Chapter 1

What Is ISO 20022?

In This Chapter

- Introducing financial messaging standards
- ISO 20022 and how it is different

In essence, ISO 20022 is a recipe for making financial messaging standards. But before we go much further, we should say what financial messaging standards are, so that's what this Part starts off by doing. We come to ISO 20022 itself later in the Part.

What Are Financial Messaging Standards?

To conduct their business, financial institutions exchange massive amounts of information with their customers and among themselves. Such exchanges only work if the sender and receiver of a message have a common understanding of how to interpret this information. This is especially true if either party wishes to rely entirely on computers to process information.

Grasping the basics: syntax and semantics

To be able to eliminate the need for human intervention to interpret the data, the financial industry has created message definitions – that is, agreements on how to organise the data they want to exchange in structured formats (*syntax*) and meaning (*semantics*). Based on such message definitions, they will exchange messages, as illustrated by the following extract of a simple payment instruction.

Suppose ExampleBank in Utrecht, the Netherlands (Bank Identifier Code (BIC) EXABNL2U) has been requested by its corporate customer ACME NV, Amstel 344, Amsterdam to transfer 12,500 US Dollars on 29 October 2009 from its account 8754219990. Instead of addressing the above instruction to its US Dollar correspondent in unstructured text, ExampleBank sends a structured message based on a standard message definition:

```
<CdtTrfTxInf>
    <IntrBkSttlmAmt Ccy=‘USD’>12500</IntrBkSttlmAmt>
    <IntrBkSttlmDt>2009-10-29</IntrBkSttlmDt>
    <Dbtr>
        <Nm>ACME NV.</Nm>
        <PstlAdr>
            <StrtNm>Amstel</StrtNm>
            <BldgNb>344</BldgNb>
            <TwnNm>Amsterdam</TwnNm>
            <Ctry>NL</Ctry>
        </PstlAdr>
    </Dbtr>
    <DbtrAcct>
        <Id>
            <Othr>
                <Id>8754219990</Id>
            </Othr>
        </Id>
    </DbtrAcct>
    <DbtrAgt>
        <FinInstnId>
            <BIC>EXABNL2U</BIC>
        </FinInstnId>
    </DbtrAgt>
</CdtTrfTxInf>
```

The above example is an excerpt from an ISO 20022 Customer Credit Transfer.

Messaging standards provide clear definitions of the information and data formats (field lengths, codes, character sets) that can be exchanged between parties. The above message, for example, contains the line

```
<IntrBkSttlmAmt Ccy='USD'>12500</IntrBkSttlmAmt>
```

to indicate the currency and amount of the transaction. The underlying standard for a Customer Credit Transfer message tells you that this field is mandatory, that it starts with the tag ''IntrBkSttlmAmt'', that the information in the field must consist of three letters (the ISO currency code) and up to 18 digits for the actual amount.

ISO 20022 is just one example of a standard used in the financial industry. The following section gives some context by describing financial messaging, the standards it uses and some of the problems posed by the multitude of such standards.

So many standards, so little time

'The great thing about standards is that there are so many to choose from'. It's an old joke, but very relevant in the financial industry. Many different standards exist covering different geographies and business areas. Many individual institutions even use their own proprietary standards internally and/or with their customers.

EXAMPLE

This excerpt is taken from a SWIFT Single Customer Credit Transfer message (MT 103) that does more or less the same as the ISO 20022 Customer Credit Transfer shown earlier. You will note that most information is the same, but the tags and the order of the fields are different:

```
:32A:091029USD12500,

:50K:/8754219990

ACME NV.

AMSTEL 344
```

AMSTERDAM

NETHERLANDS

:52A: EXABNL2U

Here is another example of the same information, this time using the Fedwire proprietary standard:

{1520}20091029xxxxxxxxyyyyyy {2000}000001250000

{5000}D8754219990ACME NV.*AMSTEL 344*AMSTERDAM*
NETHERLANDS* {5100}BEXABNL2U*

All of the above examples provide the same information, each using a different standard.

Processes and value chains in financial services often cover different geographical and business areas. The proliferation of different messaging standards in the financial industry creates problems in automating these end-to-end chains. Two significant barriers exist to a common understanding of information shared by the people and computers involved in such processes: the use of different syntaxes (structure) and the use of different semantics (meaning).

The syntax barrier

The *syntax* is the format in which the information in a message is structured. Unless the reader understands a specific syntax, it will not be possible to understand the message content. There is a lot of confusion about the difference between a standard and a syntax. The *standard* describes the agreement on what information is expressed, while the syntax is the format, or the ‘language’ used to express that information. It is difficult for two people to have a conversation unless they both use and understand the same language. The same is true for syntax. Globalisation and the ever increasing need for end-to-end processing increases the problem.

In ISO 20022, the most widely used syntax is eXtensible Mark-up Language (XML). The use of short tag names (like <PstlAdr> to represent a postal address) is also part of the syntax.

Some widely used existing standards

- **ISO 15022** is currently the predominant securities standard in cross-border settlement, reconciliation and corporate action processing. It was introduced around 1998 to replace ISO 7775, which was much less structured and often omitted crucial settlement information. The adoption of ISO 15022, mandated in 2003, has led to a dramatic increase in Straight Through Processing (STP) rates. In settlement messages, for example, it is common to come across STP rates of more than 95 per cent. One of the standard's advantages is its data dictionary based approach, which enables reuse and standardization of data across all messages. About half of the 15 million messages that are exchanged on the SWIFT network every day are ISO 15022.

- **ISO 8583** is used for almost all credit and debit card transactions, including ATMs. Several hundred million ISO 8583 messages are exchanged daily between issuing and acquiring banks.

- **FIX** is the predominant standard of the securities front office. Millions of indications of interest, trade instructions, executions etc., are sent each day using the FIX protocol.

- **FpML** stands for Financial products Markup Language. It uses the XML syntax and was specifically developed to describe the often complicated contracts that form the base of financial derivative products. It is widely used between broker-dealers and other securities industry players to exchange information on Swaps, CDOs, etc.

- **SWIFT proprietary**, also known as MT messages, are the standard for messaging in correspondent banking, foreign exchange and documentary credits. Over 9,000 financial institutions around the world use this standard to exchange millions of messages per day over the SWIFT network.

- **Proprietary domestic standards** are also widely used. DTCC is an example of a market infrastructure using proprietary standards. Each day some 40 million messages are exchanged with DTCC to clear and settle US domestic securities trades.

- **XBRL** is a flexible XML based standard for exchanging business information, which specializes in providing easy automation for information found in unstructured documents.

XML is one of the most popular syntaxes to encode documents (or messages) electronically on the Internet. XML allows communities to define their own identifiers (or *tags*) and format (or *data type*) for each component of a message. With XML, data is marked up by using opening and closing tags that indicate the meaning and structure of the information that is communicated. For example, <Dt>2009-09-29</Dt> is an XML representation of 29 September 2009. The combination of opening and closing tags with the data is called an *element*.

The MT103 Single Customer Credit Transfer extract illustrated in this part uses a SWIFT proprietary syntax. It too uses tags, called *field tags*, to introduce data. These are alphanumeric characters between colons. This is followed by the actual field content. In the example, :52A: is the field tag (Ordering Institution) and EXABNL2U is the field content.

The semantic barrier

Once the syntax is out of the way, another barrier appears: the semantic barrier. Specialists in different domains or countries have developed their own jargon or vocabularies. Different words might refer to the same concept, or worse, the same word could have different meanings.

For example, what some players in the payments industry call an Ordering Customer, others refer to a Payer or Payor, while still others talk about a Payment Originator or Initiator. The context also plays a role here: the Payment Originator/Initiator is a Debtor/Payor in a credit transfer, while that Payment Originator/Initiator is a Creditor/Payee in a direct debit.

These different names create difficulties when you are looking at end-to-end integration. You need (expensive) expert knowledge to understand what the specialists mean and how to reconcile the information.

In order to understand the information exchanged in a particular business domain, you need to be familiar with the details of the specific syntaxes and the underlying semantics. This requires a significant investment in time and technology.

ISO 20022 Basics

The previous section sketched two barriers to a common understanding of information shared between people and computers involved in these processes: the use of different syntaxes and the use of different semantics or interpretation of terms. ISO 20022 was designed to help overcome these barriers. Let's see what makes ISO 20022 special.

ISO 20022 is the agreed methodology used by the financial industry to create consistent message standards across all the business processes of the industry.

The ISO 20022 method is based on the concept of separate layers. We distinguish three layers: the top layer provides the key business processes and concepts; the middle layer provides logical messages or message models; and the bottom layer deals with syntax.

Business processes and concepts

One of the key characteristics of the ISO 20022 methodology is that there is a distinct separation between the business and the way it is represented in a message, that is, the syntax. The ISO 20022 methodology starts with the creation of the business model. Put simply, this is the definition of the activity or business process, the business roles and actors involved in that activity and the business information needed in order for the activity to take place.

The business information is organised into business components containing business elements. For example, when looking at the processes involved in a credit transfer, key notions such as debtor (the party that pays), creditor (the money receiver), debtor agent (the bank of the debtor), creditor agent (the bank of the creditor), and payment were identified. Each of these components has further details. Figure 1-1 shows a simplified business information model, represented in Unified Modeling Language (UML).

Central is the payment itself, which is associated with the debtor agent and creditor agent, which are both financial institutions. The payment is also associated with a debtor and creditor, which are both parties (i.e. persons or organisations, financial or other), which in turn have elements such as a name and address. Additionally, these parties may be owners of an account. Behind these elements lie further details. A payment, for example, contains elements such as currency and amount, a requested execution date and settlement date, and remittance information.

Logical messages independent of syntax

Using these business concepts, ISO 20022 then defines logical messages, or message models, which are the middle layer.

A logical message is a description of all the information that is needed to perform a specific business activity, independent of syntax. It is composed of message components organised in a hierarchical structure. A message component contains one or more message elements and is derived from a business component by using one, some or all of its elements. The logical message structure for the excerpt of the Customer Credit Transfer message can be seen in Figure 1-2.

The message component CreditTransferTransactionInformation contains 4 elements. Some of these, for example, Debtor and DebtorAgent, require further definition and are message components themselves. Shown here is a simplified representation that does not show, for example, whether elements are mandatory or optional, as is normally done at this level.

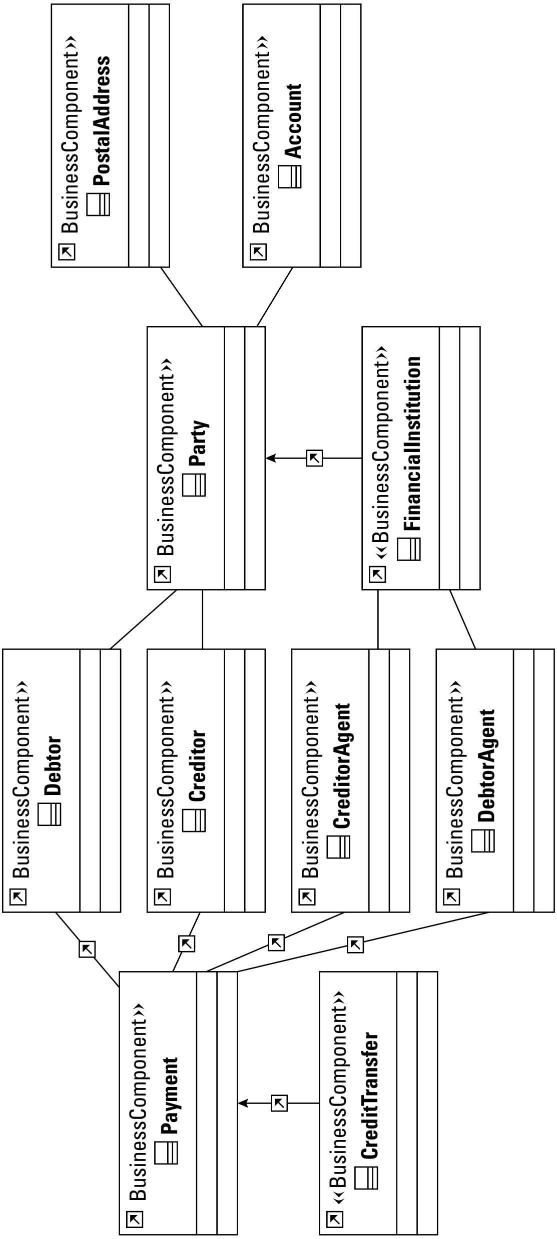


Figure 1-1: A simplified business information model for a payment transaction.

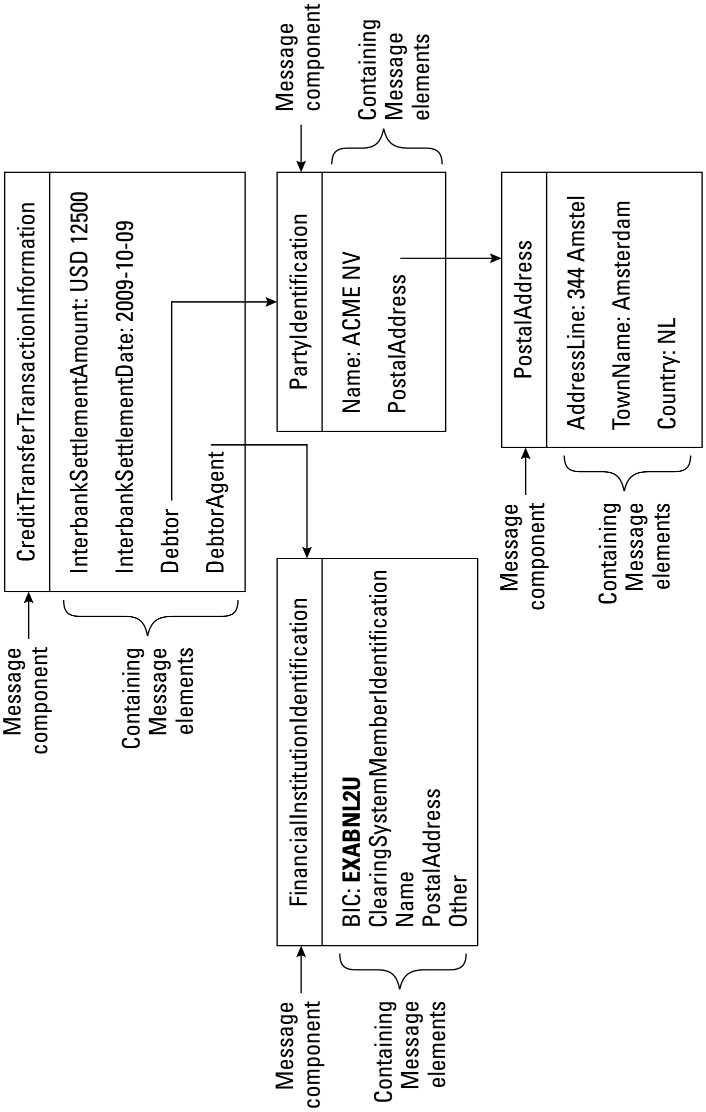

CreditTransferTransactionInformation
InterbankSettlementAmount: USD 12500
InterbankSettlementDate: 2009-10-09
Debtor
DebtorAgent
Message component
Containing Message elements
PartyIdentification
Name: ACME NV
PostalAddress
Message component
Containing Message elements
PostalAddress
AddressLine: 344 Amstel
TownName: Amsterdam
Country: NL
Message component
Containing Message elements
FinancialInstitutionIdentification
BIC: EXABNL2U
ClearingSystemMemberIdentification
Name
PostalAddress
Other
Message component
Containing Message elements

Figure 1-2: Part of the logical message structure for a credit transfer.

REMEMBER

A key feature of ISO 20022 is the ability to reuse business and message components across all messages. Whether the message is a credit transfer or a credit card payment, a securities or foreign exchange transaction, the component 'PostalAddress' can be used to express a party or financial institution's address where appropriate. Individual elements such as 'InterbankSettlementAmount' and 'InterbankSettlement Date' can also be reused.

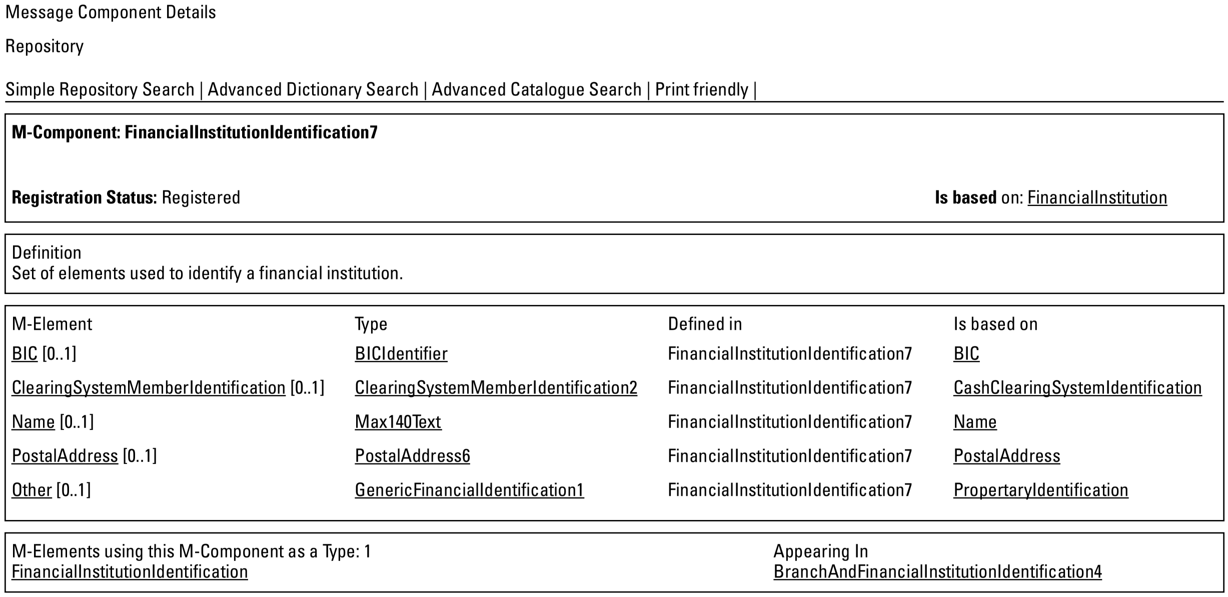
The syntax

As stated earlier, the ISO 20022 methodology is based on the concept of separate layers. The business model and the logical messages are two of those layers. The third layer, the syntax, is the physical representation of the logical message. ISO 20022 uses XML as the primary syntax and has specified how to convert a message model to XML. However, in a particular business domain, a message model could be expressed in a syntax different from XML, for example, the SWIFT proprietary syntax or the FIX syntax, if agreed.

It's all in the repository

All of the content described so far is stored in a common repository.

A dictionary forms part of this repository. The ISO 20022 dictionary, much like the Oxford Dictionary, lists the name of a component, its structure (with references to subcomponents that may be described elsewhere in the dictionary) and, most importantly, what it means and how it should be used or interpreted. Just like with words in the English language, the meaning often depends on the context. For instance, the specific meaning can depend on whether the context is a national or international payment or a securities transaction on a stock exchange. The entry for DebtorAgent tells you that it is the 'Financial institution servicing an account for the debtor'. It also tells you, that when referring to a Debtor Agent, you should use the structure called FinancialInstitutionIdentification7, which defines the data required to identify a financial institution – its name and address, Business Identifier Code (BIC) and so on. If you look up this message component in the dictionary you will find the entry shown in Figure 1-3.



Message Component Details

Repository

Simple Repository Search | Advanced Dictionary Search | Advanced Catalogue Search | Print friendly |

M-Component: FinancialInstitutionIdentification7

Registration Status: Registered

Is based on: FinancialInstitution

Definition
Set of elements used to identify a financial institution.

M-Element	Type	Defined in	Is based on
BIC [0..1]	BICIdentifier	FinancialInstitutionIdentification7	BIC
ClearingSystemMemberIdentification [0..1]	ClearingSystemMemberIdentification2	FinancialInstitutionIdentification7	CashClearingSystemIdentification
Name [0..1]	Max140Text	FinancialInstitutionIdentification7	Name
PostalAddress [0..1]	PostalAddress6	FinancialInstitutionIdentification7	PostalAddress
Other [0..1]	GenericFinancialIdentification1	FinancialInstitutionIdentification7	PropertaryIdentification

M-Elements using this M-Component as a Type: 1	Appearing In
FinancialInstitutionIdentification	BranchAndFinancialInstitutionIdentification4

Figure 1-3: The ISO 20022 web query tool showing details of a message component.

ISO 20022 standardises such components across all messages used in the financial industry. So whenever a message is received that mentions ‘debtor agent’ it is clear what is meant and what to expect in terms of descriptive data about the debtor agent.

The crucial notion here is reusability. For example, the data structure FinancialInstitutionIdentification (with all its sub-structures) is used to describe all financial institutions in all ISO 20022 messages. Similarly, the message component DebtorAgent is used across all financial messages whenever a financial institution plays that role in a transaction.

Currently, the ISO 20022 repository holds several hundred business components, around 700 message components and more than 250 message definitions.

What Makes ISO 20022 So Great?

ISO 20022 offers two things:

- A method to develop well structured financial messages, as described in the previous section.
- A way to unify the many existing standards.

A message definition in any existing standard can be looked at logically as a description of what data is exchanged in the message, its structure and what it means. Such a ‘logical’ message definition can be mapped to the business definitions of ISO 20022. This is critical in making standards interoperable: it enables the use of multiple standards and multiple syntaxes to support the same business process, as information from these can be mapped unambiguously to the business process itself. So the advantages of ISO 20022 over other standards fall into two categories; those concerned with using the standard itself, and those concerned with interoperability with other standards.

Using ISO 20022

The advantages of using ISO 20022 fall into three main categories: linking messages to business processes, reusing components, and the use of XML syntax.

Linking messages to business processes

Each part of an ISO 20022 message is linked to business components (in the model) that are meaningful and easily recognisable to users and can be linked to the data in back-office applications.

Reusing components that are well documented and structured

Since the components and elements are reused across messages, institutions need to map them only once to their internal data structures. It is therefore much easier to introduce new messages: most of the components will already be known and mapped to back-office applications. Maintenance is also a lot easier, since most of the changes can be made at the component level.

Appreciating the benefits of XML syntax

While the key feature of ISO 20022 is the use of common business models, when the XML syntax is used, it also brings significant benefits. The message format description is contained in an XML schema. This file is machine readable, so implementation of new messages, or changes to existing messages, requires less manual effort. It also enables easy manipulation of messages by most modern software, including mapping the information to other formats and standards.

REMEMBER

XML is an *international open standard*, which means that it enjoys widespread support across industry boundaries and gets extensive support from vendors. Being an international standard also means that a wide variety of XML editing, document management, validation, and other off-the-shelf tools is available. These tools allow the automatic injection of message definitions and lower the cost for their validation and their integration into back-office systems.

About XML and XML schemas

The eXtensible Markup Language (XML) is a simple text-based format for representing structured information. XML uses tags set between angled brackets to identify items of information. Each data item is enclosed by a pair of opening and closing tags. The combination of opening and closing tags and the data they contain is called an *element*. Elements can contain other elements, to group related information together, for example:

```
<address>
        <number>1</number>
        <street>Short Lane</
street>
        <city>London</city>
</address>
```

One advantage of XML is that it is (reasonably) easy for people to read and understand. However this readability comes at a cost; XML is sometimes criticised for being more verbose than other syntaxes and therefore less efficient to transmit and to store. Compression tools can overcome this problem, lessening its impact on user communities where a more efficient syntax is needed, for example, in (pre-) trade messages for securities exchanges, where microseconds count.

An *XML schema* sets out the permitted structure for an XML document (or message). It defines, amongst other things, which elements are allowed in a document, the order in which they should appear, which are mandatory and which are optional. XML schemas can be used by a computer to check whether a message conforms to its definition or not. The ISO 20022 methodology describes how to generate an XML schema from a logical message definition, for messages that will use the XML syntax. XML schemas are provided to define formally the structure of all ISO 20022 XML messages.

ISO 20022 and other standards

ISO 20022 covers the entire financial industry, enabling a common understanding and interpretation of information across such diverse areas as foreign exchange trading and credit card payments. One big advantage is that this facilitates mapping between standards. For example, the MT103 Single Customer Credit Transfer field *52a Ordering Institution* and the *ISO 20022 DebtorAgent* element are structured differently, but still describe essentially the same business concept: the financial institution that services the account of the ordering customer (or debtor). Therefore, both of them can be mapped to the same ISO 20022 business component. This is a powerful concept, because it lays the foundation for different standards to be able to work with each other (known as *interoperability*). We will get into the details of interoperability in the following parts. The main point here is that such mapping makes life a lot easier for all the parts involved in providing such interoperability: applications, translation services, and so on. Such interoperability enables automated transfer and straight-through processing across entire processing chains.