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Financial services — Universal financial industry message scheme —

Part 6: Message transport characteristics

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

Partie 6: Caractéristiques du transport de message

Reference number
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Foreword

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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 20022-6 was prepared by Technical Committee ISO/TC 68, *Financial services*.

This second edition cancels and replaces the first edition (ISO 20022-6:2009), which has been technically revised.

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.

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:

http://www.surveymonkey.com/s/20022_2013

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 hereon 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 this part of ISO 20022, 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.

— 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.

— This part of ISO 20022 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.

— ISO 20022-8 gives ASN.1 syntax generation rules to transform a Logical level model into a Physical level description in ASN.1.

Financial services — Universal financial industry message scheme —

Part 6: Message transport characteristics

1 Scope

This part of ISO 20022 specifies the characteristics of the MessageTransportSystem required for an ISO 20022 BusinessTransaction and MessageDefinition. Changes to the value of the MessageTransport Characteristics can affect the BusinessTransaction and MessageDefinition.

Each BusinessTransaction in the ISO 20022 Repository is associated with a MessageTransportMode. The MessageTransportMode specifies the values for the MessageTransportCharacteristics.

This part of ISO 20022 specifically does not define the wire-level interoperability of message transports. The overall structure is of a layered specification so that ISO 20022 can be implemented over many message transports. This part of ISO 20022 defines only those characteristics required for interoperability at the business process and message level.

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

3 Terms and definitions

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

3.1
Business Layer
higher or upper layer of the protocol hierarchy that is used to exchange ISO 20022 Messages

NOTE Two layers are defined: a MessageTransport Layer and a Business Layer. The Business Layer is concerned with the business process independently of the mechanics of messaging; effectively independently of technology. The MessageTransport Layer is concerned with the mechanics of messaging; effectively independently of the business process.

3.2
MessageInstance Header
first logical part of the MessageInstance, required to be processed before the rest of the MessageInstance

NOTE It contains information that is common/relevant to any MessageInstance; as such, it is independent of the message functionality.

EXAMPLE The identification of the sender of the MessageInstance.

3.3
Messaging Application Layer
layer immediately beneath the bottom layer of ISO 20022

NOTE This is the Open System Interconnection (OSI) Layer 7 application that delivers messages (see 4.1).

EXAMPLE Examples of applications at the Messaging Application Layer are AMQP, ftp, http and SOAP, WebsphereMQ, or SonicMQ.

3.4
Name
identifier of something

NOTE 1 A Name is “pure”, that is it shall be used for no purpose other than to identify something.

NOTE 2 Business logic shall not be based on anything about a name other than its identity.

4 Exchange of messages in ISO 20022

4.1 Layered protocol

The protocol that is used for exchanging ISO 20022 messages is defined as being in two layers sitting directly above the seven layers of the Open System Interconnection (OSI) model.

— The higher or upper layer is named the Business Layer and deals with MessageInstances. The exchange of MessageInstances is fully described in the Message Choreography and the structure of the MessageInstances is fully described by the MessageDefinitions and related MessageRules, Rules and MarketPractices. All of these shall be registered in the ISO 20022 Repository. The Business Layer is equivalent to adding a Layer 9 to the OSI model.

— The lower or bottom layer is named the MessageTransport Layer and deals with TransportMessages. The implementation of the MessageTransport Layer may vary and is therefore outside the scope of ISO 20022. The behaviour and structure of the TransportMessages shall therefore not be registered in the ISO 20022 Repository. The Transport Characteristics apply to the Message Transport Layer. The MessageTransport Layer is equivalent to adding a Layer 8 to the OSI model.

— The layer immediately beneath and therefore outside the ISO 20022 Protocol is the Application Layer. This is the Messaging Application layer. ISO 20022 allows any Messaging Application that will support the requirements of the MessageTransport Layer. The Messaging Application Layer is Layer 7 of the OSI model.

NOTE ISO 7498-1 is referred to as “OSI” throughout this part of ISO 20022.

4.2 Layering principles

A single new MessageInstance is created, by the sending business application, for each business event, i.e. each interaction in a BusinessTransaction. A MessageInstance adheres to the following principles.

— A MessageInstance shall not contain information about the MessageTransportSystem or the mechanics or mechanism of message sending, transportation, Address, or receipt.

— A MessageInstance shall be comprehensible outside of the context of the Transport Message. That is, the MessageInstance shall not require knowledge of the Transport Message to be understood.

— A MessageInstance is fully described by its MessageDefinition.

— A MessageInstance refers to Business Participants by their Name. Each instance of a Business Participant has one Name. The instance of the Business Participant shall not be referred to in the MessageTransport Layer.

A new Transport Message is created each time a MessageInstance is published by a sending Message Endpoint. A Transport Message adheres to the following principles.

— A TransportMessage will have a body which only contains the MessageInstance.

— A TransportMessage may contain headers, footers and envelopes that are meaningful for the transport and shall not contain information about the business process. As these headers, footers and envelopes are implementation specific, they shall not be registered in the ISO 20022 Repository.

— A Transport Message is published by one Messaging Endpoint and received at zero to many MessagingEndpoints. Each MessagingEndpoint is identified by one Address. The Messaging Endpoint is referred to in the Message Transport Layer by its Address. The Messaging Endpoint shall not be referred to in the Business Layer.

A Business Participant shall be able to change its association with Messaging Endpoints during a Business Transaction.

4.3 Receiving Messaging Endpoint idempotent behaviour

A MessagingEndpoint may republish a MessageInstance. This will create a new TransportMessage containing the same MessageInstance. The receiving MessagingEndpoint shall behave as if it had only received the MessageInstance once. This property is named “MessageInstance Republication Idempotency”.

The MessageTransportSystem may republish a TransportMessage. This creates a new copy of the original TransportMessage (containing a copy of the original MessageInstance). The receiving MessagingEndpoint shall behave as if it had only received the Transport Message once. This property is named “Transport Message Republication Idempotency”.

The MessageTransportSystem shall not change or add to a MessageInstance (Level 8). They shall be preserved unadulterated.

4.4 Bandwidth Assumption

The bandwidth provided for TransportMessages at a MessagingEndpoint and for the MessageTransportSystem is assumed to be unconstrained. There is no limit defined for messaging bandwidth.

Unconstrained bandwidth for Layer 8 TransportMessages will hold for all higher layers, such as Layer 9 MessageInstances, because they are transported within Layer 8.

Unconstrained bandwidth for Layer 8 TransportMessages makes no requirement for lower layers, such as Layers 1 to 7.

NOTE It is acknowledged that, in practice, the bandwidth of both the MessageTransportSystem and at a MessagingEndpoint is finite. The purpose of the Bandwidth Assumption is to be clear that it is the obligation of the MessageTransportSystem and MessagingEndpoint to meet the bandwidth requirements, and not the obligation of the MessageChoreography, MessageDefinition, or any other part of this International Standard, to constrain those requirements.

4.5 Security Assumption

It is assumed the TransportMessages are delivered securely by all the MessageTransportSystems involved in delivery. This is defined as:

— the TransportMessage is sent from the MessagingEndpoint named as the sender in the Transport Message;

— the TransportMessage has not been modified since sending, except by MessageTransportSystems;

— the TransportMessage is private to the Sender, the MessageTransportSystems it flows through, and the destinations;

— the MessageTransportSystem is not required to be capable of verifying to a third party that a sender sent a message or a destination received a message.

NOTE The purpose of the Security Assumption is to be clear that basic security does not need to be recreated inside the MessageTransport Layer or Business Layer.

5 MessageTransport characteristics

ISO 20022-1 defines the MessageTransport characteristics. These are important because their values may have an impact on MessageChoreography and MessageDefinition.

Each characteristic is defined in the metamodel, and the metamodel shows the set of possible values. The list of values is complete. The values are exclusive choices unless defined otherwise.

The MessageTransport characteristics apply to the MessageTransport Layer, not the Business Layer. The behaviour of the Business Layer is defined by the MessageChoreography.

6 Times and clocks

6.1 Clocks

It shall not be assumed there is a single global clock. Clocks represent states which may vary across MessagingEndpoints.

Clocks at each MessagingEndpoint may have different values for time and different rates of change; those rates of change may vary over time.

Clocks shall maintain a maximum (inclusive) variance from UTC less than the Maximum Clock Variation for the supported MessageTransportMode.

6.2 Time representation

It shall not be assumed that clock representations of time are linear or continuous. A clock can move forwards or backwards at any time within the constraints of synchronization.

7 Registering MessageTransportModes

7.1 General

MessageTransportModes are part of the BusinessProcessCatalogue of the ISO 20022 Repository.

Every BusinessTransaction shall be associated with a single MessageTransportMode. This is the MessageTransportMode that correctly supports the BusinessTransactions, MessageDefinitions and MessageChoreography.

Three examples of MessageTransportModes are given below: the Reliable Mode, the Quick Mode and the Bulk Transfer Mode. These shall be registered in the Repository.

7.2 Example 1: Reliable Mode

7.2.1 Purpose

Reliable Mode is intended for business processes that require simple predictability, at the price of reduced scalability and latency.

7.2.2 Message Transport Characteristics values for Reliable Mode

The Message Transport Characteristics values for Reliable Mode are as follows.

— DeliveryAssurance = AtLeastOnce

— SenderAsynchronicity = Asynchronous

— ReceiverAsynchronicity = Asynchronous

— MessageDeliveryOrder = Unordered

— MessageDeliveryWindow = -

— MessageSendingWindow = 60 s

— MessageCasting = Multicast

— BoundedCommunicationDelay = 60 s

— MessageValidationOnOrOff = ValidationOn

— MessageValidationResults = Reject

— MessageValidationLevel = Business Process Valid

— Durability = Persistent

— MaximumMessageSize = 100,000 kb (100 Mb)

7.3 Example 2: Quick Mode

7.3.1 Purpose

Quick Mode is intended for many low latency operations, at the price of reduced predictability.

7.3.2 Message Transport Characteristics values for Quick Mode

The Message Transport Characteristics values for Quick Mode are as follows.

— DeliveryAssurance = At Most Once

— SenderAsynchronicity = Asynchronous

— ReceiverAsynchronicity = Asynchronous

— MessageDeliveryOrder = Unordered

— MessageDeliveryWindow = -

— MessageSendingWindow = 30 ms

— MessageCasting = Multicast

— BoundedCommunicationDelay = 60 ms

— MessageValidationOnOrOff = ValidationOff

— MessageValidationResults = -

— MessageValidationLevel = NoValidation

— Durability = Transient

— MaximumMessageSize = 100 kb

7.4 Example 3: “Bulk Transfer” Mode

7.4.1 Purpose

“Bulk Transfer” Mode is intended for many high volume data transfer operations, such as Position Reporting or Portfolio Reconciliation.

7.4.2 Message Transport Characteristics values for “Bulk Transfer” Mode

The Message Transport Characteristics values for “Bulk Transfer” Mode are as follows.

— DeliveryAssurance = AtLeastOnce

— SenderAsynchronicity = Asynchronous

— ReceiverAsynchronicity = Asynchronous

— MessageDeliveryOrder = Unordered

— MessageDeliveryWindow = -

— MessageCasting = Multicast

— MessageValidationOnOrOff = ValidationOn

— MessageValidationResults = Reject

— MessageValidationLevel = BusinessProcessValid

— Durability = Persistent

— MaximumMessageSize = 100,000 kb (100 Mb)

— BoundedCommunicationDelay = 300 s

Bibliography

[1] ISO 7498-1, *Information technology — Open Systems Interconnection — Basic Reference Model: The Basic Model*

[2] ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

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