EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR MARITIME AFFAIRS AND FISHERIES

FISHERIES POLICY ATLANTIC, NORTH SEA, BALTIC AND OUTERMOST REGIONS
Data Management

MARE.C4/CL

INTEGRATED FISHERIES DATA MANAGEMENT PROGRAMME

IFDM LIFECYCLE MANAGEMENT

VERSION 1.1

1. INTRODUCTION

This document describes the different aspects of the lifecycle management of FLUX data exchanges and data exchange systems and solutions to tackle related issues.

It replaces an earlier document agreed[1] by the ERS and Data Management Working Group in 2016 and is based on experience gained with the implementation of several FLUX domains since then.

This document is drafted by DG MARE and is discussed and agreed by the ERS and Data Management working group.

[1] IFDM Recommendation 12 of 26-05-2016 on the FLUX-ERS Life Cycle Management

2. CONTEXT

FLUX data exchange systems are constituted of three **building blocks**:

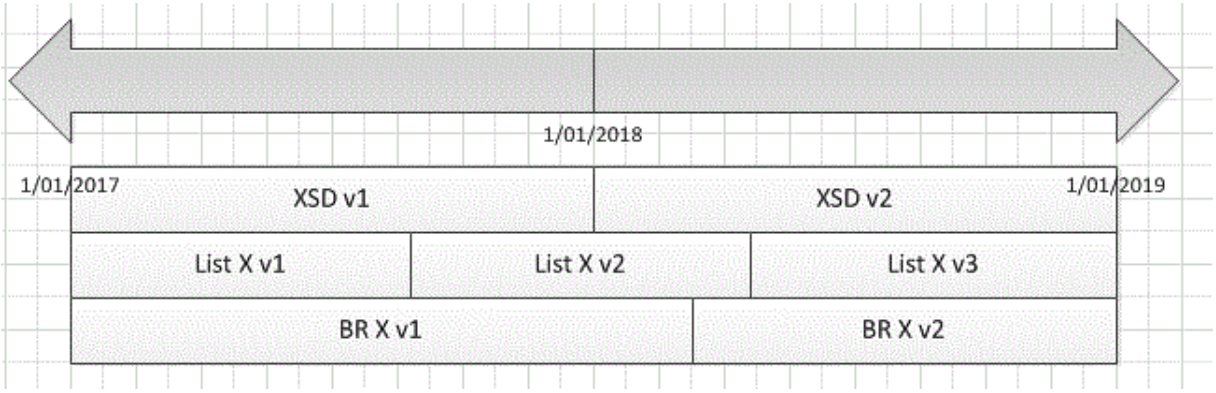
(1) The **format (XSD)** is defining the data elements and structure of FLUX messages for exchanging business information between parties. The XSD is the technical description of the data exchange format of the UN/FLUX standard for a given business domain[2]. The standard is documented in the **Business Requirements Specification** (BRS) document. There can be one or more XSDs per business domain;

(2) The **business rules (BR)** applied by the validation process to verify the quality of the information exchanged are described in **implementation documents** together with the processes governing the exchanges;

(3) The **code lists** used by the business rules to verify that the data in messages contains valid business data. The **Master Data Register (MDR)** is the reference for all code lists.

Each of these elements can be modified independently and theoretically at any moment. Changes in formats and business rules are always reflected in the implementation documents. Changes in code lists are reflected in the Master Data Register (MDR). Each modification enters into force upon proposal of the Commission and after having obtained consent of the MS as reflected in the corresponding IFDM recommendation.

The example below is a typical lifecycle where changes for each of these three elements are introduced within a period of two years.



Given the fact that it is impossible to fully synchronise the switchover from one version to another among for all Member States, in many cases a transition period will be needed (see section4.2). Here, a transition period is defined as the time between the moment when the new version is allowed to be used and when the new version becomes mandatory to be used.

[2] Domains (situation 02/2020) are VMS, Fishing Activities, Sales notes and Transport declarations, MDR, Vessel, Authorisations, Inspection and Surveillance domain, Aggregated Catch Data Reports

3. CHANGES TO THE BUILDING BLOCKS

The ERS and Data Management Working Group may decide to change (the version of) the UN/FLUX standard format used, to modify, delete or add business rules and to update code lists.

3.1. The data exchange format (XSDs) for business information

Business information (data) is exchanged between FMCs using XML messages that are complying to a specific data exchange format (XML Schema or XSD). Even though the EU is introducing and promoting the use of UN/FLUX as a single standard format for all exchanges of fisheries related data, there may be a need[3] to update this standard format or even use (temporarily or permanently) different versions of it in different contexts: for example, it could be necessary to use a different version of the standard when exchanging with a 3rd party (RFMO, SFPA). There are a number of approaches to deal with such changes:

3.1.1. Backward compatibility

One version of a format is only backward compatible if no new mandatory data elements are added and no data elements are removed. This means that XML messages that are valid according to an earlier version of the XSD will also be valid when validated against a newer XSD.

Any XSD of the UN/FLUX standard is the result of a standardisation process handled by the UN/CEFACT[4] library maintenance group.

As part of that standardisation process, updates of the Core Component Library (CCL[5]) and XML schemas (XSD) are being released twice a year. Each release has a new version number for the XSD's as well as for the associated namespaces[6] used within those XSD's. The version numbers change, irrespective of changes to the data model[7]. As a consequence all data elements previously defined do no longer exist in the newer version of the XSD.

---

[3] For example when new reporting requirements, for exchanges within EU or with 3rd parties, are introduced that cannot be exchanged with the current XSD.

[4] https://www.unece.org/cefact.html

[5] CCL or Core Component Library is a library (ic. Excel file) containing the definitions of elements and attributes defined in UN/CEFACT standards and used in the different XML schema (XSD) files. The FLUX XSDs and the "components" they contain are only part of the components defined by UN/CEFACT. Eg. When referring to UN/FLUX based on CCL19A, it means the standard including XSD files related to the FLUX standard, based on components defined in the CCL published in the 1st Semester of 2019.

[6] XML namespaces are used for providing uniquely named elements and attributes in an XML document.

[7] Note that in addition there is no guarantee that the order of the data elements in the XSD remains consistent across versions. UN/CEFACT should be consulted to confirm whether or not this is the case for subsequent versions of the XSD's they release.

This approach to versioning makes backward compatibility of newer UN/FLUX XSD's de facto impossible, even if there are no changes to the data elements or if newly added data elements or attributes are defined as optional. This means that XML messages that are valid according to an earlier version of the XSD will no longer be valid when validated against a newer XSD.

Due to UN/CEFACT's approach on versioning, UN/FLUX XSDs are never backward compatible. If the ERS group decides to move to a new XSD version, messages in the old format will be rejected by parties who have moved to the new format.

3.1.2. Business systems capable of mapping to different exchange formats

The mapping from business data to exchange formats is the responsibility of the business system. The capacity to directly map[8] business data stored in a database onto any data exchange format depending on the party with whom to exchange is considered ultimately the best and most future proof solution. It allows to ease phasing in a new exchange format, respecting the fact that not all parties will be able to implement the required functionality at exactly the same time.[9]

In order for this approach to be an option for migrating to a newer version of the exchange format, all parties migrating before the end of a transition period must be able to support both the old and the new formats for the same domain and context for the (rest of the) transition period.

All business systems (MS and COM) will have to be adapted to allow to directly map business data onto any data exchange format.

[8] Some Member States have built systems that can deal with multiple data exchange formats for the same business data, even if they are very different: eg. EU-ERS3.1 and UN/FLUX.

[9] Besides the possibility to use this approach to bridge a (short) transition period between 2 consecutive versions, it also allows having different exchange formats operational in parallel for the same type of business data. This is useful for exchanges with 3rd parties where more or less simultaneous migration of all 3rd parties is complex and not realistic. Some 3rd parties may not be able or willing to move to a new or the same version of the exchange format used in EU.

3.1.3. Use of convertors

Awaiting the implementation of direct mapping by all Member States, DG MARE could provide a convertor "in-between[10]" the business process and the FLUX TL. This convertor could be used for a limited period of time by those parties not having migrated yet. The development of a convertor may not always be possible and is very much depending on the changes in the exchange format (XSD) and the level of backward compatibility in terms of business data requirements. A convertor may also not be suitable if critical business data would be lost or not available when converting[11]. It will be evaluated on a case by case basis if a convertor is suitable and feasible.

It is assumed that as long as it concerns newer versions of UN/FLUX the risk of substantial changes would be rather limited in the coming years. Although there is no absolute guarantee due to the UN/CEFACT standardisation process, the EU's participation in this group mitigates this risk.

Pending the ideal solution of direct mapping by all MS, a convertor will be provided by DG MARE where feasible and appropriate.

3.1.4. Parallel systems

In the rare cases where mapping from business data to different exchange formats or a convertor are not a solution, the use of parallel[12] systems is the only option remaining. This option is considered as rather inconvenient as it requires maintenance of two separate systems covering the same business data. In addition, depending on the party with whom the data is exchanged, the business data will be in one or the other system, unless the party has implemented some data synchronisation process between both systems.

The solution with parallel systems is used where the other options don't work.

A change in the format/XSD requires the implementation documents to be updated accordingly; the major version number will be changed. Such change will also entail an updated dataflow name for the exchanges over FLUX TL. Exchanged XML messages using one or the other data exchange format will be distinguishable by their namespaces (business message) and dataflow name (transportation layer message).

[10] An example of a convertor "in-between" business process and TL is the NAF convertor.

[11] This has been the case for the migration from EU-ERS3.1 to UN/FLUX.

[12] Parallel systems are systems that are independent from each other but they deal with the same business data.

3.2. The Business Rules (BR)

Implementation documents describe the data exchange processes and validation business rules. The general principle is that messages received by a party must be validated according to the business rules that are/were active at a reference date. The actual date to be used as a reference[13] depends on the domain and is explained in detail in each implementation document.

For each FLUX domain (and where applicable the context) the Master Data Register (MDR) hosts the list of business rules and their validity period.

For each business rule, the following information is provided:

- A BR identifier as mentioned in the implementation document;
- The period (start date/end date) during which that BR is applicable.

The lists containing business rules are accessible through MDR on Europa website and through web services as described in section 3.3.

Parties must ensure that their systems correctly combine the reference date (see above) and the validity period defined for each business rule so that the correct rules are applied to the relevant (parts[14] of the) content.

Changes to the business rules require the implementation documents to be updated accordingly; the minor version number will be changed, unless changes are made together with a format change (see section 3.1). According to the current dataflow (DF) naming practice, a change in a BR will not entail an updated dataflow name for the exchanges over FLUX TL for a particular context. Exchanged XML messages cannot be distinguished and both "old" and "new" rules may apply to the same message.

[13] eg. the reference date can be the content or report creation date (Fishing Activities, Sales notes) or the actual business content (ACDR).

[14] eg. individual FAReportDocuments in one FLUXFAReportMessage

3.3. The Code Lists

The Master Data Register (MDR) hosts the code lists used in FLUX domains. The implementation documents also provide a list of applicable code lists used in a particular domain. Code lists are also used by validation systems to validate the content of exchanged messages.

Messages received by a party must be validated according to the business rules[15] and codes that are/were active at the reference date (see section 3.2).

For each code in a list, the following information is provided:

- The code itself and additional data (i.e. description);
- The period (validity start date / validity end date) during which that code is valid for business purposes.

The code lists are accessible in MDR on the Europa website. In addition MDR can be queried using MDR web services.

Calling the MDR web service[16] passing name of the code list and a date as parameters, will return the valid codes and related information that are applicable on that date.

The ERS and Data Management Working Group may decide to modify the content of code lists, to add new or remove existing ones. Whether or not the implementation documents must be updated depends on the type of change. Changes to the code lists containing the business rules, introduction of new code lists in the domain or phasing out existing code lists must be reflected in the relevant implementation documents. Other changes only affect the Master Data Register.

[15] See section 3.2.

[16] See P1000-10 MDR Implementation Document

4. TRANSITION FROM ONE VERSION TO ANOTHER

4.1. The approach

The proposed approach to any change that requires the implementation documents to be updated is to follow a predefined lifecycle (see section 5) and the related timing per domain. As explained earlier, transition periods will need to be used for the changeover from existing to new exchange formats and for business rules[17].

The actual impact of a change is highly depending on the actual implementation[18] the different parties have chosen for their systems. Small changes for one party may be much bigger for others.

4.1.1. Changes in the format (XSD)

Once the direct mapping solution described in section 3.1.2 is implemented, changes to the exchange format will be easier to implement and all Member States will need similar effort and time to implement those changes. Furthermore, such systems will be able to cater for different exchange formats which may be unavoidable in an international context where EU is just one (contracting) party. While within the EU only version of the standard will be used, the decision on which version of the standard to be used is not only in the hands of the EU. It seems appropriate to strive for alignment of the versions used, while avoiding too frequent updates of the version being used within a certain context.

Pending the implementation of direct mapping and where conversion is appropriate (see section 3.1.3), DG MARE will develop such convertor for use during the transition period by Member States that have not yet implemented the new exchange format.

For situations where conversion is not possible or appropriate, parties migrating before the end of the transition period must maintain parallel systems and support both the old and the new exchange formats for the same domain.

For business systems hosted centrally, the more cost-effective solution will be chosen between implementing support for simultaneous multiple data exchange formats and developing a convertor to be used during a transition period. The analysis will be done on a case-by-case basis by DG MARE.

[17] For a centralised system a transition period may not be needed at all (eg. ACDR).

[18] Eg. Some Member States need developers to intervene in order to change the severity of a business rule or to activate or deactivate them; for other the intervention would be limited to a synchronisation of the MDR tables containing the business rules with their validation system. Other approaches may exist.

4.1.2. Changes in the rules

For changes related to the business rules, including new requirements in terms of business data (irrespective of whether this requires a format change), new rules can only be blocking errors once all parties have migrated completely to the new system. During a transition period, new rules will remain disabled or defined as warning only.

4.1.3. Changes in code lists

In case the change is limited to one or more code(s) in a code list and there is no impact[19] on any business rule, the change will not be reflected in the implementation document and so the IFDM lifecycle doesn't apply. As a consequence, such changes do not require a transition period and are not bound to the lifecycle timing. On the agreed date, an update of the code list in the validation system is sufficient.

4.2. The transition period

A "transition" from one version of a system to another is only relevant within one domain and context. A transition period is the time between the moment that the new version is allowed to be used and the time when it is mandatory (legally) to be used by all parties. It has to be noted that if UN/FLUX is introduced for a new business domain or in a new context, no transition periods apply.

Prior and during the transition period proper testing of the systems should take place before completing the migration and rolling out a new version of the system in production. Sufficient time and resources need to be dedicated to this by all parties.

4.2.1. Start of the transition period

The "Allowed To Use" (ATU) date is the agreed time when exchanges can take place according to the new specifications and/or format. In practice, it starts when the first party starts exchanges using the new system.

In order to avoid putting additional burden on parties that comply with the agreed timelines and to avoid imposing requirements on systems to be able to support multiple data exchange formats for the same domain and context, the following actions apply as from the "Allowed To Use" (ATU) date:

[19] No impact means that the rule does not mention explicitly the code being changed in question. Rules for verifying presence of a code on the code list specified in the *listID* or *schemeID* attributes of the data elements in the XML messages are not considered as being impacted if the contents of the code list change.

- In case business rules have been deleted, these rules will no longer be applicable. Parties not having migrated will need to disable[20] these rules.

- In case new business rules (errors) have been added or the severity of existing business rules have been changed to "error", their severity[20] level will be a warning during the transition period.

- In case existing business rules (errors) have been changed to warnings, parties not having migrated will have to change[20] the severity of these rules.

- In case the migration includes a format (XSD) change, conversion between both formats is possible and it is decided to use a convertor[21], it must be installed and activated by the parties that have not yet migrated.

4.2.2. During transition

In case a convertor is used for the transition period, only the new data exchange format will be valid and must be used for all exchanges. The FLUX TL dataflow name (DF) corresponding to the "old" format will be disabled. Parties not having migrated yet will have to operate the convertor until they have migrated to the new version.

During the whole transition period, some rules will have a lower severity (warning instead of error). The business rules code lists will have a specific version number with a validity period, corresponding to the agreed transition period. All rules (including their attributes like severity etc.) that are changed[22] for the transition period will also have their validity period corresponding with the transition period.

4.2.3. End of the transition period

The "Compulsory To Use" (CTU) date marks the end of the transition period. As from CTU date:

- All parties must have migrated.

[20] This could be implemented using the Immediate Amendments procedure (see footnote 28).

[21] The convertor will be a process in-between the business process and the Transportation Layer. It will translate in both directions and there will be minimal impact (only configuration) on the business process and the TL node.

[22] Example: If the transition period is from TS to TE, a rule may be an "error" from T1 to TS-1 (before transition), then a "warning" from TS to TE (during transition) and then again an "error" from TE+1 to T2 (after transition).

- In case a convertor was used it will be decommissioned[23]. Only the new data exchange format (XSD) is allowed to be used for the exchanges.

- The new/updated rules will be fully activated, entailing a new version of the business rules code list where applicable.

- All new/updated codes will be fully in force[24].

[23] It will be analysed whether converted messages exchanged beyond the transition period can be blocked. For this they will have to be clearly identifiable.

[24] Note that old codes keep their (expired) validity period. They remain applicable for validating "old" reports based on the reference date as explained in section 3.3. This also applies to code lists containing business rules.

5. LIFECYCLE TIMING

Operational business and data exchange systems require maintenance and need to evolve because new reporting requirements emerge, experience leads to insights for improvements and mistakes in the specifications or implementation are detected that prevent systems from functioning properly.

Changes to the business contents, data exchange formats and business rules are reflected in the implementation documents. Changes to code lists may affect implementation documents but in general they are not (see section 3.3). In any case all changes affect the system or part of it.

During an initial start-up phase of a new system or business domain it can be expected that issues like system bugs, unclear specifications or edge-cases will be detected. Especially when starting to test with other parties who may have had a slightly different reading of the specifications. It is important to ensure time and resources are available to be able to address such issues in a number of relatively short iterations. This is a normal process and has to be planned ahead during the project planning phase.

It is however important, after this initial start-up phase, that continuous updates to the implementation documents and operational systems are avoided. The changes to the three main elements described above should be minimised both in size and number and the aim should be to only address issues that are considered critical or blocking and that prevent proper functioning of the business.

The following yearly lifecycle will apply for all domains:

September - October: Discussions with MS on changes and planning

November: Recommendation (decision) on changes and planning

Domain specific

- December to ATU[25]: implementation and testing
- ATU to CTU[26] (max. 3 months): transition period, including testing
- CTU[26]: changes implemented in production

Issues can be reported and discussed throughout the year. DG MARE will pre-analyse the issues and include them in a discussion paper to be discussed in line with the timing presented above.

The aim of the yearly lifecycle is to include agreed changes all at once and that parties can plan ahead their development and testing resources.

[25] ATU: Allowed To Use date

[26] CTU: Compulsory To Use date

If during the year a blocking issue[27] is detected that requires urgent intervention, the agreed procedure on immediate amendments[28] will be applied, changing the rule's severity to warning or even disable the rule completely.

If one of the parties has identified a bug in their validation system rejecting valid messages, that party must disable the rule in question until the issue is resolved. It is important to minimize the time one or more business rules are being disabled.

It has to be noted that this lifecycle cannot be strictly applied for integrating new requirements stemming from an international context (SFPAs or RFMOs) or from newly adopted Regulations, as there might be legal deadlines that have to be complied with and that don't fit into the lifecycle timing. However, the intention is to also adapt the timing of these updates to the lifecycle to the extent possible.

In order to ensure proper operation of the FLUX exchange system as a whole it is important that all parties have sufficient maintenance budget and resources available to be able to implement updates agreed in the implementation documents as well as the immediate amendments according to the agreed timelines.

6. CONCLUSION

Issues with the management of an IFDM lifecycle requires adequate management, supervision and governance. It is important to have processes agreed and approaches towards updates clarified, both in terms of technical ways to address transitions as well as in terms of timing, frequency and resource planning for all aspects that relate to changes in the specifications and the related system updates.

The present document covers the approach to deal with changes for the three main elements that make up the FLUX data exchange systems: formats, business rules and code lists. The concept of business data is reflected in all three elements. The document does not cover aspects of the business systems that go beyond the data exchange and validation parts.

For business rules and code lists, the key issue is to use the concept of validity period and retrieve the correct definitions based on business information like the creation date and time of the report. Where a transition period is established, this will be reflected in the business rules and other code lists. During transition periods more relaxed handling of business rules will allow exchanging data compliant to old and new specifications.

For changes to the data exchange formats the most appropriate long-term solution is to decouple business data model from exchange format and to ensure that the system is capable of supporting deprecated formats at least during a transition period. When implementing data exchanges using UN/FLUX standards beyond EU

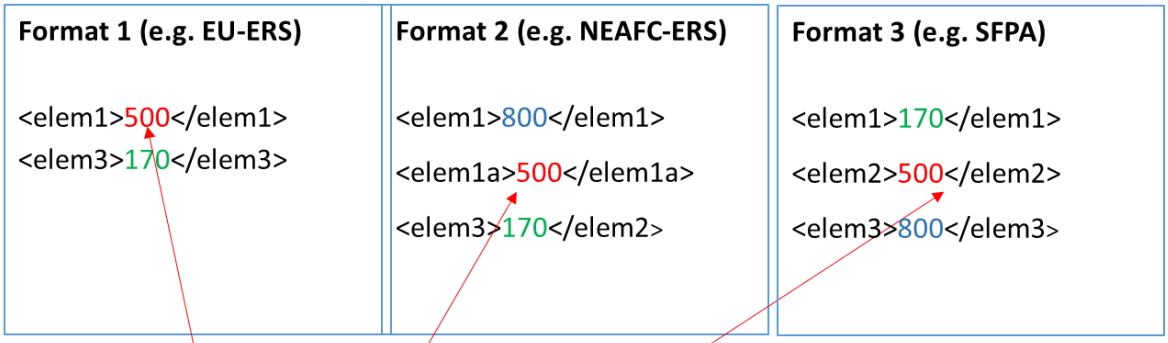
[27] eg. valid messages are being rejected by a business rule because the definition was incorrect or incomplete.

[28] Procedure discussed and agreed in ERS and Data Management WG meeting of January 2019. Disable a rule or change its severity within 2 working days.

context it is becoming increasingly important to have business systems capable of dealing with the different data formats for the same domain and to map the relevant business data to the appropriate exchange format depending on the exchange context. However, pending this, a convertor developed by DG MARE, will be used to ease the transition, where appropriate (eg. where format changes are limited).

In general it is commonly accepted that changes to the specifications (both rules and format) should be kept minimal. If changes are required, only the most critical and blocking issues will be addressed in order to ensure all parties can implement the changes within the foreseen timeframes. Budget and resources need to be allocated by all parties in order to maintain systems whereby evolutions are unavoidable. In addition, each new release of a system also requires an appropriate level of testing to ensure quality and continuity of the service.

ANNEX 1: SCHEMATIC REPRESENTATION OF DIRECT MAPPING OF BUSINESS DATA TO EXCHANGE FORMATS



Data stored in business system			
	Business data element "A"	Business data element "B"	Business data element "C"
Trip 1	500	800	170
Trip 2	…	…	…

"Direct mapping" means a business system can easily translate business data elements to different formats (different versions of the UN/FLUX standard).		
Business data element	Data element in Format 1	Data element in Format 2
A	Elem1	Elem1a
B	Elem2	Elem3
C	…	…