BS ISO 20022-8:2013

BSI Standards Publication

Financial services — Universal financial industry message scheme

Part 8: ASN.1 generation

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National foreword

This British Standard is the UK implementation of ISO 20022-8:2013.

The UK participation in its preparation was entrusted to Technical Committee IST/12, Financial services.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Financial services — Universal financial industry message scheme —

Part 8: ASN.1 generation

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

Partie 8: Génération ASN.1

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Contents

Page

Foreword iv
Introduction vi
1 Scope 1
2 Normative references 1
3 Terms and definitions 1
4 Background 1
5 ISO 20022 transformation rules for MessageSet 3
5.1 Registration and Repository 3
5.2 Preconditions 3
5.3 Transformation constraints 3
5.4 Module Header 3
5.4.1 General 3
5.4.2 Module Name 3
5.4.3 Module identification 4
5.4.4 Definition of the tagging environment 4
5.4.5 Definition of the extensibility environment 4
5.5 Granularity of Modules 4
5.6 Encoding Messages 4
5.6.1 Encoding 4
5.7 Completeness 5
5.8 Method 5
5.8.1 General 5
5.8.2 Relationship between metamodel concepts and ASN.1 artefacts 5
5.8.3 ISO 20022 DataType transformation to ASN.1 11
Bibliography 25

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Full document details: BS ISO 20022-8:2013

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.

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 20022-8 was prepared by Technical Committee ISO/TC 68, *Financial services*.

ISO 20022 consists of the following parts, under the general title *Financial services — Universal financial industry message scheme*:

— *Part 1: Metamodel*

— *Part 2: UML profile*

— *Part 3: Modelling*

— *Part 4: XML Schema generation*

— *Part 5: Reverse engineering*

— *Part 6: Message transport characteristics*

— *Part 7: Registration*

— *Part 8: ASN.1 generation*

ISO 20022-1:2013, ISO 20022-2:2013, ISO 20022-3:2013, ISO 20022-4:2013, ISO 20022-5:2013, ISO 20022-6:2013, ISO 20022-7:2013 and ISO 20022-8:2013 will be implemented by the Registration Authority by no later than the end of May 2013, at which time support for the concepts set out within them will be effective. Users and potential users of the ISO 20022 series are encouraged to familiarize themselves with the 2013 editions as soon as possible, in order to understand their impact and take advantage of their content as soon as they are implemented by the Registration Authority. For further guidance, please contact the Registration Authority.

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For the purposes of research on financial industry message standards, users are encouraged to share their views on ISO 20022:2013 and their priorities for changes to future editions of the document. Click on the link below to take part in the online survey:

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Introduction

This International Standard defines a scalable, methodical process to ensure consistent descriptions of messages throughout the financial services industry.

The purpose of this International Standard is to describe precisely and completely the externally observable aspects of financial services messaging in a way that can be verified independently against operational messaging.

The trigger for the creation of this International Standard was the rapid growth in the scale and sophistication of messaging within financial services during the 1990s using ISO 15022. The financial services industry (from here on referred to as "the industry") created the first version of this International Standard as the successor to ISO 15022 in response to that trigger. Since ISO 15022, the industry has broadened the scope from securities to the entire industry for this International Standard.

This International Standard is based on open technology standards, which historically have evolved more rapidly than the industry itself. Consequently, this International Standard adopted a model-driven approach where the model of the industry's messaging can evolve separately from the evolution of the messaging technology standards. The period during which this International Standard has emerged followed the widespread adoption of the World Wide Web (the Web) for business. XML (eXtensible Mark-up Language) emerged as the *de facto* standard for document representation on the Web and it became the first syntax for ISO 20022.

The modelling process is further refined into three levels which, in addition to the messaging technology standard, is why this International Standard is based on four levels: the Scope level, the Conceptual level, the Logical level and the Physical level.

This four-level approach is based on the first four levels of the Zachman Framework. The remaining two levels of the Zachman Framework are equivalent to the implementations and the operational levels, respectively.

In ISO 20022-1, the first, second and third levels are described in UML (Unified Modelling Language) because it is widely supported and supports multiple levels of abstraction. The models created in accordance with this International Standard are technology independent in that they do not require any particular physical expression or implementation. Such models aim to describe all parts of the message exchange. The models form the definition of the protocol between participants exchanging messages. This International Standard defines a method that describes a process by which these models can be created and maintained by the modellers.

The models and the Physical level artefacts are stored in a central repository, serviced by a Registration Authority. This International Standard's repository is available on the World Wide Web and offers public access for browsing.

The Repository is organized into two areas:

— A DataDictionary containing the industry model elements likely to have further or repeated use.

— A BusinessProcessCatalogue that contains models describing specific message definitions and business processes, and physical syntax implementations.

This International Standard is organized into the following parts.

— ISO 20022-1 describes in MOF (Meta-Object Facility) the metamodel of all the models and the Repository.

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— ISO 20022-2 covers the UML profile, a grounding of general UML into a specific subset defined for this International Standard (to be used when UML is selected to define the models).

— ISO 20022-3 describes a modelling method to produce models for this International Standard.

— ISO 20022-4 covers XML schema generation rules to transform a Logical level model into a Physical level description in the syntaxes.

— ISO 20022-5 covers logical model alignment and reverse engineering of existing message syntaxes.

— ISO 20022-6 covers message transport characteristics that define the quality of service required by the business process definitions so that they can operate successfully.

— ISO 20022-7 describes the process of managing the registration of models and physical syntax implementations.

— This part of ISO 20022 gives ASN.1 syntax generation rules to transform a Logical level model into a Physical level description in ASN.1.

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Financial services — Universal financial industry message scheme —

Part 8:
ASN.1 generation

1 Scope

This part of ISO 20022 describes the transformation rules to generate ASN.1 abstract syntax from an ISO 20022 compliant MessageDefinition. The generated abstract syntax is for the description and validation of Messages.

The transformation rules are a transformation from Level 3 to Level 4. It is a deterministic transformation, meaning that the resulting ASN.1 is completely predictable for a given MessageDefinition. There is neither manual input to the transformation itself nor manual adjustment to the result of the transformation.

This part of ISO 20022 is the ASN.1 equivalent of ISO 20022-4. In ISO 20022-4 the abstract syntax generated is XML Schema; in this part of ISO 20022 it is ASN.1. In ISO 20022-4 the only encoding supported is UTF-8 XML; in this part there are multiple encodings supported for ASN.1. These include all the standard encodings, but in addition the ability to register custom encodings in ECN.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 8825-5:2008, *Information technology — ASN.1 encoding rules: Mapping W3C XML schema definitions into ASN.1 — Part 5*

ISO 20022-1, *Financial services — Universal financial industry message scheme — Part 1: Metamodel*

W3C Recommendation: XML Schema Part 2: Datatypes Second Edition, (28 October 2004)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 20022-1 apply.

NOTE Within ASN.1 notation, XSD refers to the XSD Module defined by ISO/IEC 8825-5.

4 Background

Abstract Syntax Notation One (ASN.1) is an International Standard and flexible notation that describes data structures for representing, encoding, transmitting and decoding data. It provides a set of rules for describing

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the structure of objects that are independent of machine-specific encoding techniques and it is a precise, formal notation that removes ambiguities.

ASN.1 is a joint ISO/IEC and ITU-T standard, originally defined in 1984 as part of CCITT X.409:1984. ASN.1 constituted its own standard, X.208, in 1988 due to wide applicability. The substantially revised 1995 version is covered by the X.680 series. The current version is backward compatible with the 1995 version.

ISO/IEC 8824 covers the ASN.1 abstract syntax; ISO/IEC 8825 covers encodings for the ASN.1 abstract syntax. The abstract syntax is roughly analogous to XML Schema, and the encodings roughly analogous to XML. The XML Schema Definition Language (XSD) Recommendation is written in terms of the XML Recommendation, which makes substituting XML for a different encoding impractical. XSD effectively limits the encoding to XML.

Parts 1 to 5 of ISO 20022-5 published in 2004 use only one syntax, XML Schema, and only one encoding, UTF-8 encoded XML. Support for ASN.1 has been added to ISO 20022 in order to support scenarios in which its syntax and encodings are more suitable. It is up to users of this International Standard to decide for which scenarios ASN.1 is suitable.

The consensus that led to the inclusion of ASN.1 was a history of its usage in messaging, good support, and a reputation for small and fast to parse messages. Encoding Control Notation had been identified as a way to support existing encodings within 20022 without compromising the abstract syntax.

The addition of multiple encodings to ISO 20022 gives up wire level compatibility in return for broadening the domain in which ISO 20022 can standardize the Business Process and Message Definitions. The Messages remain syntactically compatible, which is less than wire-level compatible and more than semantically compatible. In practice, we expect an ISO 20022 Messaging Library to be identical for encodings based on ASN.1 and XSD.

ASN.1 may be used as a schema language for XML. The generated ASN.1 Abstract Syntax will contain XER tags to guide the encoding as XML. An XML Message will be equivalent, whether encoded from the ISO 20022 XSD or the ISO 20022 ASN.1 Abstract Syntax. For any Message expressed in ASN.1, when encoded to XML using XER, will produce an XML Message that is valid against the XSD for the same Message Definition. It should not matter whether the XML is produced using the XSD or ASN.1 as the ASN.1 Abstract Syntax and XSD are equivalent through their XML being compatible; the design of the ASN.1 is limited to features and design idioms with a direct equivalent in XSD. The scopes of an ASN.1 Module and an XSD Schema namespace are equivalent.

The ASN.1 generation takes a single parameter as input, which is a MessageSet. The output of the generation is ASN.1 Abstract Syntax.

Each Message Definition is mapped to a single Module containing a single PDU. Each Module is stored in a separate file with a file extension of ".asn".

Each MessageSet is mapped to a collection of PDUs. Each MessageSet is stored as a Zip file containing all the ".asn" files for the MessageDefinitions.

The default encodings are Aligned PER and XML using XER. The use of every other encoding shall be Registered. Any encoding that is not an International Standard shall also be described using ECN and that description shall be Registered.

NOTE This part of ISO 20022 explains how a given MessageDefinition will be mapped into ASN.1; it does not explain how to create a MessageDefinition. This information can be found in ISO 20022-3.

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