TECHNICAL SPECIFICATION

ISO/TS 20022-5

First edition
2004-12-15

Financial services — UNIversal Financial Industry message scheme —

Part 5: ISO 20022 reverse engineering

Services financiers — Schéma universel de messages pour l'industrie financière —

Partie 5: Ingénierie inverse ISO 20022

Reference number
ISO/TS 20022-5:2004(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

(Blank page)

Contents

Foreword

1 Introduction 5

2 Terms and definitions 6

3 Activities and deliverables 7

3.1 Gap analysis 7
3.2 Development of ISO 20022 compliant Business Transactions and Message Sets 8
3.3 ISO 20022 Registration 8
3.4 Preparation of migration 9

4 Workflow 9

4.1 Gap analysis 9
4.1.1 Industry Message Set documentation collection 10
4.1.2 Business Area gap analysis 12
4.1.3 Business Process gap analysis 13
4.1.4 Business Transaction gap analysis 15
4.1.5 Message Definition gap analysis 18
4.1.6 Business Roles gap analysis 21
4.2 Development of ISO 20022 compliant Business Transactions and Message Sets 23
4.2.1 A new Business Area 24
4.2.2 A modified Business Area 25
4.2.3 A new Business Process 25
4.2.4 A modified Business Process 26
4.2.5 A requirements use case 26
4.2.6 A new Business Transaction 27
4.2.7 A modified Business Transaction 27
4.2.8 A new Message 28
4.2.9 A modified Message 28
4.2.10 A new or modified Business Role 29
4.3 ISO 20022 registration 29
4.4 Preparation of migration 30
4.4.1 Convergence documentation 31

4.4.2 Coexistence documentation 35
4.4.3 Migration planning 35

Annex A: Convergence documentation 37

A.1 Data Type convergence tables 37
A.2 Element convergence tables 38
A.3 Message convergence tables 38
A.4 Message Item convergence tables 39
A.5 Some simple examples 40
A.5.1 Data Type convergence tables 40
A.5.2 Element convergence tables 41
A.5.3 Message convergence tables 42

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 20022-5 was prepared by Technical Committee ISO/TC 68 to complement ISO 20022-1, Overall methodology and format specifications for inputs to and outputs from the ISO 20022 Repository, with the reverse engineering guidelines explaining how to extract relevant information from existing industry message sets in order to prepare the submission to the ISO 20022 Registration Authority of equivalent ISO 20022 compliant business transactions and message sets. This Technical Specification should be reviewed and considered for publication as an International Standard once further experience has been gained in using these guidelines.

ISO 20022 consists of the following parts, under the general title *Financial services — UNIversal Financial Industry message scheme*:

— *Part 1: Overall methodology and format specifications for inputs to and outputs from the ISO 20022 Repository*

— *Part 2: Roles and responsibilities of the registration bodies*

— *Part 3: ISO 20022 modelling guidelines* [Technical Specification]

— *Part 4: ISO 20022 XML design rules* [Technical Specification]

— *Part 5: ISO 20022 reverse engineering* [Technical Specification]

1 Introduction

The ISO 20022 Repository will contain all ISO 20022 compliant Business Transactions and Message Sets, as outlined in ISO 20022-1. The approach that must be followed to add ISO 20022 compliant Business Transactions and Message Sets to the Repository can be classified as follows:

a) **Case 1:**
No ISO 20022 compliant Business Transactions and Message Sets exist
No Industry Message Set exists
- Example: Collective Investment Vehicles
- Approach: full development of ISO 20022 compliant Business Transactions and Message Sets using the ISO/TS 20022-3 Modelling guidelines.

b) **Case 2:**
No ISO 20022 compliant Business Transactions and Message Sets exist
One or more Industry Message Sets exist
- Example: Securities Pre-Trade (FIX Message Set exists)
- Approach: conversion of the Industry Message Set(s) into ISO 20022 compliant Business Transactions and Message Sets, using ISO/TS 20022-5 Reverse engineering guidelines.

c) **Case 3:**
ISO 20022 compliant Business Transactions and Message Sets exist
One or more existing Industry Message Sets exist as well
- Example: Securities Post-Trade (FIX, Omgeo Message Sets exist)
- Approach: comparison of the existing Industry Message Set(s) with the ISO 20022 compliant Business Transactions and Message Sets and extension of the ISO 20022 compliant Business Transactions and Message Sets as necessary, using ISO/TS 20022-5 Reverse engineering guidelines.

This document describes the activities of “ISO 20022 reverse engineering” from the point of view of the user who wants to verify that the business functionality, covered by his own Industry Message Set, is covered by ISO 20022 compliant Business Transactions and Message Sets.[1] The document is not an attempt to define a “methodology” for reverse engineering.

It describes the following set of required activities:

- Extract relevant information from existing Industry Message Sets and compare it to the related information in the ISO 20022 Repository

[1] The document is based on preliminary reverse engineering experiences in the framework of “electronic Business Oriented Methodology” (eBOM) and of “SWIFTStandards Modelling methodology”. It has been enriched on the basis of the work conducted in domain groups of the ISO/TC68/SC4/WG10 reverse engineering project team and on the results of the ISO/TC68/SC4/WG10 Proof of Concept.

- Use the results of this comparison for the development of ISO 20022 compliant Business Transactions and Message Sets
- Submit the resulting update requests to the Registration Authority[2]
- Prepare the migration to the ISO 20022 compliant Business Transactions and Message Sets.

The main objectives of the "ISO 20022 reverse engineering" are as follows:

- Capture the industry knowledge covered by existing Industry Message Sets
- Build upon former standardization efforts in the industry when building ISO 20022 compliant Business Transactions and Message Sets
- Ensure that the resulting ISO 20022 compliant Business Transactions and Message Sets fully cover the business scope of existing Industry Message Sets
- Maximise interoperability between existing Industry Message Sets and ISO 20022 compliant Business Transactions and Message Sets
- Support the migration from existing Industry Message Sets to ISO 20022 compliant Business Transactions and Message Sets.

The document is structured as follows:

- Chapter 2 contains some specific terms that are used in this document.
- Chapter 3 describes the major activities that will be conducted during reverse engineering and also describes at a high level the resulting deliverables.
- Chapter 4 gives a detailed workflow, explaining all activities, inputs and outputs.
- Appendix A contains a detailed description of the Convergence Documentation.

2 Terms and definitions

This document uses the terms and definitions as explained in ISO 20022-1: Overall methodology and format specifications for inputs to and outputs from the ISO 20022 Repository.

Additionally, particular attention should be given to following terms and definitions that are used in this document:

Industry Message
A Message that offers a particular Message Functionality (possibly multi-functional) and whose Message Definition is part of an Industry Message Set.

ISO 20022 Message
A Message that offers a particular Message Functionality and whose Message Definition is registered in the Business Process Catalogue of the new ISO 20022 Repository.

[2] Note that it is not the intention of reverse engineering to systematically create ISO 20022 compliant versions of all existing Industry Message Sets. Update requests shall always be based on a valid business justification.

Message Item
An element or field used at a particular place in a Message. This exact place is typically described by the Message Path.

Message Path
The exact position in a particular Message Definition. This position is uniquely identified by the full hierarchy (i.e. “path”) from the message level (i.e. the highest level) down to the element level (i.e. the lowest level).

All these terms are capitalised when used throughout this document.

3 Activities and deliverables

There are four main activities in the “ISO 20022 reverse engineering”:

- Gap analysis
- Development of ISO 20022 compliant Business Transactions and Message Sets
- ISO 20022 registration
- Preparation of migration.

The major objectives and deliverables related to these activities are described in this chapter.

3.1 Gap analysis

Objectives:

- Determine the Business Area of the Industry Message Set and identify the corresponding Business Area, Business Processes, activities and supporting Business Transactions in the ISO 20022 Business Process Catalogue.
- Compare Business Roles in ISO 20022 Business Processes and Business Transactions to the parties that use the Industry Messages or that are identified in the Industry Messages.
- Verify whether existing ISO 20022 Messages offer the complete Message Functionality that is offered by the Industry Messages.
- Evaluate whether the business content of the relevant ISO 20022 Messages cover the business content of the individual Industry Messages.
- Compare the meaning and the data typing of the used Message Components and/or Business Components to the individual Industry Message Items.

Deliverables:

- Documentation of the coverage, the differences and the gaps between the Industry Message Set and the ISO 20022 compliant Business Transactions and Message Sets.

This documentation concerns following repository items:

- Business Areas
- Business Processes
- Business Transactions and Message Sets
- Message Definitions (including Message Rules)
- Business Roles
- Business Components (including Business Elements and Rules)
- Message Components (including Message Elements and Rules)
- Data Types

- The documentation of the Industry Message Set for those repository items that were missing (i.e. the gaps) or for which a difference was identified.

3.2 Development of ISO 20022 compliant Business Transactions and Message Sets

Objectives:

- Complete the gap analysis with all additional information that is required to define or complete ISO 20022 compliant Business Transactions and Message Sets.
- Define the required updates and additions to the existing ISO 20022 compliant Business Transactions and Message Sets.

This step shall only focus on the identified gaps and differences and shall verify whether there's a valid business justification to include these gaps and differences in the ISO 20022 repository. It shall also take into account that the goal of reverse engineering is not to question (except with respect to the business justification), modify or complement the business functionality that is currently supported in the Industry Message Set.

Deliverables:

- Detailed documentation describing how the existing ISO 20022 compliant Business Transactions and Message Sets must be updated to incorporate the identified gaps and differences.

3.3 ISO 20022 Registration

Objectives:

- Prepare the information for the ISO 20022 Registration Authority to request the update of the ISO 20022 repository with all required additions and modifications.

Deliverables:

- Requests to the ISO 20022 Registration Authority to add or modify Dictionary Items and/or Catalogue Items.

3.4 Preparation of migration

Objectives:

- Define and document the relationship between the Industry Message Set and ISO 20022 compliant Business Transactions and Message Sets. The required amount of information will depend on the chosen migration path:
  - in case of a “big bang” migration, it will be sufficient to only document the relationship in a way that supports the convergence towards ISO 20022
  - in case of an accepted period of coexistence there will be a need to have “bi-directional” documentation that not only supports the convergence towards ISO 20022, but also a backwards mapping to the Industry Message Sets.
- Define a plan for the migration to the ISO 20022 compliant Business Transactions and Message Sets.

Deliverables:

- Convergence Documentation
- Coexistence Documentation (optional)
- Migration plan

4 Workflow

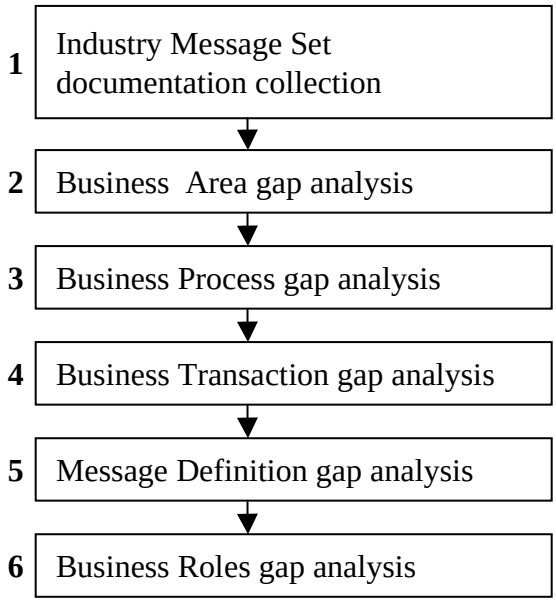
This chapter contains a detailed workflow description of the four main activities in the “ISO 20022 reverse engineering”.

4.1 Gap analysis

Preliminary remarks:

- The gap analysis requires a lot of expertise and documentation about the Industry Message Set. In case this documentation is not readily available, there will be a need to perform a thorough analysis of the Industry Message Set and its use (see first step below).
- The gap analysis also requires a lot of documentation about the ISO 20022 compliant Business Transactions and Message Sets. The repository outputs will include this documentation.
- Gap analysis is crucial for all subsequent steps:
- Identifying the differences and gaps will define the scope of the subsequent development of ISO 20022 compliant Business Transactions and Message Sets and ISO 20022 registration.
- Identifying the overlaps will provide the required information for the Convergence Documentation and the related migration.

The main steps in gap analysis are shown on the following diagram:



These steps, which are described in more detail in the subsequent paragraphs, will be executed in an iterative and incremental way. In the “reverse engineering case 2” (i.e. no existing ISO 20022 compliant Business Transactions and Message Sets) only the collection of the Industry Message Set documentation needs to be done.

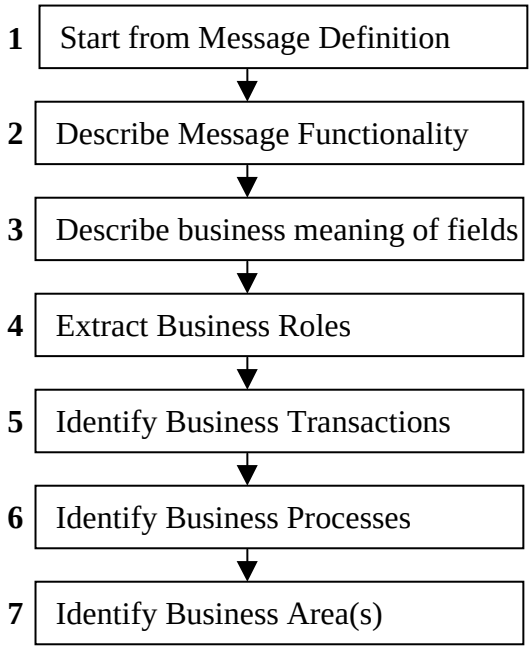
4.1.1 Industry Message Set documentation collection

If the Industry Message Set is well documented (i.e. a full description including the Business Area, the Business Processes and the Business Transactions), this step is limited to the explicit identification of the documentation set.

In many cases however, the Industry Message Set documentation will focus only on the Message Definitions and will mainly document the functionality and content of all Industry Messages. In some cases, even this documentation may be very limited (e.g. restricted to a description of the physical structure). In these cases, it is mandatory to complete the Industry Message Set documentation prior to the reverse engineering.

Activities:

The recommended approach to complete the Industry Message Set documentation is depicted in the following diagram and further explained in the text.



1. Start from the description of the Industry Message Definition.
2. Describe, for each Industry Message, the Message Functionality (i.e. the purpose(s) for which the Industry Message may be used). Note that Industry Messages may be multi-functional and that each function should be described.
3. Describe for each Industry Message Item the business meaning. Note that the meaning of the Item may depend on the specific Message Functionality, in case the Industry Message is multi-functional. In this case, all meanings must be described.[3]
4. Extract from each Industry Message the Business Roles[4], by identifying the functional roles of the sender and the receiver of the Industry Message and by identifying the functional roles of all other parties that appear in the Industry Message content.
5. Analyse the use of the Industry Messages in order to identify the "Business Transactions" (i.e. the different message flows that occur in the industry) in which the

[3] One of the big challenges of this step is to identify the real business meaning of the fields.

Note that one Industry Message field may contain multiple Business Elements and/or may contain partial Business Elements (in which case it may have to be combined with other Industry Message fields to obtain meaningful Business Elements).

Note that a multi-functional Industry Message will also contain fields to specify the used functionality. These fields won't have a corresponding Message Element in the ISO 20022 Message. For these fields, document the Message Functionality they represent.

Note that an Industry Message may contain "technical" fields, which have no business meaning. In some cases these fields may have a corresponding technical Message Element in the ISO 20022 Message Definition but they will never have a corresponding Business Element.

[4] The distinction between "Business Actors" and "Business Roles" is that the latter indicate functional roles (e.g. buyer, seller, etc.) whereas the first indicate real business parties (e.g. bank, corporate, broker/dealer, etc.). One Business Actor can play various Business Roles in a business process (e.g. a bank can be a buyer, a seller, an account servicer, etc.) and various Business Actors can often play the same Business Role (a bank, a corporate or an individual person can act as buyer).

Industry Messages are used and document each of these Business Transactions, ideally using a Message Flow Diagram and a textual description.

6. Analyse the list of identified Business Transactions in order to identify the Business Processes that are supported.
7. Identify the Business Area(s) to which the Business Processes belong.

4.1.2 Business Area gap analysis

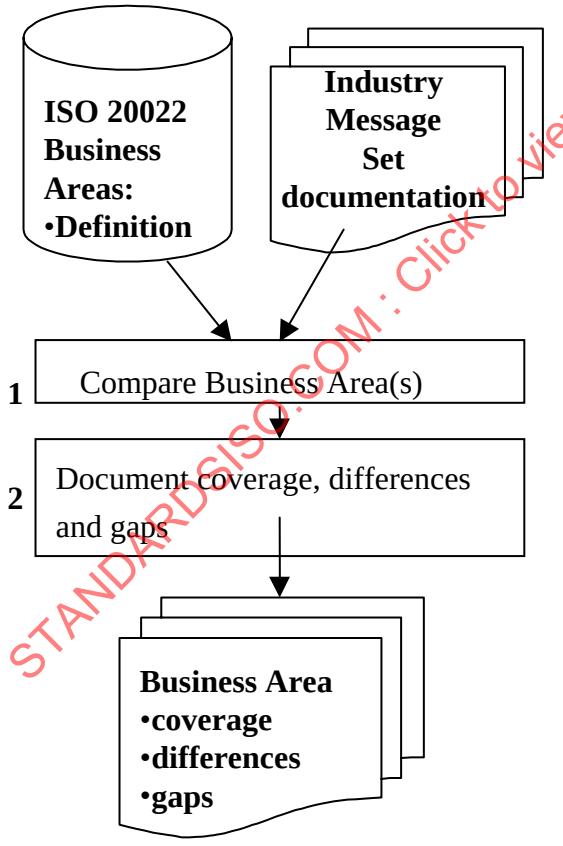
The goal is to identify the ISO 20022 Business Areas for which the Industry Message Set is used. Additionally, investigate whether the Industry Message Set is also used for other Business Areas that are not yet part of the ISO 20022 Repository.

Input:

- List of ISO 20022 Business Areas, including definitions.
- Industry Message Set documentation related to Business Areas.

Activities:

The recommended approach for Business Area gap analysis is depicted in the following diagram and further explained in the text.



1 Go through the list of Business Areas that are stored in the ISO 20022 Business Process Catalogue. Use the definitions of these Business Areas to identify the Business Area(s) that best cover(s) the Business Area(s) of the Industry Message Set.

2 Following cases can be identified:

- None of the ISO 20022 Business Areas covers the Business Area(s) of the Industry Message Set.
  - Document this additional Business Area, based on the documentation of the Industry Message Set.
- One or multiple ISO 20022 Business Areas cover precisely the Business Area(s) of the Industry Message Set.
  - Document this coverage.
  - Document possible differences that are identified between the definition of the Business Area in ISO 20022 and in the corresponding Industry Message Set.
- One ISO 20022 Business Area covers more than the Business Area(s) of the Industry Message Set.
  - Document what part of the ISO 20022 Business Area covers the Industry Message Set.
  - Document possible differences that are identified between the definition of the Business Area in ISO 20022 and in the corresponding Industry Message Set.
- One or multiple ISO 20022 Business Areas cover a part of the Business Area(s) of the Industry Message Set and the rest of the Industry Message Set is not covered.
  - Document each coverage (i.e. which part of which ISO 20022 Business Area covers which part of the Industry Message Set).
  - Document the part of the Industry Message Set that is not covered, based on the documentation of the Industry Message Set.
  - Document possible differences that are identified between the definition of the Business Area in ISO 20022 and in the corresponding Industry Message Set.

Output:

- List of ISO 20022 Business Areas that cover (parts of) the Business Area(s) of the Industry Message Set (including, where necessary, a description of which parts of the Business Area(s) of the Industry Message Set are covered). This list will include possible differences in definition that have been identified.
- List of additional Business Areas that are not covered by existing ISO 20022 Business Areas. Each Business Area in this list will contain a definition, based on the Industry Message Set documentation.

4.1.3 Business Process gap analysis

The goal is to identify the ISO 20022 Business Processes for which the Industry Message Set is used and to investigate whether the Industry Message Set is also used for other Business Processes that are not yet part of the ISO 20022 Repository.

Input:

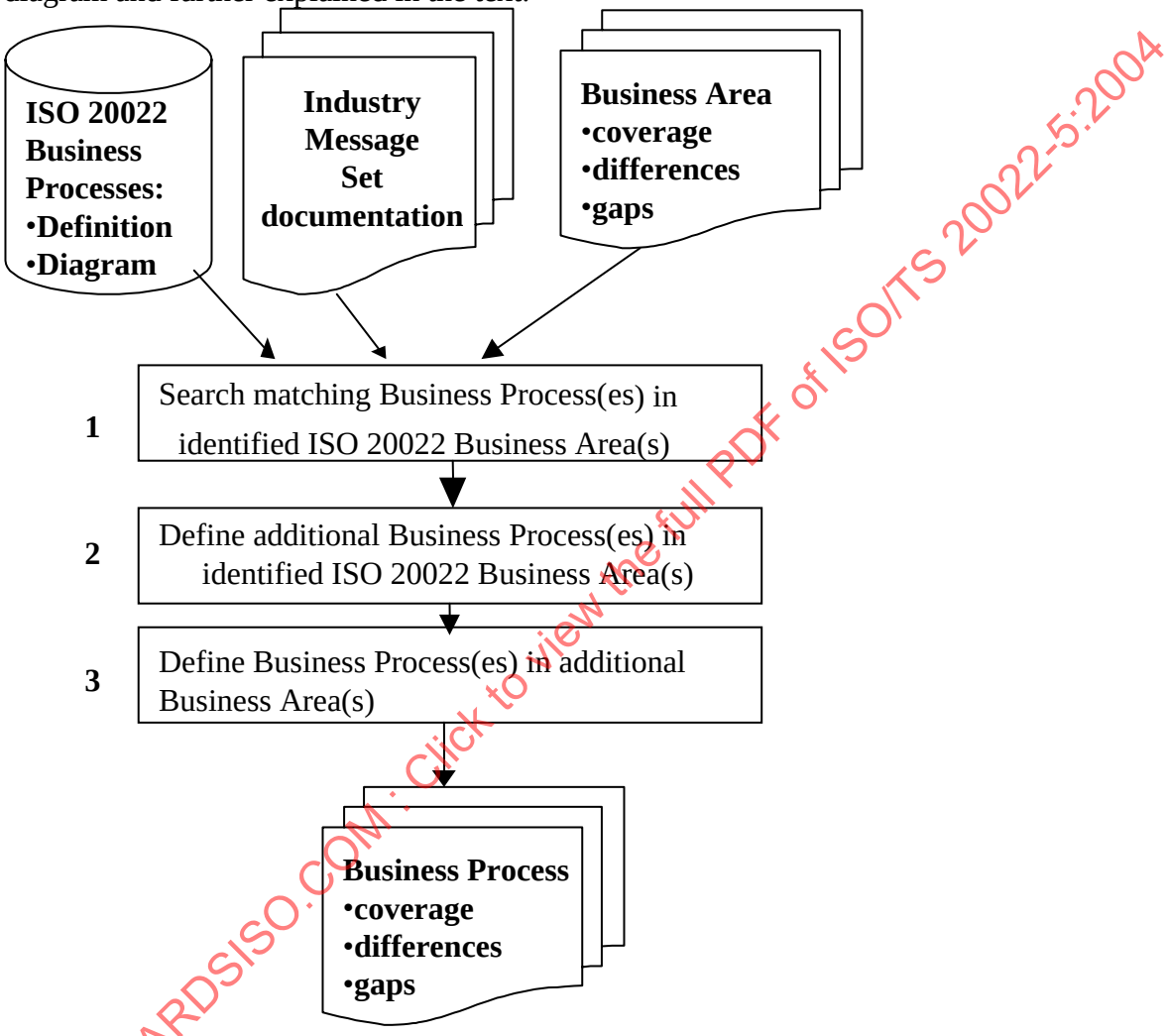
- ISO 20022 Business Process documentation:
  - Definition

  - ISO 20022 Business Process descriptions, Business Process Diagram and Business Activity Diagram

- Industry Message Set documentation related to Business Processes.

Activities:

The recommended approach for Business Process gap analysis is depicted in the following diagram and further explained in the text.



1 For each ISO 20022 Business Area that has been identified as one that matches a Business Area of the Industry Message Set:

- Go through the list of ISO 20022 Business Processes that are stored in the Business Process Catalogue.
- Use the documentation to identify the ISO 20022 Business Processes that are supported by the Industry Message Set.
- Document this coverage.
- Document possible differences that are identified between the definition of the Business Process in ISO 20022 and in the corresponding Industry Message Set.

2 For each ISO 20022 Business Area that has been identified as one that matches a Business Area of the Industry Message Set:
   - Identify any Business Processes that are supported by the Industry Message Set and that don't exist yet in ISO 20022.
   - Document these additional Business Processes based on the documentation of the Industry Message Set.

3 For each Business Area that has been identified as one that doesn't exist yet in ISO 20022:
   - Document the Business Processes that are supported by the Industry Message Set.

Output:

- List of ISO 20022 Business Processes – with reference to their ISO 20022 Business Area – that are supported by the Industry Message Set. This list will include possible differences in definition that have been identified.
- List of additional Business Processes – with reference to the Business Area to which they belong – that are not part of the ISO 20022 Repository. Each Business Process in this list will contain the available Industry Message Set documentation.

4.1.4 Business Transaction gap analysis

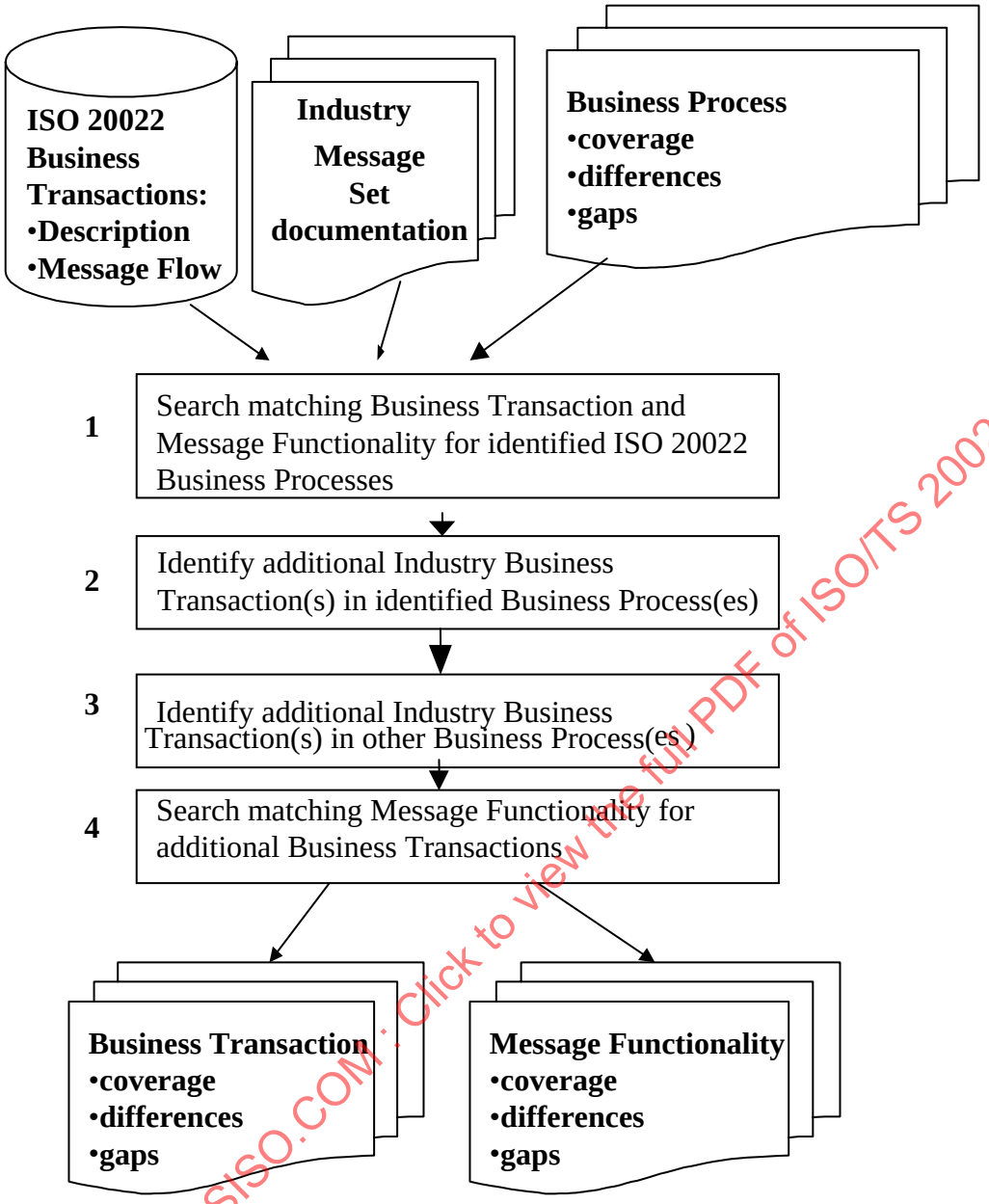
The goal is to identify ISO 20022 Business Transactions for which the Industry Message Set can be used. Additionally, investigate whether the Industry Message Set is also used for other Business Transactions that are not yet part of the ISO 20022 Repository.

Input:

- ISO 20022 Business Transaction documentation:
  - Textual definition
  - Message Flow Diagram, including message description.
- Industry Message Set documentation related to Business Transactions and Message Functionality.

Activities:

The recommended approach for Business Transaction gap analysis is depicted in the following diagram and further explained in the text.



1 For each ISO 20022 Business Process that has been identified as one that matches a Business Process of the Industry Message Set:

- Use the documentation to identify the ISO 20022 Business Transactions that are supported by the Industry Message Set.
- Document this coverage.
- Document possible differences that are identified between the documentation (textual definition and Message Flow Diagram) of the Business Transaction in ISO 20022 and in the corresponding Industry Message Set. Identify possible Message Functionality that is part of the Business Transaction in the Industry Message Set and that is not part of the ISO 20022 Business Transaction. If any such Message Functionality is identified:

- Verify whether any existing ISO 20022 Message(s) offer(s) this Message Functionality.
- Document which ISO 20022 Message(s) cover(s) this Message Functionality.
- Document Message Functionality that is not covered by any existing ISO 20022 Message Definition.

▪ Compare the Message Functionality of the ISO 20022 Messages in the various ISO 20022 Business Transactions (or Message Flow Diagrams) with the Message Functionality[5] that is offered by the Industry Messages.

▪ Document which Industry Message(s) cover(s) the Message Functionality of each ISO 20022 Message in each ISO 20022 Business Transaction.

2 For each ISO 20022 Business Process that has been identified as one that matches a Business Process of the Industry Message Set:

▪ Identify any additional Business Transactions for which the Industry Messages are currently used and that don't exist yet in ISO 20022.

▪ Document these additional Business Transactions (including the related Business Process) based on the documentation of the Industry Message Set.

3 For each Business Process that has been identified as one that doesn't exist yet in ISO 20022:

▪ Identify the Business Transactions for which the Industry Messages are currently used.

▪ Document these Business Transactions (including the related Business Process) based on the documentation of the Industry Message Set.

4 For each Business Transaction that has been identified in this step as one that doesn't exist yet in ISO 20022:

▪ Identify the Message Functionality of all Industry Messages that are used.

▪ Verify whether any existing ISO 20022 Message(s) offer(s) this Message Functionality.

▪ Document which ISO 20022 Message(s) cover(s) the additional Message Functionality of the Industry Messages.

▪ Document which Message Functionality of the Industry Message Set is not covered by any existing ISO 20022 Message Definition.

Output:

- List of ISO 20022 Business Transactions – with reference to their ISO 20022 Business Process and Business Area – that are covered by the Industry Message Set. This list will include possible differences in definition that have been identified.

[5] It is important to capture not only the individual message that is used but also to capture the business reason why this message is used (i.e. the Message Functionality). Existing Industry Messages are namely often "multi-functional" and both the gap analysis and the mapping documentation requires the identification of the correct business message. Example: it's not enough to state that the ISO 15022 MT 502 is used; one must also clarify that it was for instance used as an "order to buy" or as an "order cancellation".

- List of additional Business Transactions – with reference to their Business Process and Business Area – that are not covered by any existing ISO 20022 Business Transactions.
- List of Industry Messages (including a particular Message Functionality in case the Industry Message is multi-functional) and their corresponding ISO 20022 Messages – if possible with reference to their ISO 20022 Business Transaction, Business Process and Business Area.
- List of additional Message Functionality – with reference to their Business Transaction, Business Process and Business Area – that is not covered by any existing ISO 20022 Messages.

4.1.5 Message Definition gap analysis

The goal is to identify ISO 20022 Message Definitions that are used in the Industry Message Set and to investigate whether the Industry Message Set also has other Message Definitions that are not yet covered by an ISO 20022 compliant Business Transaction and Message Set.

Input:

- ISO 20022 Messages:
  - Message Functionality
  - Message Definition
  - Message Rules.
- ISO 20022 Data Dictionary:
  - Message Components (including Message Elements and Rules)
  - Business Components (including Business Elements and Rules)
  - Data Types.
- Industry Message Set documentation: definitions[6], formats[7] and rules of all Industry Messages and Industry Message Items.

[6] One of the big challenges of this step is to identify the real business meaning of the fields.

Note that one Industry Message field may contain multiple Business Elements and/or may contain partial Business Elements (in which case it may have to be combined with other Industry Message fields to obtain meaningful Business Elements).

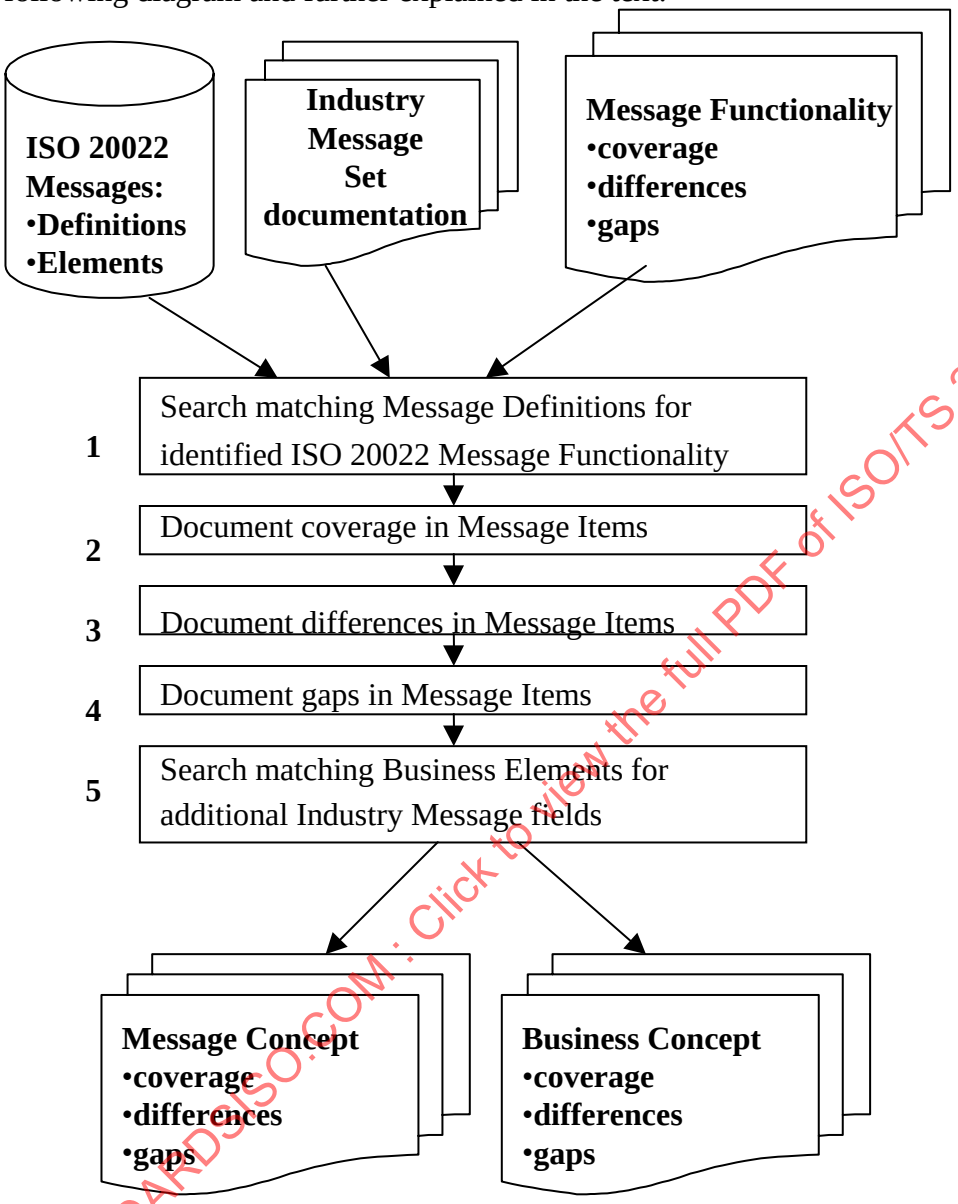
Note that a multi-functional Industry Message will also contain fields to specify the used functionality. These fields won't have a corresponding Message Element in the ISO 20022 Message. Document, for these fields, the Message Functionality they represent.

Note that an Industry Message may contain "technical" fields, which have no business meaning. In some cases, these fields may have a corresponding technical Message Element in the ISO 20022 Message Definition but they will never have a corresponding Business Element.

[7] The format is defined by the primitive Data Type + format constraints (e.g. a string, consisting only of alphabetic characters and with a maximum length of 25; a set of Codes; etc.)

Activities:

The recommended approach for Message Definition gap analysis is depicted in the following diagram and further explained in the text.



1 For each ISO 20022 Message that has been identified as one that matches a Message of the Industry Message Set:

- Compare its Message Definition with the corresponding Industry Message Definition. Take into account the used Message Functionality in case the Industry Message is multi-functional. Also take into account any Message Rules.
- Use the definitions of the ISO 20022 Message Concepts and their corresponding Business Concepts and the documentation of the Industry Message Items to identify equivalence and difference.

2 Document the coverage in Message Items:

- List corresponding ISO 20022 Message Items (including the Message Component and Message Path in the ISO 20022 Message) and Industry Message Items (including the Message Path in the Industry Message).
- Include the Business Element (and Business Component) that corresponds to the Message Element.

3 Document the differences in Message Items:

- List ISO 20022 Message Items (including the Message Component and path in the ISO 20022 Message) and Industry Message Item (including the path in the Industry Message) where the correspondence is not complete.
- Include the Business Element (and Business Component) that corresponds to the Message Element.
- Document the differences. These differences can be related to:
  - the underlying business meaning
  - the used Data Type (primitive type, format and/or possible values)
  - the used Rules.

4 Document the gaps in Message Items:

- List the ISO 20022 Message Items (including the Message Component and path in the ISO 20022 Message) for which no corresponding Industry Message Item exists.
- List the Industry Message Items (including the path in the Industry Message) for which no corresponding ISO 20022 Message Item exists.

5 For all Industry Message Items for which no corresponding ISO 20022 Message Item exists (note that this may include Industry Message Items from additional Industry Message Functionality):

- Search the ISO 20022 Data Dictionary to identify the Business Component and Business Element that correspond to the meaning of the Industry Message Item.
  - If the corresponding ISO 20022 Business Component and Business Element exist:
    - Document them
    - Identify differences or gaps regarding the Data Type and Rules and document these as well.
  - If the corresponding ISO 20022 Business Component and/or Business Element don't exist:
    - Use the Industry Message Documentation to document the required Business Component, Business Element, Data Type and Rules.
- Note that a multi-functional Industry Message will also contain Industry Message Items to specify the used functionality. These Industry Message Items won't necessarily have a corresponding ISO 20022 Message Element. Document for these Industry Message Items the Message Functionality they represent.

Output:

- List of fully corresponding ISO 20022 Message Items and Industry Message Items, including the Message Paths and the related Business Element and Business Component.
- List of partially corresponding ISO 20022 Message Items and Industry Message Items, including the Message Paths and the related Business Element and Business Component. This list will also include a documentation of the identified differences (meaning, data typing and/or rules)
- List of industry gaps (i.e. all ISO 20022 Message Items, including the Message Paths, for which no corresponding Industry Message Item exists)
- List of ISO 20022 Message Concept gaps (i.e. all Industry Message Items, including the Message Paths, for which no corresponding ISO 20022 Message Item exists).
- List of ISO 20022 Business Concept differences and gaps (i.e. all business concepts that are covered by Industry Message Items but for which no corresponding ISO 20022 Business Concepts exist).

4.1.6 Business Roles gap analysis

The goal is to identify ISO 20022 Business Roles that appear in the Industry Message Set and to investigate whether the Industry Message Set also covers other Business Roles that are not yet covered by an ISO 20022 compliant Business Transaction and Message Set.

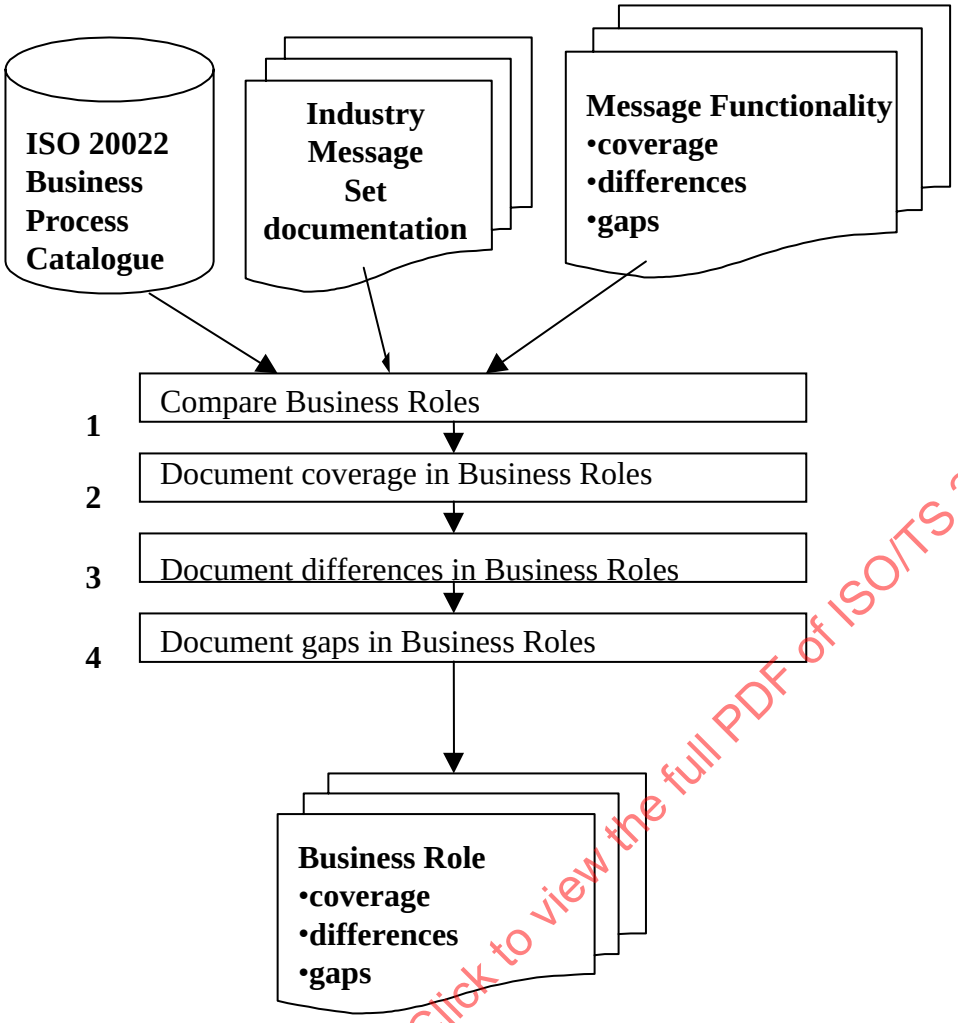
Note that some parts of this step can be executed earlier in the gap analysis, namely after the Business Process gap analysis and after the Business Transaction gap analysis.

Input:

- ISO 20022 Business Roles definitions
- ISO 20022 Business Process descriptions, Business Process Diagram and Business Activity Diagrams
- ISO 20022 Business Transaction documentation:
  - Textual definition
  - Message Flow Diagram, including message description
- Industry Message Set documentation related to Business Processes, Business Transactions and Messages.

Activities:

The recommended approach for Business Roles gap analysis is depicted in the following diagram and further explained in the text.



1 Compare the Business Roles that appear in the Industry Message Set with the ISO 20022 Business Roles that appear in corresponding ISO 20022 Business Processes, activities, Business Transactions and Messages.

2 Document the corresponding Business Roles (i.e. the Business Roles that appear both in an ISO 20022 compliant Business Transaction and Message Set and in the Industry Message Set).

3 Document possible differences that are identified between the definition of the Business Roles in ISO 20022 and in the Industry Message Set.

4 Document the identified gaps (i.e. the Business Roles that are only covered in the Industry Message Set).

Output:

- List of ISO 20022 Business Roles – with reference to their ISO 20022 Business Transaction, Business Process and Business Area – and their corresponding Industry Message Set Business Roles (with specification of the relevant Industry Message and Message Functionality). This list will include possible differences in definition that have been identified.

- List of additional Business Roles – with reference to their messages, Business Process and Business Area – that are not covered by existing ISO 20022 Business Roles.

4.2 Development of ISO 20022 compliant Business Transactions and Message Sets

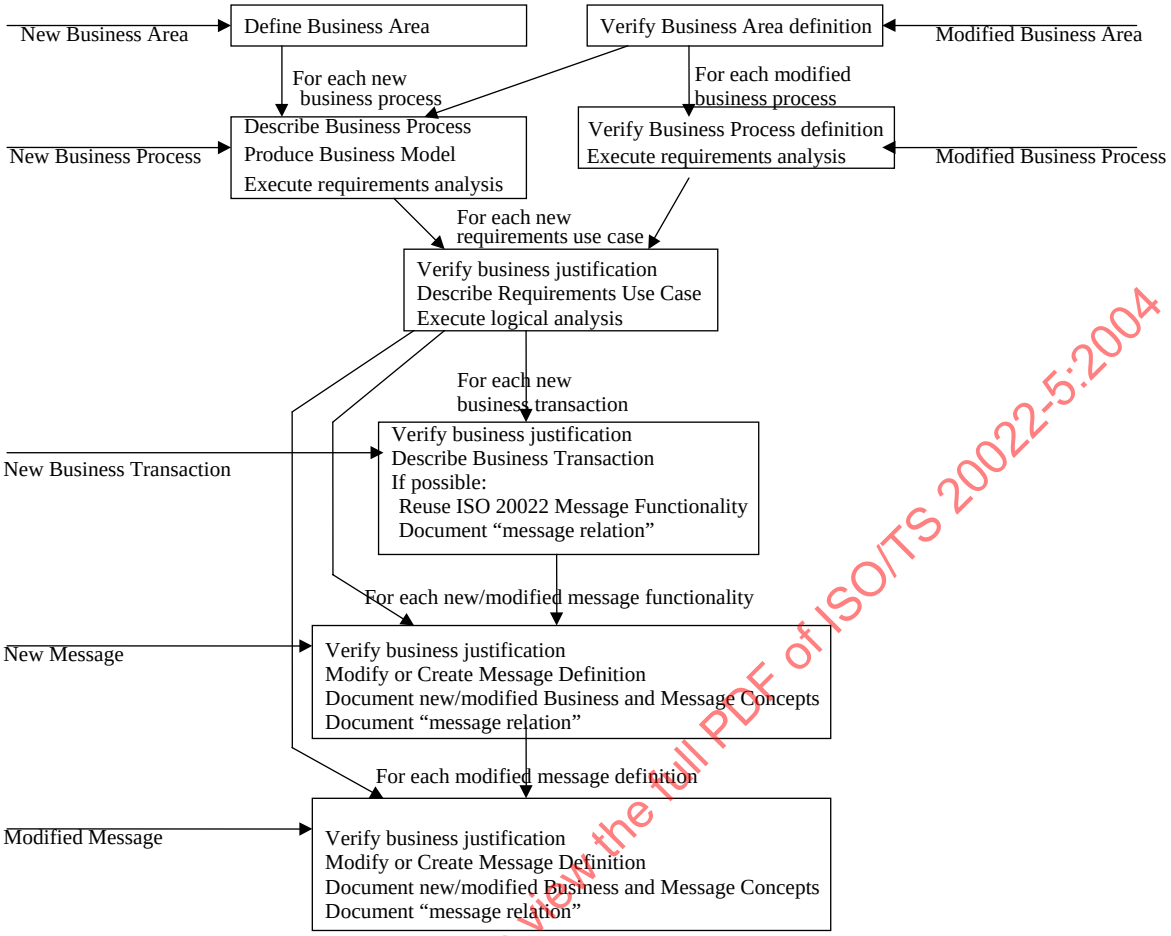
The detailed approach to use for this activity is described in the document "ISO 20022 Modelling Guidelines" and is therefore not explained here. Following remarks should be taken into account when using this approach as part of the "ISO 20022 reverse engineering":

- The development of ISO 20022 compliant Business Transactions and Message Sets will only be done for the parts where a difference or a gap has been identified. This implies that the full approach will only be necessary when a complete Business Area or Business Process is missing in the ISO 20022 Repository. In other cases, the approach will mainly focus on parts of the logical analysis and/or message design.
- Wherever possible, the development of ISO 20022 compliant Business Transactions and Message Sets will reuse the documentation that is provided by the Industry Message Set.
- The requirements analysis will always be simplified as the reverse engineering only focuses on the Business Transactions that are offered by the Industry Message Set.

Development of ISO 20022 compliant Business Transaction and Message Sets will be based on the results of the gap analysis. The gap analysis can result in the discovery of following cases:

1. A new Business Area
2. A modified Business Area
3. A new Business Process
4. A modified Business Process
5. A new Business Transaction
6. A modified Business Transaction
7. A new Message
8. A modified Message
9. A new or modified Business Role

The required development activities of ISO 20022 compliant Business Transactions and Message Sets in each of these cases are depicted in the following diagram and further described in the subsequent paragraphs.



4.2.1 A new Business Area

If the gap analysis has identified a new Business Area, the complete approach for the development of ISO 20022 compliant Business Transactions and Message Sets will be followed for this Business Area, but with some simplifications:

- The documentation of the Industry Message Set will be reused where possible.
- As the goal of reverse engineering is not to question, modify or complement the currently supported business functionality and as the Industry Message Set normally offers a real-life solution, the requirements phase and the logical analysis will be driven by this solution.

Activities:

1. Verify the business justification of the new Business Area (i.e. is there a real business need to have standardized Business Transactions and Message Sets in this Business Area).
2. Use the Industry Message Set documentation to get the definition of the new Business Area. There is no need to go into the business rationale, strategic fit and other similar topics that are part of the normal development approach.

3. Start the overall Business Model based on the Business Processes that have been identified in the Industry Message Set documentation.
4. For each Business Process that has been identified for this Business Area:
   - Follow the “new Business Process” approach (see below).

4.2.2 A modified Business Area

If the gap analysis has identified modifications to an existing Business Area, the approach for the development of ISO 20022 compliant Business Transactions and Message Sets will focus on activities described for new and/or modified Business Processes.

Activities:

1. Verify whether there is a need and a business justification to update the definition of the ISO 20022 Business Area.
2. For each new Business Process that has been identified for this Business Area:
   - Follow the “new Business Process” approach (see below).
3. For each modified Business Process that has been identified for this Business Area:
   - Follow the “modified Business Process” approach (see below).

4.2.3 A new Business Process

If the gap analysis has identified a new Business Process, the complete approach for the development of ISO 20022 compliant Business Transactions and Message Sets will be followed for this Business Process, but with some simplifications:

- The documentation of the Industry Message Set will be reused where possible.
- As the goal of reverse engineering is not to question, modify or complement the currently supported business functionality and as the Industry Message Set normally offers a real-life solution, the requirements phase and the logical analysis will be driven by this solution.

Activities:

1. Verify the business justification of the new Business Process (i.e. is there a real business need to have standardized Business Transactions and Message Sets for this Business Process).
2. Use the Industry Message Set documentation as a basis to describe the Business Process (i.e. definition, trigger, pre- and post-conditions, arguments and roles).
3. Produce the corresponding Business Model, by completing the ISO 20022 Business Model for the Business Area:
   - Add the new Business Process.
   - Add the Business Activity Diagram.

- Add or modify Business Roles (if necessary). Note that Business Roles will only be added if there is a business justification to do so (and not only because they exist in the Industry Message Set).
- Add or modify Business Components (if necessary). Note that Business Components will only be added if there is a business justification to do so (and not only because they exist in the Industry Message Set).
- Complete definitions where necessary.

4. Execute the requirements analysis to identify the requirements use cases.
5. For each requirements use case that has been identified for this Business Process:
   - Follow the “requirements use case” approach (see below).

4.2.4 A modified Business Process

If the gap analysis has identified modifications to an existing Business Process, the approach for the development of ISO 20022 compliant Business Transactions and Message Sets will start from the requirements analysis.

Activities:

1. Verify whether there is a need and a business justification to update the definition of the ISO 20022 Business Process.
2. Execute the requirements analysis to identify the requirements use cases.
3. For each requirements use case that has been identified for this Business Process:
   - Follow the “requirements use case” approach (see below).

4.2.5 A requirements use case

If the previous steps have identified a requirements use case, the following activities will be executed.

Activities:

1. Verify the business justification of the requirements use case.
2. Use the Industry Message Set documentation as a basis to describe the requirements use case (i.e. definition, trigger, pre- and post-conditions and arguments).
3. Execute the logical analysis to identify new Business Transactions and new or modified Messages.
4. For each new Business Transaction that has been identified for this requirements use case:
   - Follow the “new Business Transaction” approach (see below).
5. For each additional Message Functionality that has been identified for this requirements use case:
   - Follow the “new Message” approach (see below).

6. For each modified Message Definition that has been identified for this requirements use case:
   - Follow the “modified Message” approach (see below).

4.2.6 A new Business Transaction

If the gap analysis has identified a new Business Transaction, the approach for the development of ISO 20022 compliant Business Transactions and Message Sets will mainly focus on the logical analysis and message design, but with some simplifications:

- The documentation of the Industry Message Set will be reused where possible.
- As the goal of reverse engineering is not to question, modify or complement the currently supported business functionality and as the Industry Message Set already offers a real-life solution, the logical analysis will be driven by this solution.

Activities:

1. Verify the business justification of the new Business Transaction (i.e. verify whether real business requirements can be identified for this Business Transaction).
2. Use the Industry Message Set documentation to create the documentation of the Business Transaction (at least textual description and Message Flow Diagram).
3. Where possible:
   - Reuse existing ISO 20022 Messages to support the required Message Functionality in the new ISO 20022 Business Transaction.
   - Document their relation with the existing Industry Messages (i.e. document corresponding ISO 20022 Message Items and Industry Message Items, including the Message Paths and the related Business Element and Business Component).
4. Where no existing ISO 20022 Messages can be reused:
   - Follow the “new Message” approach (see below).

4.2.7 A modified Business Transaction

If the gap analysis has identified a modified Business Transaction, the approach for the development of ISO 20022 compliant Business Transactions and Message Sets will mainly focus on the logical analysis and message design, but with some simplifications:

- The documentation of the Industry Message Set will be reused where possible.
- As the goal of reverse engineering is not to question, modify or complement the currently supported business functionality and as the Industry Message Set normally offers a real-life solution, the logical analysis will be driven by this solution.

Activities:

1. Verify the business justification of the modified Business Transaction (i.e. verify whether real business requirements can be identified for this modification).
2. Use the Industry Message Set documentation to modify the documentation of the Business Transaction (textual definition and/or Message Flow Diagram).

3. If additional Message Functionality has been identified that can be supported by existing ISO 20022 Messages, document their relation with the existing Industry Messages (i.e. document corresponding ISO 20022 Message Items and Industry Message Items, including the Message Paths and the related Business Element and Business Component).
4. If additional Message Functionality has been identified that cannot be supported by existing ISO 20022 Messages, follow the “new Message” approach (see below).

4.2.8 A new Message

If the gap analysis has identified additional Message Functionality, the approach for the development of ISO 20022 compliant Business Transactions and Message Sets will mainly focus on the logical analysis and message design, but with some simplifications:

- The documentation of the Industry Message Set will be reused where possible.

Activities:

1. Verify the business justification of the new Message (i.e. verify whether real business requirements can be identified for the identified Message Functionality).
2. Complete the message descriptions in the Business Transactions.
3. If an existing ISO 20022 Message can be – slightly - modified to support the additional Message Functionality:
   - Document the required modifications (i.e. ISO 20022 Message Items, Message Elements or Business Elements to be added, Rules to be added or modified, multiplicity to change, etc.).
   - Document the relation of the resulting modified ISO 20022 Message with the Industry Message (i.e. document corresponding ISO 20022 Message Items and Industry Message Items, including the Message Paths and the related Business Element and Business Component).
4. If no existing ISO 20022 Message can be reused or modified:
   - Design a new ISO 20022 Message.
   - Document the relation of the resulting modified ISO 20022 Message with the Industry Message (i.e. document corresponding ISO 20022 Message Items and Industry Message Items, including the Message Paths and the related Business Element and Business Component).
5. Document any Message Concepts and/or Business Concepts that need to be added or modified in order to support the required Message Definition.

4.2.9 A modified Message

If the gap analysis has identified a modified Message Definition (i.e. difference in message content) for an existing ISO 20022 Message, the approach for the development of ISO 20022 compliant Business Transactions and Message Sets will mainly focus on the logical analysis and message design, but with some simplifications:

- The documentation of the Industry Message Set will be reused where possible.

Activities:

1. Verify the business justification of the modified Message Definition (i.e. verify whether real business requirements can be identified for this message content).
2. If the existing ISO 20022 Message can be – slightly - modified to support the modified Message Definition:
   - Document the required modifications (i.e. ISO 20022 Message Items, Message Elements or Business Elements to be added, Rules to be added or modified, multiplicity to change, etc.).
   - Document the relation of the resulting modified ISO 20022 Message with the Industry Message (i.e. document corresponding ISO 20022 Message Items and Industry Message Items, including the Message Paths and the related Business Element and Business Component).
3. If the existing ISO 20022 Message cannot be modified because the impact would be too great:
   - Design a new ISO 20022 Message.
   - Document the relation of the resulting modified ISO 20022 Message with the Industry Message Set (i.e. document corresponding ISO 20022 Message Items and Industry Message Items, including the Message Paths and the related Business Element and Business Component).
4. Document any Message Concepts and/or Business Concepts that need to be added or modified in order to support the required Message Definition.

4.2.10 A new or modified Business Role

If the gap analysis has identified a new or modified Business Role, this will either result in the definition of a new or modified Business Process, Business Transaction or Message. The approach for the development of ISO 20022 compliant Business Transactions and Message Sets will therefore be the approach that is described in these cases.

Activities:

1. Verify the business justification of the new or modified Business Role (i.e. verify whether real business requirements can be identified for this Business Role).
2. Add or complete the definition of the Business Role.
3. Depending on the case, follow the approach for a new or modified Business Process, Business Transaction or Message.

4.3 ISO 20022 registration

The approach for the ISO 20022 registration is as follows:

- Use the information that has been obtained during the previous step (development of ISO 20022 compliant Business Transactions and Message Sets) to complete the

required ISO 20022 submission templates for all new or modified Dictionary Items and Catalogue Items. Make sure to use the official submission templates and to follow the related guidelines for these requests.

- Submit the requests to the ISO 20022 Registration Authority.
- The Registration Authority will receive the requests and will follow the appropriate process to update the ISO 20022 Repository.

Note that the final ISO 20022 registration may deviate from the original ISO 20022 requests in order to ensure consistency in the ISO 20022 Repository or to ensure full compliance with the ISO 20022 standard. These differences need to be identified, as they will have an impact on the exact relation between the Industry Message Set and the corresponding ISO 20022 compliant Business Transactions and Message Sets and hence on the Convergence Documentation that will be produced in the next activity of the ISO 20022 reverse engineering.

4.4 Preparation of migration

This activity will use the results of the previous activities (i.e. gap analysis, development of ISO 20022 compliant Business Transactions and Message Sets and ISO 20022 registration) to produce documentation that will support the migration towards the ISO 20022 compliant Business Transactions and Message Sets.

- “Convergence Documentation” will support the migration of the Industry Messages to the corresponding ISO 20022 Messages.
- Where necessary, additional “coexistence documentation” may support the coexistence of the Industry Message Set and the ISO 20022 compliant Business Transactions and Message Sets.
- Migration planning documentation will help the users of the Industry Message Set to plan and organize their migration towards the ISO 20022 compliant Business Transactions and Message Sets.

Note that this documentation is complementary to the basic documentation of the Industry Message Set and to the overall ISO 20022 documentation. The implementation of the ISO 20022 compliant Business Transactions and Message Sets must therefore be based on the full documentation set (i.e. Industry Message Set documentation, information in the ISO 20022 Repository, Convergence Documentation, coexistence documentation and migration planning documentation).

Note also that it will be up to individual organizations to provide (and maintain) this information for their own Industry Message Set. This implies that mapping documentation between two Industry Message Sets will only be available if individual organizations take the initiative to provide this documentation.

4.4.1 Convergence documentation

4.4.1.1 Objectives

The objective of the Convergence Documentation is to provide sufficient information to find the ISO 20022 Message, ISO 20022 Message Item and value that corresponds to any value of any Industry Message Item.

The above objective can be achieved by producing a complete and explicit "convergence table" that contains this information for each possible value in each possible Industry Message Item. This table would contain all possible paths of the Industry Messages with the corresponding ISO 20022 Message Path.

In order to optimize the use and maintenance of this information, it is possible to define "convergence tables" at multiple levels:

- Data Type convergence tables
- Element convergence tables
- Message convergence tables
- Message Item convergence tables.

These tables are described more in detail in the subsequent paragraph. Although the convergence tables are described here as simple tables, this should not be considered as a concrete proposal for implementation. Other forms (such as for instance relational databases, XML-documents or XSLT transformation rules) may be better suited for a real implementation.

The Convergence Documentation will – as much as practical – be provided in a machine-processable way in order to support organizations wishing to automate the migration. This section doesn't give guidelines on the format to use, as this will depend on the Industry Message Set for which Convergence Documentation is provided.

4.4.1.2 Description of convergence tables[8]

4.4.1.2.1 Data Type convergence tables

Description:

For each Data Type that is used in the Industry Message Set, it will identify the corresponding ISO 20022 Data Type(s) – including the Data Type Representation - that can be used. The information may also contain formatting constraints and value conversions.

Example:

- Price (FIX) --> Amount (ISO 20022)
- Account Number /35x (ISO E7775) --> AccountNumber_Identifier (ISO 20022)

[8] See Appendix A for a more detailed description of the Convergence Documentation

- Trade Transaction Type /4!c /value = ”BASK” (ISO E7775) --> TradeType_Code /value = ”BASK” (ISO 20022)

Remarks:

It is quite possible that the way a Data Type has to be converted partially depends on the element (and even the message) for which the Data Type has been used. In this case, the Data Type convergence table will contain all possibilities and the exact convergence rule to use will be indicated at element level (or even at message level).

4.4.1.2.2 Element convergence tables

Description:

For each Industry Message Element (or part of it), it will identify the corresponding Message Element(s) – including the owning Message Component – and/or Business Element(s) – including the owning Business Component – that can be used. The information may also contain more precise information concerning the Data Type and its formatting constraints and value conversions.

Example:

- MaxFloor (FIX) --> SecuritiesOrderParameters.MaximumShowFloorQuantity (ISO 20022)
- 36B.MAXF.Quantity (ISO E7775) --> SecuritiesOrderParameters.MaximumShowFloorQuantity (ISO 20022)

Remarks:

It is quite possible that the way an Industry Message Element has to be converted is dependent on the message in which it is being used. In this case, the Element convergence table will contain all possibilities and the exact convergence rule to use will be indicated at message level (i.e. in the Message Item convergence table).

4.4.1.2.3 Message convergence tables

Description:

For each message that is used in the Industry Message Set, it will identify the corresponding ISO 20022 Message(s) that can be used. The information may also contain details about the exact Message Functionality and about the conditions under which a particular ISO 20022 Message can be used.

Example:

- New Order Single (FIX) --> Order to Buy (ISO 20022), Order to Sell (ISO 20022)
- MT 502 (ISO E7775) --> Order to Buy (ISO 20022), Order to Sell (ISO 20022), Cancellation of Order (ISO 20022)

4.4.1.2.4 Message Item convergence tables

Description:

This table will provide additional information for Industry Message Items (or parts) that are used in a particular Industry Message AND for which the information that is present in the "Element convergence table" and the "Message convergence table" is not sufficient.

Example:

- A general rule doesn't apply (e.g. an Industry Message Item exceptionally maps to another Message Element or Business Element, or a specific Industry Message Item value exceptionally converts into another ISO 20022 Element value).
- A general rule is ambiguous (e.g. there are two different Business Elements that could be used to map the Industry Message Element into).

4.4.1.3 Development of Convergence Documentation

Input:

The input for the production of the Convergence Documentation comes from all previous activities:

- Gap analysis:

  Gap analysis related to Business Transactions or to Message Definitions can provide following input information:

  – Business Transaction gap analysis provides a list of Industry Messages (including a particular Message Functionality in case the message of the Industry Message Set is multi-functional) and their corresponding ISO 20022 Messages.

  – Message Definition gap analysis provides a list of corresponding ISO 20022 Message Items and Industry Message Items, including the Message Paths and the related Business Element and Business Component. This list will also include documentation about differences in data typing and possible values.

- Development of ISO 20022 compliant Business Transactions and Message Sets.

  Development of ISO 20022 compliant Business Transactions and Message Sets related to Business Transactions or to Messages can provide following input information:

  – Additional links between Industry Messages and ISO 20022 Messages.

  – Detailed information for these additional linked messages on corresponding Industry Message Items and ISO 20022 Message Items, Business Elements and Data Types.

- ISO 20022 registration

  ISO 20022 registration can provide additional input information in case the final registration of a Message, a Message Concept or a Business Concept deviates from the request for registration. This may for instance be the case if another Message Component than the one requested is used in a new Message or if another Data Type than the one requested is used for a Business Element or Message Element.

Activities:

1. Use the information from the ISO 20022 Registration Authority regarding differently registered messages to update the relation between Industry Messages and their corresponding ISO 20022 Message.
2. Use the information from the ISO 20022 Registration Authority regarding differently registered Message Concepts and Business Concepts to update the relation between Industry Message Items and ISO 20022 Message Items, Business Elements and Data Types.
3. Go through the list of all linked Industry Messages and ISO 20022 Messages.

   For each link:
   - Define the identification of the two messages
   - Define additional constraints (if any) that apply to the Industry Message in order to guarantee the desired functionality.
   - Verify whether the combination of messages and functionality constraints exists already in the Message convergence table. If not:
     - Add a new row in the Message convergence table.
4. Go through the list of corresponding Industry Message Items and ISO 20022 Message Items, Business Elements and Data Types.

   For each corresponding group:
   - Identify the Data Type of the Industry Message Item and the ISO 20022 Data Type and Data Type Representation.
   - Identify the relevant information on format constraints and on the conversion of the possible values.
   - Verify whether the combination of Data Types, format constraints and value conversion exists already in the Data Type convergence table. If not:
     - Add a new row in the Data Type convergence table.
   - Identify the identification of the Industry Message Item (or of the relevant part of or of the relevant combination)[9] and of the corresponding Message Element, Message Component, Business Element and Business Component.
   - Search the relevant row in the Data Type convergence table.
   - Verify whether there are additional constraints to be applied to the Data Type conversion.
   - Verify whether the combination of Industry Message Element, Data Type conversion and additional constraints exists already in the Element convergence table. If not:
     - Add a new row in the Element convergence table.

[9] One Industry Message field may contain multiple Business Elements and/or may contain partial Business Elements (in which case it may have to be combined with other Industry Message fields to obtain meaningful Business Elements).