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Improving transparency in financial and business reporting — Harmonization topics

Part 2: Guidelines for data point modelling

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National foreword

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Part 2: Guidelines for data point modelling

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www. iso. org/directives).

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This document was prepared by the European Committee for Standardization (CEN) (as CWA XBRL 002) and was adopted with the following modifications by Technical Committee ISO/TC 68, *Financial services*, Subcommittee SC 9, *Information exchange for financial services*.

— minor editorial change to Clause 1;

— Clause 2, Normative references, added;

— minor editorial changes.

A list of all parts in the ISO 5116 series can be found on the ISO website.

This document uses different verbal forms from those listed in the ISO/IEC Directives, Part 2.

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Introduction

0.1 General

The purpose of this document is to support supervisory experts in the creation of a Data Point Model (DPM). According to the definition of the European Banking Authority (EBA), a DPM "is a structured formal representation of the data [...], identifying all the business concepts and its relations, as well as validation rules, oriented to all kinds of implementers."[1)]

The underlying rules for the creation of such methods were initially introduced by the Eurofiling Initiative and developed further by the European Insurance and Occupational Pensions Authority (EIOPA). The main objective of data point modelling, the process of creating a DPM, is as follows: "[it] should help to produce a better understanding of the legal background to the prudential reporting data and make data analysis much easier for both the institutions and regulators"[2)].

Further goals are to prevent redundancies, lower maintenance efforts and, in general, to facilitate working with national extensions on the European agreed-upon data set to facilitate the descriptions of requirements that are sharable across national legislations. It is a requirement to have all the information collected by the national supervisory agencies, particularly in Europe, transformed into the same data structure with the same quality in order to be able to carry out standardized analysis of the data across Europe. The current implementations are not able to meet these European requirements for supervision "to achieve higher quality and better comparability of data"[3)]. The main reasons for this are the differences between the data definitions and the data formats of the various national supervisory agencies, making comparison of reported data virtually impossible.

0.2 Objective

The aim to harmonize the European supervisory reporting is to be able to carry out more comprehensive analysis and an increase of comparability of data. Since the supervisory agencies are already acquainted with the representation of regulations specified in laws, this document is going to introduce the reader to the concept of Data Point modelling methodology, as well as to its main terms and definitions that will enable you to create Data Point Models that contain "all the relevant technical specifications necessary for developing an IT reporting format" on your own.

0.3 Target audience

In general, as a banking supervisor you are responsible for communicating with Information Technology (IT) experts in order to support the transfer of the essence of regulatory reporting to IT systems. In 2009, the Eurofiling Initiative published the concept of Data Point modelling. Structures of data represented in supervisory tables, as well as underlying laws and guidelines, were defined in order to enable the interpretation of the reporting information by IT applications. IT specialists are responsible for the development of software. However, most of the time they do not have the special business knowledge needed to gather reporting requirements from various sources, such as legal texts like Solvency Regulations and National Banking Acts, in order to build a flawless system. Therefore, the task of creating a DPM is assigned to you.

This document introduces the basic principles deemed necessary in the modelling process. On the basis of the explanations given in this document, you will be able to provide prerequisites for deriving data formats on the basis of a DPM, as well as setting up a powerful data warehouse. This implies that the model is published in a format that is understood by both parties involved in transforming legislation into a model: business experts and IT specialists. The topics regarding supervisory reporting are kept short and limited to the content relevant for this document. The idea is to convey the creation of the Data Point Model to you, as you are a supervisor with analytical capabilities and personal interest in this topic. No special IT knowledge is expected. The first sections will give you an overview on the required IT knowledge.

1) EBA (2011a), p.22

2) EBA (2011a), p.30

3) EBA (2011a), p.29

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National banking supervisors have a mandate to evaluate the financial situation of financial institutions in their country. To be able to perform the necessary analytics, financial data is required from these institutions. The requirements are described in the form of texts and tables of data. To make a comprehensive model from these texts and tables, a model is being created to enable IT support in communicating and storing the necessary data. A common problem with the National Supervisory Authorities (NSAs) is that IT staff has little financial background and financial specialists have little IT background. This makes data modelling a problematic area, as both specialities are needed. This document is aimed at providing the tools and knowledge of creating a DPM by the financial specialists. The result, a model, can be perfected by IT staff later in the process.

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Improving transparency in financial and business reporting — Harmonization topics —

Part 2: Guidelines for data point modelling

1 Scope

This document provides guidelines for data point modelling for supervising experts. The main body consists of four sections. The interrogative form helps in choosing which section may best answer your question and lead you to a good understanding of the subject matter.

After this first introductory section and the section containing terms and definitions, the main part starts to provide basic knowledge about different types of data models and data modelling approaches. The first and the second sections provide an overview of data models in general, in contrast to the third section that highlights the necessity of data modelling for supervisory data. This third section draws on the objectives and background information of the preceding sections. Furthermore, a paragraph classifies the Data Point Model introduced by the Eurofiling Initiative and elaborated by EIOPA and EBA, where many new terms related to DPM are introduced. Another paragraph explains the areas of application for the DPM. The third section concludes with a paragraph introducing a subset of the technical constrains that need to be considered in the creation process of the DPM. The fourth section gives step-by-step instructions on how to create a DPM. The paper concludes with remarks on the progress achieved so far, and provides an outlook on the software that is being developed at the moment to support you during the creation process.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

NOTE The terms and definitions used in connection with Data Point modelling are inspired by vocabulary already known through their use in describing multidimensional databases and data warehouses. IT specialists originally introduced these terms. However, for an understanding and creation of Data Point Models, they are now established in the language of business specialists as well.

3.1
data point
combination of quantitative and qualitative aspects to describe a reportable information

3.2
default member
specific element of a dimension which is applied when a dimension is not explicitly associated to a Data Point

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3.3
dictionary element
abstract term for all qualitative and quantitative aspects of a multidimensional model

3.4
dimension
data set of one characteristic area which is composed of individual and non-overlapping data elements used to define "by" conditions which represent the qualitative aspects of a Data Point

Note 1 to entry: Dimensions literally describe the dimensioned element in order to limit the range of interpretation and thereby qualify the dimensioned element. One dimension either has a definite (i.e. countable) number of members, which is called an explicit dimension, or an infinite number of members represented as values, that follow a specific typing pattern, which is known as a typed dimension.

3.5
dimensioned element
element that shows the nature of the data by typing it and holds information about the underlying structure of the cell that is specified

Note 1 to entry: In IT contexts, a dimensioned element is referred to as metadata.

3.6
domain
category with items that share a common semantic identity

Note 1 to entry: A Domain provides, therefore, an unambiguous collection of items in a value range. The items of a Domain can have a definite, and therefore countable, number of items, or an infinite number of elements that follow a specific (syntax) pattern.

3.7
domain member
element that is part of a domain

Note 1 to entry: It is also possible to have members that do not belong to a domain; they can refer to a dimension directly.

Note 2 to entry: Domain members can either be explicitly named or defined by a type.

3.8
enumerable dimension
dimension that specifies a finite number of members

3.9
fact
quantitative aspect of data reported

EXAMPLE An amount, a number, a string of text, a date.

3.10
hierarchy
nesting (setting relationships in a parent–child-like architecture) of dictionary elements

3.11
non-enumerable dimension
dimension that specifies an undefined number of elements by defining syntactic constraints on the values of the members, i.e. a data type or a specific pattern

3.12
sub-domain
subset of the members of a domain

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3.13
taxonomy
description of a valid Data Point Model

3.14
template
graphical representation of a set of supervisory data

4 What is a data model

4.1 General

Data models outline the relationships between data.[4] It is important that the person responsible for modelling takes the time to capture all relations between data that can be shown in the model. It is essential that the model is reviewed by third parties involved for errors to be identified in advance. Furthermore, it helps to get a clearly structured model that can save time and costs later.

4.2 The term "model"

The term model has its origin in the Middle French noun "modelle".[5] In IT context, a model pictures a target-oriented system instead of directly intervening in the complex system.[6] Specifically, in terms of data models, this means a real system, a system from the domain comprising real components that are tangible and dynamic, which is mapped to a model to reduce complexity.[7] This may help to find a suitable solution to an existing problem. The model needs to be created as close to reality as possible, with attention to requirements regarding structure and behaviour. Nevertheless, in order to raise the comprehensibility, aspects irrelevant for the purpose of modelling may be left out. The importance of a single aspect, and whether it is worth being specified in the model, depends on the decision of the domain experts. This strongly depends on the modeller's understanding, creativity and capability to associate the object system with the model.

The challenge of data modelling is that a data model "must be simple enough to communicate [it] to the end user [...] [and] [...] detailed enough for the database design to use it to create the physical structure".[8] The same principle applies to message design and its physical representation.

In the following paragraph, the procedure of data-oriented modelling is presented.

4.3 Data-oriented process of modelling

The data-oriented process focuses on describing the static structure of the reporting system, in contrast to the function-oriented process, which begins with modelling the functions of the reporting system and adds the data in a later stage.

As data is the focus point of the banking supervisors, the data-oriented process is applied. Additionally, in the course of time, data [objects] do not change as much as processes do. Functions are not being taken into account here.

Applying the data-oriented process, data objects are specified first, as well as the attributes that belong to each data object. The next step is to put the objects in relation to each other. Furthermore, the data model can imply integrity conditions and define operations that can be carried out on the data.[9]

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4) Cf. Gartner (2012)

5) Harper,D.(2013)

6) Cf. Ferstl, O./ Sinz,E. (2013), p. 22

7) Cf. ibidem, p. 20

8) ZaZa Network (2007)

9) Cf. Baeumle-Courth P./Nieland S./Schröder H. (2004), p.56

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4.4 The conceptual data model as a first step aiming for a database system

The data-oriented modelling takes place on 3 different levels that are built upon one another.

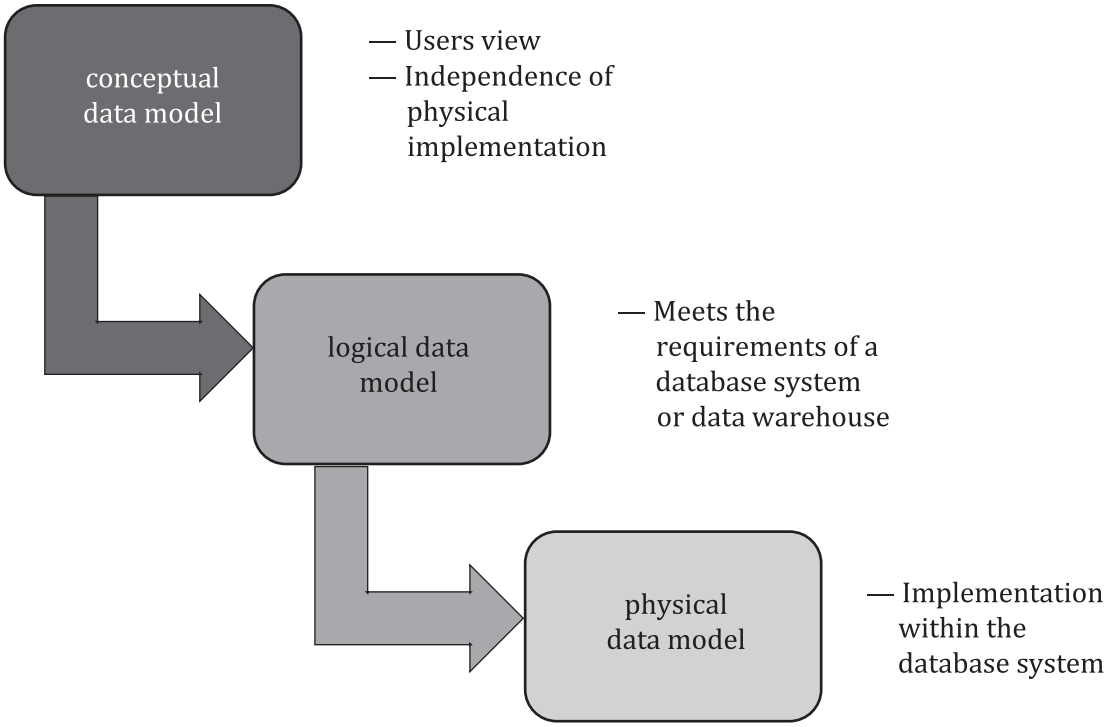

Figure 1 — Levels of data-oriented modelling

The conceptual data model reflects your reporting requirements. You are in the best position to know what pieces of information are requested. The conceptual model helps you in the communication with your IT specialists. This is an important step to avoid unpleasant surprises later when the model is implemented in the IT department. The model is built regardless of the database system or data warehouse to be used.[10)] Relevant facts of the object system are to be specified without loss of information. However, you, as the creators of the conceptual model do not need to be technically skilled because the succeeding steps of data modelling are carried out by IT specialists. They should be concerned about the technical requirements. It is very important that this first step of preparing the conceptual data model is carefully elaborated before transferring the information to the IT. This can be ensured by early reviews, which include all parties concerned.

The logical data model, as well as the physical data model, is prepared by the IT specialists. In essence, the logical data model immediately follows the conceptual model (see Figure 1). When aimed at a database approach, in contrast to the conceptual model, it also takes the requirements of the database or the data warehouse into account.[11)] The physical data model, as a final step, describes the actual implementation into an existing database system.[12)]

4.5 Description of data modelling approaches for supervisory purposes

4.5.1 General

This paragraph deals with the methods that are used to disseminate data and identify all of its appropriate aspects. The two most appropriate methods of expressing regulatory data in a structure to determine the context of the information will be discussed here.

10) Cf. 1keydata (2013a)

11) Cf. 1keydata (2013b)

12) Cf. 1keydata (2013c)

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Both modelling approaches refer to metadata.

Definitions for data and metadata are given below:

Data is “information processed or stored by a computer. This information may be in the form of text documents, images, audio clips, software programs, or other types of data. Computer data may be processed by the computer's CPU and is stored in files and folders on the computer's hard disk.”[13)]

Metadata “describes data. It provides information about a certain item's content.”[14)]

While data is a number like “50”, the metadata adds qualifying information to the number. The explanation on the “form centric” and the “data centric” modelling approaches will clarify the difference.

4.5.2 Using the “form centric” modelling approach

The “form centric” approach is an ordinary table format with information held in a cell of a predefined table called a template. Here a template is understood as a graphical representation of a set of supervisory data. This approach identifies reporting data by their position in the templates. In this case, each datum is defined by its coordinate in the table that is represented by the combination of columns and rows of a template. Each coordinate has a code that is based on the row code and the column code. This means that the data reported on the basis of coordinate codes is meaningless without the context of the template. In the following example, each cell that represents a data requirement is described by a code combination of its column and its row of the table Market Risk: Standardised form for position risk in equities (MKR SA EQU) of the COREP framework. The form represents market risk equity positions of the institutions that are subject to mandatory reporting. Throughout the whole document, this table serves as an example to introduce terms and concepts of Data Point modelling to you. The table with annotations can be found in the appendix in full size in order to deliver better clarity.

MKR SA EQU — MARKET RISK: STANDARDISED APPROACH FOR POSITION RISK IN EQUITIES

		POSITIONS					RISK CAPITAL CHARGE (%)	OWN FUNDS REQUIR-EMENTS	TOTAL RISK EXPOSURE AMOUNT
		GROSS POSITIONS		NET POSITIONS					
		LONG	SHORT	LONG	SHORT				
		010	020	030	040	050		060	070
010	EQUITIES IN TRADING BOOK								Cell linked to CA
020	General risk								
021	Derivatives						8,00		
022	Other assets and liabilities								
030	Exchange traded stock-index futures broadly diversified subject to particular approach								
040	Other equities than exchange traded stock-index futures broadly diversified								
050	Specific risk						8,00		
080	Particular approach for position risk in CIUs								
090	Additional requirements for options (non-delta risks)								

Figure 2 — Table MKR SA EQU as an example of a form centric approach[15)]

13) TechTerms (2013a)

14) TechTerms (2013b)

15) EBA (2013)

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The “form centric” approach is oriented as the visualization of the data. Dependencies between the codes of the data are only shown in the templates, i.e. by identifying the appropriate headlines or by the indents of the label rows. A report based on the “form centric” approach, which uses codes for the identification of data, is not able to incorporate the dependencies visibly.

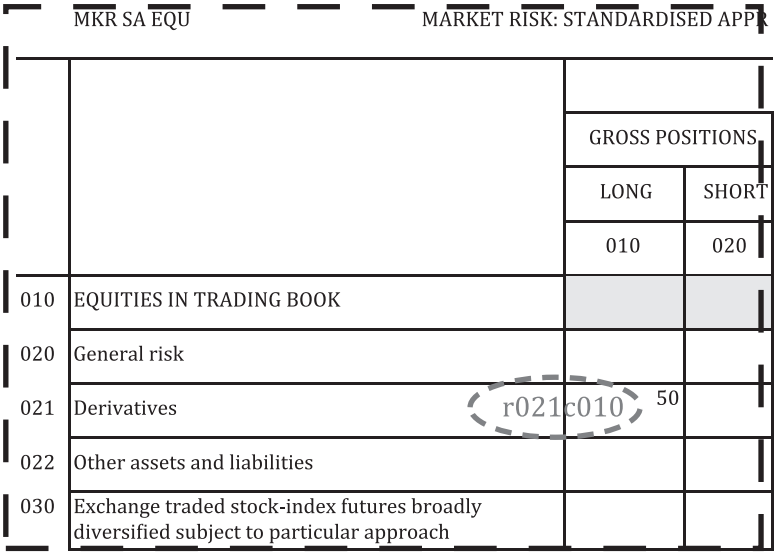

Figure 3 — Close up of table MKR SA EQU for higher visibility on important aspects

On the basis of the section of sample table MKR SA EQU, shown in Figure 3, the “form centric” approach is explained. The value reported by the monetary institution in each cell is called a fact. Facts are classified as data. Let us say that the oval circled cell, defined by the row position r021 and the column position c010, holds the monetary value “50”. The coordinate code r021c010 in the red circle is the combination of the row position followed by the column position. Taking the template into account, we realize the number “50” represents a value for derivatives as a gross position. When we include additionally the headline above column c010 we can conclude that a long-term position is reported.

Looking at the excerpt, it is not specified to which year this information belongs. Neither do we know whether “50” represents a value in thousands or millions, nor can we conclude its currency. We can imagine that it would be really hard for a non-supervisor to correctly classify this information 50. Now, if you think about the table shown in Figure 3 again, what would that number tell you if you did not have any headlines labelling the rows and the columns? Obviously, the information would be useless.

In conclusion, we see that the “form centric” approach doesn’t include information about the data reported, which is assumed to be known (like all figures are in thousands). Moreover, without the context of the row and column position of the datum, the information content is essentially zero.

4.5.3 Using the “data centric” modelling approach

In the “data centric” approach, data is identified by a set of characteristics. It is considered independently of its graphical representation by adding information that unambiguously defines the datum. Therefore, no positional alignment is needed in order to give the datum a specific meaning. Any datum is expressed in terms of the categories necessary for their identification.

Information available is divided into two groups:

— qualifying information;

— quantifying information[16].

16) Cf. Sapia, C. / et al (1999)

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