



# e-Invoicing Standardisation

## Overview, issues and conclusions for future actions

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**Industrial Innovation and Mobility Industries**  
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## CONTENTS

CONTENTS .....	1
FOREWORD .....	2
1. BACKGROUND .....	3
2. POINTS OF ATTENTION.....	3
3. OUTSTANDING ISSUES .....	5
4. CONCLUSIONS.....	7
5. NEXT STEPS .....	9
ANNEX 1 – PARTICIPANTS LIST .....	10
ANNEX 2 – REFERENCES / REFERENCE INFORMATION .....	11
ANNEX 3 – ONGOING ACTIVITIES .....	12
ANNEX 4 – PUBLISHED DOCUMENTATION .....	20
ANNEX 5 – INVOLVEMENT IN THE E-INVOICING OUTSTANDING ISSUES.....	22
ANNEX 6 – ISO TC154 POSITION ON RELEVANT OUTSTANDING ISSUES.....	27
ANNEX 7 – INTEROPERABILITY LEVELS .....	31

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## **FOREWORD**

Over the last years the Commission, other international and European organisations (ISO, UN/CEFACT, CEN, OASIS, GS1), and projects (PEPPOL, e-PRIOR) have addressed e-invoicing matters from their respective duties and perspectives.

International and European standardisation bodies play an important role. They have carried out valuable work, driven by formal ‘new work item proposals’ and carried out within their formal remit. Examples of published documentation are mentioned in Annex 4.

It has become clear that enhanced coordination with regard to the ongoing and planned standardisation activities – given the previously outlined interoperability adoption scenarios – could be instrumental in removing outstanding obstacles and facilitating the deployment of e-invoicing in Europe, if carried out as part of a holistic approach to e-invoicing.

For this reason, DG ENTR invited representatives of the various organisations and projects to participate in a series of informal meetings. The purpose of these meetings was to gather information on existing dialogues among the various organisations and discuss opportunities to improve the dialogues; to share information on ongoing work and views on future e-invoicing standardisation activities; to identify items of common interest; and to outline a possible way forward for enhanced coordination.

This document addresses the major aspects of e-invoicing standardisation, and outlines some conclusions for future actions.

## 1. BACKGROUND

<sup>[1]</sup> Trade has the potential to involve all types of trading party (e.g. businesses of all sizes, consumers and government agencies) trading with other types of trading party.

<sup>[2]</sup> Over the past few decades much effort has been put into improving efficiency in the physical supply chain. This has led for example to reduced lead times, lower inventories, increased responsiveness and improved customer service.

Using automated and electronic systems, information can be processed faster and more accurately, cutting lead times. Similarly, if purchase orders are managed electronically, procurement is quicker.

Furthermore, if a company can accurately forecast purchases and sales, it will gain a competitive advantage by successfully managing its supply chain.

Improvements in financial flows in supply chains should match improvements to supply chain management. Having both financial and trade process information available electronically can minimize human errors, reduce reconciliation time in the three-way match of purchase order, shipping receipt and invoice and create a more tightly integrated supply chain.

However, if there would be a mismatch in information flows, resulting in for example delays in processing and reconciling invoices, then the “days’ sales outstanding” for accounts receivable will be higher than necessary, implying that working capital management needs to be able to deal with uncertainties.

Matching information flows in the supply chain – effective management of information flows – benefits all parties. This requirement for “effective management of information flows” boils down to “interoperability”. Interoperability is defined here as “*the capability to run business processes seamlessly across organisational boundaries*”.

Interoperability is achieved by:

- understanding how the business processes of different organisations can interconnect;
- developing standards to support these business processes efficiently; and
- specifying the semantics of messages exchanged between organisations to support these business processes in a scalable way.

A more detailed interoperability framework is described in Annex 7.

## 2. POINTS OF ATTENTION

The ‘playing field’ of ‘business agreements’ and ‘standards’ deserves attention; not only because <sup>[4]</sup> standardisation can take different forms (ranging from the adoption of consensus based standards by the recognised European or national standards bodies, and through consortia and fora, to agreements between independent

companies) but also because the agreements on the various levels of interoperability must all be developed and established in harmony.

It is important here to acknowledge that (for standards and agreements) under normal circumstances (i.e. not-enforced by regulation or legislation) a distinction should be made between the following phases:

1. development
2. endorsement
3. adoption
4. implementation and
5. support / use.

A decision whether or not to support a standard or agreement depends on the actor(s) concerned. Support in a product or service is a business decision, such support cannot (and should not) be mandatory.

Actors can be distinguished in: business (users, implementers), regulators / legislators and facilitators (like standardisation organisations). This implies that each category of actor may have a different underlying drive (for example: the approach / (business-) drive as mirrored in the activities of standardisation organisations is not necessarily equal to the drive of a project like PEPPOL)

Taking the above 5 phases in consideration, the present, relatively disjointed, developments in the various operating models for the electronic exchange of trade information, if not addressed, could:

- inhibit participation by important market segments especially small businesses;
- create barriers to reach, which is the ability of one entity to forward electronic business documents to another in a predictable manner.

By [addressing/ improving] cooperation and creating interoperability, all trading parties (suppliers and buyers) and service providers should be better able to work with their counterparties. Society would benefit in terms of cost effectiveness from the results of standardisation, while at the same time also benefiting from a vigorous competitive market for e-Invoicing solutions.

In the current market reality, the following elements are noteworthy:

- Many trading parties in 'supplier-centric' environments engage in bilateral connections using unstructured formats (PDFs). The usage of unstructured formats leads to suboptimal processes due to the resultant absence of end-to-end business process automation.
- Many trading parties in 'buyer-centric' environments engage in bilateral connections using sector specific or local structured formats as well as exchange mechanisms.
- The use of multiple standards for invoice content adds to complexity. Format conversion services provided by service providers mask the underlying problem and associated cost from the ultimate trading parties. As a counter-weight to this, many feel that the usage of widely implemented formats and exchange

mechanisms would promote network effects and accelerate the adoption of e-invoicing.

- Many SMEs often enter bilateral arrangements with their counterparties and/or the latter's service providers with the consequence that the number of individual arrangements (e.g. bilateral, portals and service providers acting as consolidators) needed to reach all their counterparties, can rise to a level which is hard to manage. SMEs also have to use translator tools to assist in operating with counterparties using different data formats.
- At present, service providers typically engage in bilateral interoperability agreements with their service provider counter-parts, which create cost and complexity. Some multilateral network activity is developing.

Based on these trends, a number of interoperability initiatives are currently observable in terms of the development of network models:

- The growth of interoperability agreements between service providers including collective agreements.
- Banks providing channels and linking to other service providers in a number of markets and potentially on a pan-European basis.
- Public initiatives such as PEPPOL and the Commission procurement programmes and initiatives among various Member States.
- The CEN Workshop Agreement on the interconnection of service providers developed by the CEN Workshop on e-Invoicing.

### **3. OUTSTANDING ISSUES**

In order to explore any hindrances to the realisation of the standards and agreements, able to enable electronic exchange of e-invoices and related data between participants by providing a minimum basis for technical, semantic and business interoperability, the Commission hosted two informal meetings on the 20 December 2011 and on the 5 March 2012 in Brussels. The participants list is in Annex 1.

The participants welcomed the initiative, and outlined their ongoing activities in the domain of e-invoicing standardisation. The details are reported in Annex 3.

International and European standardisation bodies have carried out valuable work, driven by formal 'new work item proposals' and carried out within their formal remit. Examples of published documentation are mentioned in Annex 4.

However, the participants agreed that there are a number of outstanding issues. They can be classified as follows.

#### **Policy/Management issues**

- (1) Role of the various organisations, and their coordination
- (2) Dissemination on the use of the standards, implementation, exploitation and maintenance of the various deliverables

- (3) Long term sustainability:
  - CEN WS eINV and WS BII
  - PEPPOL project
  - CEN e-Invoice Gateway
  - Compliance Guidelines (user interface)

### **Technical issues**

- (4) Implications of the recommendation contained in the Communication COM (2010) 712 final: "the UN/CEFACT Cross-Industry Invoice (CII) v.2 should be adopted as the common reference semantic data model upon which future e-invoice content standard solutions are based".
- (5) Should a semantic mapping be preferred to a single semantic data model?
- (6) Convergence between UBL and CII V2
- (7) CII V2 vs. V3, and alignment with the Financial Invoice message
- (8) ISO TC 68 potential work items on factoring message, and on order and delivery information
- (9) Addressing and routing
- (10) Future of CCTS
- (11) Interoperability with EDIFACT solutions
- (12) Which code lists to use and how to extend/restrict
- (13) Implications for customs in trade between Member States
- (14) e-Delivery convergence (PEPPOL, SPOCS, and e-CODEX projects)
- (15) Identifiers and authentication
- (16) Items under discussion in relation to MUG:
  - use of the information content and business rules for the MUG core invoice, as defined in CWA 16356 Part 1, for implementation or as the basis for further contextualization of e-invoicing within the European Union and EEA
  - use of the syntax binding, as defined in CWA 16356 Part 2, as the basis for implementation of the CII
  - maintenance and online service to spread the CCII Guide
  - link to financial and payment services
  - XML and presentation files
  - mapping to Core Component Library / updated
  - link to UN/CEFACT Syntax and other syntaxes

#### Notes:

- This is a non exhaustive list. The issues are not listed in priority order.
- The issues could be arranged according to the 5 layers described in the Interoperability model – that is left to the follow-up.
- The categories mentioned follow from a first attempt to categorise and are not necessarily final.
- The issues are listed as mentioned during the discussions. Further elaboration should clarify them, and allow for the removal of those that turn out to be based on perception or interpretation.

#### 4. CONCLUSIONS

The following conclusions were drawn from the two meetings:

- The participants agreed that it is worth pursuing the debate among the various players at a more detailed technical level. The European Multi-stakeholder Forum on e-Invoicing<sup>1</sup> may provide specific requirements and guidance, upon advice of its Activity Group 4.
- The future work for the resolution of the outstanding issues needs to be coordinated. Bearing in mind its global nature and subject to the agreement of all concerned organisations, UN/CEFACT may take over this task and become the coordinating agent, provided that it guarantees an appropriate governance model ensuring in particular the speed of delivery and the quality of the expected results.
- The multiplicity of e-invoicing standards makes it difficult to converge / migrate to a single and commonly used standard. The policy of the Commission is *to promote interoperability, while recommending the convergence towards a common semantic data model*. Decoupling the underlying semantic reference model from the syntax would make easier the coexistence of different standards.
- The debate within the group proved fruitful. The group could be informally reconvened by the DG ENTR if an assessment of progress is considered necessary.
- The playing field contains a number of different components that are mutually dependent and influence each other.
- If interoperability is seen as a *condicio sine qua non* to establishing growth in e-business and e-invoicing (where its establishment will enable wider adoption of e-invoicing, and foster improved competition, stimulating network effects) then achieving the required interoperability depends on the standards and agreements that are made on various levels between different actors, and on the progress in development, acceptance, implementation and use – which may be subject to different (business) decisions on each of the different layers.
- Enforcing standards and agreements by means of regulation and legislation would not be a realistic approach given the multiplicity of existing trade and business scenarios.
- If developments in political and legal context are seen as beyond the remit of the participants in the informal meetings, the focus remains on ‘the lower layers’. Hence the discussion should be restricted to what could be achieved, given the scope and remit of the organisations that participated, a pragmatic approach for a follow up should be chosen

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<sup>1</sup> The Commission Decision that set up the Forum is published at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:326:0013:0015:EN:PDF>.



- Standards for invoice content should support the mandatory data elements, a good selection of additional optional data elements and support for the compliance needs of users in relation to VAT and other regulatory requirements.

Nowadays there is no universal standard for invoice content. This is due to the differing needs of industries, geographies and jurisdictions, as well as the existence of legacy systems. These differing needs and historical circumstances have resulted in a huge variety of content standards, and datasets tailored to specific requirements.

Indeed it is not realistic to contemplate the development of a universal invoice content standard or data set and indeed this absence of a universal standard is not a barrier to e-invoicing adoption. However, a greater degree of targeted standardisation will assist market development as described below.

Currently the varying invoice content standards and datasets referenced above are derived from many varying data dictionaries and data models.

Ideally, an open and royalty free single semantic data model agreed at a global level, such as UN/CEFACT Cross Industry Invoice (CII), could be used to provide the foundation of all these varying invoice content and data set requirements. All compilers of invoice content and datasets would refer to the same semantic data model in order to meet their specific needs. Indeed such an approach can and is being used to develop a core invoice subset (CWA 16356-1& 2& 3: *Guide for a European CORE INVOICE data model with UN/CEFACT CII Implementation Guideline* and the Financial Invoice V01 developed using ISO 20022)

Likewise, a set of open and royalty free naming and design rules (also available from UN/CEFACT) could provide the basis of data format standards, and the convergence towards a universal data format standard would become feasible.

These targeted standardisation efforts covering both invoice content / datasets and data formats as described above will happen if encouraged by market participants who are urged to involve themselves in and to support such processes of convergence and adoption.

- In the meantime, service providers are encouraged to use such content standards and data formats (preferably open content standards and data formats) as they require to meet their customers' needs and to undertake the necessary conversions between them. It is also recognized that the adoption of standards in a network industry is often propelled by their first use in an interoperable network between service providers and large users. Over time such standards and preferably a universal standard are likely to become embedded in software and systems used by the wider community of users.

## 5. NEXT STEPS

The European Multi-stakeholder Forum on e-Invoicing, and in particular its Activity Group 4, should follow up the issues listed in this document and derive the recommendations on coordination and new work items for the relevant standardisation organisations within their formal remit.

This approach will ensure adequate involvement and reporting to the national e-invoicing fora, and minimise the risk for duplication of effort. The need for additional mechanisms, like ‘the informal meeting’ can be indicated and underpinned if thought necessary for progress.

Activity Group 4 is currently working to provide some conclusions and recommendations on the following topics:

- Analysis of the convergence towards a common semantic reference data model (as suggested in COM(2010)712 Final) by 2020 (in line with the time frame set in the Communication on e-invoicing of December 2010), and documenting ways to contribute to the objective.
- The pros and cons of the implications for the concerned stakeholders (industry sectors, businesses, service providers, vendors, etc.) related to the convergence towards a single semantic data model, as recommended in the Communication on e-invoicing of December 2010. The potential path towards the objective should be outlined, with a view to analyse it in more detail during the subsequent phase of the work.
- Intermediate solutions that will ensure the interoperability among the various existing solutions.

## **ANNEX 1 – PARTICIPANTS LIST**

The following people attended at least one meeting:

- European Commission: Antonio Conte [chair], Michel Catinat, Hannele Lahti
- ISO 20022 RMG: Gerard Hartsink
- ISO 20022 Trade Services SEG: Tapani Turunen
- ISO TC 154: Sue Probert
- UN/CEFACT Supply Chain Programme Development Area: Mike Doran, Tim McGrath
- CEN: Alain Dechamps, Peter Potgieser [CEN representative in the EU Multi-stakeholder Forum on e-Invoicing]
- CEN Workshop on e-Invoicing: Anders Grangard, Stefan Engel-Flechsigt
- CEN Workshop BII: Jostein Frømyr, Giancarlo De Stefano
- CEN Workshop eBES and CEN MUG project leader: Bernard Longhi
- PEPPOL project: Klaus Vilstrup Pedersen, Bergthor Skulason
- e-PRIOR project: Didier Thunus, Joao Frade Rodrigues (DG DIGIT)

## ANNEX 2 – REFERENCES / REFERENCE INFORMATION

- [1] Final Report of the Expert Group on e-Invoicing, November 2009  
[http://ec.europa.eu/enterprise/sectors/ict/files/finalreport\\_en.pdf](http://ec.europa.eu/enterprise/sectors/ict/files/finalreport_en.pdf)
- [2] ISO Focus+, March 2012  
[http://www.iso.org/iso/iso-magazines/iso-focus-plus\\_index/iso-focusplus\\_2012/iso-focusplus\\_2012-03.htm](http://www.iso.org/iso/iso-magazines/iso-focus-plus_index/iso-focusplus_2012/iso-focusplus_2012-03.htm)
- [3] Draft document as basis for EIF 2.0  
<http://ec.europa.eu/idabc/servlets/Docb0db.pdf?id=31597>
- [4] Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements  
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:011:0001:0072:EN:PDF>
- [5] Minutes of the second meeting of the European Multi-stakeholder Forum on electronic invoicing  
[http://ec.europa.eu/enterprise/sectors/ict/e-invoicing/benefits/invoicing\\_forum\\_en.htm](http://ec.europa.eu/enterprise/sectors/ict/e-invoicing/benefits/invoicing_forum_en.htm)

## **ANNEX 3 – ONGOING ACTIVITIES<sup>2</sup>**

### **International Organisations**

#### **ISO TC68**

The first version of the Financial Invoice message based on the ISO 20022 methodology was added to the ISO 20022 Trade Services messages in December 2010. The documentation is published at [http://www.iso20022.org/trade\\_services\\_messages.page](http://www.iso20022.org/trade_services_messages.page).

During one year there have been many activities on deployment. The main action was to apply the message as the interchange format between service providers. SWIFT has introduced an e-invoicing service that is based on the use of the Financial Invoice. First corporate pilots have been successful.

It is expected that some content related maintenance requests will be submitted during spring 2012 based on use experience.

A new Business Justification for factoring message was accepted, while a message review is expected to take place during 2Q12.

#### **ISO TC154**

TC154 believe that the ISO TC15000-5 Core Component Technical Specification (CCTS) provides a unique platform for semantic interoperability and harmonisation for the following reasons:

- ISO TC15000-5 is also published as UN/CEFACT CCTS v2.01 and ebXML part 8 which makes it the most widely recognised global standard for semantic data structuring
- ISO TC15000-5 is based on the ISO 11179 data element naming and defining standard
- ISO TC15000-5 is the basis of the mature UN/CEFACT Core Component Library (CCL) which includes an extensive international supply chain BUY/SHIP/PAY set of core components
- ISO TC15000-5 and the UN/CEFACT CCL is recommended by the following ISO IEC ITU UN/ECE MoU Management Group (ebMOU MG) Resolutions:
  - Resolution 04/01 – April 2004

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<sup>2</sup> All contributions in Annex 3 and Annex 4 were provided by the representatives of the organisations that participated in the informal meetings convened by the European Commission. These contributions do not necessarily reflect the views of the European Commission nor the governments nor the organisations for which the participants work.

MoU/MG confirms its Resolution 03/03 in support of the CCTS (v2.01) and encourages all organisations developing e-business content to harmonize that content through the UN/CEFACT TBG 17 (Harmonization) working group.

– Resolution 03/03 (5.3):

The MoU MG encourages the concerned parties to develop a project plan to address harmonization of content. The MoU MG welcomes Core Components Technical Specification (CCTS) version 2.01 and encourage all organisations developing e-business content to harmonize their efforts using that specification.

- Whilst several organisations have built libraries of Aggregate Business Information Entities (ABIE) based on the ISO TS15000-5 standard, only UN/CEFACT has developed a fully compliant Core Component Library which includes a base library of Aggregate Core Components (ACC). This well-maintained, stable and mature base library of ACCS offers the best platform available anywhere in the world for semantic harmonisation.
- The UN/CEFACT CCL is aligned with the ISO 7372 (also known as UNTDED) data dictionary for cross-border trade, transport and border clearance procedures.
- The UN/CEFACT CCL is the basis of the UN/CEFACT CII which is recommended by the EU Expert Group on e-Invoicing.
- ISO TC154 is committed to upgrade the ISO TS15000-5 CCTS to a full IS standard and this work item has been approved on the basis that backwards compatibility with the current widely implemented TS version is maintained.

## UN/CEFACT

UN/CEFACT's global remit is focused on simple, transparent and effective processes for global commerce. This has involved developing recommendations and standards in a public-private partnership with communities of experts to address a wide range of cross-sectoral and cross-border requirements.

Over the years, the cornerstone of e-invoicing around the world has been the UN/EDIFACT INVOIC message, together with the UNECE Recommendation 6 for the aligned invoice layout key for international trade. This experience, along with UN/CEFACT's later work on the Cross Industry Invoice data model, has highlighted the challenges to be addressed in implementing public-private sector procurement, regulatory and financial processes that support the e-invoicing requirements of different stakeholder communities around the world. This has been demonstrated by ongoing efforts within Europe to focus on a core invoice data model and represents a significant step towards addressing European requirements.

Moreover, what seems to matter most are commonalities in stakeholder requirements and how they are met, many of which can be identified in the various communities of users of standards. It is also evident that UN/CEFACT's intergovernmental mandate could provide a global forum to identify and to agree on common requirements and to foster interoperability among these various communities.

Over the next few months UN/CEFACT will be taking steps towards providing a simpler, pragmatic, and more facilitative and collaborative framework, involving other standards development organizations, for applying e-business to the facilitation of international trade. In going forward, the Commission's encouragement of further coordination, convergence and harmonization is important. Moreover, the exchange of views and outcomes of the e-invoice Multi-Stakeholder Forum will be viewed with interest and provide input into UN/CEFACT's efforts to address global requirements.

## **European Organisations**

### **CEN**

The Technical Board of CEN agreed the establishment of a Coordination Group in the domain of e-business. The new body should be formally set up during 2012.

#### **CEN Workshop on e-Invoicing**

The CEN Workshop on e-Invoicing ended its third phase in February 2012. It attracted around 90 participants representing a wide variety of stakeholders with an average of 50 persons attending the face-to-face plenary meetings. The adopted CWAs are published at

[http://www.cen.eu/CEN/sectors/sectors/iss/activity/Pages/einvoicing\\_2.aspx](http://www.cen.eu/CEN/sectors/sectors/iss/activity/Pages/einvoicing_2.aspx) .

These documents include essential input on awareness on electronic invoicing, compliance of electronic invoice solutions, interoperability of electronic invoice services and on requirements of SMEs. The deliverables also include two publicly available web based tools: the e-Invoicing Gateway and the compliance toolbox. In addition, the deliverables include CWAs – the Message user Guidelines and the European Code of Practice; these were introduced after the start of the workshop as a result of the updated VAT Directive and the Communication from DG Enterprise at the end of 2010.

Future work in this area is currently being discussed between the members of the workshop that could result in a phase four. Topics that need attention include routing and addressing of electronic invoice services and development of an electronic invoice module, as well as maintenance of several documents, notably the Compliance Guideline and the Code of Practice and further dissemination and marketing activities. For the latter, future governance and development of the eInvoicing Gateway is of essence.

#### **CEN Workshop on Business Interoperability Interfaces (BII)**

The objective of the BII workshop is to provide consistent support for electronic message exchange in the whole procurement process in Europe, from e-Notification to e-Invoicing. This focus is based on the fact that most invoices are issued as a part of a procurement process within a contract scenario. This emphasis changes the focus of invoicing standardisation considerably towards the practical needs of the market in controlling contracts, VAT and flow of goods and money. BII therefore focuses on establishing the best practice recommendation for the EU market as basis

for establishing guidelines and tool support and provide confidence in electronic invoicing.

To achieve this BII will:

1. Identify and document core requirements from the European market. This will include business process requirements (Profiles) as well as information content requirements (Information Requirement Models) and the applicable business rules. The aim of these deliverables is to provide Organisational and Semantic interoperability.
2. Provide documentation on how existing syntax solutions in the market (i.e. UN/CEFACT and UBL) can cater for these requirements by documenting a syntax binding from the requirements on to existing standards. The aim of these deliverables is to provide Technical interoperability.
3. Provide a set of validation artefacts that may be used in run-time systems to measure conformance.

The results of phase 1 of the BII workshop were published as CWA 16073 in January 2010 (see <http://www.cen.eu/cwa/bii/specs/>). CWA 16073 is published in 5 parts and includes 26 profiles covering some 50 business transactions. Phase 2 of the workshop was initiated in March 2010 in order to provide a forum for development and governance of the BII deliverables.

The BII workshop is open for participation from any organisation and currently has 27 participating organisations - including both public and private sector organisations from 9 different European countries. There is currently a strong support from the public sector, but approximately 50% if its participants are private sector companies.

The deliverables from phase 2 of the BII workshop were made available for public review at the beginning of July 2012, while the final deliverables will be made publically available in December 2012.

### **CEN Workshop eBES**

eBES stands for e-Business Board for European Standardisation. It is the European Entry Point into UN/CEFACT standardisation process (EDIFACT or XML syntaxes). It is acting as a convergence platform for European standardisation in Electronic Exchanges field: notably to choose either to input from eBES to UN/CEFACT or to launch a project for a new CWA.

eBES is made up of a Board, paying members who participate in the plenary meetings and of working groups (voluntary work)

The working groups are (EEG = European Expert groups):

- EEG1: Supply Chain,
- EEG2: Transport,
- EEG5: Architecture, Engineering and Construction,
- EEG7: Insurance,
- EEG11: Accounting and Auditing,
- EEG13: Governmental,



- EEG14: Agriculture

The outputs of eBES works are typically:

- Data Maintenance Request (DMR) process towards UN/CEFACT;
- Publication of CWAs at European level or direct inputs to other Workshops;
- Specific projects: Message User Guidelines, Translations,... (CWA);
- Support activities to UN/CEFACT (web site, participation in UN/CEFACT Forums...).

### **Message User Guide (MUG) project**

The CEN e-Invoicing, BII and eBES Workshops jointly developed a common invoice content standard referred to as a CORE European invoice - a reference semantic data model - and implementation guideline for the UN/CEFACT CII syntax.

The resulting CWA 16356 describes the European reference semantic data model for the CORE invoice (Part 1) and Implementation guidelines and syntax mapping of the reference data model to UN/CEFACT CII syntax (Part 2). This work provides:

- European reference semantic data model for the CORE European Invoice. The group has based its work on results already developed by participating workshops. The goal is documenting a common set of e-invoicing requirements for Europe. The project has also reviewed the results from relevant initiatives implementing the deliverables of the workshops. This analysis does not depend on any syntax. The relevant documents for this analysis are attached as an annex.
- Implementation guidelines and syntax mapping of the reference data model are done to UN/CEFACT CII D09B XML Schema. This will enable use of that syntax in the European context and guide implementers in that market. Furthermore an informative mapping is given to the draft implementation of CII using CCTS v3.0 and NDR v3.0

It is expected that other syntax developers will develop similar mapping of the CORE Invoice data model and implementation guidelines for use in European context. This work therefore respects the fact that in the short term the market will use series of syntaxes, but at the same time this work point towards the future, the way for harmonization of European requirements and the ultimate goal of providing one syntax solution for the European market.

The MUG core invoice provides for data and business rules that can support business requirements of companies and organisations within the European Union and EEA.

## **Fora & Consortia**

### **OASIS (UBL)**

UBL 2.0 has been available since 2006 and is implemented by a number of public sector agencies and services providers to the e-Invoice community in Europe, such as e-PRIOR, some of the digital supply chain projects and PEPPOL. It is also the basis for the e-Freight framework developed with DG MOVE.

UBL 2.1 will be published in mid-2012. While technically a minor release because it preserves complete backward compatibility with UBL 2.0, UBL 2.1 doubles the number of standardized XML electronic business documents with the addition of 33 new document schemas for e-tendering; collaborative planning, forecasting, and replenishment; vendor managed inventory; and intermodal freight management. It also includes a number of enhancements for interoperability with the financial infrastructure and adds a standard UBL extension that enables use of the XAdES advanced digital signature protocol with UBL documents.

The OASIS UBL Technical Committee are determined to preserve the investment of these legacy stakeholders as part of a global community and are working with UN/CEFACT and ISO to establish a framework for how to achieve this.

### **GS1**

GS1 is a neutral, not-for-profit organisation dedicated to the design and implementation of global standards and solutions to improve efficiency and visibility in supply chains. It is driven by 1.3 million companies, which execute more than six billion transactions daily in 150 countries with the GS1 System of Standards. GS1 has local member organisations in 111 countries. Its global office is in Brussels.

GS1 provides two sets of information exchange standards, one based on UN/EDIFACT (EANCOM) and one based on XML (GS1 XML). These cover all aspects of the supply chain including e-invoicing and are widely used in public and private business around the world.

Detailed information is published at <http://www.gs1.org>.

## **European Projects**

### **PEPPOL project**

PEPPOL ends in April 2012 and there will be a continuation called openPEPPOL, with a user driven Governance approach. openPEPPOL will continue having a high focus on e-invoicing, since it is a cornerstone in the procurement process. This also means that openPEPPOL values the initiatives and efforts done on all interoperability layers (Legal, Organisational, Semantic and Technical) by the different groups. But from a usage perspective it is of equal importance that these efforts are aligned.

PEPPOL has a strategic cooperation with CEN WS/BII, since they share objectives from a standardisation and a usage point of view, i.e. Public Entity Procurement, focus on the procurement process and Pan European. Also CEN WS/BII has

contributed to PEPPOL with usage oriented deliverables e.g. specifications, guidelines and tools, and we support a continuation of CEN BII as a WS or a TC, since openPEPPOL will depend on the Life Cycle Management of CEN ISSS WS/BII deliverables.

PEPPOL shares the vision of harmonisation of invoicing within Europe, but we would like to emphasise that these efforts need to be based on the following considerations:

- in the procurement context, most invoices are issued as part of a contract context and as a response to an order but NOT as a stand alone document. This changes the discussion on best practice within invoicing dramatically towards practical and cost saving issues, away from technical and academic issues.
- PEPPOL and BII have emphasised invoicing within a context of use and need: what do people actually do and how can we best support them. From this perspective the focus on best practice guidelines and support material is of the biggest value.

### **e-PRIOR project**

e-PRIOR is a document exchange platform funded by ISA (previously IDABC) supporting not only e-invoicing, but also all the other post-awarding processes. The project team has actively contributed to the CEN/BII workshops and e-PRIOR has been the first project to put those emerging standards in practice. It has also collaborated closely with the PEPPOL project in order to provide a solution which was complementary to it (i.e. the last mile between a PEPPOL Access Point and the Contracting Authority's back-office).

Today, e-PRIOR is in production at DIGIT and will cover more than 50% of the invoices of DIGIT as from 2012. DIGIT is making the use of e-invoicing mandatory for the whole Commission and the Agencies using its framework contracts, meaning that by 2013 all purchases of IT goods and services will have to be invoiced electronically. Other DGs and Agencies will follow the same path as from 2012, as well as other institutions such as the Court of Justice and the Council. In addition to that, DIGIT is liaising with DG Budget in order to make e-invoicing mandatory at corporate level. e-PRIOR is the main instrument of the Commission for its action 88 of the Digital Agenda, whereby the Commission has to lead by example in the context of the implementation of full electronic procurement.

In 2012, e-PRIOR will tackle the pre-award processes by conducting a study and organising a pilot. Additionally, support of the CII invoice format will also be envisaged.

### **Digital supply chain projects**

DG ENTR supports a set of industry led projects that aim at facilitating the integration of SMEs in global digital supply chains, and at improving the overall efficiency. Five sectors are covered: fashion (textile, clothing and footwear - pilot completed); automotive ["Autogrator" project], and transport - logistics (pilots to be completed in March); tourism, and food supply chain (underway). These projects build on the success of each other and increasingly incorporate more cross-sectoral

and skills-related aspects. They have to provide interfaces to the downstream e-invoicing process, thus will contribute to its uptake. The first results are very positive with SMEs, industry and Member States reporting that the publicly-available results of the demonstration actions and the reference models proposed render the implementation of •-business solutions easier and more affordable and interoperable with benefits for both SMEs and large players alike.

## ANNEX 4 – PUBLISHED DOCUMENTATION

### – ISO

- § Financial Invoice message based on the ISO 20022 methodology
  - XML Schema
  - XML Instances
  - Message Definition Report
  - Diagrams
- § ISO 7372 (UNTDED)
- § ISO 9735 (UN/EDIFACT)
- § ISO 15000 series (ebXML)

### – UN/CEFACT

- § Business Requirements Specification Cross Industry Invoicing Process
- § Requirements Specification Mapping Cross Industry Invoicing Process
- § Cross Industry Invoice Schema Module
- § Core Component Library (UN/CCL)
- § Core Component Technical Specification
- § Core Components Data Type Catalogue
- § XML Naming and Design Rules

### – CEN WS eINV

- § 14 CWAs on various implementation aspects<sup>3</sup> (2006 and 2009)
- § CWA 16460 "Good Practice: e-Invoicing Compliance Guidelines – The Commentary"
- § CWA 16461 "Electronic Invoice processes in Europe and enablement of SMEs to use them efficiently"
- § CWA 16462 "CEN e-Invoice Gateway"<sup>4</sup>
- § CWA 16463 "Code of Practice on Electronic Invoicing in the EU"
- § CWA 16464 "Electronic Invoicing"
  - Part 1: Addressing and Routing
  - Part 2: Model Interoperability Agreement for Transmission and Processing of Electronic Invoices and other Business Documents
  - Part 3: Conformance Criteria for Interoperability between Electronic Invoicing Services

### – CEN WS BII

- § CWA 16073 "Business Interoperability Interfaces for Public procurement in Europe"

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<sup>3</sup> The full list is published at  
[http://www.cen.eu/cen/Sectors/Sectors/ISSS/Activity/Pages/eInv1\\_CWA.aspx](http://www.cen.eu/cen/Sectors/Sectors/ISSS/Activity/Pages/eInv1_CWA.aspx).

<sup>4</sup> URL: <http://www.e-invoice-gateway.net>

- CEN MUG1 project
  - § CWA 16356 "Guide for a European Core Invoice data model with UN/CEFACT CII Implementation Guideline"
- OASIS
  - § Universal Business Language (UBL)
  - § Universal Business Language Naming and Design Rules (UBLNDR)
  - § Code List Representation (CLR)
  - § Business Document Exchange (BDX)
  - § ebXML Core (ebCore)
  - § ebXML Messaging Services (ebMS)

## ANNEX 5 – INVOLVEMENT IN THE E-INVOICING OUTSTANDING ISSUES

	ISO 20022 TRADE SEG	ISO TC15 4	UN/ CEFAC T	CCM C	CEN WS eINV	CEN WS BII	CEN WS eBES	MUG project	OASIS (UBL)	GS1	PEPPOL project	e- PRIO R project	Digital supply chain eBIZ
<b>Policy/Management issues</b>													
Role of the various organisations, and their coordination	X	X	X	X			X	X	X				X
Dissemination on the use of the standards, implementation, exploitation and maintenance of the various deliverables	X	X	X	X	X		X	X	X	X	X	X	X
Long term sustainability:													
CEN WS eINV and WS BII				X	X	X	X	X		X	X	X	X
PEPPOL project										X	X	X	X
CEN e-Invoice Gateway				X	X					X			(User)
Compliance Guidelines (user interface)				X	X				X	X		X	

	ISO 20022 TRADE SEG	ISO TC15 4	UN/ CEFACT T	CCM C	CEN WS eINV	CEN WS BII	CEN WS eBES	MUG project	OASIS (UBL)	GS1	PEPPO L project	e- PRIO R project	Digital supply chain eBIZ
<b>Technical issues</b>													
Implications of the recommendation contained in the Communication COM (2010) 712 final "the UN/CEFACT Cross-Industry Invoice (CII) v.2 should be adopted as the common reference semantic data model upon which future e-invoice content standard solutions are based".		X	X		CWA 15575	X		CWA 16356		X		X	X
Should a semantic mapping be preferred to a single semantic data model?		X	X		No	X		X	X	No	X	X	No
Convergence between UBL and CII V2			X						X				
CII V2 vs. V3, and alignment with the Financial Invoice message	X	X	X (2 issues)		Not a problem	X		X		X (No Financial Invoice)			
ISO TC 68 potential work items on factoring message, and on order and delivery information	X	X	X		Competing messages to be avoided								



	ISO 20022 TRADE SEG	ISO TC15 4	UN/ CEFAC T	CCM C	CEN WS eINV	CEN WS BII	CEN WS eBES	MUG project	OASIS	GS1	PEPPOL project	e- PRIO R project	Digital supply chain eBIZ
Addressing and routing		X	X		X				BDX, ebMS, ebCore	X	X	X	
Future of CCTS		X	X		?			X	UBL	X		X	
Interoperability with EDIFACT solutions	X	X	X		X	X		X		X	X		X
Which code lists to use and how to extend/restrict	X	X	X		Not specific to e-inv	X		X	UBL CLR	X	X	X	X
Implications for customs in trade between Member States		X	X		?			X			(X)		
e-Delivery convergence (PEPPOL, SPOCS, and e-CODEX projects)									BDX				
Identifiers and authentication	X		X						X	X			

ISO 20022 TRADE SEG	ISO TC15 4	UN/ CEFACT	CCM C	CEN WS eINV	CEN WS BII	CEN WS eBES	MUG project	OASIS	GS1	PEPPO L project	e- PRIO R project	Digita l supply chain eBIZ
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Items under discussion in relation to MUG:

use of the information content and business rules for the MUG core invoice, as defined in CWA 16356 Part 1, for implementation or as the basis for further contextualization of e-invoicing within the European Union and EEA	X	X		X	X	X	X		X			X
use of the syntax binding, as defined in CWA 16356 Part 2, as the basis for implementation of the UN/CEFACT Cross Industry Invoice (CII)		X		X	X	X	X		X			
maintenance and online service to spread the CCII Guide	X	X		X		X	X		X			
link to financial and payment services	X	X	X	X		X	X	X				

XML and presentation files		X		?	X	X	X	X	X	X	X	X
mapping to Core Component Library / updated	X			X	(X)	X	X	X				
link to UN/CEFACT Syntax and other syntaxes	X	X		X	X	X	X	X	X			

## ANNEX 6 – ISO TC154 POSITION ON RELEVANT OUTSTANDING ISSUES

	ISO TC154
Policy/Management issues	
Role of the various organisations, and their coordination	<p>ISO Technical Committee responsible for ‘Processes, data elements and documents in commerce, industry and administration’ with following scope:</p> <ul style="list-style-type: none"> <li>• International standardisation and registration of business, and administration processes and supporting data used for information interchange between and within individual organisations and support for standardisation activities in the field of industrial data.</li> <li>• Development and maintenance of application specific meta standards for: <ul style="list-style-type: none"> <li>○ process specification (in the absence of development by other technical committees);</li> <li>○ data specification with content;</li> <li>○ forms-layout (paper / electronic).</li> </ul> </li> <li>• Development and maintenance of standards for <ul style="list-style-type: none"> <li>○ process identification (in the absence of development by other technical committees);</li> <li>○ data identification.</li> </ul> </li> <li>• Maintenance of the EDIFACT-Syntax.</li> </ul> <p>ISO partner to UN/CEFACT under MoU between ISO and UNECE</p>
Dissemination on the use of the standards, implementation, exploitation and maintenance of the various deliverables	<p>TC154 publishes its list of standards but, as of today, has not published any publications providing guidelines on use, implementation, exploitation or maintenance of those standards.</p>

Technical issues	
<p>Implications of the recommendation contained in the Communication COM (2010) 712 final "the UN/CEFACT Cross-Industry Invoice (CII) v.2 should be adopted as the common reference semantic data model upon which future e-invoice content standard solutions are based".</p>	<p>TC154 strongly support the use of an underlying data model (independent of any message exchange syntax and based on a globally recognised data modelling methodology) as a basis for semantic interoperability.</p>
<p>Should a semantic mapping be preferred to a single semantic data model?</p>	<p>Sorry, we do not understand the distinction being questioned Please provide your definitions of a semantic mapping and a single semantic data model.</p>
<p>CII V2 vs. V3, and alignment with the Financial Invoice message</p>	<ul style="list-style-type: none"> <li>a) With relation to the CCTS versioning, please note that only CCTS v2.01 is also an ISO standard (ISO TS 15000-5) AND ebXML Part 8. Because of this broad reach, the MoU/MG has (and still is) supporting ONLY CCTS V2.01 and the CCTS v2.01 version CCL for use as the basis for interoperability between SDOs. TC154 believe that these are very important credentials for global relevance and acceptance. TC154 would also recommend that until CCTS 3.0 is submitted to TC154 as a new fast track work item through the formal ISO procedures and emerges as a published ISO standard it would not be prudent to move to a CII based on CCTS v3.0 as the EU recommendation. In the meantime we believe that the CCTS v2.01 version remains the best basis as recommended by the EU Expert Report for supporting maximum interoperability.</li> <li>b) With regards to the Financial Invoice, TC154 believe that a mapping from the CII CCTS data model to the ISO 20022 Invoice is the best approach which is a straightforward relationship as the ISO 20022 Invoice data structures are already included in the latest v2.01 Core Component Library (CCL)</li> </ul>

ISO TC 68 potential work items on factoring message, and on order and delivery information	As recommended by the ebMoU MG, TC154 supports the continuation of submissions from the TC68 ISO 20022 data modelling teams to the UN/CEFACT v2.01 CCL.
Addressing and routing	<p>TC154 believe that, whilst this is an important standardisation subject, this is outside of the semantic content data issues.</p> <p>In the sense of message address routing, TC154 jointly with UN/CEFACT is responsible for the maintenance of the EDIFACT service segment directory (including relevant code lists)</p> <p>However, in the sense of address information in the business content context TC154 passed this area of standardisation to the UPU some time ago. The work of ISO TC211 is also very important in this area as it is bringing together and harmonising address work from many SDOs including UPU.</p>
Future of CCTS	TC154 have a new work item to develop the current published CCTS 2.01 up to a full ISO standard (ISO 15000-5). This work item will be able to incorporate amendments and new requirements if approved and only on the basis of maximum (preferably total) backwards compatibility with the current TS15000-5. This provision is designed to minimise the impact of existing derivative work such as the UN/CEFACT CCL, OASIS UBL etc. and also to minimise the impact on existing alignments with related standards such as the UNTDED (ISO 7372), UN/EDIFACT, the WCO Data Model, ISO 20022 etc.
Interoperability with EDIFACT solutions	Please see above response,
Which code lists to use and how to extend/restrict	The recommendation of globally published and maintained code lists is recommended by TC154. The EDIFACT code lists as published in the UN/CEFACT EDIFACT Directories are a crucial set of codes recommended for business data exchanges. This is an especially important reason to prioritise the alignment with EDIFACT as explained in the two immediately preceding responses.
Implications for customs in trade between Member States	The alignment between the EDIFACT Customs UNSMs and between the CCL and the WCO Data Model is important not only for Customs but also for the compliance with other cross-border regulatory and fiscal requirements. This applies to cross-border trade between Member States but also very importantly to trade between EU Member States and non-EU countries.
Items under discussion in relation to MUG:	
use of the information content and business rules for the MUG core	TC154 believe that the key deliverable of the MUG and any other future MiG projects should be a subset data model which is independent of data exchange syntax in order to provide the best basis

invoice, as defined in CWA 16356 Part 1, for implementation or as the basis for further contextualization of e-invoicing within the European Union and EEA	for interoperability across different syntax implementations. Subordinate deliverables could then by syntax specific implementation guides each based on the syntax neutral data model subset.
Use of the syntax binding, as defined in CWA 16356 Part 2, as the basis for implementation of the UN/CEFACT Cross Industry Invoice (CII)	This issue is outside of the TC154 scope.
Maintenance and online service to spread the CCII Guide	TC154 is supportive of such initiatives and recommends that online validation would also be of benefit to assist implementers.
link to financial and payment services	TC154 considers these links to be critically important to support an aligned BUY-SHIP-PAY semantic framework.
XML and presentation files	This issue is outside of the TC154 scope. On a global basis this is the responsibility of UN/CEFACT and if a link to CCTS v2.01 and that version of the CCL is ensured the this could underpin interoperability between EDI and XML
Mapping to Core Component Library / updated	For the many reasons given in several responses above, TC154 consider the mapping to the ISO TS15000-5 (CCTS v2.01)compliant UN/CEFACT the most important mapping . This should be kept updated as necessary to the published CCL releases .
link to UN/CEFACT Syntax and other syntaxes	The EDIFACT syntax is published by TC154 and TC154 is happy to assist wherever possible. Any other syntax standards are outside the scope of TC154.

## ANNEX 7 – INTEROPERABILITY LEVELS

<sup>[1]</sup> The goal of interoperability is to allow information to be presented in a consistent manner between business systems, regardless of technology, application or platform. It thus provides organisations with the ability to transfer and use information across multiple technologies and systems by creating commonality in the way that business systems share information and processes across organisational boundaries.

In current business scenarios, interoperability represents the most complete form of collaboration, enabling companies not only to interact with each other electronically but also to interact as if they were a single 'virtual organisation'. Interoperability thus can be seen as a central prerequisite to establishing e-business.

Interoperability is central to establishing growth in e-business and e-invoicing. It provides users with the ability to transfer and use information across multiple technologies, systems and organisation boundaries. The establishment of interoperability will enable wider adoption of e-invoicing, while fostering improved competition, stimulating network effects.

To reach this goal, interoperability is not intended to be restricted to a technical level, but also applicable at the business and process level, including for example processes related to the relationship between suppliers and customers and to cooperation with business partners, commercial counterparties and financial institutions.

In a heterogeneous business environment actors do not need to know in detail how another actor operates; however the existence of *business agreements* that set out a common collaborative way of working together is vital. A closer examination, for the benefit of structuring the matter, shows that the business agreements mentioned need to be made on a number of distinct 'levels':

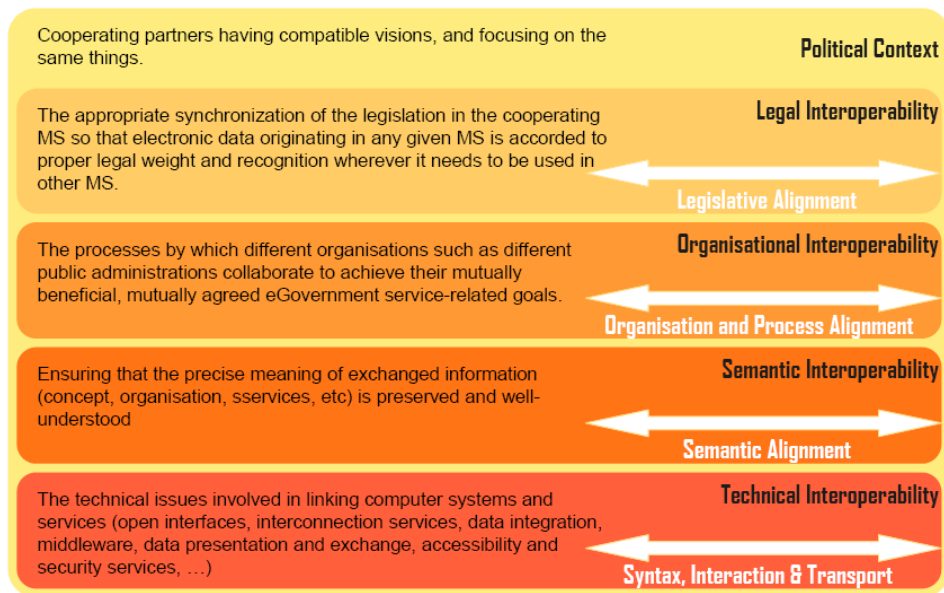
1. Business and organisational interoperability
2. Process interoperability
3. Technical interoperability

Where the agreements on these levels need to be enabled and supported by 'legal interoperability' embedded in 'political context'. <sup>[3]</sup> This is shown in the figure<sup>5</sup> below:

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<sup>5</sup> Where, in this figure 'e-Government' is used, the same is valid for business oriented – i.e. private sector related agreements





On each of these levels the necessary agreements need to be made; it should be noted that the actors involved are not necessarily the same across the layers.

For the sake of understanding, four layers will be elaborated:

### Legal Interoperability

Legal interoperability refers to ensuring alignment with legal requirements (e.g. data integrity and protection) both in domestic and in the cross-border context, ensuring fulfilment of European Union directives, national legislations, legal risks, etc.

### Business and organisational interoperability

This can also be extended to include (part of) the legal and contractual environment. This layer includes all the tools and instruments required to enable the business integration of actors and roles to facilitate information exchange.

Business and organisational interoperability has the objective of making services available, easily identifiable, accessible and user-oriented between trading parties and within the business community generally. To reach this goal, all parties must agree on reciprocal information needs and on shared contractual rules to ensure it occurs safely, with minimal overhead, on an ongoing basis, and on the basis of well constructed plans and their implementation.

### Process interoperability

This layer consists of making it possible to automatically process information exchanged between all parties consistently and accurately, in order to produce useful results as defined by the end-users of both business processes.

Process interoperability includes discovery (acquiring relevant information) and collaboration aspects (how to work together), including workflow and decision-making

transactions. This often requires alignment of business processes as well as operational synchronisation of collaboration data.

To achieve this level of interoperability, parties must agree on or have available to them a common information exchange reference model. The content of information exchanges must be unambiguously defined, to ensure that what is sent is correctly understood from the receiver.

#### Technical interoperability

This layer consists of the common methods and shared services for the communication, storage, processing and presentation of data.

Technical Interoperability is usually associated mainly with applications and/or hardware and network components, referring to systems and platforms that enable machine-to-machine or application-to-application communication to take place.

This aspect of technical interoperability – interoperability at the 'protocol layer' – is mainly focused on enabling electronic communication between remote devices.

Standards for “(electronic) *messages exchanged between the organisations to support these business processes* – as stated above” are developed by standardisation organisations.