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E - FREIGHT IMPLEMENTATION ACTION

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Fundamentals

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Availability: P

Co-financed by the European Union
Connecting Europe Facility

			Approved			
Issue	**Date**	**Prepared by**	**Approved**		**Ammendment**	
1	13.01.2017	G. Fabbri				
2	07.03.2017	G. Fabbri A. Urbano				

Table of content:

1 Introduction

This document, named Fundamentals, is part of the e-Freight Toolkit and has been produced to give introductory information about e-Freight representing a general reference document to assist any interested party to easily adopt the e-Freight framework.

The e-Freight Toolkit has been designed and assembled in the context of the EU Project e-IMPACT in order to allow a smooth transition from current practices to new e-Freight developments.

The main purpose of this document is therefore to provide the interested parties with a quick guide allowing them to familiarize with the set of principles of e-Freight and its usage, the e-Freight messages definitions, and the Access Points specification and its usage.

The e-Freight Toolkit can be considered as an open box containing the adequate artefacts to support an interested party (to be designated simply by adopter hereafter) in the adoption of the e-Freight Common Framework.

It is important to underline that the contents of the box can be always and constantly updated and improved coherently with e-Freight developments. This will be ensured through the participation in working groups and standardization initiatives under the e-Freight policy umbrella, through study and interaction with relevant FP7 and H2020 projects, and thanks to the suggestions of the adopters.

Important:	**This document helps to familiarize with the set of principles of e-Freight and its usage, the e-Freight messages definitions, and the Access Points specification and its usage clarifying the relation between e-Freight and ISO 19845 (UBL v2.1).**

As better described in Sections 5 and 6, the adopter can use all of the artefacts included in the Toolkit or select just those that best suit to their needs.

This document should be the first tool to be read and used by any interested party because it clarifies the relation between e-Freight and ISO 19845 (UBL v2.1) and how to use the toolkit.

In fact care must be taken when to referring to UBLv2.1 and e-Freight Common Framework because they are not fully intermixable.

In terms of messages not all messages of UBL belong to e-Freight Common Framework, and not all messages of e-Freight Common Framework are defined in UBL **In the e-IMPACT project, the focus object is the set of messages of e-Freight Common Framework**.

Although, for the messages of e-Freight Common Framework that are defined in UBL v2.1 not all elements present in the UBL definition are used in the e-Freight Common Framework definition. So e-Freight Common Framework definitions are a subset of the UBL v2.1 definitions. **In the e-IMPACT project the definitions to be considered are the ones in e-Freight Common Framework**.

An additional issue is that e-Freight Common Framework defines two limits for each message definition. The upper limit corresponds to the full definition of the message as presented by the e-Freight, meaning the usage of all elements in the message. This is named **Full Profile**. On the other limit there is what is called **Core Profile**. In this case the message only considers a subset of the elements in the message but

were considered as the minimum to characterise the message. This difference is also presented in the e-IMPACT_Mapping_Template_Manual.

What is it?:	**The Tool Kit is a set of tools to assist any interested party to start using the e-Freight Common Framework**
Why?:	**Bridge between current business and applications, and ISO/IEC 19845 and e-freight Common Framework**
How?:	**Providing a set of ruled flexible tools to be partly or totally used during adoption projects' execution**
What is not?:	**A standard, a fully ready to use solution, a set of closed items, a closed set of items.**

2 e-Freight

The term e-Freight was first introduced in the "Freight Transport Logistics Action Plan"[1]. The concept was further developed during the Swedish Presidency in the European Union in the last half of 2009[2].

The vision for e-Freight is to achieve:

- Paperless, electronic flow of information, eliminating paper handling, transporting and processing costs
- Simple and harmonized procedures supporting the physical flow of goods
- Functions for tracking cargo from door-to-door irrespective of the combination of modes and for tracing its movements if needed
- Automatic electronic exchange of information – business-to-business, business-to-authorities, and authority-to-authority
- Reduction of paper consuming contributing to the environment

Several EU initiatives have been taken in the previous years to deal with information exchange within the various transport modes. Some examples are:

- The Action Plan for the Deployment of Intelligent Transport Systems (ITS) in Europe3 dealing with road transport and interfaces to other modes

[1] Communication from the Commission COM(2007) 607 final

[2] e-Freight: Let's make it happen –Roadmap for developing and deploying e-Freight. Swedish Government, Vinnova and NetPort 2009

[3] Communication from the Commission COM(2008) 886 final

- The TAF TSI (Telematic Applications for Freight – Technical Specification for Interoperability) Regulation4 focused on rail.
- Harmonised river information services (RIS) on inland waterways5
- The EU e-Maritime initiative6

As can be seen in the ITS Action Plan title, all these initiatives indicate that there shall be links to other modes. One observation to be made from the initiatives above is that they are essentially focused on the movement of vehicles in the various types of infrastructures. e-Freight, however, is focused on the movement of goods utilising the various modes and combination of modes to the best of their ability. As illustrated in Figure 1, one may say that e-Freight is what "binds together" information about the movement of goods in all modes.

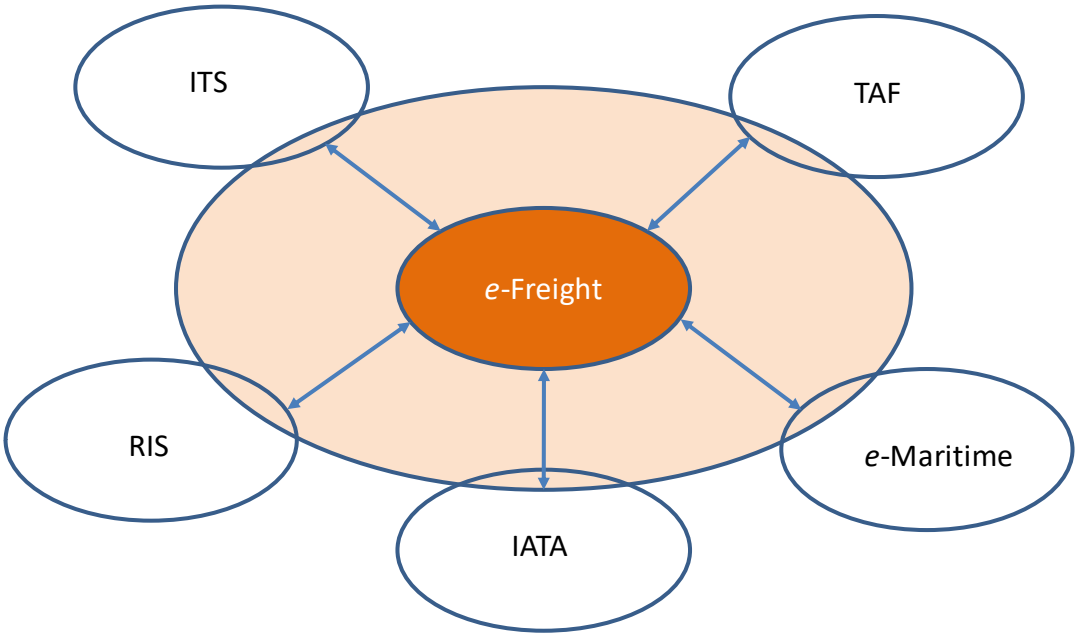

Figure 1 e-*Freight context*

3 The e-Freight Framework

3.1 The Origin

The e-Freight Framework as used in this project is also known as the Common Framework. Its development started in the FREIGHTWISE[7] project as a response to the EU Commissions request for a framework for information exchange in transport and logistics. At the time of FREIGHTWISE, a number of EU projects aimed to develop THE standard framework for information exchange in logistics and make it an international standard. The people involved in these projects understood that collaboration was better than competition, and that led to the joint effort of creating "One Common Framework for Information and Communication Systems in Transport and Logistics".

[4] Commission Regulation (EC) No 62/2006

[5] Directive 2005/44/EC of the European Parliament and of the Council of 7 September 2005

[6] SKEMA - PROPS Stakeholder workshop "Accelerated Implementation of EU Maritime Transport policy" Riga, 11th June 2009: Christos Pipitsoulis, Maritime Transport Policy, DG Energy and Transport

[7] http://freightwise.tec-hh.net/

The projects involved were:
FREIGHTWISE, e-Freight, INTEGRITY, Smart-CM, SMARTFREIGHT, EURIDICE, RISING, DiSCwise, iCargo, COMSIS, eMAR and others, covering DG MOVE, DEG Enterprise, DG RTD, and DE CONNECT.

This joint initiative also led to the ambition of making the Common Framework an international standard, ultimately approved by ISO.

3.2 The Standardisation Process, OASIS and the Universal Business Language

The standardisation process started in 2008 through cooperation with the technical committee in OASIS[8] that was developing version 2.1 of UBL (Universal Business Language).

OASIS is a non-profit consortium that drives the development, convergence and adoption of open standards for the global information society promoting industry consensus and produces worldwide standards for security, Internet of Things, cloud computing, energy, content technologies, emergency management, and other areas. OASIS open standards offer the potential to lower cost, stimulate innovation, grow global markets, and protect the right of free choice of technology. OASIS members broadly represent the marketplace of public and private sector technology leaders, users and influencers. The consortium has more than 5,000 participants representing over 600 organizations and individual members in more than 65 countries. OASIS is distinguished by its transparent governance and operating procedures. Members themselves set the OASIS technical agenda, using a lightweight process expressly designed to promote industry consensus and unite disparate efforts. Completed work is ratified by open ballot. Governance is accountable and unrestricted. Officers of both the OASIS Board of Directors and Technical Advisory Board are chosen by democratic election to serve two-year terms. Consortium leadership is based on individual merit and is not tied to financial contribution, corporate standing, or special appointment.

Definition:	**OASIS is a non-profit consortium that drives the development, convergence and adoption of open standards for the global information society.**

Much work was involved in adapting the ideas of the Common Framework to the principles of UBL and to provide the required backwards compatibility. However, eventually key elements of the Common Framework became part of the official version of UBL 2.1. After making UBL 2.1 complete and official, OASIS started a process of having this standard accepted by ISO. This process completed late 2015, and elements of the Common (e-Freight) Framework are now part of ISO/IEC 19845[9].

ISO/IEC 19845 specifies then the OASIS Universal Business Language (UBL), which defines a generic XML interchange format for business documents that can be restricted or extended to meet the requirements of particular industries. Specifically, UBL provides the following:

[8] https://www.oasis-open.org/

[9] http://www.iso.org/iso/catalogue_detail.htm?csnumber=66370

- A suite of structured business objects and their associated semantics expressed as reusable data components and common business documents.
- A library of XML schemas for reusable data components such as "Address", "Item", and "Payment", the common data elements of everyday business documents.
- A set of XML schemas for common business documents such as "Order", "Despatch Advice", and "Invoice" that are constructed from the UBL library components and can be used in generic procurement and transportation contexts.

Definition:	**ISO/IEC 19845 specifies the OASIS Universal Business Language (UBL), which defines a generic XML interchange format for business documents.**

Typically UBL refers to Business Information Entities (BIE) according to what it is defined in ISO/TS 15000-5:2005 Electronic Business Extensible Markup Language (ebXML) – Part 5: ebXML Core Components Technical Specification, Version 2.01. In practical terms, they all end up in being XML elements that are used or not in the messages. For the purpose of this document and others in the Tool Kit the term “element” is preferred.

Having this in mind, it may be complementary used the words “composite” and “simple” if the context of the text requires this qualification for clarification purposes. The “composite” word will be used to refer ABIE and ASBIE indifferently, and “simple” word will be used to refer BBIE. So we will have “composite element” and “simple element” when appropriate.

3.3 The Framework

The development of the Framework started by defining the roles that were involved in transport and logistics. In addition to the EU funded projects mentioned above, the Framework was developed in close cooperation with the group within GS1 responsible for what they call the Logistics Interoperability Model[10]. Figure 2 illustrates the main roles.

[10] http://www.gs1.org/lim

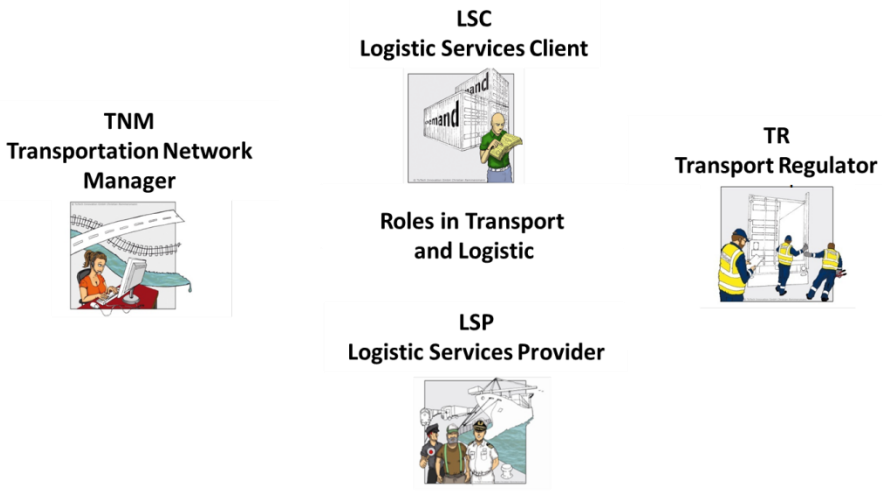

Figure 2 Roles

These are:

- Logistics Services Client (LSC) – associated with the Logistics Demand domain, where demand for logistics services originates and where such services are being purchased.
- Logistics Services Provider (LSP) – associated with the Logistics Supply domain, which responds to the demands from LSCs.
- Transport Network Manager (TNM) – associated with the Transport Network Management domain and responsible for providing information about availability and status for the transport and logistics infrastructure
- Transport Regulator (TR) – associated with the Regulation Enforcement domain and responsible for ensuring that transport and logistics operations are being conducted according to rules and regulations.

The first two of these two roles were harmonised with GS1. However, GS1 concentrated on interaction between commercial stakeholders and did not include authorities.

The scope for the Framework was all modes and combination of modes. It was also realised that the role that has been called Freight Services Integrator (FSI) is not a separate role in relation to the ones described above. The FSI characterises an organisation or person that combines the roles of LSC and LSP in order to conduct business. From an information exchange point of view, the FSI does not have any special requirements.

Important:	**There are four main role in Transport and Logistic: Logistics Services Client, Logistics Services Providers, Transport Network Manager, Transport Regulator**

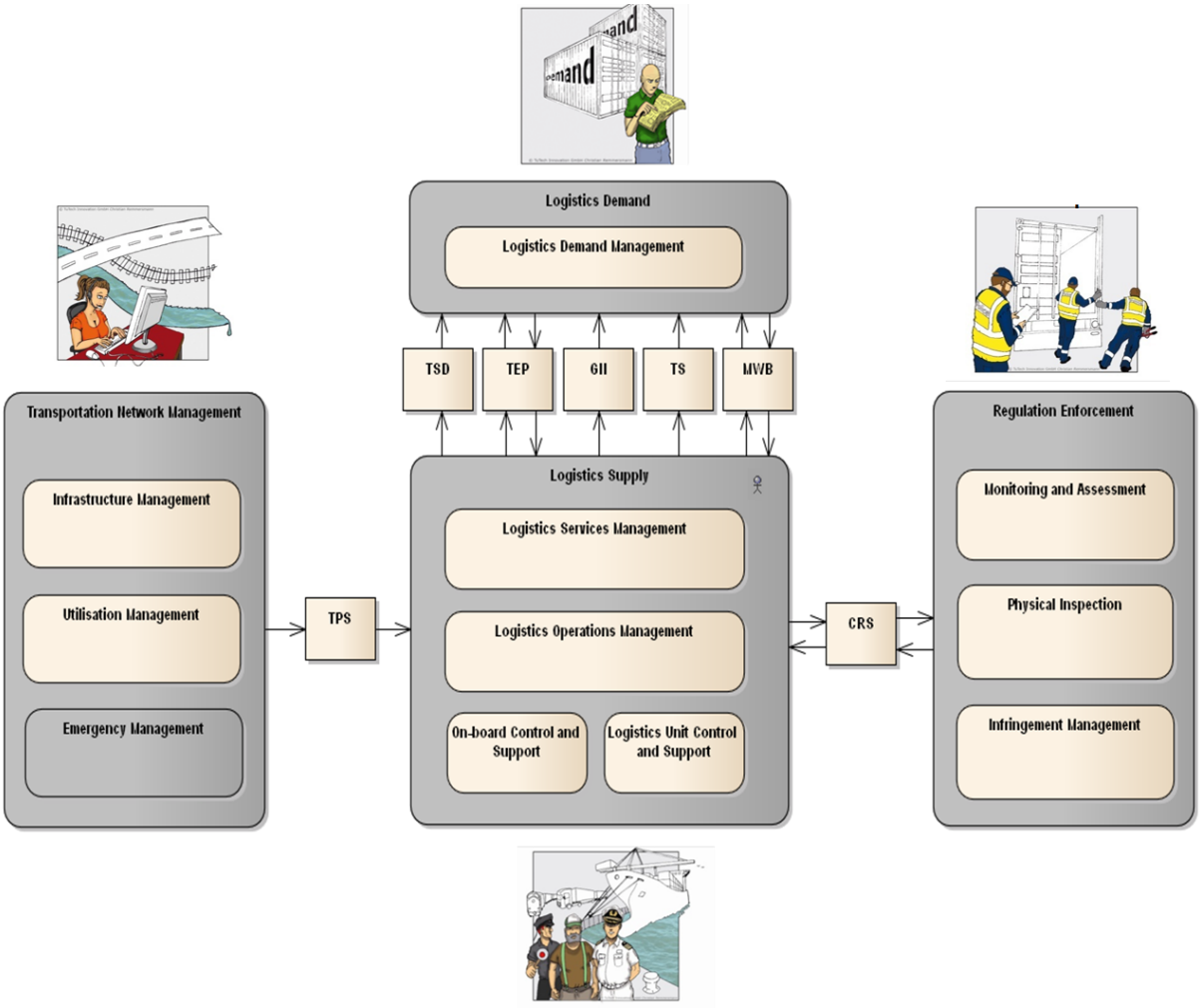

Figure 3 Reference model

By carefully analysing the information required by these roles to do a proper job, the reference model decomposes the entire transport and logistics domain into manageable sub-domains - each addressing responsibility areas. Figure 3 illustrates the domains and a minimum set of electronic documents that are required for operators in the different domains to do their jobs properly.

These electronic documents are:

- Transport Service Description – TSD - is used for a LSP to announce transport and logistics services. Such a service can be the carriage of goods between origins and destinations, but can also be warehousing or terminal handling services, document handling, and other services related to the movement of goods. The TSD interface consists of both a request and response message.

- Transport Execution Plan – TEP - is an agreement established between a LSC and a LSP regarding the movement of goods. Essentially it is the equivalent of a ticket used for passenger transport. The TEP can be used for arranging all kinds of transport services: pure carriage, warehousing storage, and terminal operation services (consolidation, loading and unloading, etc.). The process of establishing a TEP may require many interactions between the two roles,

from what is typically called a quotation stage until the TEP is finalized (agreed). The Transport Execution Plan interface consists of a request and response message.

- Goods Item Itinerary – GII - specifies the route and time schedule as well as other service details for a transported item. It may contain one or more transportation segments, or legs. Each such segment represents a part of the total journey. Thus, each segment can be delivered by different LSPs. The exchange of the GII may take place after a TEP is committed between LSC and LSP. In addition to defining the initial route and time schedule, the GII may be used to record the actual progress of transport in the form of new estimated times for departure and/or arrival, actual departure and arrival times. The GII is therefore containing information that may be used for analysing the performance (in time) of transport services and for tracing the progress of cargo, if such analysis is required.

- Transportation Status – TS - provides the status on a TEP. This includes both status on the overall execution (if the service is according to plan) and the condition of the transported items. The TS is exchanged be-tween the LSP and the LSC. The TS interface consists of both a request and response message.

- Transport Progress Status – TPS - is an interface exchanged between a TNM and a LSP. The LSP requests the TNM to provide tracking information related to a specific transport vehicle (of relevance to some transport modes, e.g. rail). The TNM then provides the relevant information to the LSP. The most typical use of TPS is to ask assistance from the TNM in order to estimate times of arrival. The TPS interface consists of both a request and response message.

- Multimodal eWaybill – MWB – performs the same role as its paper counterparts of confirming that there is a contract of carriage for the cargo and providing relevant information to support the transport execution. It can be used in any transport mode, sector or legal framework. The structure is agile enough to support entire multimodal chains, as well single ‘unimodal’ transport legs. In comparison to the other transactions, the MWB is closer to a “document” as it must have the ability to be signed and must often be displayed in one of a number of standard layout formats required by legislation.

- Common Reporting Schema – CRS - is a single, standardised document containing data fields for all the information required for reporting to authorities across all modes and in all Member States. The CRS is developed using information structures from the TEP supplemented by structures from WCO (GOVCBR). The CRS is developed by the principle that the content should fulfil regulatory requirements but the structure should be driven by the transport planning and booking process, hence making it feasible for a reporting party (e.g. LSP) to translate information automatically from these processes into information required by the regulatory domain.

The TSD, TEP, GII, TS, and TPS are part of the ISO/IEC 19845 standard.

4 The e-Delivery Infrastructure

4.1 Connectivity and Interoperability

The global transport and logistics industry comprises more than several million enterprises. Even if divided into smaller communities based on the type of industry served (retail, forestry, electronics, car,

etc.) or by geography (corridors), the number of "e-relationships" that need to be established in order for properly facilitate electronic communication between stakeholders would be substantial.

The various industries also operate with their own standards (GS1 - retail, PapiNet - forestry, RosettaNet - electronics, Odette - automotive, etc.; ref **Erro! A origem da referência não foi encontrada.**). It is also such that different stakeholders interpret the standards differently. Hence, the number of standards that freight forwarders and carriers need to relate to is quite substantial if a variety of industries are served.

Figure 4 Public and private standards

For small and medium sized enterprises (SMEs) the costs of interoperability represent an entry barrier to new markets. Few if any of them can afford connecting to many other companies using conventional technologies. Large companies find themselves in the same situation where the need for connectivity increases, as modern companies tend to work within a network of companies instead of as a single organization.

The consequence of this situation is that there are and will be numerous standards and interpretation of standards used in the foreseeable future in logistics. It is unthinkable that one standard will dominate, even though ISO/IEC have now published 19845, a standard that holds electronic documents supporting multimodal freight transport management. This means that those using the LOGINK and NEAL-NET standards for example, will have to communicate with others outside these communities that are using other standards, if they need to collaborate in global supply chains.

This also means that an infrastructure that is to be used for electronic information exchange in logistics also needs to be able to connect people and organizations that are using different standards.

4.2 Information Exchange infrastructure for Public Procurement – PEPPOL Access Points

The approach taken in previous projects was to develop an infrastructure for exchange of logistics information that does not require any essential centralized management or user authentication. The

inspiration for the approach was the results from the research and development project PEPPOL[11] that developed an infrastructure for exchanging orders, product catalogues and invoices related to public procurement. Provision of products to public authorities in European used to be a national activity and various standards for information exchange related to public procurement had developed in the different European countries.

Opening up of the market within Europe then led to the need for enabling public procurement to become an international activity, involving all EU countries. To facilitate electronic procurement, the PEPPOL project started two initiatives:

- Developing a common standard for information exchange related to procurement (including e-Catalogues, e-Orders, and e-Invoices). These electronic documents were made part of the UBL 2.1 standard, and are now included in ISO/IEC 19845.

- Developing an infrastructure for electronic information exchange with the ability to provide interoperability between national standards that had been developed in the different European countries.

This infrastructure is now governed by the organization openPEPPOL and the central elements are operated by the European Commission.

The PEPPOL infrastructure uses the Internet for communication and developed what is called Access Points for connecting users to the infrastructure. Access Points may be seen as "gateways" between users and the PEPPOL Infrastructure. Access Points works in a way similar to e-mail servers. Hence, exchanging messages is much like sending and receiving e-mail. The Access Points, however, have mechanisms to provide secure exchange of information, they handle structured documents, and they may be used to provide value-added services, that is, to enhance the information provided to an Access Point, for example, convert documents from one format to another.

Another key approach taken by PEPPOL was to make the specification of the Access Points open and available to all. The idea is that anyone may develop and Access Point and connect it to the network after quality of the Access Point software has been properly validated according to strict procedures. Providers of Access Points may then sell Access Point software as a product or as a service.

This approach has been very successful, and in the countries where the PEPPOL approach is widely used (Austria, France, Norway, Sweden) there are 100 providers of Access Points. The Access Point specifications are governed by OpenPEPPOL.

In PEPPOL there is the need for a directory of Access Points, called the Service Metadata Locator (SML). This is the only central resource of the PEPPOL network and it is operated by the European Commission.

The same infrastructure is now being used to exchange information for other domains than public procurement. Health and legal documents are examples.

4.3 Experience from Applying PEPPOL for Logistics

The eFreight project adopted the PEPPOL Access Points to be used for logistics purposes. The first process that was supported was booking of ferry transport services between DSV Road and Stena Lines in Sweden.

[11] http://www.peppol.eu/

The booking process is synchronous, that is, when DSV sent a booking to Stena, an immediate reaction was expected. The architecture of PEPPOL is asynchronous. This means that one cannot guarantee the proper response to a booking request. In order to secure quality of the synchronous operation, vital modifications needed to be made to the PEPPOL Access Points for making it possible to support the response times required. Several approaches were made, and the end result was that significant modifications were required to make the PEPPOL Infrastructure support logistics operations.

Another experience was that the time it took to get proper credentials (security certificates) connecting to the network was time-consuming. The logistics industry, with a large number of companies involved, many of them small, it is different from the stakeholders involved in public procurement. The need for effective and efficient expansion of a network for logistics seemed different from that of the PEPPOL network, at least the way it was operated when the eFreight implementations took place.

4.4 The eDelivery Infrastructure

The experiences above were taken into account with the project iCargo attempted to develop an Access Point based infrastructure that, in addition to facilitating exchange of electronic documents (including converting formats of these if required, also could provide APIs so that software applications could directly connect to Access Points.

Furthermore, business requirements related to situational awareness and automatic composition of logistics chains needed to be taken into account. The latter requires that the logistics infrastructure gets access to descriptions of logistics services in a format that enables them automatically to be linked.

The Access Points developed in the iCargo project operates on entity specific information elements. This is part of the entity-centric approach that was taken in iCargo and enables to collect, store and share information per individual entity (parcel, pallet, etc.). Although a message is broken down in smaller pieces, the relations of the hierarchical message structure can be preserved as relations per individual entity. Organizing all information for a specific entity enables also a subscription per attribute per type of entity, to be included as part of a Cooperation Agreement. Implementing the iCargo REST API also means handling sets and facts. A set serves like a bag and contains one or more facts. A fact is a standard envelope around information, which is related to one specific entity specified in the envelope subject attribute.

Nevertheless EDI messages are still today a major part of inter-company and inter-system information exchange. A subset of the iCargo access point specification is provided to define the best use of the iCargo Access Point to exchange EDI structures and delivering state-of-the-art security and reliability, while creating a highly reusable and scalable architecture for message exchange.

4.5 Value-Adding Services in Access Points – Providing Interoperability

An Access Point based network where everyone is connected once and able to communicate with all others that are also connected is illustrated in Figure 5.

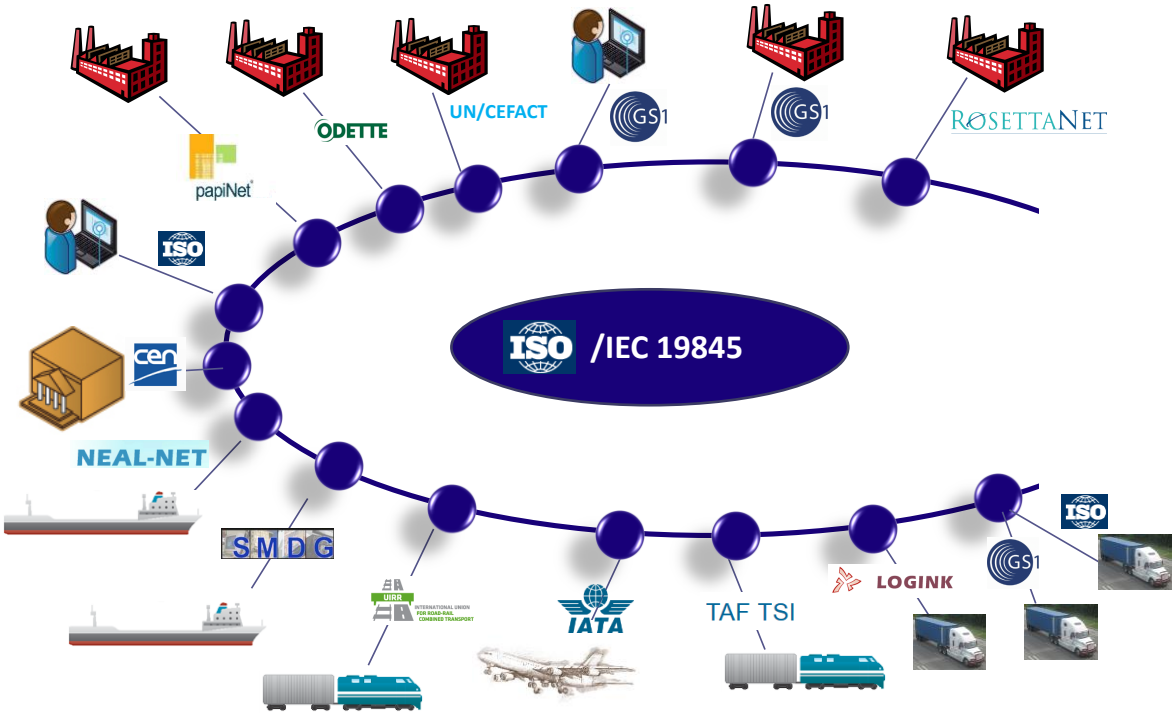

Figure 5 Using Access Points and ISO/IEC DIS 19845 to support interoperability

Figure 5 also illustrates that different stakeholders are using different standards. In order to provide interoperability, in addition to connectivity, the Access Points may be used to provide appropriate conversion between the different standards.

If transformations were to be made directly between all formats, the number of transportations that were needed would be $2n^2$-2n. However, if we are choosing a common intermediate language for converting between formats, as shown in Figure 6, the number of transformations required are 2n,

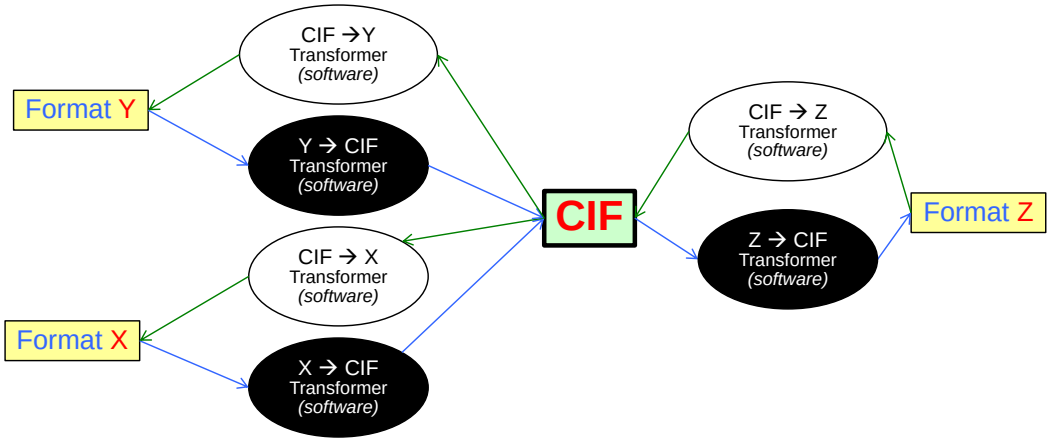

Figure 6 Using a Common Intermediate Format

The consequences of the two approaches are shown in Figure 7.

Number of formats to support	Number of transfortmations (direct)	Number of transformations (via CIF)
3	12	6
4	24	8
10	180	20
20	760	40
30	1740	60

Figure 7 Number of transformations required

The data models supporting the relevant elements in ISO/IEC 19845 are comprehensive. In the EU project EcoHubs[12], the ISO/IEC 19845 message Transport Execution Plan (TEP) was used to enhance the content in the COPRAR message received by the Port of Koper in Slovenia from the shipping agent. The initial version of COPRAR received by the port did not have information about cargo destinations. Hence, the port was not able to store containers in a way that made loading of trains efficient. The combined transport operator that were to pick up the cargo on the port had information about the destinations, however, but in a format that is very different from COPRAR. In EcoHubs, the original COPRAR message and the message holding destination information were both converted to the TEP format. The information was merged into an improved TEP message, now holding destination information, and the improved TEP was converted to the COPRAR format to be used by the port.

This process illustrates the suitability of the ISO/IEC 19845 format to be used as the common intermediate format in transformations.

Access Points may include software for performing such transformations. Each organization that is connected to the infrastructure is described by a "profile". One of the elements in this profile is the format that is used by this organization for electronic information exchange. If the sender and receiver of an electronic document use different formats, the information from the sender is converted to the standard format of the eDelivery Infrastructure in the Access Point where the sender is connected. Information on the standard format is then sent to the access point of the receiver, where it is converted from the standard format to the format used by the receiver; see Figure 8.

[12] http://www.ecohubs.eu/

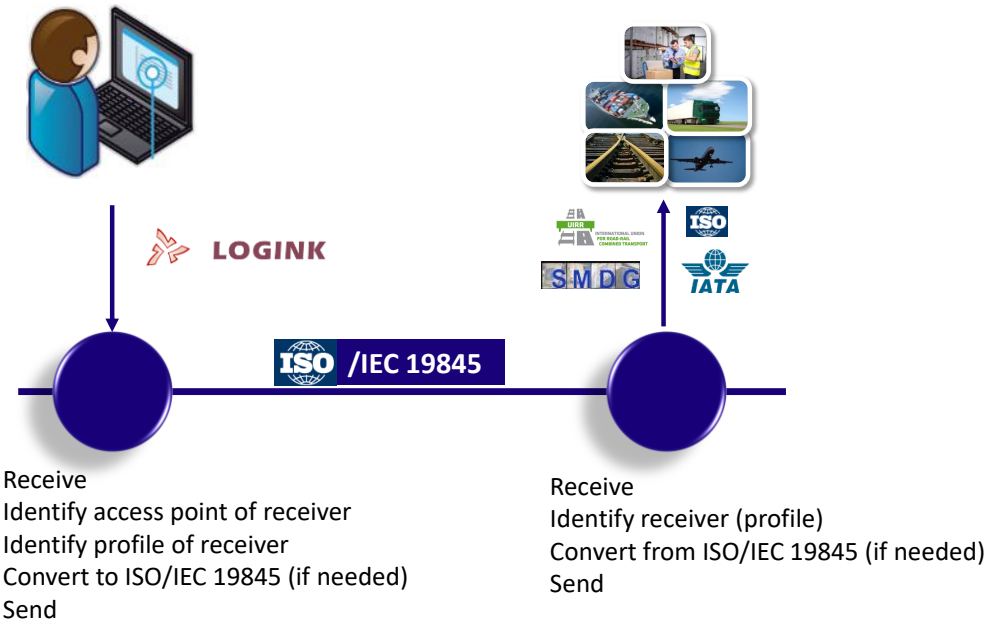

Figure 8 Converting between LOGINK and other formats

4.6 The connectivity Infrastructure in e-IMPACT

From the adopter point of view, the Connectivity Infrastructure is constituted by two types of software pieces: an Access Point and the Connectors.

Generically the Access Point is a piece of software that allows data exchange between parties in the same business domain. This piece of software can be deployed in each party or shared. It does not need to be the same piece of software, as long as a common specification is follow.

The Connector is a piece of software that links the party internal applications or other messages' systems, with the Access Point. As this depends on the specific situation of each party and/or its own requirements, hardly it can be shared.

The Access Point solution to be provided in the context of e-IMPACT is based on the results of the European Initiative CEF eDelivery. This initiative aims to ensure that Public Administrations can exchange any type of data and documents across borders. This means enabling Administration to Administration communication (A2A) contributing to the creation of an EU single market which is fit for the digital age. eDelivery can also be used in Administration to Business (A2B) and Business to Administration (B2A) scenarios as proven by the PEPPOL implementation of eDelivery in the eProcurement domain.

The main advantages are the adoption of a common architecture already tested, a proof of concept already done, the standardization of a common communications solution, the opportunity to propose the creation of a profile for transports and logistics inside the eDelivery initiative, and alignment inside the e-IMPACT project with the other EU CEF initiatives.

The specification adopted by the e-IMPACT project for the Access Point, guidelines for developing the connectors and how they should interact with the Access Point are introduced in the document 'Points for e-Delivery and Access Point specifications' developed in Sub-Activity 1.2.

5 The content of the Tool Kit

The e-Freight Toolkit includes guidelines and templates on how to exchange information across modes, through standards and systems in use by the various stakeholders and supporting the deployment of advanced IT infrastructures. These infrastructures are based on access points, allowing each stakeholder's system to connect once and be able to exchange data with potentially every other system similarly connected.

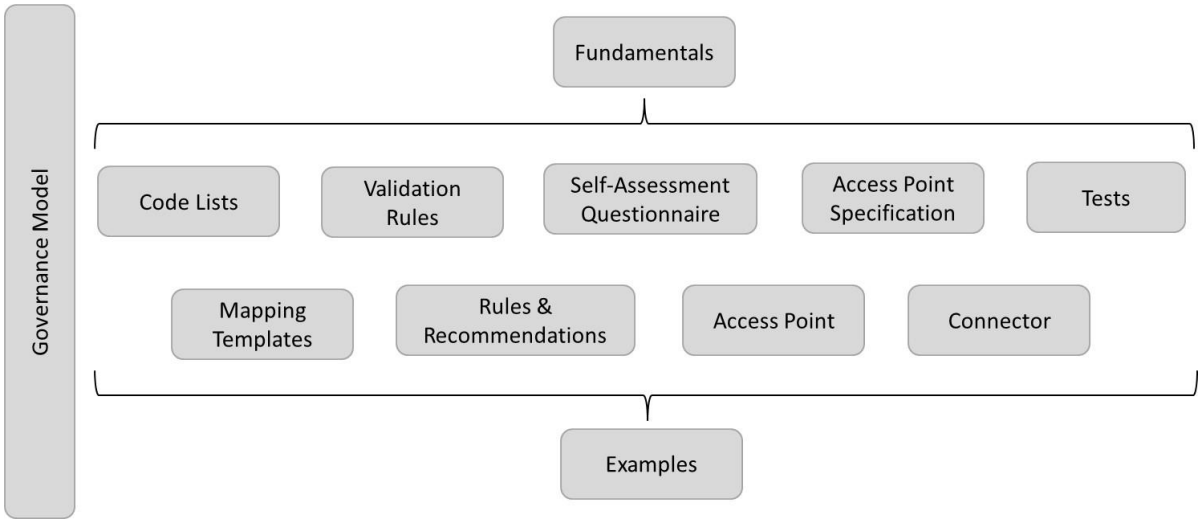

Figure 9 All the Tools of the e-Freight Toolkit

Figure 9 illustrates a general scheme showing all the tools in the Toolkit: the majority of them are documents to be read and others are piece of software as described in the following:

Fundamentals

The Fundamentals is itself a tool of the e-freight Toolkit. Fundamentals are constituted by introductory information about e-Freight, set of principles of e-Freight and its usage, the e-Freight messages definitions, and the Access Points specification and usage.

Mapping Templates

The Mapping Templates tool consists in a set of data elements, making up a data dictionary, to be used by the adopter. Each data element has an id, a name, a description, a type, a size, a reference model (if applicable), and one or more mapping with data elements in different syntaxes (if applicable).

For each message or data element, the adopter can register the relation between e-Freight definitions and its own reality or current formats or data models.

Code Lists

This tool consists in a set of lists. Each list contains the codes, and respective description, to be used in data elements mentioned in the Mapping Templates and that refer to the specific Code List. Code Lists are based on standards, recommendations from reference bodies, generally accepted references, or specific codes.

Rule and Recommendations

The Rule and Recommendations tool provides a Set of statements that define the protocol for interactions under e-Freight, and instruct the adopter on what it is required to use the e-Freight for existent or new processes.

Moreover a Set of statements is describing the recommended practices and approaches for the adoption of e-Freight, or the change of a current e-Freight usage, including mapping recommendations between partner specifics and e-Freight messages.

In particular, when justified, the recommend practices and approaches are described in more detail by mapping of steps and processes to provide guidance to the adopters in achieving the goal of include the e-Freight Toolkit within their own business and/or technical processes.

Validation Rules

Set of rules, conditions and value contents, in order to assure the interoperability between partners, at process level and technical level.

Examples

This tool provides possible practical applications. Main examples are represented by Business Cases developed in the e-IMPACT project and by the Toolkit Usage Example where a hypothetical situation of a company that decides to accede to e-Freight is presented through a simple story.

Self-Assessment Questionnaire

This tool is a list of questions, grouped by category (example: technical, process, business, etc), to help the adopter to clarify its starting point of the path towards the adoption of e-Freight. The questionnaire is complemented with assessment criteria, for each category. The criteria point to classes of situations (examples: ready to adopt e-Freight; minor developments required before adopt e-Freight, etc.).

Tests

A set of software tests to be performed on the final stages of an e-Freight process adoption. If the expected tests' results are reached, it means that the adopter is ready to interact using the e-Freight framework.

Governance Model

Set of rules and procedures that guide the group of experts (to be nominated) with the mission to guarantee that the evolution of connectivity infrastructure, and the contents of the e-Freight Toolkit can happen maintaining coherency.

Access Point Specifications

This tool illustrates the specification adopted by the e-IMPACT project for the Access Point, guidelines for developing the connectors and how they should interact with the Access Point.

Access Point

This tool is a piece of software to provide the interconnection between stakeholders internal applications and the e-Freight Infrastructure, and allow connections between Access Points. The dialog between Access Points is based on the e-Freight messages.

Under these conditions business processes between several partners, based on e-Freight, can be set up. The Access Point is represented by an e-SENS4 open-source reference implementation called Domibus, and the European Commission provides the source for this implementation under the European Union Public Licence V. 1.1.

Connector

The Connector is a piece of software that links the adopter internal applications or other messages' systems, with the Access Point. As this depends on the specific situation of each party and/or its own requirements, hardly it can be shared. However, in the context of the Tool Kit, an example connector is provided.

6 Suggested Steps to use the Tool Kit

Figure 10 shows a possible path towards the adoption of the e-Freight Framework:

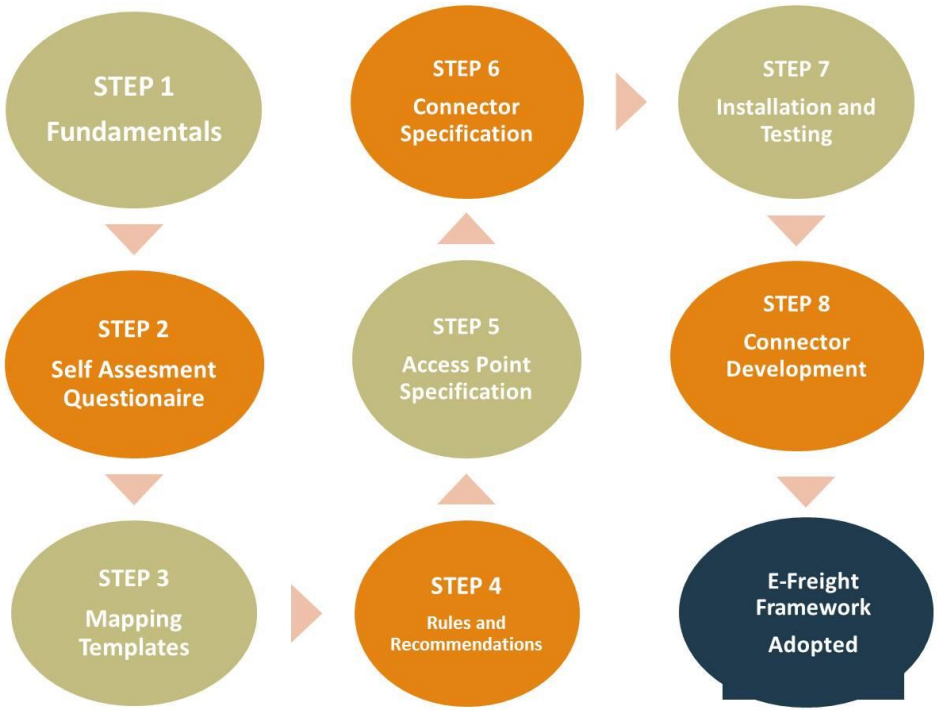

Figure 10 Suggested steps towards the adoption of the e-Freight Framework

This scheme is just a suggestion and does not need to be followed as a unique and sequential procedure but it can be adapted according to the adopter's needs.

Step 1: The first Step that the adopter should perform is to read the Fundamentals and Example Tools in order to understand how to use the Toolkit and familiarize or getting more aware with general concepts of e-freight like:

- The various roles in logistic and transport,
- The set of principles of e-Freight and its usage
- The e-Freight messages definitions
- The Access Points specification and its usage
- The used standards and relation between e-Freight and ISO 19845 (UBL v2.1)

Reading the story presented in the Toolkit Usage Example will allow the adopter to get easily familiar with the full procedure to adopt the e-Freight Framework.

Step 2: The Second Step should be to fulfil the Self Assessment Questionnaire. The usage of this tool will help the adopter to better clarify its starting point of the path towards the adoption of e-Freight defying:

- The exact role that they have in Transport and Logistic according to the Logistics Interoperability Mode
- The messages that they can adopt according to the Framework reference model
- The code lists that they can use

Step 3: The Third Step to follow should be the analysis of the set of Mapping Templates provided in the *e-IMPACT_Mapping_Template_Manual*. This will allow the adopter to get familiar with the Templates, the composites and the business elements allowing to:

- Map the e-Freight data elements with its own application data structures.
- Analyse which e-Freight elements are actually required
- Analyse which e-Freight elements have to be discarded.
- Make several working copies of the selected mapping templates

Step 4: Use the Rules and Recommendations Tool to have guidance and tips on the usage of the messages and process involving theirs exchange.

Step 5: Use the e-IMPACT_Access-Point-Specification Tool to inquire about the possibility to use an already developed Access Point that handle interoperable data exchange between heterogeneous systems. This is represented by an e-SENS4 open-source reference implementation called Domibus and the European Commission provides the source for this implementation under the European Union Public Licence V. 1.1.

Step 6: Develop an additional module called connector that acts as a proxy between the adopter proprietary IT system and other external systems. The connector will be used to transform information between the adopter IT internal data model and the e-freight message format and will use a Domibus access point instance to send and receive e-freight messages to/from other systems through their corresponding access points. At the end of this step the adopter will be able to continue to operate with its own proprietary system but it will need its own access point and to develop a connector.

Step 7: This step is about the installation and testing of the Access Point in the adopter server. This will be possible following the access point installation guide.

Step 8: The final step should be the development of software routines in order to convert between the adopter IT system and e-freight messages. This can be done developing the connector (ChannelModule) and, through this module, the adopter will finally be able to talk to the world.

7 The Governance Model

The Governance Model is part of the e-Freight toolkit and explores pragmatic thinking on the components to be adopted in order to deliver the control, alignment, accountability, transparency and compliance results desired by organization leaders.

Important:	**The nomination or definition of the entity/organization that will govern the results of the project is not in the scope of the project.**

The Governance Model is the set of rules and procedures that guide the group of experts (to be nominated) with the mission to guarantee that the evolution of connectivity infrastructure, and the contents of the e-Freight Toolkit can happen maintaining coherency. Additionally is defines how any e-Freight adopter can submit requests for improvements, new codes, elements' inclusion, and any other change to the toolkit (Maintenance Requests).

As a complementary mission, the governance group based on the Maintenance Requests received, could be a reporting entity to the standards' organization (ISO, OASIS, etc), presenting to these institutions appropriate Maintenance Requests.

Example:	*During the process of adoption, a company identified a requirement that could easily be fulfilled if a change in message TS structure was introduced. So it presents the issue to the governance group. However, the e-Freight message definition is in the scope of OASIS and ISO. So the governance group could present this as a Maintenance Request to OASIS.*

The Governance Model is a working set of processes and management structures that allow key decisions to be made during the lifecycle of the whole toolkit to ensure that the benefits and outcomes of the toolkit are achievable.

The e-Freight development utilize the appropriate mechanism outlined in the proposal for the ITS Directive[13]:

1. The European ITS Committee composed of representatives of the Member States and chaired by a representative of the Commission.

2. The European ITS Advisory Group composed of high level representatives from relevant ITS service providers, associations of users, transport and facilities operators, manufacturing industry, social partners, professional association, local authorities and other relevant forum.

It is imperative that *e*-Freight is properly represented, particularly in the Advisory group. This could be done by assigning a sub-committee in the European ITS Committee and a sub-group in the ITS Advisory Group dedicated to *e*-Freight issues.

Important:	**The Governance Model is a working set of processes and management structures that allow key decisions to be made during the lifecycle of the toolkit to ensure that the benefits and outcomes of the adopting e-freight are achievable.**

The Governance Model focuses on the content of the document tools (temporary codes, mapping templates, rules/recommendations inclusion, etc), setting pace for changes of the Access Point application on e-Freight implementations and eventually proposing changes to UBL. The Governance Model does not define standards (codes, messages, …) or define strict / closed tools or guidelines.

[13] COM(2008)887 final

Important:	**The governance model is focused in defining the three points:** **- how to govern the tool (methods and procedures)** **- what it is to be governs (the object of governance)** **- when to apply changes (timing of evolutions)**