating from what is expected are marked for manual assessment
  
- Order reference
  - Purchase order previously issued by the seller
  - Line reference – each invoice line points to a purchase order line
  - In the European standard, use **BT-13 Purchase Order Reference** + **BT-132 Referenced purchase order line reference**
- Periodical invoices related to subscription, electricity, telecom or other invoice objects
  - Requires an invoice object registry with approved max/min, allowed variances
  - In the European standard, use **BT-18 Invoiced object**
  - Can result in positive side effects – such as identification of unused phone subscriptions



**2.b**

**From the buyer's perspective**

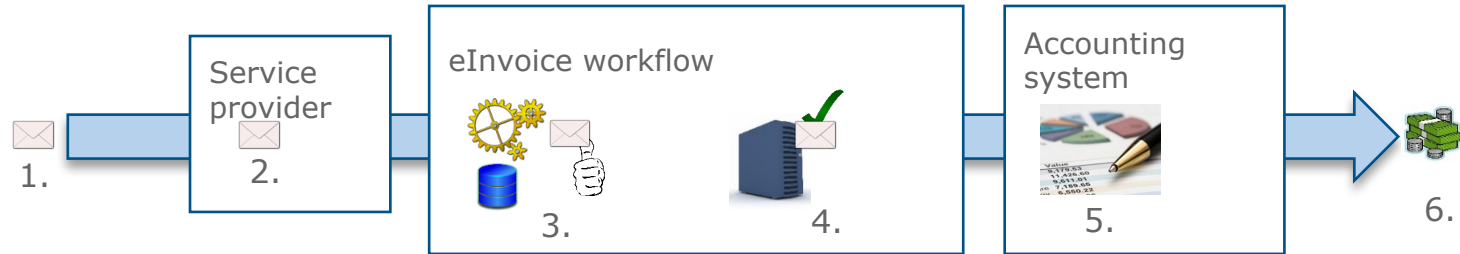
# Buyer process



- The invoice is received
- The invoice is routed automatically to the workflow
- The supplier is known by the buyer
- There is a buyer reference in the invoice for forwarding in the workflow
- The invoice is assessed, approved and payment is initiated

# Buyer process

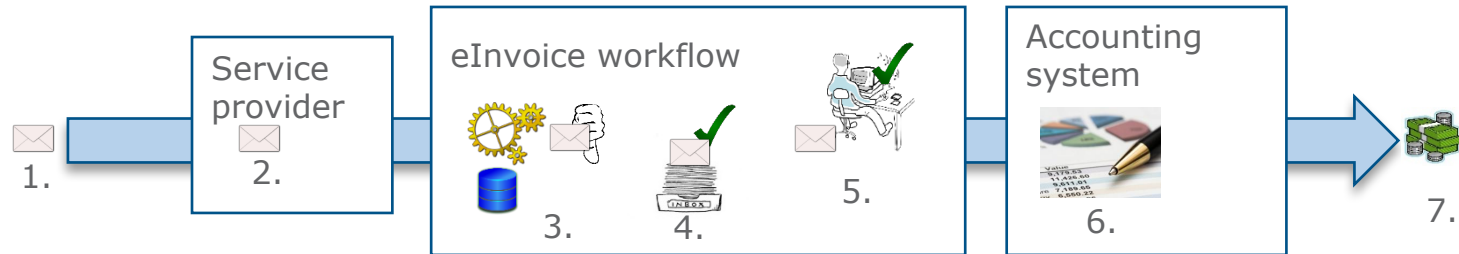
## Automated assessment/validation



- The invoice is received
- The invoice is routed automatically to the workflow
- The supplier is known by the buyer
- The invoice has a reference to an order or a registered object (e.g subscription number, rent object id). Rules for approval is associated with the registered object
- The invoice is automatically assessed, approved and payment is initiated



# Buyer process Unknown supplier



- The invoice is received
- The invoice is routed automatically to the workflow
- The supplier is not known by the buyer and is placed in a queue for handling
- The supplier is accepted and registered in the system
- There is a reference in the invoice for forwarding in the workflow
- The invoice is assessed, approved and payment is initiated



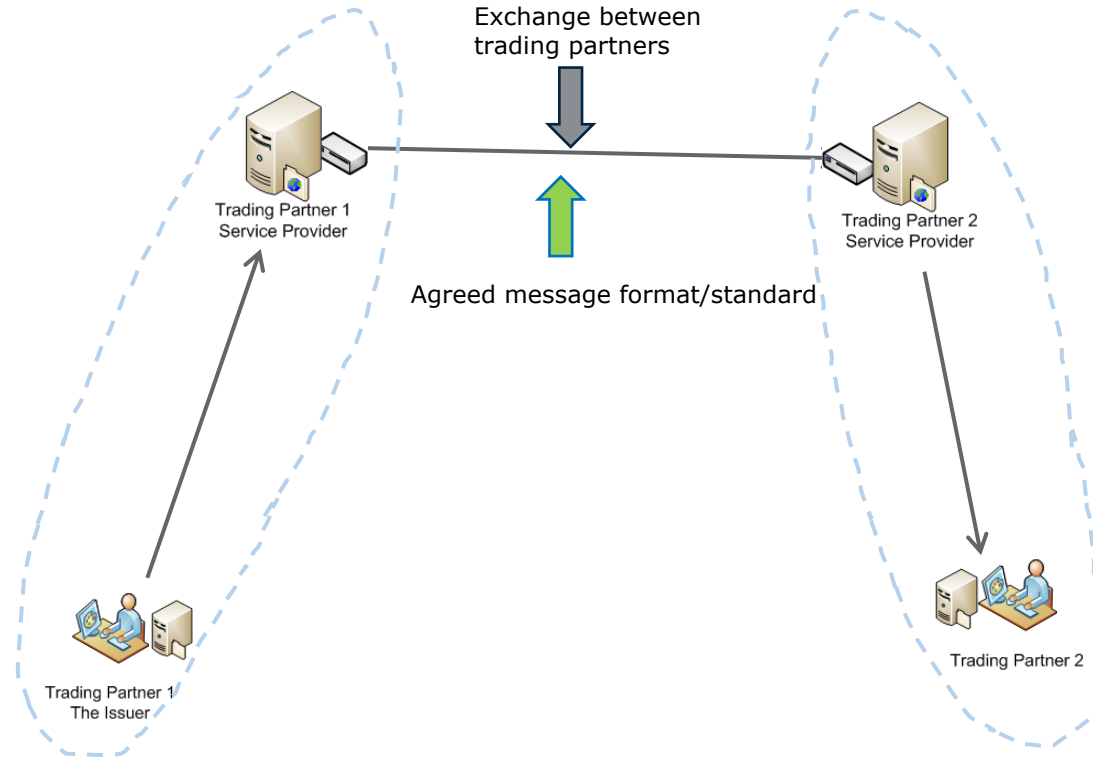
**2.c**

## **Different approaches on transmission**

# 4-corner model

## Characteristics

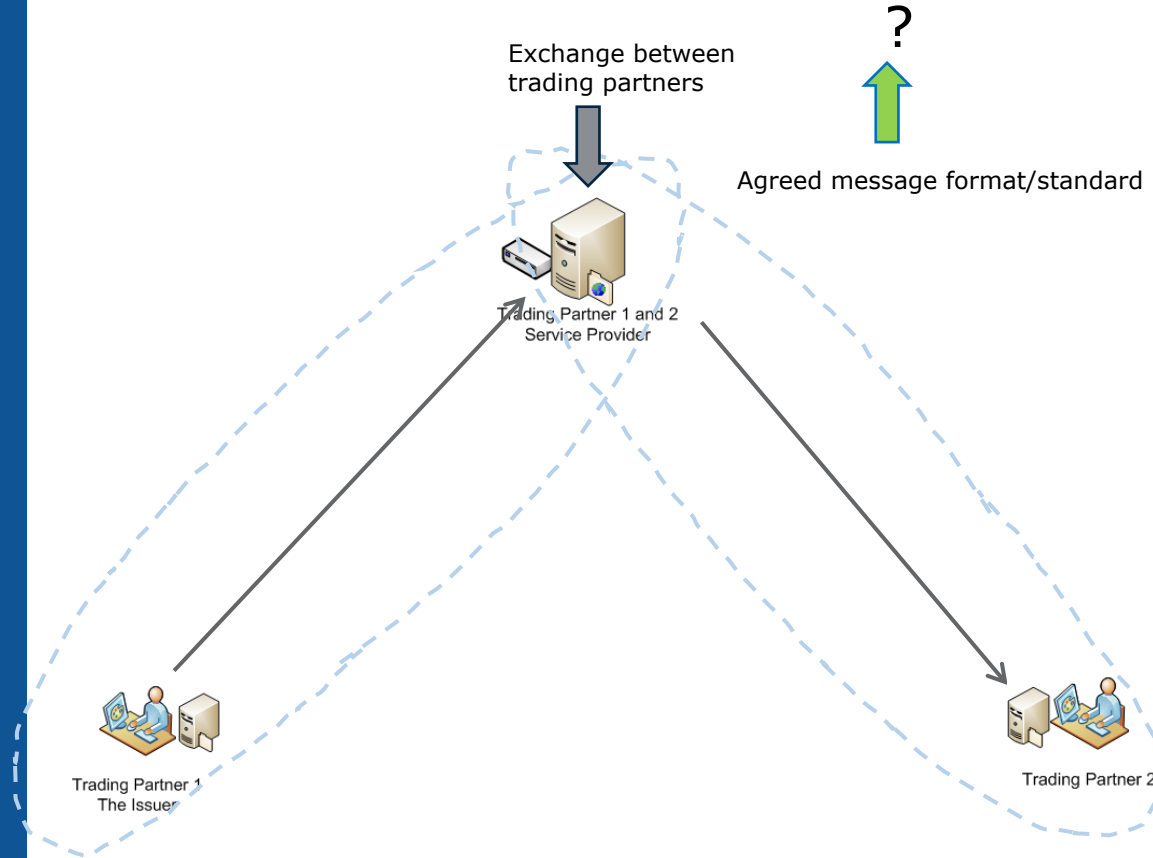
- Each trading partner has its own service provider
- The trading partners don't exchange messages directly with each other
- The trading partners agree on the format used between the service providers
- Service providers may transform to/from the agreed format before sending or after receiving depending on the trading partners' preference



# 3-corner model

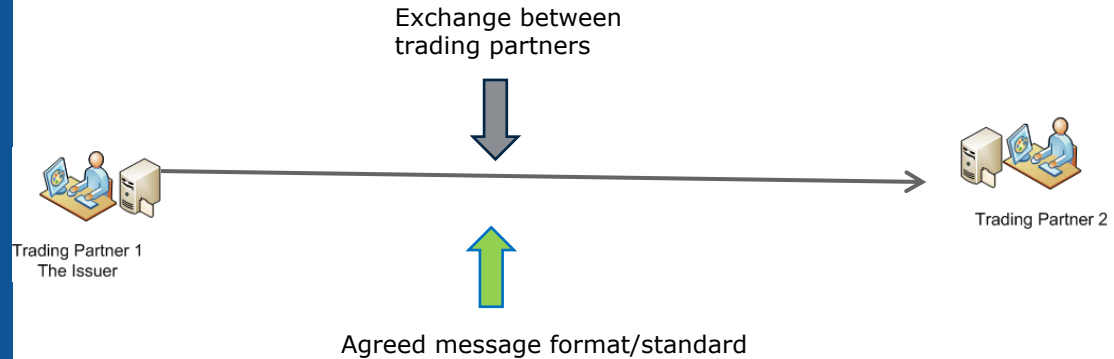
## Characteristics

- Both trading partners have the same service provider
- The trading partners don't exchange messages directly with each other
- The trading partners agree with the service provider on the format to be used



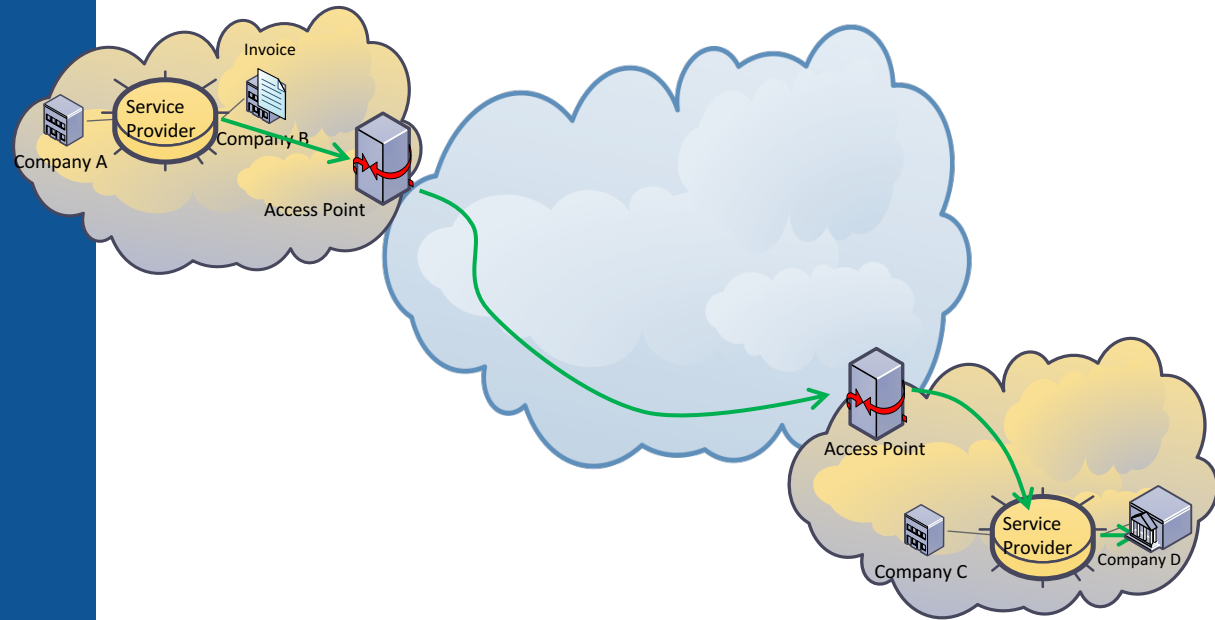
# Peer-to-peer Characteristics

- Sending and receiving directly by issuing trading partner and receiving trading partner
- No one is using a service provider
- Trading partners agree on the format



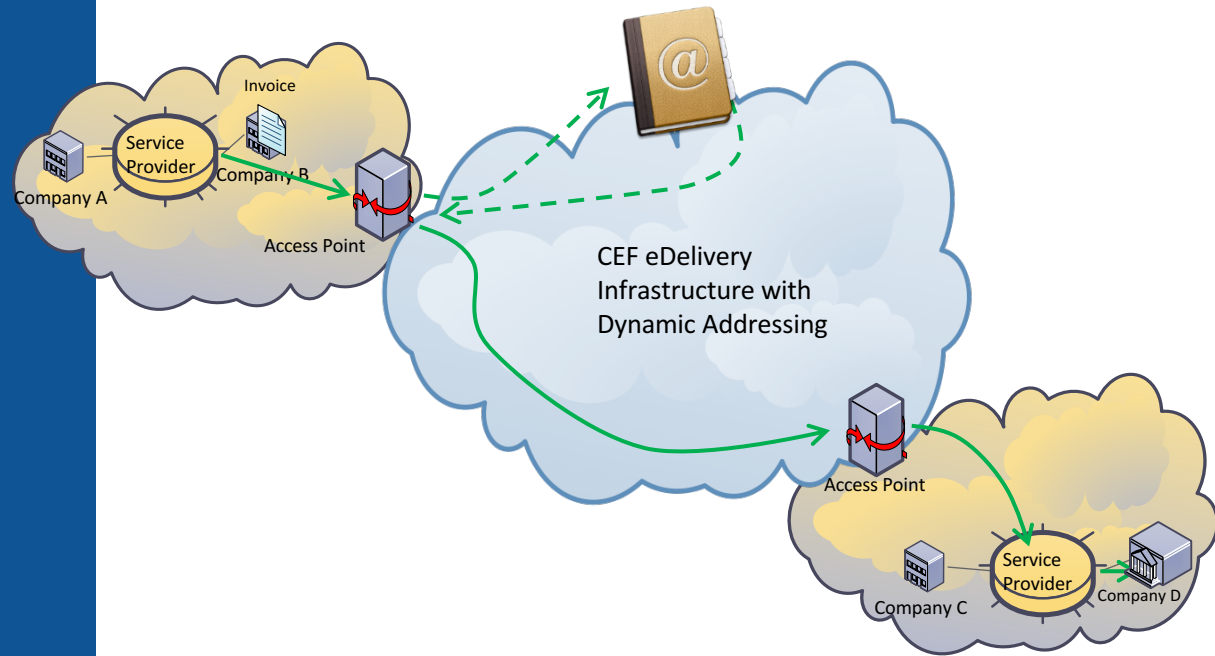
# Challenges with most models

- Onboarding of trading partners often requires testing/configuration
- Service providers often charge per trading partner's connection
- Addressing configuration often managed "statically"
- Changing service provider (and migrating all trading partners) can be costly



# CEF eDelivery offers dynamic addressing

- The receiving address is stored in a registry in the network
- No need for pre-configuration of each trading partner
- Dynamic addressing enables mass adoption
- Makes migration between service providers easier



## Question

**Do the public entities in this country have electronic workflow support for managing invoices (paper/scanned/electronic)?**





3

## **The development of the European standard on eInvoicing**

---

# Initiation of the standardisation

## From article 3

*The Commission shall request that the relevant **European standardisation organisation** draft a European standard for the semantic data model of the core elements of an electronic invoice (the 'European standard on electronic invoicing').*

...

*The Commission shall request that the relevant European standardisation organisation provide a list with a limited number of syntaxes which comply with the European standard on electronic invoicing, the appropriate syntax bindings and guidelines on transmission interoperability, in order to facilitate the use of such standard.*

# Standardisation request

Shall take into account where relevant:

- CII XML V2 and v3
- UBL 2.1
- Financial Invoice
- other formats (e.g. EDIFACT)
- other relevant technical specifications

**International eInvoice  
standard formats**

Should be based on:

- BII
- MUG

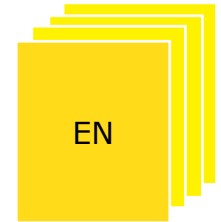
**Existing European core  
eInvoice models**

Should also take into account:

- EIF
- ISA Interoperability Solutions
- Results of LSP projects
- DSI on eInvoicing

**Various related  
European projects**

**Development of EN  
and ancillary  
standardization  
deliverables**



The EN shall fulfil a list of "specific requirements" From the Directive and EC

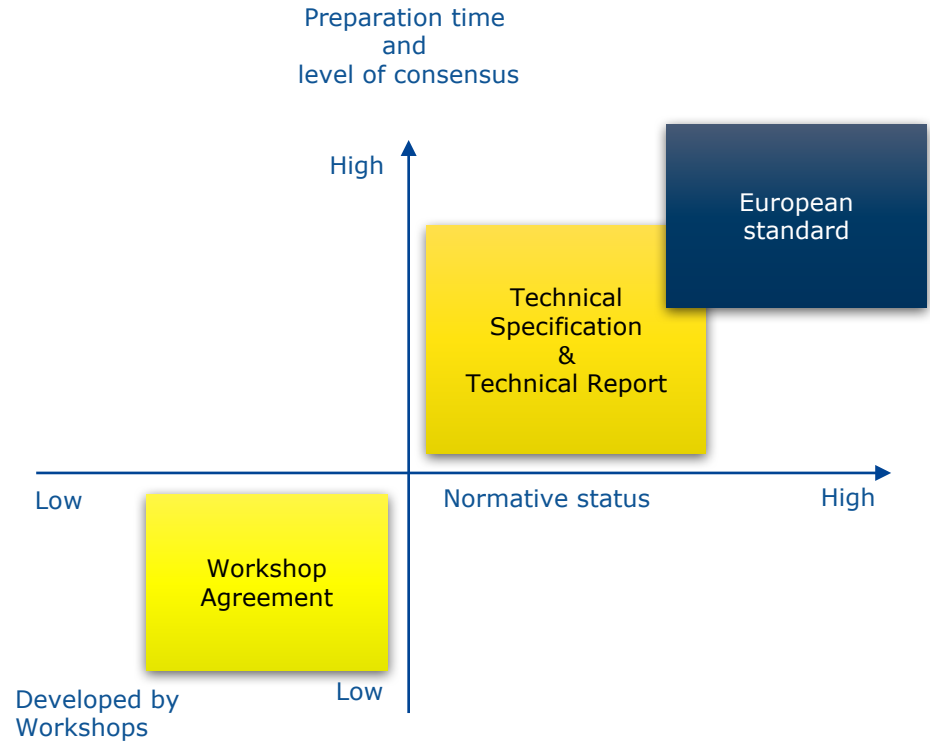
The standards organisation shall also take into account:

- any relevant material from the EMSFeI
- documents to be used during the e-procurement process
- the possibility of allowing multilingualism and multicurrency usage
- preservation of the existing investments

**Other initiatives and  
existing work**

# CEN/TC 434 was established

- CEN - European Committee for Standardisation
- The work started in a project committee (PC434) but was later changed into a technical committee (TC434)
- TC434 has over 100 committee members from 31 countries
- Participation in the work must go through the national standardisation committees.
- The committee is about to finalize all deliverables defined in the standardisation request



## Current status

Number	Title	Status
<b>EN 16931-1</b>	Semantic data model of the core elements of an electronic invoice	Approved!
<b>CEN/TS 16931-2</b>	List of syntaxes that comply with EN 16931-1	Approved!
<b>CEN/TS 16931-3-1</b>	Methodology for syntax bindings of the core elements of an electronic invoice	Approved!
<b>CEN/TS 16931-3-2</b>	Syntax binding for ISO/IEC 19845 (UBL2.1) invoice and credit note	Approved!
<b>CEN/TS 16931-3-3</b>	Syntax binding for UN/CEFACT XML Cross Industry Invoice D16B	Approved!
<b>CEN/TS 16931-3-4</b>	Syntax binding for UN/EDIFACT D16B	Approved!
<b>CEN/TR 16931-4</b>	Guidelines on interoperability of electronic invoices at the transmission level	Approved!
<b>CEN/TR 16931-5</b>	Guidelines on the use of sector or country extensions in conjunction with EN 16931-1, methodology to be applied in the real environment	Approved!
<b>CEN/TR 16931-6</b>	Result of the test of EN 16931-1 with respect to its practical application for an end user	Approved!

**Coffee break  
20 minutes**

 [#ConnectingEurope](#)



4

## **Introduction to key concepts of the standard**

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

FINAL DRAFT  
FprEN 16931-1

January 2017

ICS 35.240.20; 35.240.63

English Version

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

Facturation électronique - Partie 1: Modèle sémantique  
de données des éléments essentiels d'une facture  
électronique

Elektronische Rechnungsstellung - Teil 1:  
Semantisches Datenmodell der Kernelemente einer  
elektronischen Rechnung

This draft European Standard is submitted to CEN members for formal vote. It has been drawn up by the Technical Committee CEN/TC 434.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning: This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Ref. No. FprEN 16931-1:2017 E

Section 1-3 - Scope, references, terms & definitions

- Section 4 – The concept of a core invoice
- Section 5 – Business process to support
- Section 6 – The semantic model, rules and data types
- Section 7 – Core Invoice Usage Specification (and compliance)

Annex A – Examples (Informative)

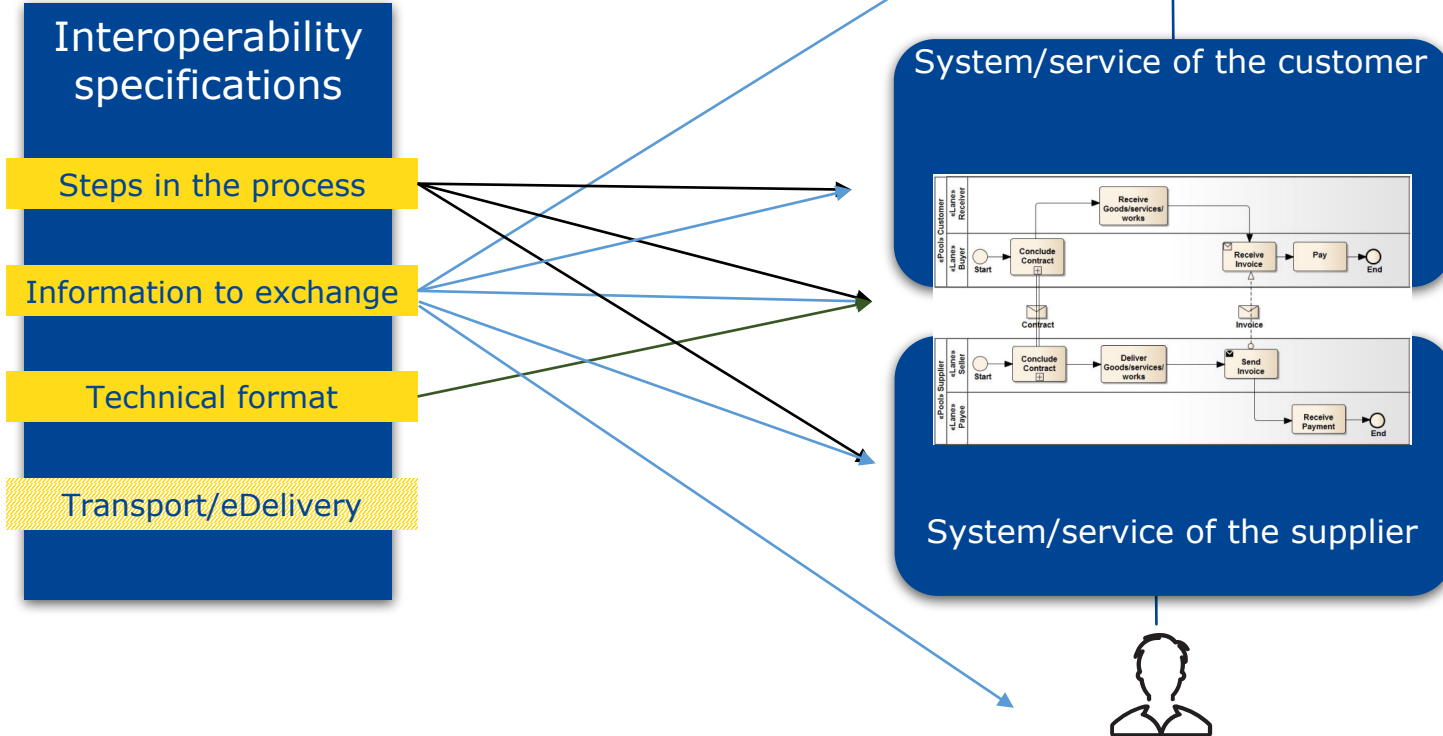
Annex B – Assessment of the EN towards the  
Standardization request (Informative)

Annex C – How does the EN meet legal  
requirements (Informative)

Annex D – BPMN symbols (informative)



# Areas covered by the standard



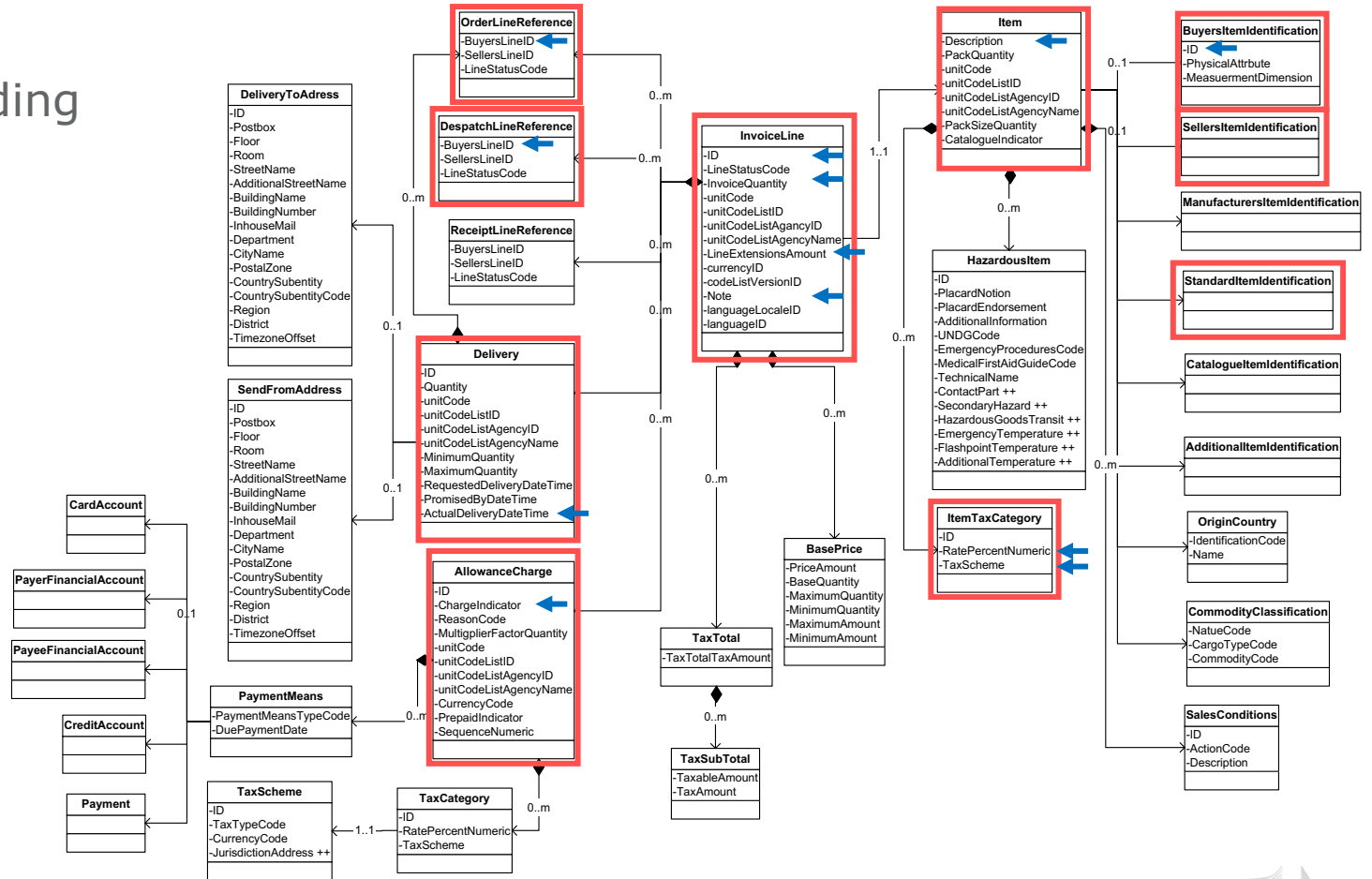
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## Reasons for a core invoice

The European standard recognises the following reasons:

- Business environment is diverse – also the need for information exchange
- Invoices from different situations may potentially contain many information elements – a complete model becomes very large and complex
- Even if it would technically be possible to have a large model, it would be challenging and costly
- When different countries/industries use subset of large standards, interoperability is hampered and silo-implementations are created

# Common understanding

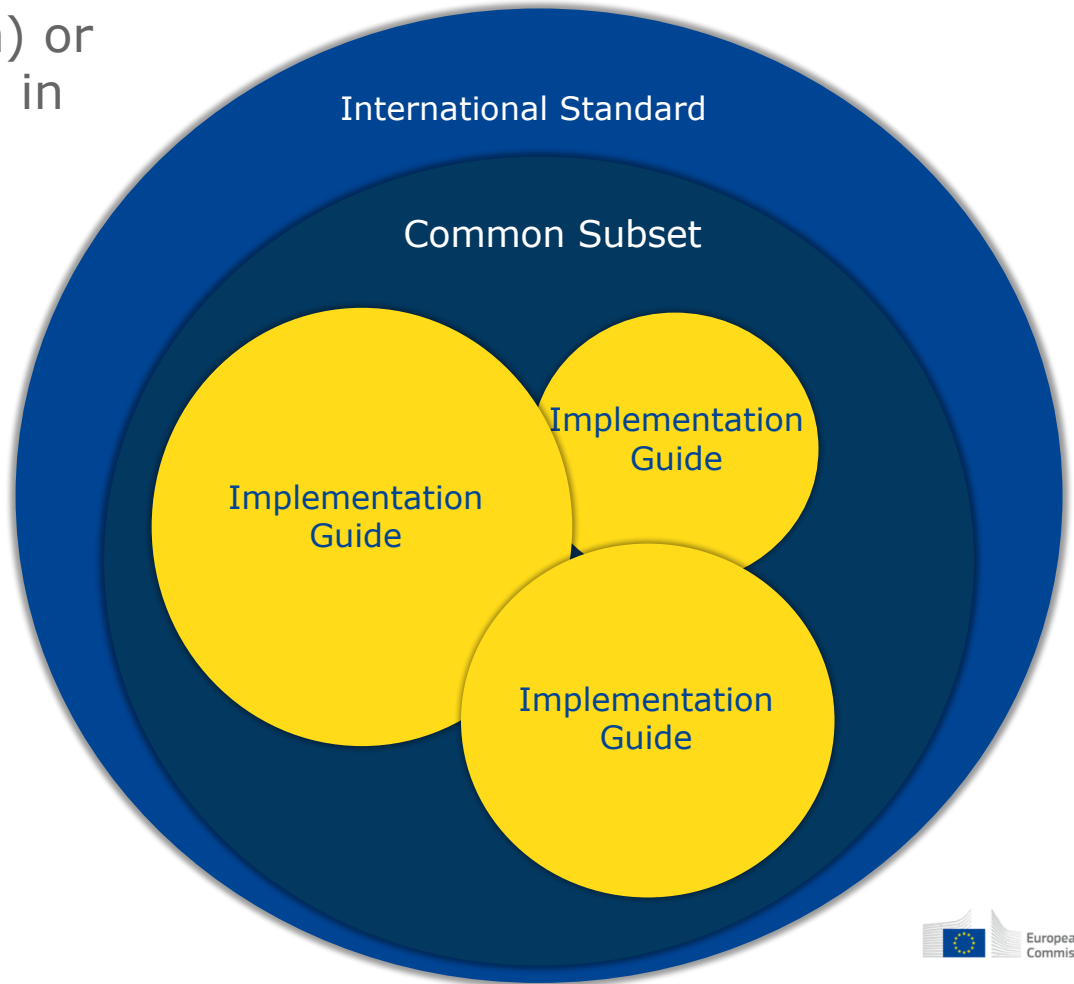


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Core (minimum in common) or  
common subset (maximum in  
common)

**The subset approach**

- The subset becomes the  
framework/outer boundaries

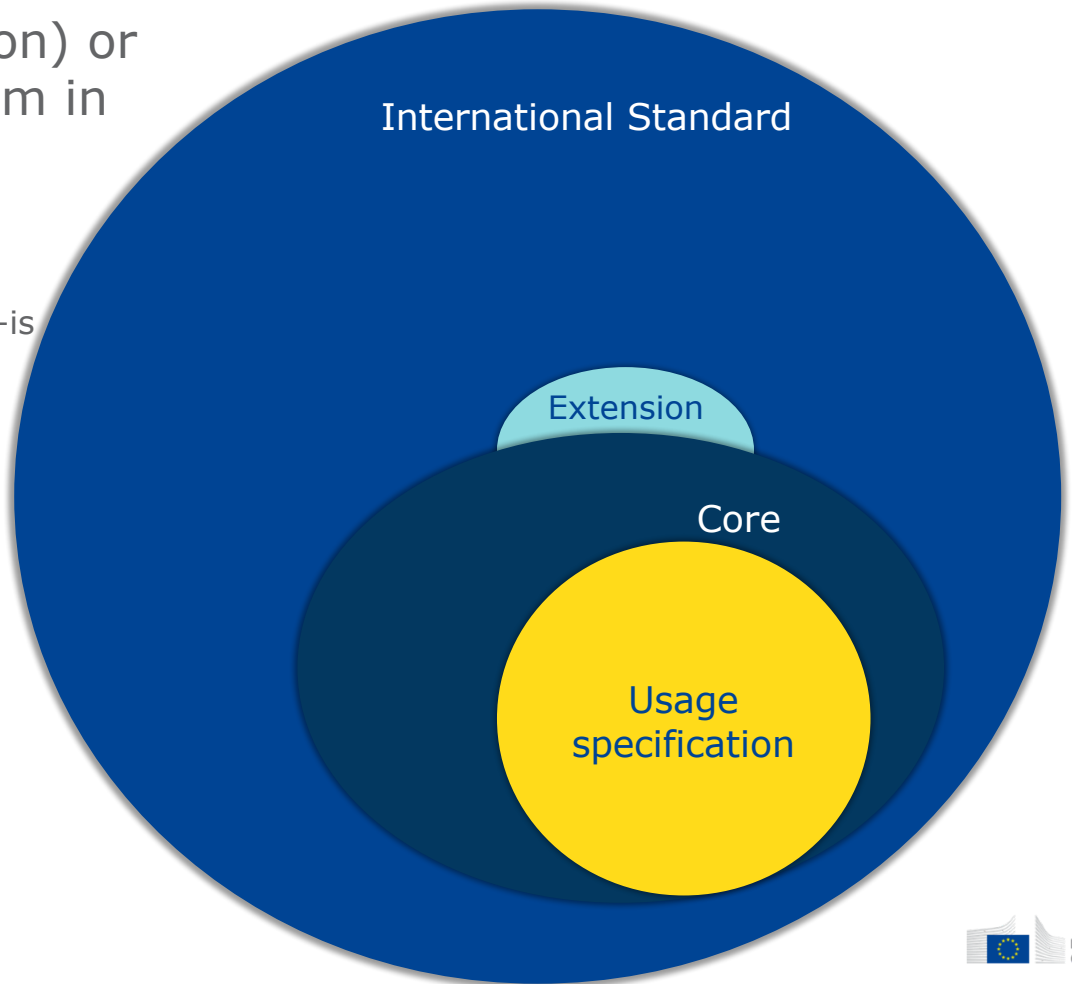


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Core (minimum in common) or  
common subset (maximum in  
common)

**The core approach**

- The core is intended to be used as-is
- Can also be extended or restricted



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# The concept of a core invoice – How?

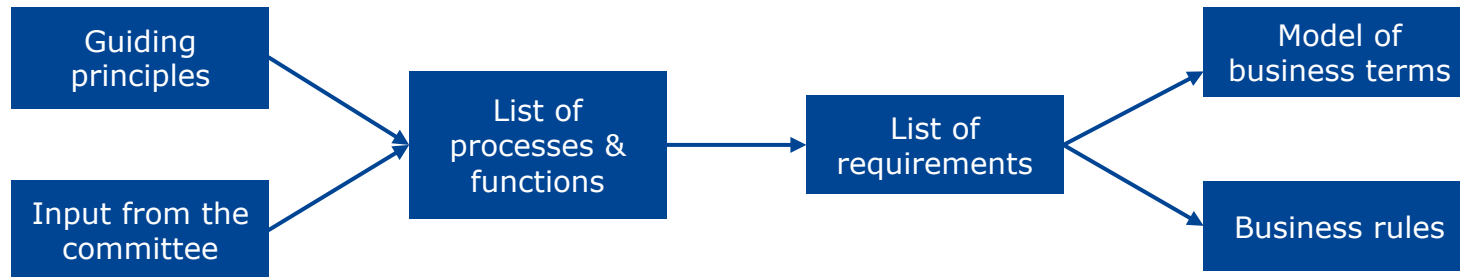
The norm identifies a few **guiding principles**:

- It should be easier to use than paper invoicing
- Standardised information elements makes processing more efficient (than paper invoices)
- It should be possible to use without prior consultation or bilateral agreements
- It should contain information to enable efficient and automatic processing
- Software should be able to present all information, and automatically process structured data
- Structured data should result in optimised business processes
- The core invoice model should not make assumptions on the method of creation, delivery or processing
- The core invoice model should not make assumptions on the syntax or transmission technology

---

## Requirement driven approach on defining the model

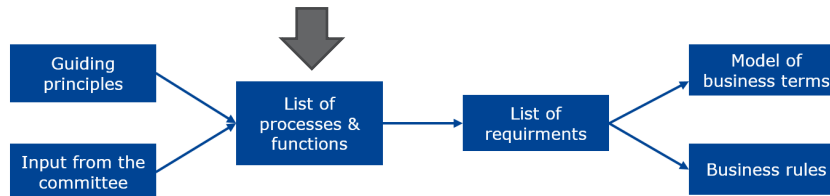
- Each business term in the model comes from one or more documented (and numbered) requirement
- The requirements give a good understanding of the background



# Business processes to support

The invoice model contains information elements to support the following processes

- P1: Invoicing of deliveries of goods and services against purchase orders, based on a contract
- P2: Invoicing deliveries of goods and services based on a contract
- P3: Invoicing the delivery of an incidental purchase order
- P4: Pre-payment
- P5: Spot payment
- P6: Payment in advance of delivery
- P7: Invoices with references to a despatch advice
- P8: Invoices with references to a despatch advice and a receiving advice
- P9: Credit notes or invoices with negative amounts, issued for a variety of reasons including the return of empty packaging
- P10: Corrective invoicing (cancellation/correction of an invoice)
- P11: Partial and final invoicing
- P12: Self billing

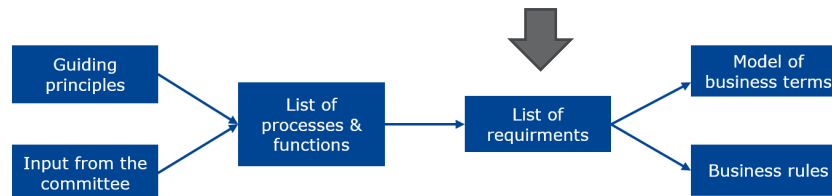


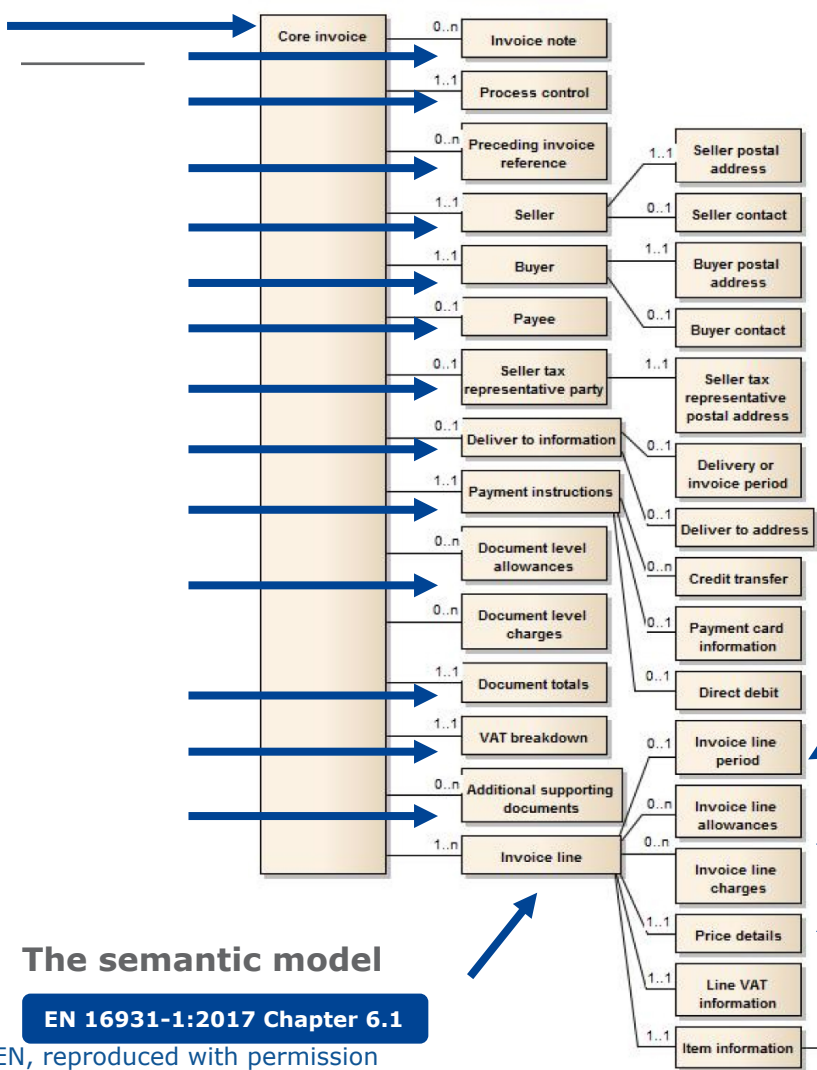


# Business requirements derived from the processes

- Based on the identified processes and listed invoice functions, requirements are defined
- Each requirement has an assigned identifier

- R5 information to trace to a single related purchase order from the document level (all processes, except P2 and P5);
- R6 information to trace to a single related purchase order line from the invoice line (all processes, except P2 and P5);
- R7 information to trace to a single contract and the underlying call for tenders from the document level (all processes, except P3 and P5);





## Examples of key components

Invoice (header)  
 Invoice number (1..1)  
 Issue date (1.1)  
 Type code (1..1)  
 Currency code (1..1)  
 ....

Seller information  
 Name (1..1)  
 Trading name (0..1)  
 Identifier (0..n)  
 Legal registration identifier (0..1)  
 VAT number (0..1)  
 Additional information (0..n)  
 ...

Payment instructions  
 Payment means type code (1..1)  
 Payment means text (0..1)  
 Payment means (0..1)

VAT Breakdown  
 Category taxable amount (1..1)  
 Category tax amount (1..1)  
 Category code (1..1)  
 Category rate (1..1)  
 Exemption text (0..1)  
 Exemption code (1..1)

Item information  
 Name (1..1)  
 Description (0..1)  
 Sellers identifier (0..1)  
 Buyers identifier (0..1)  
 Standard identifier (0..1)  
 Item classification (0..n)  
 Country of origin (0..1)

## The semantic model

EN 16931-1:2017 Chapter 6.1

# Examples of business terms

ID	Level	Cardinality	Business Term	Description	Usage Note	Req. ID	Semantic data type <sup>2</sup>
BT-1	+	1..1	Invoice number	A unique identification of the Invoice.	The sequential number required in Article 226(2) of the directive 2006/112/EC [2], to uniquely identify the Invoice within the business context, time-frame, operating systems and records of the Seller. It may be based on one or more series of numbers, which may include alphanumeric characters. No identification scheme is to be used.	R56	Identifier
BT-2	+	1..1	Invoice issue date	The date when the Invoice was issued.		R56	Date
BT-3	+	1..1	Invoice type code	A code specifying the functional type of the Invoice.	Commercial invoices and credit notes are defined according the entries in UNTDID 1001 [6]. Other entries of UNTDID 1001 [6] with specific invoices or credit notes may be used if applicable.	R44	Code

**ID** – Unique id for each business term

**Level** – indicates depth in model (+, ++, +++, +++++)

**Cardinality** – Indicates optionality, repetitions allowed

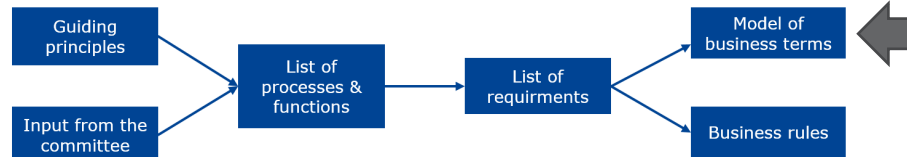
**Business term** – name of the business term

**Description** – short description/definition

**Usage note** – guiding/explanatory information

**Req id** – reference to underlying requirement

**Data type** – the type of



# Semantic datatypes

## Primitive types

- Binary
- Date
- Decimal
- String

Primitive types used in

## Semantic datatypes

- Amount (two decimals)
- Unit Price Amount
- Quantity
- Percentage
- Identifier
- Document reference
- Code
- Date
- Text
- Binary object

Component	Use	Primitive Type	Example
Content	Mandatory	Binary	
Mime Code	Mandatory	String	"image/jpeg"
Filename	Mandatory	String	"drawing5.jpg"

A Receiver of an Invoice, conformant to this document shall accept and process attachments that are of the following mime types (commonly used file extensions are added between brackets):

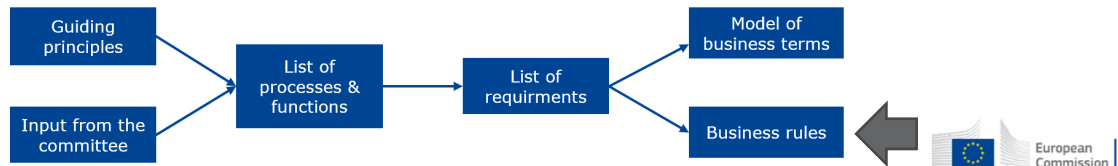
- application/pdf (.pdf)
- image/png (.png)
- image/jpeg (.jpg)
- text/csv (.csv)
- application/vnd.openxmlformats-officedocument.spreadsheetml.sheet (.xlsx)
- application/vnd.oasis.opendocument.spreadsheet (.ods)

**Data types can have supplementary components/attributes**

---

# Business rules

- In addition to the business terms in the semantic model, rules have been defined
- Expressed as an assertion, a statement which should be true “An Invoice shall have an Invoice number”
- **Integrity constraints** – mandatory elements and rules against negative values
  - The data model is also expressing these through the cardinality
  - The syntaxes may or may not have the same restrictions – if not, the integrity constraint can be implemented through a schematron rule
- **Conditions** – dependencies between business terms
  - Not possible to see by just assessing the business terms
  - The syntaxes do not have these rules built in, but they can be implemented through schematron rules
- All rules are normative – an invoice message shall (MUST) follow the rules to be considered compliant



# Business rules - Integrity constraints

- Integrity constraints (In many cases, the data model cardinality indicates the same thing)

ID	Description	Target / context	Business term / group
BR-20	The Seller tax representative postal address shall contain a Tax representative country code, if the Seller has a tax representative party.	Seller tax representative postal address	BT-69
BR-21	Each Invoice line shall have an Invoice line identifier.	Invoice Line	BT-126
BR-22	Each Invoice line shall have an Invoiced quantity.	Invoice Line	BT-129
BR-23	An invoice line shall have an Invoice quantity unit of measure.	Invoice Line	BT-130

**ID** – Unique id for each business rule

**Description** – textual description of the rule

**Target/Context** – the cgroup/class for where the rule applies

**Business term/group** – reference to the term for which the rule applies

# Business rules - Conditions

- Conditions – dependencies between terms

ID	Description	Target / context	Business term / group
BR-CO-8	Invoice line charge reason code and Invoice line charge reason shall indicate the same type of charge reason.	Invoice Charges	line BT-144, BT-145
BR-CO-9	The Seller VAT identifier, Seller tax representative VAT identifier, Buyer VAT identifier shall have a prefix in accordance with ISO code ISO 3166-1 alpha-2 by which the country of issue may be identified. Nevertheless, Greece may use the prefix 'EL'.	VAT identifiers	BT-31, BT-48, BT-63
BR-CO-10	Sum of Invoice line net amount = $\sum$ Invoice line net amount.	Document totals	BT-106

**ID** – Unique id for each business rule

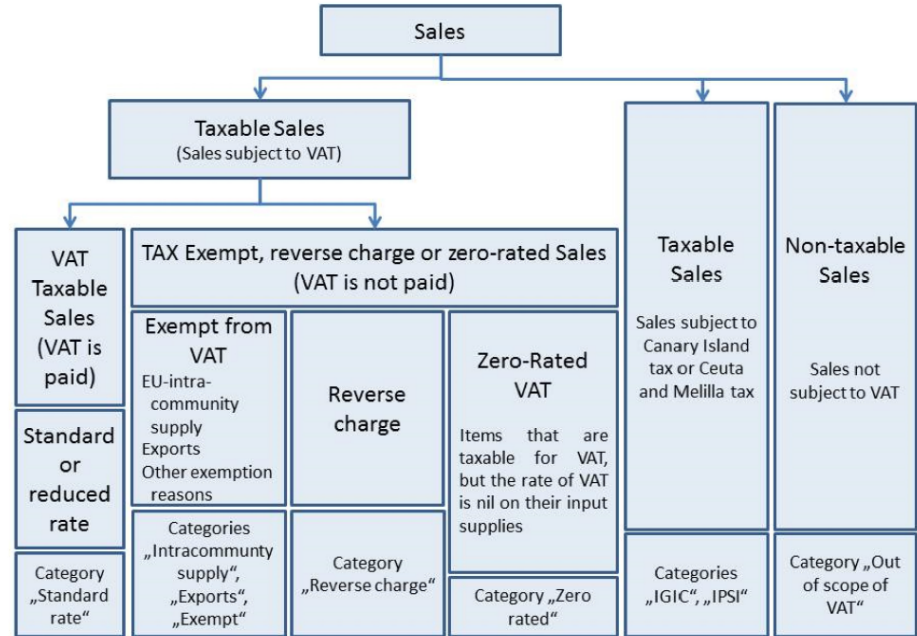
**Description** – textual description of the rule

**Target/Context** – the cgroup/class for where the rule applies

**Business term/group** – reference to the term for which the rule applies

# Business rules – VAT Rules

- VAT Rules – Rules for each VAT category



ID	Description
BR-Z-1	An Invoice that contains a line, a document level allowance where the Invoiced item VAT category code (BT-151, BT-152) shall contain in the VAT breakdown (BG-23) exactly one equal with “Zero rated”.
BR-Z-2	An Invoice that contains a line where the Invoiced item VAT category code (BT-151) is “Zero rated” shall contain the Sellers VAT Identifier (BT-31), the Seller Tax registration identifier (BT-32) or the Seller tax representative VAT identifier (BT-63).
BR-Z-3	An Invoice that contains a document level allowance where the Invoiced item VAT category code (BT-95) is “Zero rated” shall contain the Sellers VAT Identifier (BT-31), the Seller Tax registration identifier (BT-32) or the Seller tax representative VAT identifier (BT-63).



## Question

**Which eInvoicing formats are you currently using?**

**The European standard requires a very high level of information quality. Can this prove to be a challenge in your coming implementation?**



---

# Understanding OASIS UBL 2.1 and UN/CEFACT Cross Industry Invoice D16B

---

**Martin Forsberg**  
DIGIT

# Content

**1. List of syntaxes that comply with EN 16931-1**

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**2. UBL Version 2.1 – ISO/IEC 19845:2015**

---

**3. UN/CEFACT Cross Industry Invoice D16B**

---

**4. Where to find the specifications**

---

**5. Mapping and conversion**

---



**1**

List of syntaxes that comply with EN 16931-1

# The standardization request from EC defined a number of criteria

## Req ID Requirement of sub-requirement

1	Comply with the core invoice semantic data model specified in the EN
2	Be international, open and free to use
3	Have a governance and sustainability model
3.1	There is an established organisation maintaining the syntax (format)
3.2	There is a maintenance process that is: <ul style="list-style-type: none"><li>- documented with defined participation and voting rules;</li><li>- governed;</li><li>- open to participation for stakeholders.</li></ul>
3.3	There is a funding model allowing further development and maintenance.
3.4	Support can be provided (consulting, educating, training) to solution providers (implementers) or users (companies, PAs etc.).
4	Be part of a coherent set of standards and technical specifications to support the broader e-procurement process or the broader e-invoicing supply chain
5	Be widely used in the EU or worldwide
6	Be used in production environments (and not just test) by both the public and the private sector
7	Reflect well-accepted technology and aim to incorporate the latest technological developments considered to be state of the art
8	Have guidelines, code lists, validating tools freely available to ease implementation by ICT vendors and suppliers
9	Have a set of official, freely available syntax-dependent artefacts for validation (the XML Schema or Schematron) to support tool independent validation
10	Have an official updating and versioning strategy that takes due account of backward compatibility, as well as appropriate guidelines for customisation that explain how to extend and restrict the syntax

---

# Understanding UBL and CII

- For both UBL 2.1 and UN/CEFACT Cross Industry Invoice
  - Overview of the Specifications, XML-schemas and other resources
  - Use of namespaces, versioning and document types
  - Handling of codelists
  - Typical message design and key syntactical features
- The CEN TC/434 List of syntaxes that comply with the EN 16931-1 (semantic model)
  - Requirements defined in the standardization mandate

A decorative graphic consisting of three overlapping squares. The front-most square is white and contains the number '2'. The two squares behind it are light blue and are slightly offset to the left and top.

**2**

UBL Version 2.1 – ISO/IEC 19845:2015

---

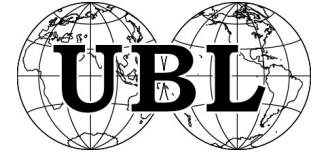
# Overview of the standard



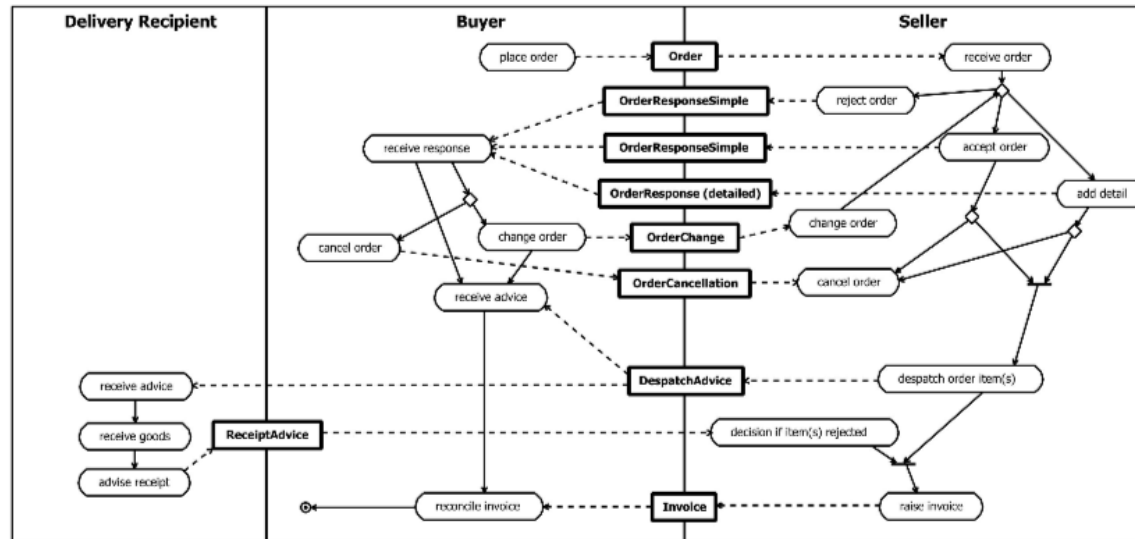
- UBL stands for Universal Business Language
- OASIS UBL 2.1 is developed and maintained by the UBL Technical Committee within OASIS
- UBL is an ISO-standard (ISO/IEC 19845-2015)
  
- UBL was developed with starting point in the CBL/xCBL format
- The first publicly available and implemented version was v0.7 and was made available in 2003. Denmark used this version in the mandatory implementation of electronic invoicing (OIOXML)



# UBL 1.0

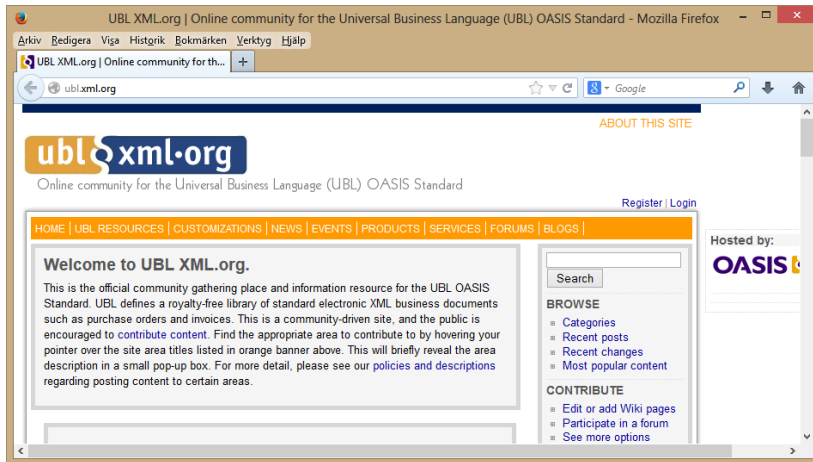


- Published 2004
- Order To Invoice (8 Documents)
- >600 elements in common library



# UBL 2.0

- 31 business documents
- >1900 elements in common library
- Input from European projects
- Published 2006



## Sourcing (product and price synchronization)

- Catalogue Request, Catalogue, Catalogue Item Specification Update,
- Catalogue Pricing Update, Catalogue Deletion, Request For Quotation, Quotation

## Fulfilment (shipping)

- Forwarding Instructions, Packing List, Bill Of Lading, Waybill, Certificate Of Origin
- Transportation Status

## Billing

- Credit Note, Debit Note, Self Billed Invoice, Self Billed Credit Note, Freight
- Invoice, Reminder

## Payment

- Remittance Advice, Statement

## Additional document types

- Application Response, Attached Document

---

# UBL 2.1

- 62 business documents
- Library of >2300 elements
- Built based on input from projects like CEN/BII, PEPPOL, ePRIOR and freight management projects
- Backward compatible with UBL 2.0.
  - Any XML-instance produced based on UBL 2.0 will validate using UBL 2.1
- All definitions were reviewed

## Additional guidelines

- Customization Methodology
- Generic Code list support
- Digital signature extension (XAAdES)

### **Sourcing (product and price synchronization)**

- Catalogue Request, Catalogue, Catalogue Item Specification Update,
- Catalogue Pricing Update, Catalogue Deletion, Request For Quotation, Quotation

### **Fulfilment (shipping)**

- Forwarding Instructions, Packing List, Bill Of Lading, Waybill, Certificate Of Origin
- Transportation Status ,Fulfilment Cancellation

### **Billing**

- Invoice, Credit Note, Debit Note, Self Billed Invoice, Self Billed Credit Note, Freight Invoice, Reminder

### **Payment**

- Remittance Advice, Statement

### **Tendering**

- Awarded Notification, Call for Tenders, Contract Award Notice, Contract Notice
- Guarantee Certificate, Prior Information Notice, Tender, Tender Receipt
- Tenderer Qualification, Tenderer Qualification Response, Unawarded Notification

### **VICS Collaborative Planning, Forecasting, and Replenishment**

- Exception Criteria, Exception Notification, Forecast, Forecast Revision
- Item Information Request, Product Activity

### **Vendor Managed Inventory**

- Instruction for Returns, Inventory Report, Retail Event, Stock Availability Report
- Trade Item Location Profile

### **Intermodal Freight Management**

- Goods Item Itinerary, Packing List, Transport Execution Plan, Transport Execution Plan Request
- Transport Progress Status, Transport Progress Status Request, Transport Service Description
- Transport Service Description Request, Transportation Status, Transportation Status Request

### **Utility Billing**

- Utility Statement

### **Additional Documents**

- Application Response, Attached Document
- Document Status, Document Status Request

# Localization

- UBL TC has a number of localization subcommittees
- Translated business term names and definitions
- UBL 1 is translated into
  - Chinese (traditional and simplified)
  - Japanese
  - Korean
  - Spanish
  - Italian
- UBL 2 is translated into
  - Italian
  - Spanish
  - German
  - Slovak
- And partially to
  - Danish
  - Turkish
  - Hungarian
  - Lithuanian

	A	B	C	D	E
	UBL Name	Description in Japanese	BIE Dictionary Entry Name	Object Class	Qualifier
1	Order	注文情報	Order.Details	Order	Order
2	ID	注文情報の識別子	Order.Identifier	Order	
3	CopyIndicator	複製レベル(原本/複製)	Order.Copy.Indicator	Order	
4	GUID	グローバル識別子	Order.Globally Unique Identifier	Order	
5	IssueDate	作成日	Order.Issue.Date	Order	
6	Note	備考	Order.Note.Text	Order	
7	AcknowledgementResponseCode	応答コード	Order.Acknowledgement_Response.Code	Order	
8	TransactionCurrencyCode	注文情報の通貨単位(ISO)	Order.Transaction_Currency.Code	Order	
9	PricingCurrencyCode	価格情報の通貨単位(ISO)	Order.Pricing_Currency.Code	Order	
10	EarliestDate	有効開始日	Order.Earliest.Date	Order	



**3**

UN/CEFACT Cross Industry Invoice D16B

---

## Overview of the standard

- CII stands for Cross Industry Invoice
- CII is developed and maintained by UN/CEFACT
- UN/CEFACT serves as the focal point for trade facilitation recommendations and electronic business standards, covering both commercial and government business processes that can foster growth in international trade and related services.
- UN/CEFACT develops and maintains UN/EDIFACT, XML Schemas, Code lists and a number of UNECE Recommendations (such as Recommendation N°. 20 - Codes for Units of Measure)

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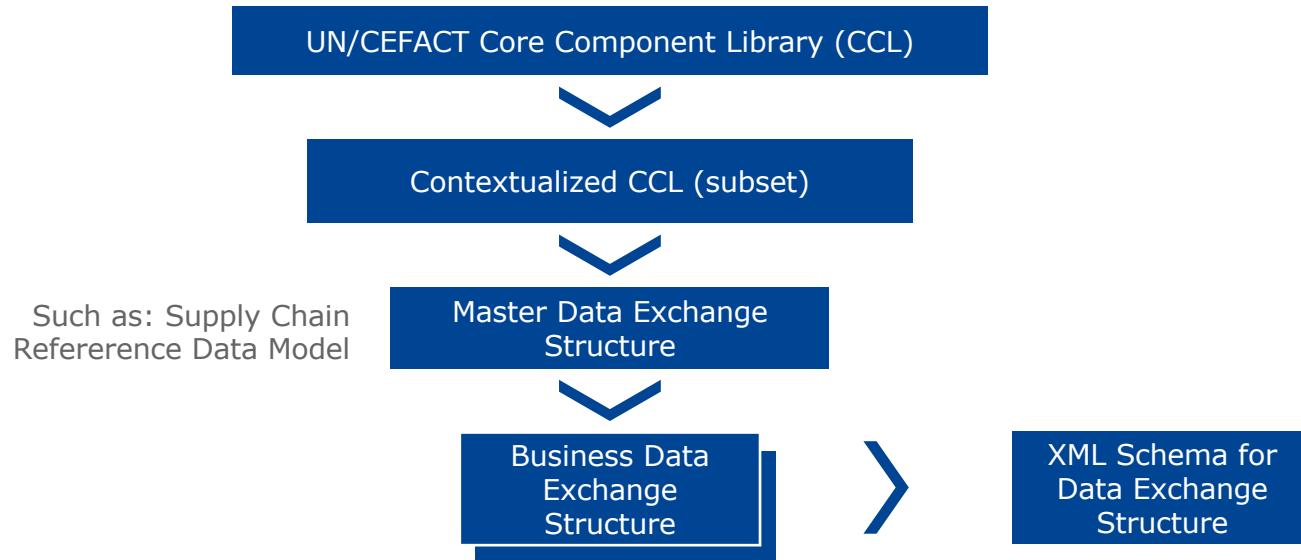
# Cross Industry messages

- Version 1 published 2009 (as part of D09A)
- In D09B, Cross Industry Order, Catalogue and DespatchAdvice were added
- New schemas are normally published 2 times a year
- Since 2016, UN/CEFACT publishes two branches of the XML Schemas
- One branch following the same method as before. Currently it contains 16 different Cross Industry (messages) XML schemas
- One branch called the Supply Chain Reference Data Model (SCRDM) which are process-driven schemas derived from the model. Currently it only contains the Cross Industry Invoice-message

---

# Reference data model

- A reference datamodel is a master/family content model which can be reused, within a certain context, for many message structures
- Each message structure is a subset of the master model, derived from requirement documented in a BRS (Business Requirement Specification)





## Question

**Two formats – do you see  
this as primarily an  
opportunity or a challenge?**

A decorative graphic consisting of three overlapping squares. The front-most square is white and contains the number '4'. The two squares behind it are light blue and are slightly offset to the left and top, creating a layered effect.

4

Where to find the specifications

---

# Where can I find the specifications?

UBL 2.1 specifications:

- XML schemas + supporting material: <http://docs.oasis-open.org/ubl/os-UBL-2.1/UBL-2.1.html>

CII specifications:

- XML Schema: [http://www.unece.org/cefact/xml\\_schemas/index](http://www.unece.org/cefact/xml_schemas/index) (SCRDM - CII)
- Business Requirement Specification: [http://www.unece.org/cefact/brs/brs\\_index.html](http://www.unece.org/cefact/brs/brs_index.html)
- Requirement Specification Mapping: [http://www.unece.org/cefact/rsm/rsm\\_index.html](http://www.unece.org/cefact/rsm/rsm_index.html)

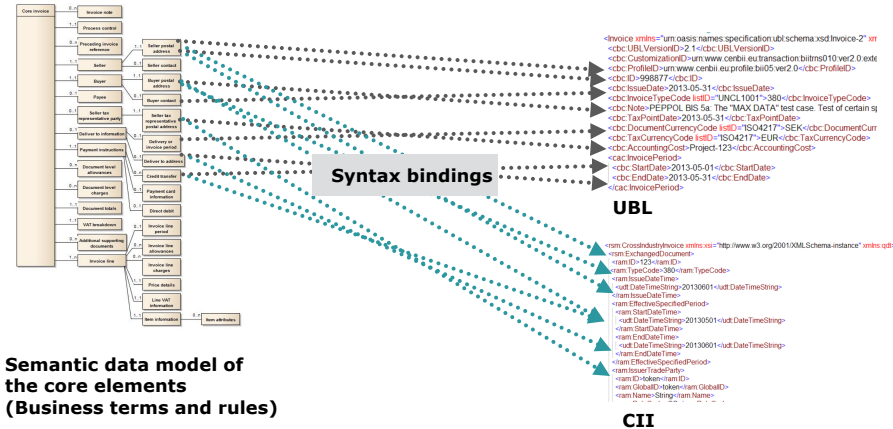


5

## Mapping and conversion

# Conversion/transformation between different formats/syntaxes

- Often proposed as a solution when different standards are used by buyer/seller
- Often more complex than expected
- Important to consider archiving rules and traceability



# Situations to consider

## Situations to consider

1. All information can be transferred

a) to an almost identical structure

Example: From UBL version 2.0 to UBL version 2.1

b) to a different structure where content must be adjusted

2. Information must be adjusted

a) irreversibly

Sub-totals in combined into totals (and sub-totals are not transferred)

Structured information concatenated into unstructured forma

a) reversibly

Country code 752 translated to SE

VAT rate in percent in one format is not transferred, but it is possible to deduce it from the amounts.

3. Information is deleted

a) on purpose

Meaningless information such as logotype-location

Target format does not allow all information

b) by accident

"Overpopulated" document where non-expected information is neglected.

4. Information is added

a) when the target format requires information not present

Only article numbers are used, but article names are added during conversion



5

## **Interoperability and validation**

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# XML Schema and Schematron – techniques used in the standard to test compliance

## XML Schema

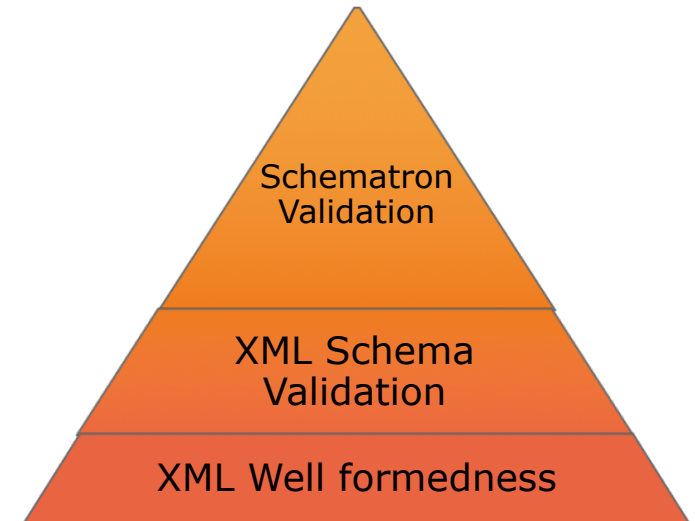
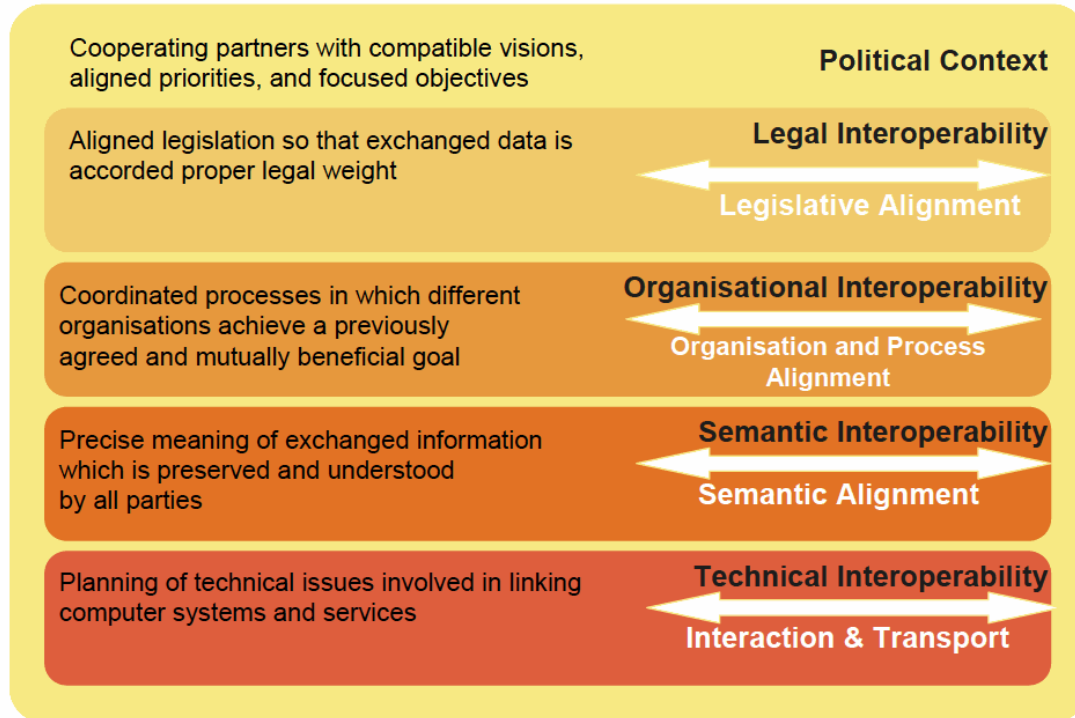
- Vocabularies and document models
- Datatypes and formats
- Structures and order
- *Everything which isn't explicitly allowed is forbidden!*

## Schematron

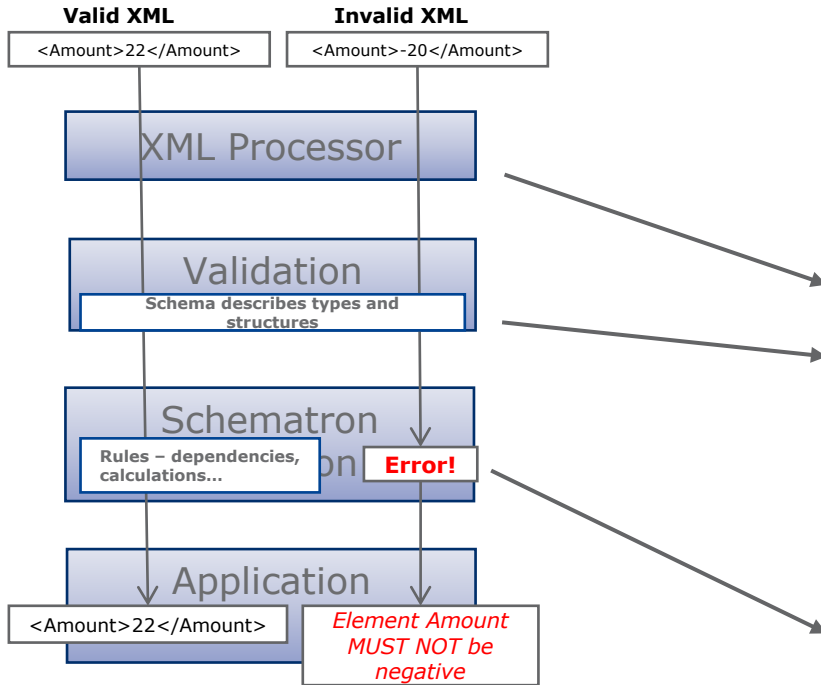
- Rules-oriented
- Conditions and relation between elements
- Advanced logic
- *Everything which isn't explicitly forbidden is allowed!*



# Interoperability and validation technology



# Validation services uses all levels of test artefacts



The screenshot shows the SFT! web interface for a validation report. The report title is 'Report' and the filename is 'Svefaktura-Tom OrderlineReference.xml'. A 'View as PDF' button is visible in the top right.

**Document Types**

Description	Matched	Info	Warning	Fatal
XML Structural Validation	Yes	0	0	0
XML Schema	Yes	0	0	1
Additional rules	Yes	0	2	0
Business rule 2	Yes	0	0	0

**XML Structural Validation**

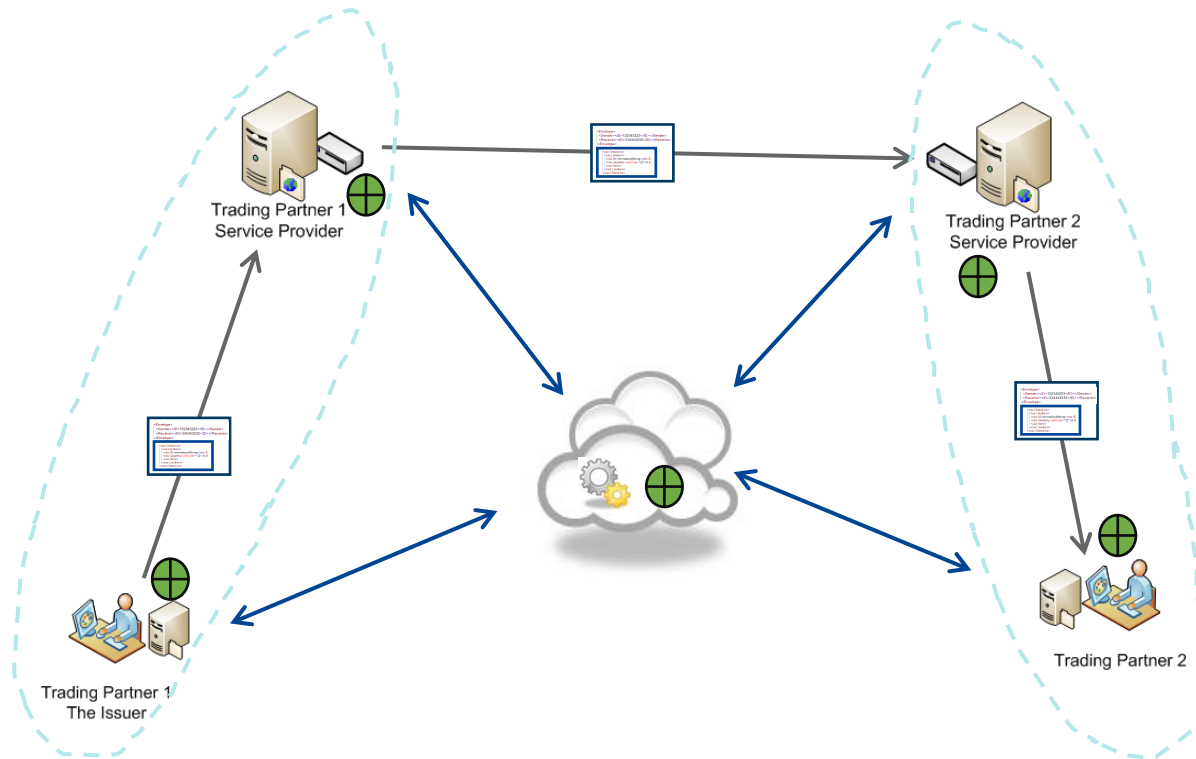
**XML Schema**

Flag	Message	Location
fatal	In content of element <InvoiceLine>: The content model does not allow element <Q[...eComponents:1:0]Items> to appear immediately after element <Q[...eComponents:1:0]OrderLineReference>. The following elements would be valid here, all in namespace urn:sfti:CommonAggregateComponents:1:0: AllowanceCharge, DespatchLineReference, Delivery, Item.	Line -1, character -1

**Additional rules**

Flag	Message	Location
warning	Optional xml-elements should not be stated if empty (no value inside the element).	/Invoice[1]/InvoiceLine[1] /OrderLineReference[1]/
warning	Optional xml-elements should not be stated if empty (no value inside the element).	/Invoice[1]/InvoiceLine[1]/Items[1]/

# Who validates?



## Question

**Validation is a central function in the European standard. Are the service providers ready for the technology?**

**Lunch break**  
**59 minutes**

 [#ConnectingEurope](#)

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6

## **Usage specifications and compliance**

---

# Compliance – Usage Specifications

- The norm allows for (Core Invoice) Usage Specifications – CIUS
- A CIUS can be compared to an implementation guide
- A CIUS must be a true subset of the norm – meaning it must follow all business rules and can't add any terms not already defined (that would require an Extension)
- A CIUS can range from a simple restriction like
  - “The seller MUST provide a contract reference”
- To more complex specifications
  - Restrictions of cardinalities
  - Subset of codelists
  - Length restrictions of text elements

---

# What is allowed to restrict in a Core Invoice Usage Specification

- "Forbid" optional elements 0..n/0..1 → 0..0
- Make definition narrower
- Add synonyms or explanatory text
- Make optional element mandatory
- Limit allowed number of repetitions
- Change data type to narrower representation (alphanumeric → numeric)
- Limited allowed code values
- Add additional business rules or make existing more restrictive
- Restrict field lengths
- Require certain formatting on values
- Restrict number of decimals/fractions

## **IMPORTANT**

An invoice which follows a CIUS **MUST ALWAYS** also be compliant towards the (non-restricted) norm.



---

# Requirements for the contracting authorities/entities

## From article 7

### ***Receipt and processing of electronic invoices***

*Member States shall ensure that contracting authorities and contracting entities **receive and process electronic invoices which comply with the European standard on electronic invoicing** whose reference has been published pursuant to Article 3(2) and with any of the syntaxes on the list published pursuant to Article 3(2).*

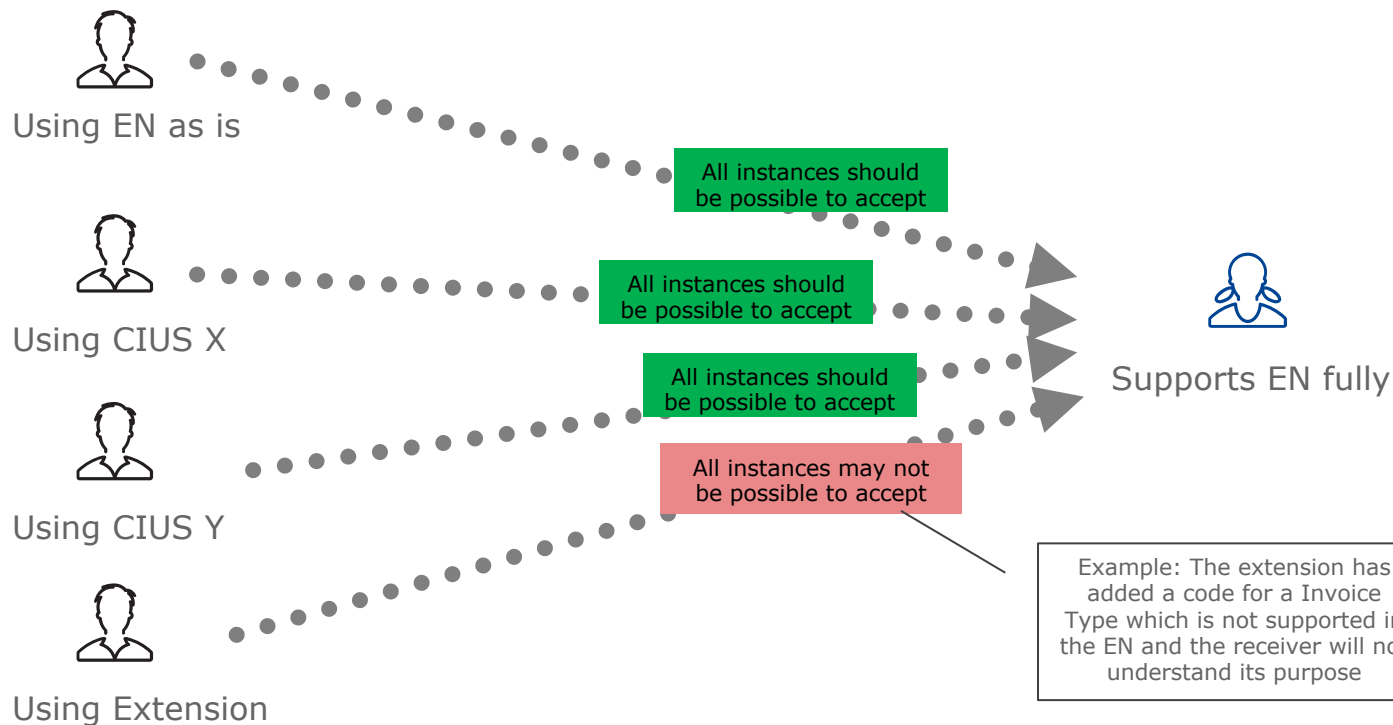
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# Claiming compliance towards the norm

## ***Compliance of sending or receiving party***

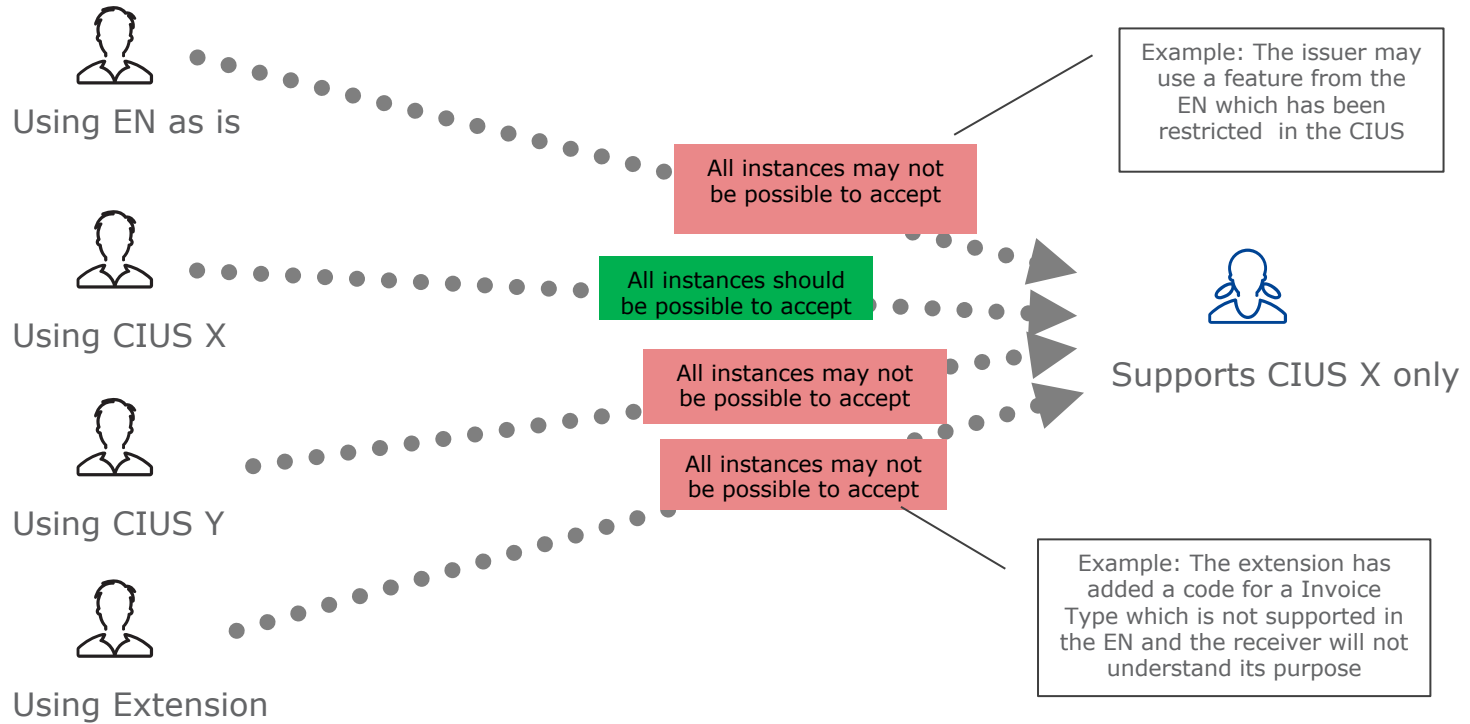
*A receiving party may only claim compliance to the core invoice model if he accepts invoices that comply with the core invoice model in general, or with a CIUS, that is itself compliant with the core invoice model.*

# A few scenarios



Assuming the invoices are conformant against its specification (EN/CIUS/Extension)

# A few more scenarios



Assuming the invoices are conformant against its specification (EN/CIUS/Extension)

## Question

**CIUS – benefits and challenges, what is your opinion?**



# Infrastructure in coherence with CEF eInvoicing

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**Christian Vindinge Rasmussen &  
Martin Forsberg  
DIGIT D3**

# Agenda

1. **A short introduction to the (former) challenges in electronic business**

---
2. **The CEF eDelivery Discovery Model/PEPPOL approach**

---
3. **Consequences for the users**

---
4. **Scalability of the infrastructure**

---
5. **Technical specifications**

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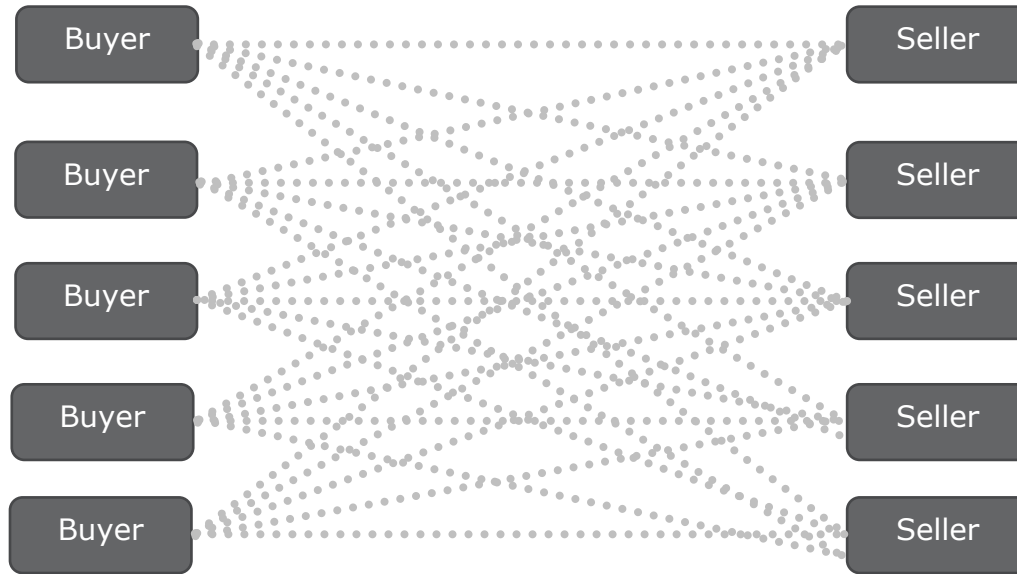
1

**A short introduction to the (former)  
challenges in electronic business**



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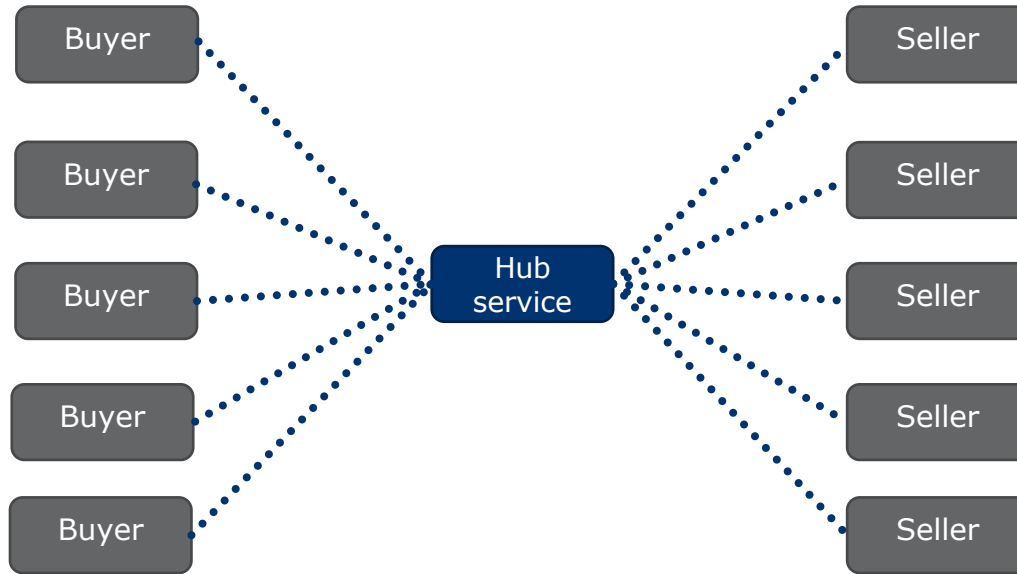
## How it used to work...



- Bilaterally agreed configuration of format, protocol, security
- In-house IT-solutions
- Each new connection => a project

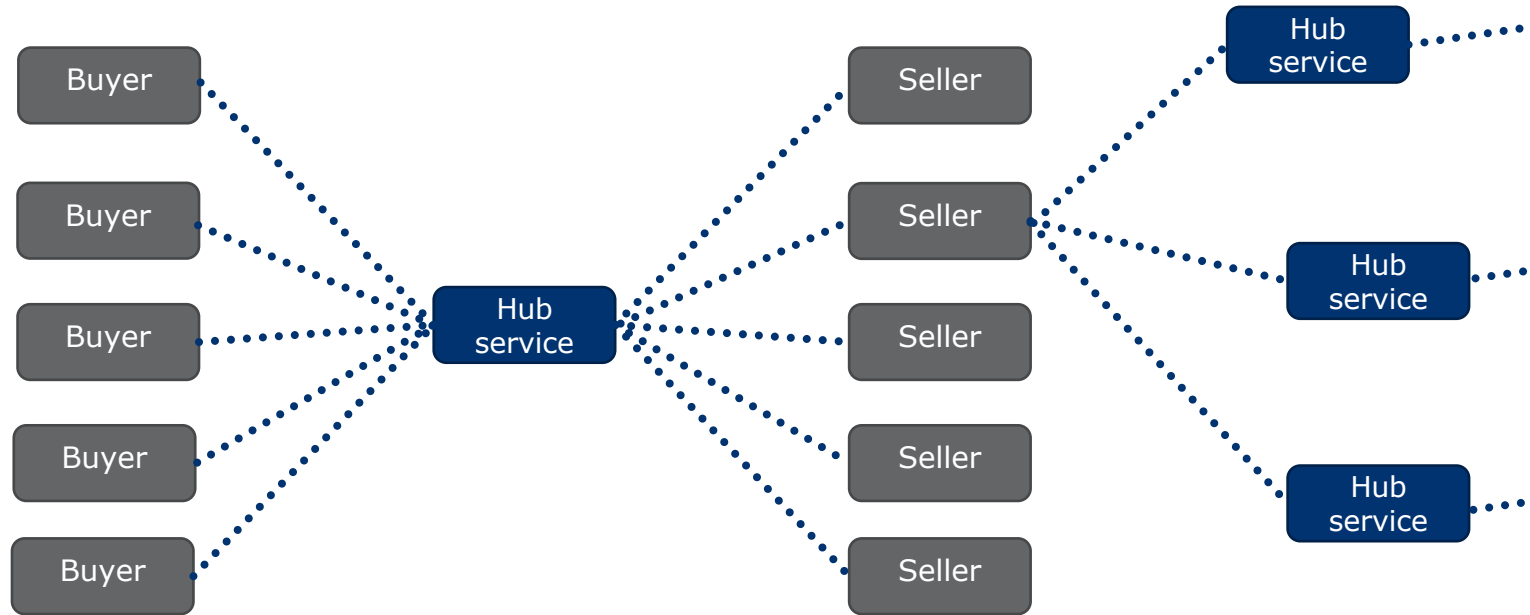
---

## How it used to work...



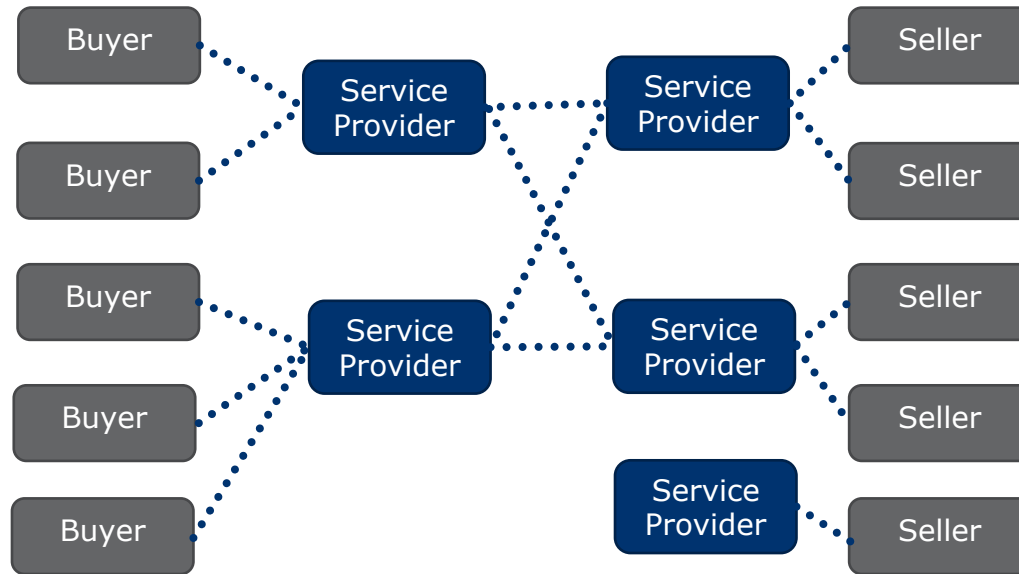
- Central hub takes care of the routing
- Buyer and seller become customers of the hub
- Business partners must use the same hub

## How it used to work...



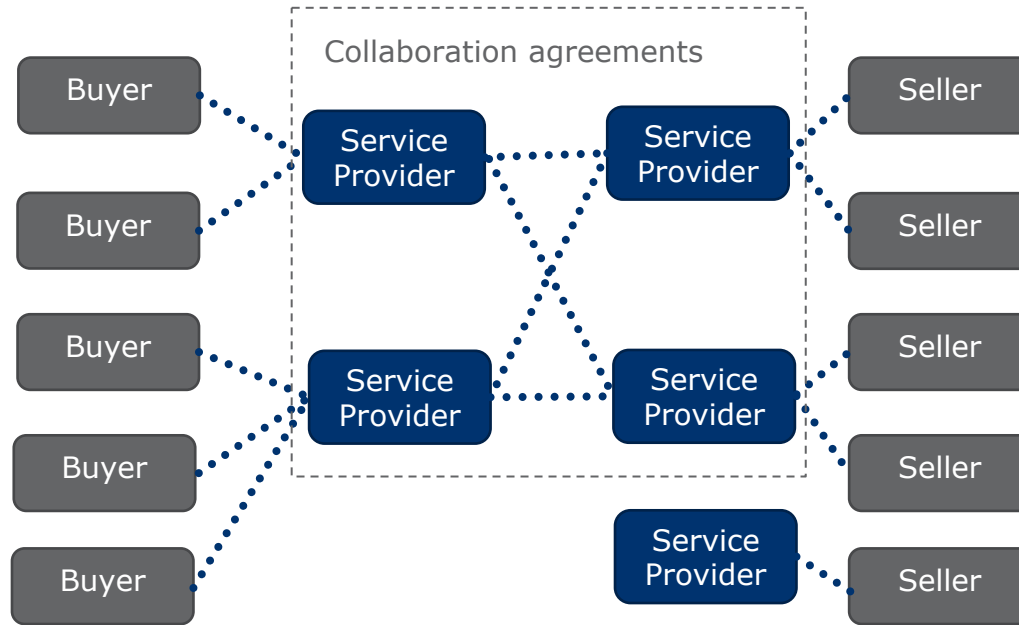
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## How it used to work...



- Service providers acting on behalf of the buyer or seller
- End point (addressing)-information stored by the service provider or the issuer
- Have collaboration-agreements defining SLA, technical details...

## How it used to work...



- Service providers acting on behalf of the buyer or seller
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---

## Typical problems we see today

- Complex process to connect new business partners
- Very costly to configure new connections
- Hard to know which format/standard is used for messages
- Almost impossible to connect cross-border in a rational way
- All service providers don't collaborate
- Very costly to change service provider

A decorative graphic consisting of three overlapping squares in shades of blue and white, positioned to the left of the main title.

2

## **The CEF eDelivery Discovery Model approach**

# Discovery models

CEF eDelivery

## Static

In a Static Service Location model the IP address and related attributes are static. The IP address of all the Access Points in the network are stored on a central location for the other Access Points to reference. To send a message, the sending Access Point looks at the static list of IP addresses on the networks' Domain Name System (DNS) to locate the Access Point of the receiver.

## Dynamic

Dynamic Service Location enables the sending AP to dynamically discover the IP address and capabilities of the receiver. Instead of looking at a static list of IP addresses, the sender consults a **Service Metadata Publisher (SMP)** where information about every participant in the data exchange network is kept up to date. As at any point in time there can be several SMPs, every participant must be given a unique ID that must be published by **the Service Metadata Locator (SML)** on the network's Domain Name System (DNS). By knowing this URL, the sender is able to dynamically locate the right SMP and therefore the right receiver.

## PROS & CONS

- + High speed as there is no overhead processing
- Less flexible, change of irrelevant references

- + More automated and flexible
- Slower speed, as some overhead processing is required



# PEPPOL – A deployment of CEF eDelivery DSI

## AP

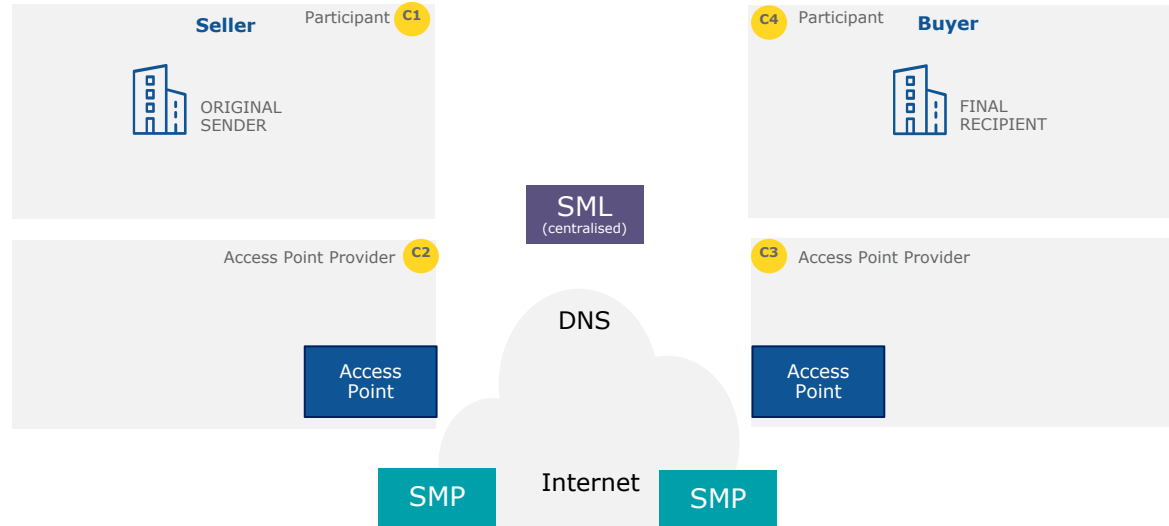
The role of the AP (Access Point) is to send and receive messages in a secure and reliable way, on behalf of the participants. The AP is essentially a simple which is often offered together with other value added services by a service provider.

## SMP

Once the sender discovers the address of the receiver's SMP, it is able to retrieve the needed information (i.e. metadata) about the receiver. With such information, the message can be sent. The SMP is usually a distributed component in an eDelivery Messaging Infrastructure.

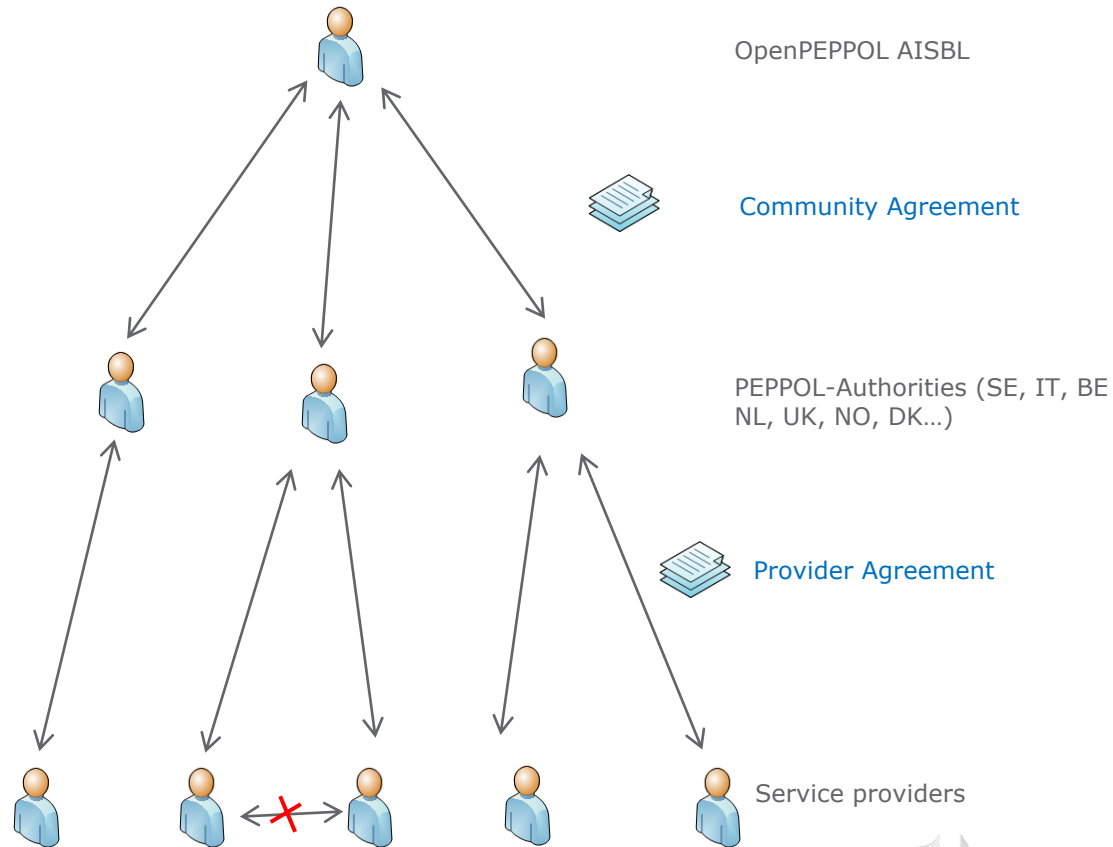
## SML

The role of the SML (Service Metadata Locator) is to manage the resource records of the participants and SMPs (Service Metadata Publisher) in the DNS (Domain Name System). The SML is usually a centralised component in an eDelivery Messaging Infrastructure.



# Transport Infrastructure Agreements (TIA)

- The Access Point Provider and the Service Metadata Publisher Provider must sign a contract with OpenPEPPOL (or any of the PEPPOL Authorities)
- Agreements defines responsibilities, expectations, service levels and more
- Only providers who have signed the agreements can participate in the network (controlled by digital certificates on a communication level)



# Dynamic discovery in detail

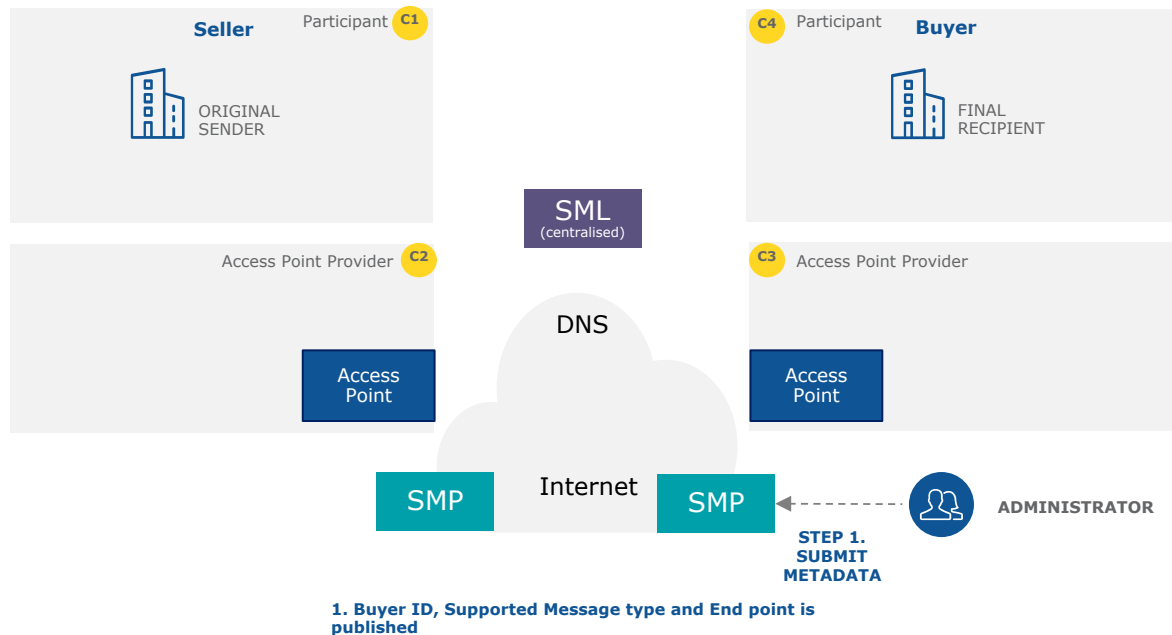
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## Phase 1: Registration



# Dynamic discovery in detail

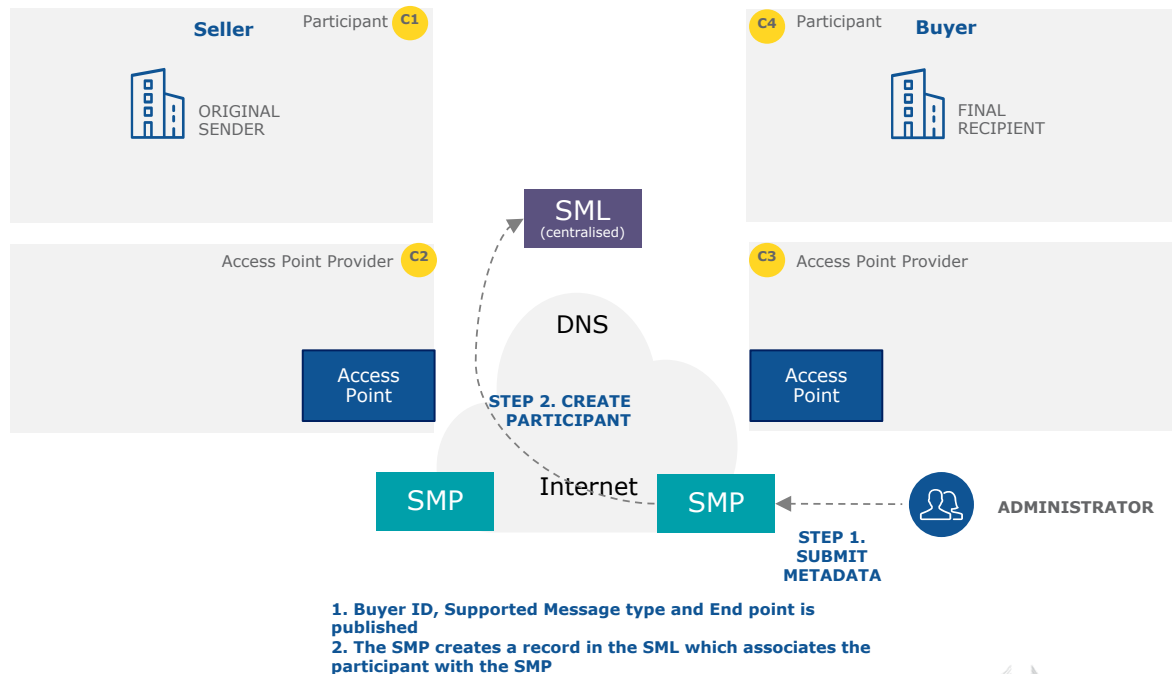
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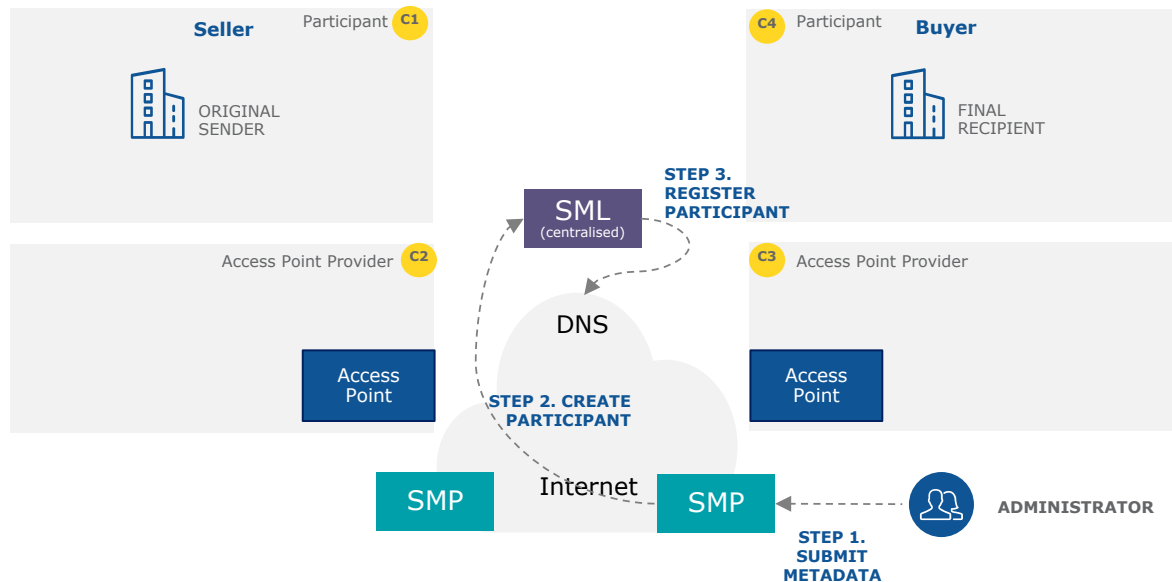
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## Phase 1: Registration



1. Buyer ID, Supported Message type and End point is published
2. The SMP creates a record in the SML which associates the participant with the SMP
3. The SML updates the DNS which creates a DNS record for the participant, pointing to the SMP

# Dynamic discovery in detail

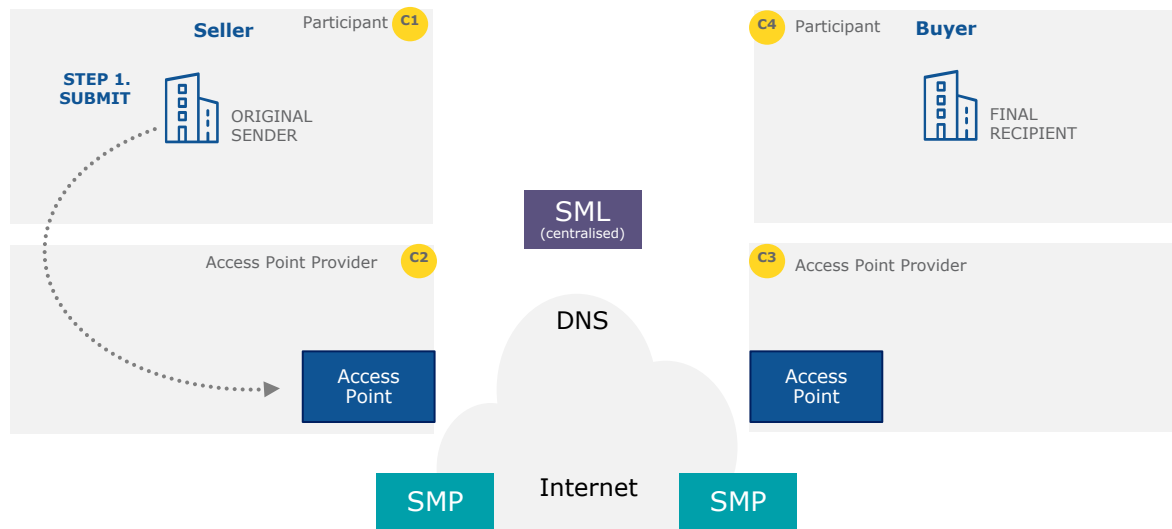
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## Phase 2: Operations



1. Seller issues an eInvoice (or other eDocument) and hands it over to the AP

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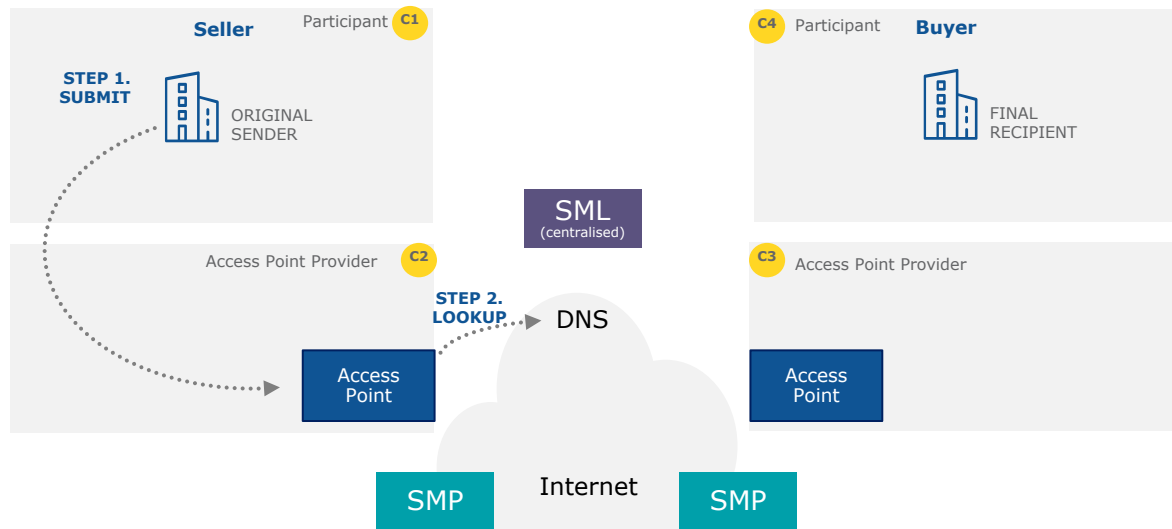
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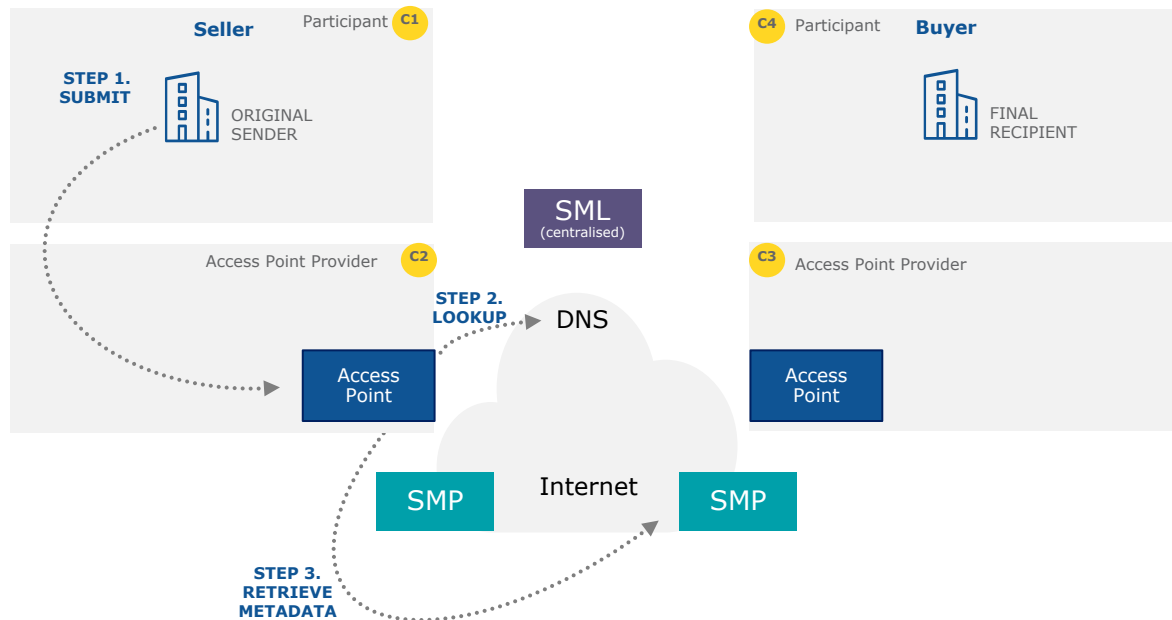
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2. The AP makes a lookup using a HTTP GET. The DNS directs the AP to the participant's SMP
3. The HTTP GET results in the service metadata for the end point (AP)



# Service Metadata Example

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns3:SignedServiceMetadata xmlns="http://busdox.org/transport/identifiers/1.0/" xmlns:ns2="http://www.w3.org/2005/08/addressing" xmlns:ns3="
http://busdox.org/serviceMetadata/publishing/1.0/">
  <ns3:ServiceMetadata>
    <ns3:ServiceInformation>
      <ParticipantIdentifier scheme="iso6523-actorid-upis">0088:50512318800008</ParticipantIdentifier>
      <DocumentIdentifier scheme="busdox-docid-qns">
urn:oasis:names:specification:ubl:schema:xsd:Invoice-2::Invoice#urn:www.cenbii.eu:transaction:biitrns010:ver2.0:extended:urn:www.peppol.eu:b
      <ns3:ProcessList>
        <ns3:Process>
          <ProcessIdentifier scheme="cenbii-procid-ubl">urn:www.cenbii.eu:profile:bii05:ver2.0</ProcessIdentifier>
          <ns3:ServiceEndpointList>
            <ns3:Endpoint transportProfile="busdox-transport-as2-ver1p0">
              <ns2:EndpointReference>
                <ns2:Address>https://peppol.zzz.com/yyyy/adapter/inbound/as2peppol</ns2:Address>
              </ns2:EndpointReference>
              <ns3:RequireBusinessLevelSignature>false</ns3:RequireBusinessLevelSignature>
              <ns3:MinimumAuthenticationLevel>1</ns3:MinimumAuthenticationLevel>
              <ns3:ServiceActivationDate>2017-03-13Z</ns3:ServiceActivationDate>
              <ns3:ServiceExpirationDate>2027-03-13Z</ns3:ServiceExpirationDate>
              <ns3:Certificate>MIIENiCCAx6gAwIBAgIOAovA/eZvyKgJmu+nv11PdDANBgkqhkiG9w0BAQsFADBX
```

- The Participant's identifier
- Type of supported business message
- Type of business process
- Type of transport protocol to use for this message
- Technical endpoint/address to where the message should be sent

# Dynamic discovery in detail

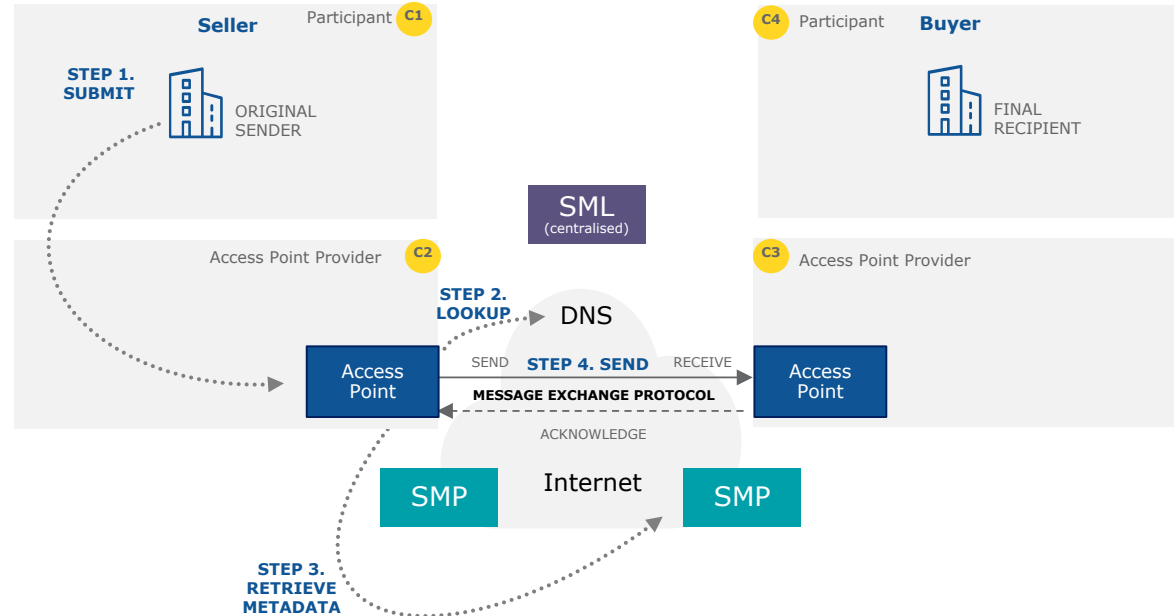
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4. The AP sends the eInvoice to the receiver's AP

# Dynamic discovery in detail

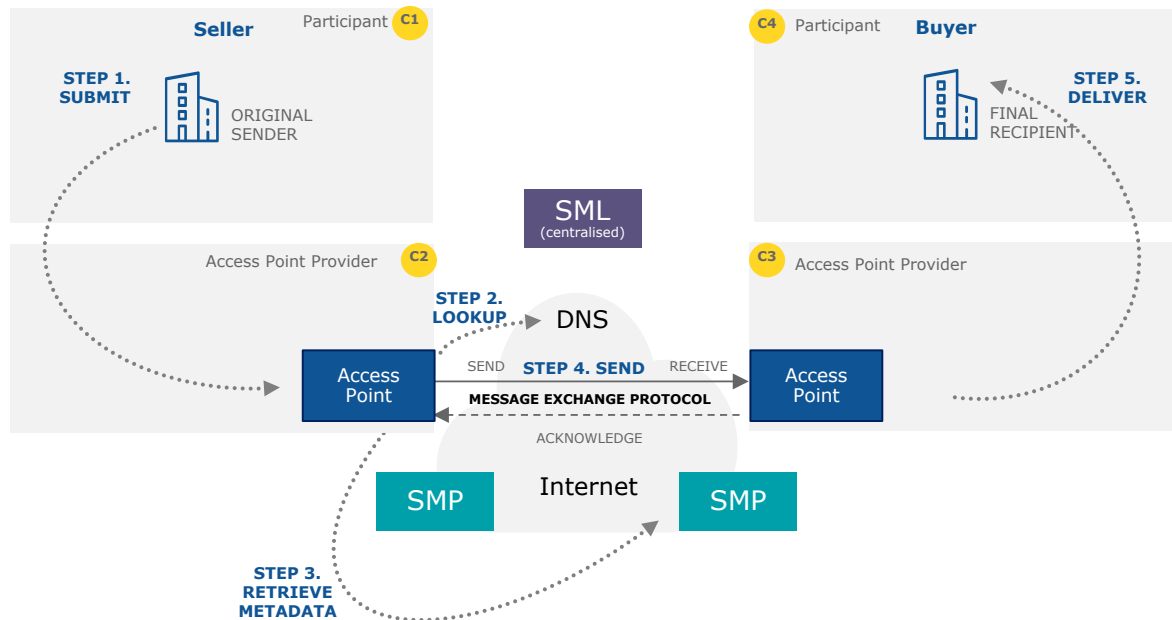
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2. The AP makes a lookup using a HTTP GET. The DNS directs the AP to the participant's SMP
3. The HTTP GET results in the service metadata for the end point (AP)
4. The AP sends the eInvoice to the receiver's AP
5. The receiver's AP hands the eInvoice over to the Buyer



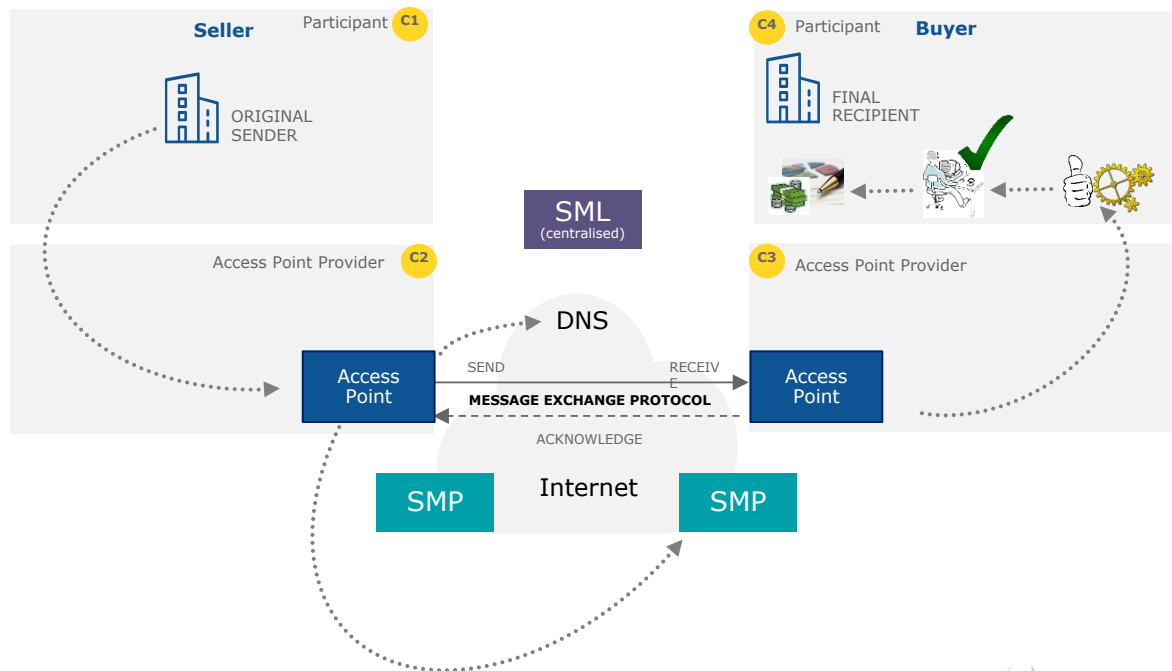
3

## Consequences for the users

# Consequences for the users

- A participant registered in the PEPPOL Infrastructure is visible as a receiver by everybody. The SML/SMP is open for queries.
- Only certified and approved Access points can send messages in the infrastructure
- Receiving Access points are not allowed to refuse an incoming message if it comes from a certified Access point
- Participants must implement routines for handling new connections!

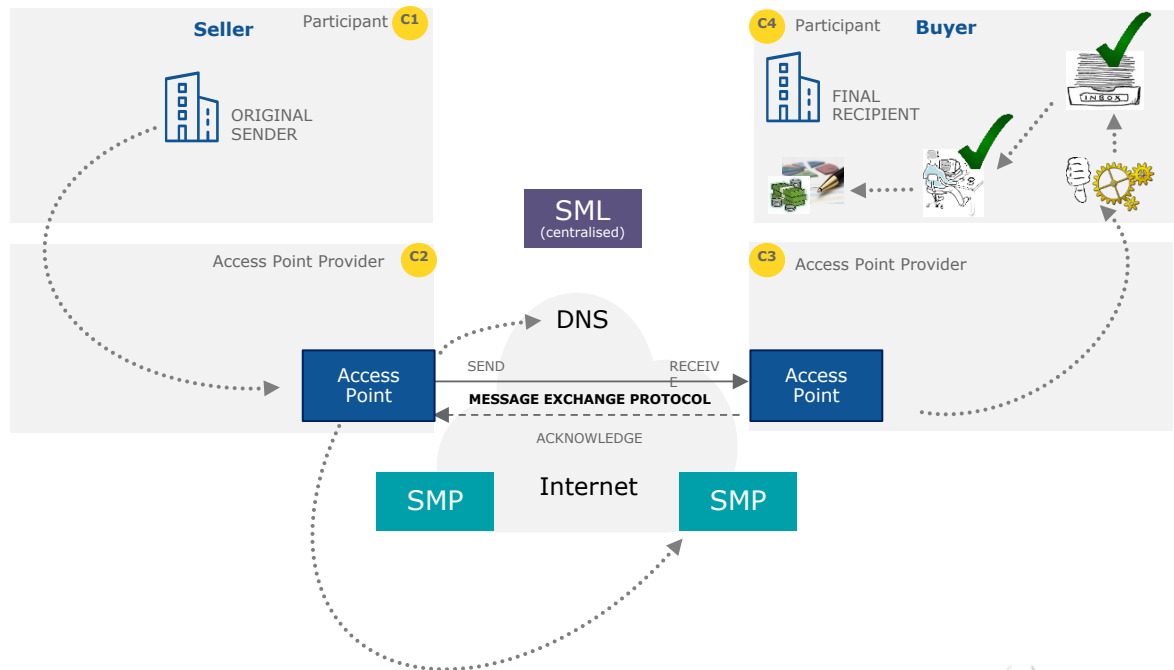
## Scenario - Known business partner



# Consequences for the users

- A participant registered in the PEPPOL Infrastructure is visible as a receiver by everybody. The SML/SMP is open for queries.
- Only certified and approved Access points can send messages in the infrastructure
- Receiving Access points are not allowed to refuse an incoming message if it comes from a certified Access point
- Participants must implement routines for handling new connections!

## Scenario – Unknown business partner





4

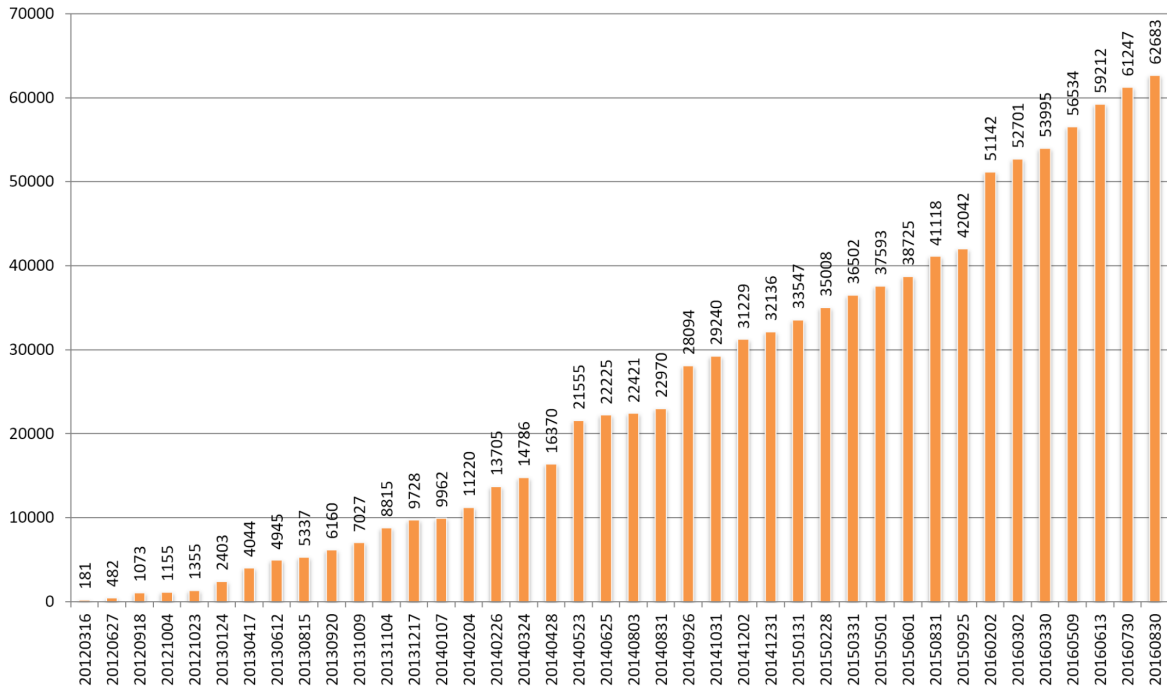
## **Scalability of the infrastructure**

# Scalability of the infrastructure

The discovery mechanism is using DNS, well known for stability and performance

The only central service, the SML, is for administration of the participants, not the message flow itself

## Total number of organizations capable of receiving eInvoices in PEPPOL





Source: [www.galaxygw.com](http://www.galaxygw.com)

2017 Q1: 85.000 registered receivers!  
2017 Q3: 100.000 registered receivers!



# CEF eDelivery is not a one-size fits all solution

				<b>Your</b> CEF eDelivery implementation
				4-corner model
SCOPE OF CEF eDELIVERY	<b>EXCHANGE MODEL</b>			
	TOPOLOGY	4-corner model	4-corner model	<b>Your</b> choice
	PROTOCOL	PEPPOL AS2 profile	e-SENS AS4 profile	e-SENS AS4 profile recommended
	INTEGRATION APPROACH	Service Providers (Market)	Specific Connector	<b>Your</b> choice
<b>DISCOVERY MODEL</b>		Dynamic	Static	<b>Your</b> choice
<b>SECURITY MODEL</b>	TRUST CIRCLE	PKI	Mutual trust	<b>Your</b> choice
	SECURITY CONTROL	Liberal inner security	Inner security with connector	<b>Your</b> choice

A decorative graphic consisting of three overlapping squares. The front-most square is white and contains the number '5'. The two squares behind it are light blue and are slightly offset to the left and top.

5

## **Technical specifications**

# CEF eDelivery specifications

The approach employed by eDelivery is to promote the use of existing technical specifications and standards rather than to define new ones.

The profiling work of e-SENS and PEPPOL on these standards, i.e. constraining configuration choices, is equally taken on board. Even though eDelivery makes software available implementing these specifications, the use of commercial software or other Open Source software projects is also possible.

## COMPONENT

Access Point

Digital Certificates

Connector

Service Metadata Locator (SML)

Service Metadata Publisher (SMP)

## KEY SPECIFICATIONS

- e-SENS AS4 profile of the ebMS3/AS4 OASIS Standards
- PEPPOL AS2 profile of AS2 and SBDH (for the post award eProcurement only)
- ETSI – Electronic Signatures and Infrastructures profile
- ETSI REM for evidences
- e-SENS Profile based on the OASIS BDXL Specification
- e-SENS ebCore Party ID Profile
- e-SENS Profile based on the OASIS BDX-SMP Specification

# e-SENS AS4 conformant solutions

The screenshot shows the CEF Digital website with the following structure:

- Header: CEF DIGITAL, European Commission > CEF Digital Home > CEF building blocks > eDelivery > eDelivery Services > eDelivery Software > Access Point software
- Navigation: Home, Discover, How it works, **Services**, Collaboration
- Left Sidebar (eDelivery):
  - TECHNICAL SPECIFICATIONS
    - Access Point specifications
    - Connector specifications
    - PKI specifications
    - SML specifications
    - SMP specifications
  - SOFTWARE
    - Access Point software
      - e-SENS AS4 conformant solutions**
      - SML software
      - SMP software
    - Security Controls
    - Connector software
  - MANAGED SERVICES
    - PKI Service
    - SML service
  - TESTING SERVICES
    - eDelivery Conformance testing
    - eDelivery Connectivity testing
  - SUPPORTING SERVICES
    - eDelivery Training and Deployment
    - eDelivery Service desk
- Main Content: **e-SENS AS4 conformant solutions**
  - Text: "This page lists the solutions that have passed or are in the process of passing the conformance testing according to the e-SENS AS4 profile:"
  - List:
    - Domibus (EC sample implementation)
    - Flame
    - Holodeck
    - IBM
    - Laurentius
    - Mendelson
    - RSSBus
  - Text: "A full list of other vendors supporting AS4 can be accessed at the bottom of this page."
- Vendor Cards:
  - Domibus** (CONFORMANT): Latest release Download Domibus v3.1.1, Test report Download (zip), Contact CEF-EDELIVERY-SUPPORT@ec.europa.eu
  - Flame** (CONFORMANT): Latest release Download FMS Server and Light Client v5.3, Test report Download (zip), Contact info@flameins.com
  - Holodeck B2B** (CONFORMANT): Latest release Download Holodeck B2B v2.0, Test report Download (zip), Contact info@holodeck-b2b.org

More information on CEF Digital

Conformant Solutions >

DOMIBUS

FLAME

HOLODECK

IBM

LAURENTIUS

MENDELSON

RSSBus

ADES

Integration cloud

iFenix

Conformant

Ongoing

# Certified PEPPOL Access Point Providers

The screenshot shows the PEPPOL website with a search bar and a navigation menu on the left. The main content area displays a table of Certified PEPPOL Access Point Providers.

**Who is who**

- OpenPEPPOL member list
- Certified PEPPOL Access Points (APs)**
- PEPPOL Authorities (PAs)
- Coordinating Community (CC) Leaders
- Work Group Leaders
- Change Management Boards (CMBs)
- Managing Committee (MC)
- Coordinating Community

**Certified PEPPOL Access Points (APs)**

**PEPPOL Access Point Providers**

Company Name	AP Location	PEPPOL Authority	Contact Name
AdValvas Europe	Belgium	FEDICT	Michel Gilis
Advanced Business Software and Solutions UK	UK	OpenPEPPOL	Peter Leigh
Aksess Innkjøp (Prosjektservice AS)	Norway	DIFI	Tommy Storjord
Aksesspunkt Norge AS	Norway	DIFI	Morten Buskop
Aliquid Italy	Italy	OpenPEPPOL	Fabrizio Pastorello
Amesto Solutions Purchasing A/S	Norway	DIFI	Thomas Karlsen
Anachron B.V.	Netherlands	DIGST	Marco Eeman
Apix Messaging Oy	Finland	DIFI	Antti Marjala
Apro Consulting Services B.V.	Netherlands	Simpler Invoicing	Heinen Wijnand
Archiva S.r.L.	Italy	OpenPEPPOL	Lorenzo Della Vedova
Archivium Srl	Italy	OpenPEPPOL	Lauritano
At Work Systems	Norway	DIFI	Tore Sollheim
Babelway	Belgium	OpenPEPPOL	Mathieu Pasture
Basware	Finland	DIFI	Fredrik Heimerback
BEAst AB	Sweden	ESV	Peter Fredholm
BIZbrains A/S	Denmark	DIGST	Per Lund Thomsen
Bluzor B.V.	Netherlands	DIFI	M. Freriksen

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# Summary

- Automatic discovery is necessary for mass-use of electronic business
- A common collaboration agreement and security structure
- The service metadata contains all you need to know to dynamically connect and exchange messages
- Necessary to implement routines for handling new business partners
- No roaming fees or discrimination of participants allowed
- Standardised specification

## Question

**Is CEF eDelivery/PEPPOL  
relevant for you?**

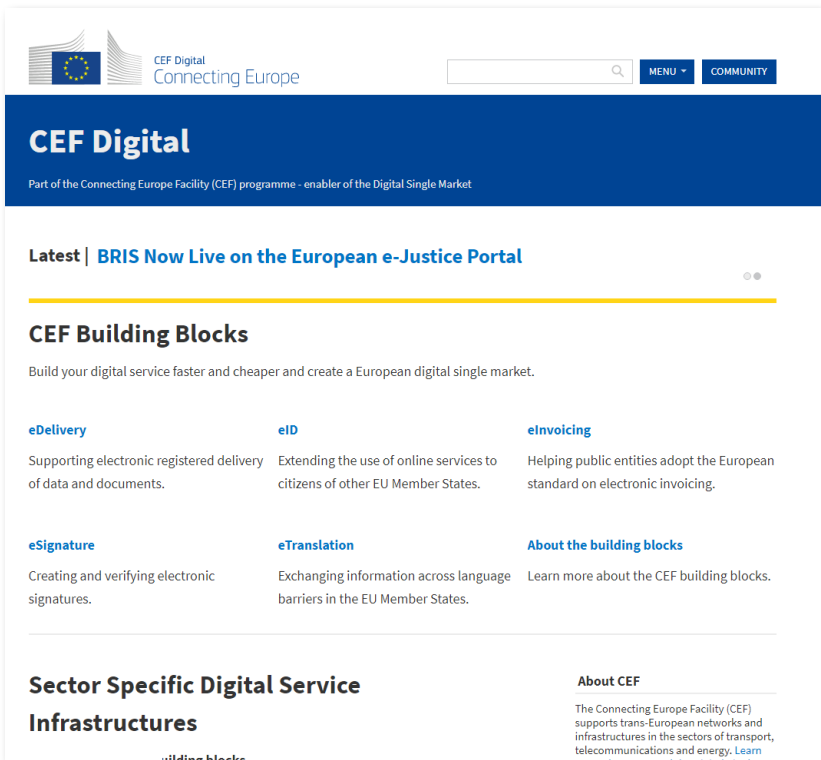
# Discussion

 [#ConnectingEurope](#)



# Find out more on CEF Digital

ec.europa.eu/cefdigital



The screenshot shows the CEF Digital website homepage. At the top left is the logo for CEF Digital, featuring the European Union flag and the text "CEF Digital Connecting Europe". To the right of the logo is a search bar and two buttons labeled "MENU" and "COMMUNITY". Below the logo area is a dark blue header with the text "CEF Digital" in white, followed by the subtitle "Part of the Connecting Europe Facility (CEF) programme - enabler of the Digital Single Market". The main content area has a white background. It starts with a "Latest" section titled "BRIS Now Live on the European e-Justice Portal". Below this is a yellow horizontal line. The next section is "CEF Building Blocks", with the subtext "Build your digital service faster and cheaper and create a European digital single market." This section contains three columns of information: "eDelivery" (Supporting electronic registered delivery of data and documents), "eID" (Extending the use of online services to citizens of other EU Member States), and "eInvoicing" (Helping public entities adopt the European standard on electronic invoicing). Below these are three more items: "eSignature" (Creating and verifying electronic signatures), "eTranslation" (Exchanging information across language barriers in the EU Member States), and "About the building blocks" (Learn more about the CEF building blocks). At the bottom left is a section titled "Sector Specific Digital Service Infrastructures" with the subtext "building blocks". At the bottom right is a section titled "About CEF" with the text "The Connecting Europe Facility (CEF) supports trans-European networks and infrastructures in the sectors of transport, telecommunications and energy. Learn more about CEF.".

## Contact us



CEF-BUILDING-BLOCKS@ec.europa.eu

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**Thanks!**