SEPA formats - an introduction to XML
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Introduction

The purpose of this document is to facilitate your migration process to SEPA Credit Transfers (SCT) and SEPA Direct Debits (SDD).

This document aims to help you to understand and to use the XML format for your SEPA transactions.

The EPC (European Payments Council) publishes various documents related to SEPA, including a data model reference, rulebooks¹, and implementation guides for both credit transfers and direct debits.

The EPC rulebooks contain the business requirements and rules for the operation of the SEPA schemes².

The implementation guidelines specify the SEPA core requirements that apply to the UNIFI (ISO20022) XML standards and cover mandatory bank-to-bank messages and optional recommended customer-to-bank messages. UNIFI ISO20022 is de facto the basis for the European Payments Council for creating the SEPA Credit Transfer (SCT) and the SEPA Direct Debit (SDD) guidelines.

All national bank organisations incorporate the EPC Rulebook into a country specific implementation guideline and add country specifics to the document to make it suitable for the local market.

Each local bank complements the implementation guidelines by adding a small appendix with bank specifics.

Indeed, although the guidelines should contain all information to create a correct financial message, we do believe more information is necessary to come to an efficient and smooth transfer with a satisfying end result.

The country and bank specifics do not in any way affect the XML structure as presented by the ISO20022 and EPC.

An additional success factor is the use of your current knowledge to achieve a correct SEPA migration. In this document we also want to give you information on how to create XML elements.

We conclude this document with the information on how ING can help you with testing.

We would like to draw your attention to the fact that ING cut-off times must be respected for a smooth processing of your transactions.

¹ A Rulebook is a collection of rules or prescribed standards on the basis of which decisions are made.
² A Scheme is a set of rules, practices and standards agreed between providers of payment services (SEPA Credit Transfers Scheme and SEPA Direct debit Scheme).
Introduction to XML

What is XML?

XML stands for eXtensible Markup Language: it is a set of rules for modelling documents in machine-readable form. XML provides a uniform method for describing and exchanging structured data.

XML is based on “mark up”3. It is a language which can be read more fluently than files with “fixed record length”.

Specifications:

• An XML document is a string of characters.
• Elements must be properly nested
• Every document must contain a single, unique root element
• Order matters
• Attribute values must be enclosed in quotes
• No repeating attributes in an element

For financial messaging however it is of the utmost importance that both parties understand the message perfectly. The sender and the receiver need to agree on how the message must be interpreted. The ISO20022 standard puts some additional rules and constraints to the use of XML messaging. In order to work with ISO20022 basic knowledge of XML is required.

What is a root element?

XML documents must contain one element that is the parent of all other elements. This element is called the root element. Each XML message must and can have only one root element.

– <root>
  – <child>
    <subchild>…</subchild>
  </child>
</root>

What are the specifications of a tag?

• XML tags are case sensitive.
• Tags come in three flavours:
  > start-tags: A start-tag begins by the “<” character and ends by the “>” character.
  > e.g. <section>
  > end-tags: In XML, all elements must have a closing tag (or end-tag). Each open tag must obligatory be closed by an end-tag “</”.
  > e.g. </section>
  > empty-element tags: These tags allow a programmer to make a fixed XML scheme where fields are left without a value, if no value can be supplied. This type of tags however it not allowed in the ISO20022 structure. If a tag is used, the correspondent data field may not be left empty. At least one character has to be filled in.
  > e.g. <section/>.
• Tags must not overlap
• Matching open/close tag
  > <Address> is a start-tag and </Address> is an end-tag. E.g.<PostCode>75002</PostCode>

How are tags well formatted?

XML is a language where only the data between a start-tag and an end-tag is accepted as ‘information’. This means there can be spaces or white lines between tags without a problem, although this will ignore the general idea of easy readable text. It is therefore recommended not to place spaces or white lines between tags.

On the other hand it is not allowed to put space in the tag itself. This will result definitely in an erroneous XML file. e.g.: <Street Name>

---

3 Text added to the data of a document in order to convey information about it.
How are data fields correctly formed?

A data field is the space between a start-tag and an end-tag, when there is no child-element. The characters in this space are considered as the value of the element. This value is the actual data that is key to your financial message.

e.g. <PostCode>75002</PostCode>

This data is subjected to two important conditions:

- **Character set:**
  In the first line of an XML document, the character set is defined. This character set defines which characters can be used in the data fields. The character set defined in the ISO20022 standard is the well-known UTF-8 set. This set is a rather small character set which allows the following characters to be used.

  a b c d e f g h i j k l m n o p q r s t u v w x y z
  A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
  0 1 2 3 4 5 6 7 8 9
  / - ?: () , '.' +
  Space

- **Length:** Every data field has a specific length. This can be a fixed length where a specific code should be filled in. This can also be a variable where a maximum length is defined. The minimum length for data fields is always 1. Empty fields are not advised.

- **Remark:** A space is a valid character. It is highly recommended to verify that the content of a data field follows directly to the start-tag and is directly followed by an end-tag.

e.g. <PostCode>75002</PostCode>
Element Status

What is the status of an element?
Some elements in the financial message lay-out are mandatory. Others are optional and can be used at your wish. It is useful to check these optional elements as they might contain a benefit for your payment and cash management business.

The indication whether an element is mandatory or optional can be found in the next point. In the “Message structure” chapter, we have taken the liberty to indicate some optional fields as recommended, because we strongly believe they can bring an advantage to your payment processing.

What is an occurrence?
This indicates how many times the element can be repeated. The number of occurrences is shown between square brackets.

- [0..1] shows that the element can be present 0 times or 1 time. > Element is optional.
- [1..1] shows that the element can be present only 1 time. > Element is mandatory.
- [1..n] shows that the element can be present 1 to n times. > Element is mandatory.

‘n’ is sometimes shown as ‘∞’, which stands for infinite.

The interpretation of the status of the data is influenced by an indication of “Or”. In that case two different sub children can be used for one child. Both are correct but have another impact and consequence. The two different sub children will be indicated in the occurrence as follows: [0..1](Or [0..1] Or)

What is an Index?
Every element in the ISO20022 standard is indexed with a number. The number is attributed chronologically based on 2 levels. The first level indicates whether it is linked to the header or the payment information. The second level of the number indicates the order in which each element must be offered. Although several elements are optional, when supplied the element must be supplied in the correct order.
What is the general structure of an XML document?

For example, the general structure of a SEPA Credit Transfer can be displayed as follows:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<Document xmlns="urn:iso:std:iso:20022:tech:xsd:pain.001.001.03"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <CstmrCdtTrfInitn>message content</CstmrCdtTrfInitn>
</Document>
```

The XML document can be divided in 3 main parts:

- **The first part is called the prologue** and is of a very high importance. It allows the creator to assign an XML version and a character set. ISO20022 only supports the version 1.0 of XML and the character set UTF-8.

- The prologue for an ISO20022 file should always be as follows:
  ```xml
  <?xml version="1.0" encoding="UTF-8"?>
  ```

- **The second part is used for document declaration.** The document declaration states the type of document that will be used and defines the set of rules whereto the document can be validated. The ISO organisation has supplied an XSD schema that defines the rules of a specific document type. If a namespace (xmlns) is supplied, this can be used in a validator to verify the structural validity of the document.

  - The used xmlns is dependent from the version of the ISO20022 lay-out that is used.
    - The following document declaration is used for a SEPA Credit Transfer:
      ```xml
      <Document xmlns="urn:iso:std:iso:20022:tech:xsd:pain.001.001.03">
      ```
    - The following document declaration is used for a SEPA Direct Debit:
      ```xml
      <Document xmlns="urn:iso:std:iso:20022:tech:xsd:pain.008.001.02">
      ```

- **The third part is the main part and contains the entire tree structure of an XML document.**

  Below we will discuss this structure more in detail for the SEPA Credit Transfer and the SEPA Direct Debit.
What is the GroupHeader block?
The groupheader block is the first block of information that is nested within the document. It is mandatory and supplies information that is valid for all following information. It supplies the ordering financial institution the opportunity to perform some basic security checks. The date and time when the file is created is such information, but also the indication of the total amount of transactions that will follow in the payment information is an important factor.

What is the PaymentInformation block?
It concerns the batch level. This building block is mandatory and repetitive. It allows the initiator of a financial message to organize his transactions in a logical order. All transactions within one <PmtInf> will be processed with the same ordering account and same execution date. It will also indicate whether the transaction in the <PmtInf> will be booked globally or individually on the account (BtchBookg). If one transaction is supplied per <PmtInf> the batch booking parameter will not serve its purpose.

The Payment Information block can contain several transactions and should group all transactions within the xml that have the same PaymentInformation instructions! This to avoid that the same information is unnecessarily repeated (larger files, risk of errors, ...).

What is the CreditTransferTransactionInformation block?
This concerns the transaction level of an XML for SEPA Credit Transfers (pain.001.001.03). This building block is mandatory and repetitive. It contains, among other things, elements related to the credit side of the transaction, such as Creditor and Remittance Information. While the information of the debit side will be common for all the transactions in a batch, the information about the beneficiaries will be stated for each transaction individually.

What is the DirectDebitTransactionInformation block?
This concerns the transaction level of an XML for SEPA Direct Debits (pain.008.001.02). This building block is mandatory and repetitive. It contains, among other things, elements related to the debit side of the transaction, such as Debtor, Mandate Related Information and Remittance Information. While the information on the credit side will be common for all the transactions in a batch, the information about the debtor side will be stated for each collection individually.
Example for SEPA Credit Transfers

```xml
<?xml version="1.0" encoding="utf-8" ?>
<Document xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns="urn:iso:std:iso:20022:tech:xsd:pain.001.001.03">
  <CstmrCdtTrfInitn>
    <GrpHdr>
      <!-- The GroupHeader Block 1 per xml-file -->
    </GrpHdr>
    <PmtInf>
      <!-- The PaymentInformation Block (= batch-level) [1...∞] batches per xml-file -->
      <CdtTrfTxInf>
        <!-- Transaction Level [1...∞] per batch -->
        <CdtrRefInf>
          <!-- Transaction 1 -->
          <CdtTrfTxInf>
            <!-- Transaction 2 -->
            <CdtTrfTxInf>
              <!-- Transaction 3 -->
          </CdtTrfTxInf>
        </CdtrRefInf>
      </CdtTrfTxInf>
    </PmtInf>
  </CstmrCdtTrfInitn>
</Document>
```
Example for SEPA Direct Debits

```xml
<?xml version="1.0" encoding="utf-8"?>
<Document xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns="urn:iso:std:iso:20022:tech:xsd:pain.008.001.02">
  <CstmrDthDbtInitn>
    <GrpHdr>
      The GroupHeader Block 1 per xml-file
    </GrpHdr>
    <PmtInf>
      The PaymentInformation Block (= batch-level) [1..∞] batches per xml-file
      <PmtTpInf>
        Transaction 1
        Transaction 2
        Transaction 3
      </PmtTpInf>
      <InfTp>
        Transaction Level [1..∞] per batch
      </InfTp>
    </PmtInf>
  </CstmrDthDbtInitn>
</Document>
```
ING offers you the possibility to perform a test on-line with the format validation tool.

**What is the format validation tool?**

The format validation tool (FVT) is an online service which can be used to validate specific ING payment format files. These files are the envelopes in which customers put their transaction instructions to be processed by ING. It offers users a service which they can use when implementing changes in their current formats or when validating test files during implementation. FVT offers fast automated validation of file formats. It can speed up the implementation process which will result in a faster time to market. This service is an addition to the current known implementation process and does not replace a step in the current process.

The User Manual is available on the website via this link: http://www.ingsepa.com/formatvalidationtool/en (click on HELP to access the User Manual).

**How to get access to this tool?**

Address: http://www.ingsepa.com/formatvalidationtool/en
Username: ING10
Password: Format10
Useful links

The official document on Character set conversion (EPC)
http://www.europeanpaymentscouncil.eu/knowledge_bank_detail.cfm?documents_id=332

European Payments Council (EPC)
http://www.europeanpaymentscouncil.eu/content.cfm?page=sepa_direct_debit_(sdd)

European Payments Council (EPC)
http://www.europeanpaymentscouncil.eu/content.cfm?page=sepa_credit_transfer