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Rules and Recommendations

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1. Introduction

In the context of the EU Project e-IMPACT it was identified the need to build a toolkit 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.

Activity 1 of the project aimed the development of the artefacts. They have two natures: documents and software. In Sub-Activity 1.1 the artefacts were identified, and the ones that are documents were developed.

The present document is included in the list resulting from the identification process (done under SubAct 1.1, Task 1.1.1). Its aim is the **description of a set of Rules and Recommendations** in order to provide a common ground of understanding for the messages' usage.

> **Important:**   **Provide a common understanding.**

Having a common ground has several advantages:

- Allows a quicker path to join an existent community, whatever the nature and scope of "community".
- Helps with the adoption process, mainly for new adopters if they interact with partners that already use e-Freight and follow the same rules.
- Provide "ready to use" answers and solutions to transversal doubts.

Of course that the "more common" there is, "less tailor made" exists. That can provoke a non-adherence posture since a potential adopter may not identify his/her business situation with what is ruled or recommended.

Care must be taken establishing the boundaries that (mostly) rules and recommendations define. A balance between providing a clear orientation / guidance on one side, and freedom to cope with each situation particulars' on the other is necessary to avoid a strict and clear situation, but useless or with low adherence.

As more e-Freight adoption projects are implemented, lessons learned provide valuable information in order to assess the balance achieved. Changes to the content of this document are expected, and even desirable, to provide a better set of rules and recommendations to other adopters.

1.1   Audience

This document is to be used by everyone interested or involved in the adoption of e-Freight as a document interchange format, whether another existent system is already in place or not, and whether the adherence to the UBL v2.1 business processes' is intended.

It is important to have deep knowledge of its own business scenario, context, requirements and data, where e-Freight is being applied. This will allow to align with the example.

It is useful to have some basic knowledge mainly on data validation and process specification.

1.2   Complementary Documents

By the nature of the toolkit, this document is complemented by other documents. The "e-IMPACT_Fundamentals" and the Mapping Templates[1] are the most relevant ones to consider. In the "e-IMPACT_Examples" document it can be found a possible way to get guidance from this document.

1.3   Terminology Clarification

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 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 clarity 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.

2. Background

In the recent years, "a number of EU funded research and development projects have been addressing the issues of information and communication technologies in transport and logistics"[2]. One of these projects is e-Freight, and one of its results was a common framework containing the definitions of a set of messages to support business documents interchange between several actors in the logistics and transport business.

This common framework was incorporated into ISO/IEC 19845 – "Information Technology – Universal Business Language Version 2.1 (UBL v2.1)"[3]. UBL v2.1 models the processes and defines the documents supporting the interaction between logistics actors.

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[1] Made of "e-IMPACT_Mapping_Template_Manual" and the "e-IMPACT-... – MapTemplate - …" files.
[2] Pedersen, Jan Tore – "*One Common Framework for Information and Communication Systems in Transport and Logistics – Facilitating Interoperability*", June, 2011.
[3] UBL v2.1 can be found at http://docs.oasis-open.org/ubl/UBL-2.1.html.

However there are three issues that need to be addressed in order to transform these results into practical solutions:

- e-Freight itself defines extensions to the definitions in UBL v2.1, both in terms of the existent messages in UBL and in terms of additional messages, since not all the common framework was included in UBL v2.1[4].
- Simultaneously e-Freight messages included in the UBL v2.1 are a subset of the corresponding messages in UBL v2.1 since not all elements of the standard are used in e-Freight.
- It is difficult to apply the e-Freight definitions into practice mainly in situations of existent messages interchanges processes, lack of knowledge or experience in an adoption process of standards, and limited resources.

To address these issues, e-IMPACT project has as one of its goals the development of a toolkit containing a set of artefacts or tools. The choice of which artefacts to include was done in the context of Task 1.1.1, in Sub-Activity 1.1 of Activity 1 of e-IMPACT. A future adopter of e-Freight can use the artefacts in the toolkit that he finds convenient when going through the process of adopting e-Freight.

One of the identified artefacts is a set of rules and recommendations to assist the adopters in handling with the large range of possible uses that e-Freight allows. This way an alignment is created allowing several partners (existent or new) in a same community to participate and benefit from a particular implementation.

Another purpose is to provide additional detail to the processes involving the exchange of messages. This detail will help easier interpretation of messages contents mostly in "dialogue" situations, and will allow efficient processing routines to handle inbound messages.

Example:	*In a TransportationStatus message, both UBL v2.1 and e-Freight provide an element to identify the TransportationStatusRequest. But, its usage is optional.*
	However it can be useful for the requestor (the one "who asks") to be able to easily identify the context applied to a received status, without having to go through all contents of the TransportationStatus. In other words, to match the "answer" with the "question".

3. The Problem

UBL v2.1 allows a wide range of the usage of each message contents. Actually it has enough flexibility to allow the implementation of incompatible messages by having, for example, different usages of the structure or different elements' usage.

e-Freight Common Framework restrains this flexibility, mainly if the Core Profile[5] is considered. Two main measures allow this: the exclusion of use of composite and simple elements, and by fixing

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[4] However it is known that steps are being taken in order to incorporate the missing issues in a future revision of UBL.

[5] See "e-Freight_Mapping_Template_Manual", section 5.1.

cardinality of some elements.

Although UBL v2.1 defines the business processes where each message is applied[6], it does not define detailed used of the messages in each process. Elements to use, optional or required, when to use, and source of data for the messages, are examples of the open questions that even e-Freight, being more restrictive, does not answer.

The rules and the recommendations presented here intend to provide guidance to the adopter on the matters which e-Freight nothing says.

The rules define strict usages of the messages and the elements in order to set a common ground for some behaviour of the exchange messages in general.

The recommendations provide advice on practices to be followed in order to have global efficient processes.

The major concern of this tool is the interaction between parties using messages in a coherent way, from a global business process perspective. Even if for that, some rules or recommendations are defined over particular elements.

4. Rules

Rules are a set of measures to enforce a determined usage of the messages and elements, eliminating or strongly reducing the ambiguity of usage and behaviour of the messaging exchange process.

They differ from the Validation Rules because the focus is the whole process, even the rule refers to a specific element.

	Number: **RL 1**
Designation:	RL 1 - Message chaining – latest information to consider.
Description:	On receiving a message of the same type and relating with the same business transaction of a previous received message, but with a data/time of issue previous to the previous received message, then ignore the received message.
Background:	e-Freight does provide a specific mechanism to ensure that sender and receiver can always have the same message sequence over the same document synchronized between them.
	Some messages have element DocumentReference present at header level. This element could be used by the sender to place the id of the previous sent message related with the same transaction. Then the receiver could use this to understand how the information changed. But the presence of this element is not universal.
	Only based on the date/time of issue this can be achieved.

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[6] See ISO/IEC 19845, Chapter 2.

Example:

Suppose that TransportationStatus messages are being sent under the same TransportationStatusRequest and TransportExecutionPlan. On the same day, the sender sends this sequence:

Message 1 issued at time 1 -> Message 2 issued at time 2 -> Message 3 issued at time 3

where time 1 < time 2 < time 3.

However, the receiver gets the following:

Message 1 issued at time 1 -> Message 3 issued at time 3 -> Message 2 issued at time 2.

If the receiver take some conclusions or mirrors in its system the contents of Message 2, the outdated information will be consider. To avoid this, Message 2 should be ignored according to the Rule.

Number: **RL 2**

Designation: RL 2 - Elements to provide unequivocal message identification.

Description: At least, messages should be identified by the contents of the following elements: ID, IssueDate, IssueTime and SenderParty.

Background: Either e-Freight and UBL v2.1 defines ID as "An identifier for this document, assigned by the sender.". This means a receiver can receive different messages from different senders having the same ID, potentially creating collision problems between different messages of several senders or between messages of the same sender.

Number: **RL 3**

Designation: RL 3 - Required usage of elements ID, IssueDate, IssueTime, Sender and ReceiverParty.

Description: The elements ID, IssueDate, IssueTime, SenderParty and ReceiverParty must be present in all messages with values.

Background: -

Number: **RL 4**

Designation: RL 4 - Transport equipment numbers.

Description: Equipment numbers must be transmitted as contiguous alpha-numeric value as shown on the actual equipment, including prefixes and actual numbers.

Example: ANNU2341234.

Background:	This is based on ITIGG Recommendation D4/G20, expressed in the document "Principles and Rules for the implementation of transport EDI messages – General Recommendations, version 2.1, D4/ITIGG/104/v.200, 2001, March".
	Equipment numbering standards, like ISO 6346, among other things, define the format for the identification of equipment. However on of the major concern is the visual aspect of the identification on the equipment itself (characters size, alignment, separators, etc).
	In the electronic data exchange context, "visual" is not the main issue, since it will be a computer that has to "see" this identification. To accelerate data processing, it is of the more useful to have a format based on simple but rigid rules. This ensures that two different representations of the same sequence of letters and/or numbers actually represent the same.
	Example: identifications like ANNU 234123-4 or ANNU-234123/4, or any other variation must be sent in the e-Freight messages as ANNU2341234.
	It is up to the sender or the receiver systems to have the visualization masks in theirs application interfaces for the users.

Number: RL 5

Designation:	RL 5 – Period boundaries.
Description:	The StartDate value in element Period, can't be higher than EndDate.
Background:	No time period starts after its end.

Number: RL 6

Designation:	RL 6 – Periods between transport events.
Description:	The EndDate value in element Period of a particular transport event must be equal or lower to the StartDatevalue in element Period of a following transport event.
Background:	---

Number: RL 7

Designation:	RL 7 – Transport event periods between shipment stages.
Description:	The EndDate value in element Period of the last transport event expressed in a shipment stage must be equal or lower to the StartDate value in element Period of the first transport event of a following shipment stage..

Background:	---

5. Recommendations

Recommendations are measures advised to be adopted. Although not so "strong" as rules, they provide guidance in usage of the messages, and adding clarification to elements in particular contexts.

Some recommendations may be applicable only to a subset of the e-Freight messages. These situations are expressed in the recommendation.

	Number: **RC 1**
Designation:	RC 1 - Additional element for message identification.
Recommendation:	When adequate, message identification should consider the type of the message itself.
Background:	-

	Number: **RC 2**
Designation:	RC 2 - Elements to provide references' identification.
Recommendation:	Whenever possible use elements IssueDate and IssueTime in DocumentReference to identify a reference.
Background:	This minimizes the collision of references, allowing the receiver to identify the correct reference.

	Number: **RC 3**
Designation:	RC 3 - References to the requests' identification.
Recommendation:	Refer the request id in messages replying to request.
Background:	Some messages of e-Freight made pairs of the type "question-answer". These pairs are:

- TransportServiceDescriptionRequest – TransportServiceDescription
- TransportExecutionPlanRequest - TransportExecutionPlan
- TransportationStatusRequest – TransportationStatus
- TransportProgressStatusRequest – TransportProgressStatus

Some of these pairs are on a one-to-one basis. Example: for one

TransportServiceDescriptionRequest sent to a logistics service provider, one TransportServiceDescription is sent back to the logistics service client. Others are one-to-many. Example: For a TransportationStatusRequest sent to a logistics service provider, several TransportationStatus may be sent back to the logistics service client.

It may happen that the same requestor has several messages of the same type being exchanged with the same provider, mainly in situations of high business volume between them. Example: the existence of several requests on transportation status related with different but currently occurring goods flow.

On the provision of status information, the provider should indicate the corresponding request for the requestor be able to match the status with the request, and all other related information.

Number: **RC 4**

Designation:

RC 4 - Format for the values in ID elements of the messages at header level.

Recommendation:

It is recommended the inclusion of the year of issue followed by the initials of the message name in the ID elements of the messages, and a sequential number, with a total limit of 35 character for the whole value. The "-" should be used when the number of initials is less than 4. Spaces should be avoided.

Examples:

- `2016TS--000000000000000000000009514`
- `2016TEPR000000000000000000003255941`
- `2016TSD-00000000000000001027725260`

Background:

Element ID in the e-Freight messages has no theoretical limit by definition. However in practice it exists due to several factors like, the machine architecture where the application runs, the programming language in which the application is written, the age of the application, etc. This may be a bigger problem if two parties want to exchange messages but the respective IT systems deeply differ in respect to the mention factors.

The limit of 35 characters is present in some wide used syntaxes for electronic message exchange.

With the New Year the sequential numbering should be reset.

Number: **RC 5**

Designation:

RC 5 - Elements with references to elements of the same type.

Recommendation:

When the definition of an element includes an element having the same definition, in the form parent/child, it is recommended that:

- If the enclosed element data is needed to the receiver for him to adequately provide the service and/or fulfil legal requirements, then all needed data in the enclosed element should be provided.
- If the enclosed element data is not needed for the receiver, then just provide the enclosed element identification and/or other references for follow up of the service execution.

Background:	The e-Freight Full Profile[7] messages' definitions have some elements that have elements of the same type in their own definition. For example the Consignment element definition contains composite element ChildConsigment which is defined by Consigment.

In theory this means an endless number of levels of consignments inside consignments can be represented in a message.

In practice it means that any number of levels can represented depending of the number parties involved in a logistics service, mainly if transport is used.

Apart of the technological challenges presented to represent such reality, mainly to legacy systems, the point is to determine from the business perspective:

    a) The required number of levels;
    b) The required data in each level.

Each situation of application of e-Freight is unique.

The major goal is to achieve a balance between volume of data exchanged and its purpose on each level, assuring that all needed data, but not more, is available to who needs it. |

<div align="center">Number: RC 6</div>

Designation:	RC 6 - Use of UTC Time.
Recommendation:	It is recommended the use of UTC in all elements of type Time in the e-Freight messages.
Background:	This is based on ITIGG Recommendation D4/G23, expressed in the document "Principles and Rules for the implementation of transport EDI messages – General Recommendations, version 2.1, D4/ITIGG/104/v.200, 2001, March".

As mentioned in the above reference, "this is considered to be particularly important in the following cases:

- When dates and times may be required by third parties further along the transport chain
- When the dates and times may be generated as procured by computer applications situated in geographical different location from both the sender and receiver of the message |

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[7] See "e-Freight_Mapping_Template_Manual", section 5.1.

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In practice the time must be written in the messages considering the time zone deviation.

Example: message issue time was by 15h 36m 02s at Panama City, it should be written like

<cbc:IssueTime>21:36:02-06:00</cbc:IssueTime>

Number: **RC 7**

Designation:	RC 7 - Use of code values.
Recommendation:	In situations that there is a pair of elements of the type Something – SomethingCode, it is recommended the usage of the SomethingCode. Example: in DocumentReference element there are DocumentType and DocumentTypeCode. The order of preference of usage is: 1. DocumentTypeCode with a code value contained in the reference code list. 2. DocumentTypeCode with a temporary code value agreed by a set of parties. 3. DocumentTypeCode with a dummy value, complemented by a description in DocumentType.
Background:	The usage of codes avoids the problems resulting from languages characteristics. Only if no proper code value exists or a temporary one is not defined by a set of parties, in the context of a governance group, the usage of free text is needed.

Number: **RC 8**

Designation:	RC 8 - Use of element ContainedInTransportEquipment for bundled equipment.
Recommendation:	In the scenario of medium or large transport equipment (like returnable pallets or containers) movement the following situation applies. It is recommended that for bundled equipment (such as a bundle of flat rack containers or collapsible flat rack containers) the element ContainedInTransportEquipment of TransportEquipment is used. It is recommended that a distinction be made between the logistics service provider (LSP) view (like a carrier) and the logistics service client (LSC) view, with regards to the bundle of items: • The LSP is focused on the bundle comprising of all those pieces of equipment that can be handled as a single item. The identification number of the leading piece of bundled equipment is in element ID of the TransportEquipment. The identification

numbers of the other pieces of bundled equipment are to be specified in element ID of ContainedInTransportEquipment.

Example:
…
<TransportHandlingUnit>
  …
   <TransportEquipment>
    <ID>POLU1234567</ID>

    ….
    <ContainedInTransportEquipment>
     <ID>POLU1234577</ID>
    </ContainedInTransportEquipment>
    <ContainedInTransportEquipment>
     <ID>POLU1234566</ID>
    </ContainedInTransportEquipment>
    <ContainedInTransportEquipment>
     <ID>POLU1234555</ID>
    </ContainedInTransportEquipment>

    ….
   </TransportEquipment>
  …
<TransportHandlingUnit>
…

- The client's focus is each and every individual piece of equipment in the bundle that is to be transported.
  In this view all pieces of equipment in the bundle are equal, and each piece of equipment is specified in element ID of TransportEquipment. A special reference may be used to specify the bundle. This bundle number is used in each TransportEquipment element that describes one piece of equipment.
  TransportEquipment does not have a specific element for references. If this bundle number is absolutely required, use the Description element of TransportEquipment.

Example:
…
<TransportHandlingUnit>
  …
   <TransportEquipment>
    <ID>POLU1234567</ID>

    …
    <Description> ATW:PILE123</Description>

    …
   </TransportEquipment>
</TransportHandlingUnit>
<TransportHandlingUnit>

  …
   <TransportEquipment>

```
            <ID>POLU1234577</ID>
            …
            <Description> ATW:PILE123</Description>
            …
          </TransportEquipment>
        </TransportHandlingUnit>
        <TransportHandlingUnit>
          …
          <TransportEquipment>
            <ID>POLU1234566</ID>
            …
            <Description> ATW:PILE123</Description>
            …
          </TransportEquipment>
        </TransportHandlingUnit>
        <TransportHandlingUnit>
          …
          <TransportEquipment>
            <ID>POLU1234555</ID>
            …
            <Description>ATW:PILE123</Description>
            …
          </TransportEquipment>
        </TransportHandlingUnit>
        …
```

The usage of the letters ATW is recommended for two reasons:

- Define a common identifier independent of the local language of the sender and the receiver.
- It corresponds to the EDIFACT qualifier meaning "Flat rack container bundled identification number".

Background:	This is based on ITIGG Recommendation D4/G62, expressed in the document "Principles and Rules for the implementation of transport EDI messages – General Recommendations, version 2.1, D4/ITIGG/104/v.200, 2001, March".

	Number: **RC 9**
Designation:	RC 9 - Inner references sharing.
Recommendation:	On passing data related with a logistics service, mainly if transport is involved, include all references associated to the goods items benefiting from the service.
Background:	In today logistics activities it is common that a particular goods item movement is associated to several references: a reference provided by the manufacturer regarding the shipment, a reference provided by the freight forwarded due to the service contract established with the manufacturer, a

reference provided by the shipping company due to the contract with the freight forward, a reference between shipping companies due to slot agreements, and so on.

On the other hand, mainly in multimodal transport, the deeper we look into the transport chain, more goods items are associated with a single reference. Cargo aggregations to achieve economies of scale is a major reason for this. At this level the current practice is not to share the "smaller" items references and established all communication based on the "big" items references.

Example: a freight forwarder establishes a booking with a shipping company for the transport of 10 items (where an "item" is a thing or a set of things) each with its own reference, and resulted from contracts with 10 manufacturers. These items are to be transported by sea in one container. The shipping company gives a new reference (example, the booking number) to this transport service. But the shipping company will ignore all the other 10 references. That means if the shipping company it asked to provide information (current location for example) on a single of the 10 items, it will not be able to do so. If the manufacturer is not aware of the booking number between the freight forwarder and the shipping company, or the container id, it will be unable to enquire the shipping company. Additionally, in relation to reporting to authorities, mainly Customs, the shipping company can only provide the booking number, the container id, and the container contents as a whole. Customs will be unable to associate efficiently the things in the container with each manufacturer without taking extra steps. Even another party apart from the ones mentioned, will not be able to follow a particular item. The client of the manufacturer, that probably only knows the reference provided at the factory, will be unable to query anything. He must know the freight forwarder reference or the booking number that are references established, or applicable, in a context where he is not included.

Passing through the logistics chain all the applicable references related with particular service, allows visibility that will promote better planning and contingency reaction to deviations.

	Number: **RC 10**
Designation:	RC 10 – Avoid excess of data sharing.
Recommendation:	Share the data that allows added value in the whole process and not more than that even if you have it.
Background:	Data sharing between all parties involved in the logistic service planned and executed over a goods item is needed to properly define and contract the adequate service, follow its execution and fulfil some legal requirements.
	Also each participant in the service adds its own value that it is increased by the volume of required data that it needs to use but does not have to input, but decreased if too much data is available but not needed. Possess the right data at the right time increases operational performance.

But sharing data does not mean "send everything to everyone". If a set data should be shared between party A and party B, and other set of data should be shared between party A and party C, it doesn't mean that the both sets of data should be shared between party B and party C, for two reasons.

One is confidentiality. Just because some data needs to be shared between party A and a public authority, it does not mean that data is public or can be shared with party B.

The other is "noise" and cost. Too much data, especially if not needed, means an extra cost in keeping and storing it, and it doesn't add nothing to the role that a party has in the whole supply chain.

Keep an open posture on sharing data with your partners, by providing and by requiring to avoid excess of input and resulting errors, but invest time with your partners to choose the right elements to share.

6. Example of Application

Examples of the Rules and Recommendations following can be found in the tool "e-IMPACT_Examples", in particular section 3.4.

The examples are presented in the context of a hypothetical e-Freight adoption process. To make them interesting, the reader is driven through a business story where an analyst has to make some options on adopting e-Freight regarding the overall business goals.

The rules and recommendations are not alone in the Toolkit. The examples take this into account regarding specific points.

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