Interactive Financial eXchange

IFX Implementation Guide – SAMPLE EXTRACT

Based on IFX Specification Version 2
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The TOC describe the entire guide, but only selected content is available in this sample document.

In this sample document we use highlighted ellipses (…) to indicate that the Implementation Guide goes into further detail. This sample document is intended to illustrate that the guide is a robust document with valuable information about the underlying concepts of the specification and significant detail about how to use the IFX specification to implement real-world use-cases.

1 Introduction

The Interactive Financial eXchange (IFX) Business Message Specification is developed and maintained as a cooperative industry effort among major financial institutions, service providers, and information technology partners to achieve a single, open financial services industry standard. It provides a comprehensive message set for developing new financial industry services and software.

The concepts in this Guide rely upon the currently published version 2.x of the IFX Business Message Specification (BMS) which is available at this URL. http://bms.ifxforum.org/rel2. In many cases, there are hyperlinks from this document to the BMS for convenient reference to details in the specification.

2 Intended Use – SAMPLE DOCUMENT

This document is an Implementation Guide for parties interested in building an interoperable software application for financial message processing, using the business messages of the Interactive Financial eXchange (IFX) Specification..

> **In this sample document we use highlighted ellipses (…) to indicate that the Implementation Guide goes into further detail. This sample document is intended to illustrate that the guide is a robust document with valuable information about the underlying concepts of the specification and significant detail about how to use the IFX specification to implement real-world use-cases.**

3 Common Vocabulary

The IFX Business Management Specification (BMS) utilizes several terms that may have somewhat different meanings for users versed in particular Web Services standards and tools. The purpose of this section is to provide context to several terms to clarify concepts within the IFX Messaging Standard.

Within this document, these terms will be prefixed with IFX when referring to the term as defined in the IFX BMS in order to avoid ambiguity.

Object

IFX Objects can be somewhat simplistically viewed as organized sets of data of a particular type. As in any typical banking environment, the IFX Objects are subject to action in more than one service interaction. Further discussion of IFX Objects can be found in *Appendix A – IFX BMS Object Search*

Message

IFX Messages are defined to affect the state and content of IFX objects. The standard does not define implementation details, but IFX Messages …

To summarize, the IFX BMS defines a set of objects and messages. The messages and objects adhere to consistent design patterns that simplify understanding and provide an obvious framework for extensions. A set of messages represents an IFX Service. These services can then be realized using Web Service technologies and standards. The IFX Message Specification places no restriction on the organization of operations or services, nor on the manner in which these are implemented.

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4 Web Services Concepts

This document assumes basic understanding of Web Services concepts and the artifacts involved in design and development of a Web Service, and will draw correlation, when possible, to the W3C Working Group Notes for Web Services Architecture (http://www.w3.org/TR/ws-arch/).

- Web Services Description Language (WSDL) – The standard for describing web services (e.g., the messages that are exchanged between provider and agent)
- Service Oriented Architecture Protocol (SOAP) – The standard framework for packaging and exchanging XML messages

The Web Services Supplement, a companion publication to this guide, offers specific guidance on using the IFX messages in a Web Services implementation **including working code examples**. The Web Services Supplement is not available in Sample Form.

Web Services Supplement (Table of Contents)

5 IFX Service Architecture / Framework

The IFX Framework consists of an Object Framework, outlining the structure and common elements of message content and a Message Framework, which provides the structure of IFX compliant messages consumed and produced by service implementations.

5.1 Overall Framework

The IFX Business Message Specification is designed to operate in stateless, multi-tiered, service-oriented environments. The framework consists of Common Object Definitions with well-defined data semantics and a Request-Response message protocol, where each message is …

5.2 Object Framework

An IFX Object is a set of data that is organized according to a consistent pattern and supports a well-defined set of operations. IFX Messages cause IFX Objects to be created, modified, and destroyed. IFX Objects are constructed from basic building blocks …

For more specific information on data typing and object representation, see *Appendix C – Data Representation*

5.3 Message Framework

The messages comprising the IFX Specification are listed in *Appendix B – IFX Messages*. The specification supports implementation of a subset of messages based on the services that are going to be offered.

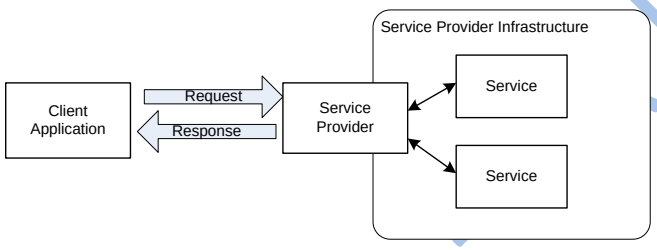
5.4 Service Provider and Service Objects

A fundamental assumption underlying the IFX Specification is that one or more services are being offered by a Service Provider.

Specific services are not defined by the IFX Forum. Rather, Service Providers define Services at a level of granularity and functionality convenient to them. These may be very broad sets of capabilities or …

The diagram below describes the relationship between clients, Service Providers, and Services in their simplest form.

- Request Messages are directed to the Service Provider by the client
- The Service Provider uses one or more Services to satisfy the request
- The client receives a response



5.4.1 Summary

The IFX Standard is based on Service Oriented Architecture.

1. A Service Provider is uniquely identifiable. IFX mandates …
2. Each Service is uniquely identifiable within the Service Provider's domain. This, in effect, …
3. IFX Objects are "owned" or managed by the *Service* that creates or instantiates the object.
4. IFX Messages are directed to a Service Provider, who may in turn redirect the message(s) …
5. Although it is typical for networks, mainframes, servers, and databases to be involved in supporting a service offering, IFX makes no assumptions about the technical infrastructure used to provide services.

6 Implementation Process

This section provides an outline of the steps usually taken during an implementation. The document will provide more in-depth detail of the steps, while taking each use scenario from use case to implementation.

At a high level, implementing a Web Service using the IFX Message Specification can be broken down into the following steps:

1. Documenting the Business Process Flow
2. Defining the scope and intent of service(s)
3. Determining appropriate IFX Messages
4. Defining IFX Service(s)
5. Mapping IFX Message content to elements of System of Record (SOR)
6. Generating the Supporting Schema
7. Defining the Interface / WSDL
8. Generating XML Bindings
9. Implementation and Deployment.

The following section provides a definition of each of these steps, and experiences of participants in the working group. The subsequent sections provide walkthroughs of realizing an IFX Service based on common use cases.

6.1 Map IFX Message Content to System of Record

It is important to understand SOR data model with its data types, required elements, and description. Data type compatibility also needs to be taken into consideration when performing data mapping, to ensure that proper type conversion is implemented when necessary, and to enforce compatibility with the SOR.

6.1.1 Mapping Documentation

Generally, these mappings are kept as spreadsheets. The resulting artifact can be used as a specification between Business Analysts and the developers. The artifact typically allows for specification of translation between the two formats (required fields, type conversions etc.). An IFX Request Message must contain all relevant data required by the SOR, so the required elements of the message must be documented. First, create a data dictionary of the SOR.

Entity info	Type	Length	Required	Description
Customer.Id	Number	12	Y	Primary key
Customer.FullName	Varchar	150	Y	

…

Then, map the service inputs and outputs. Most implementations use an XPath style notation to represent the fully qualified data path.

Business Reference	XPath element reference	Type	Usage	Table Column	Type	Length	Req'd	Note
Service Input								
Party Identifier	PartyInqRq/PartySel/PartyKeys/PartyId	NC-36	Req'd	Customer.Id	Num	12	Yes	Primary key
…								
Service Output								
Party Identifier	PartyInqRs/PartyRec/PartyId	NC-36	Req'd	Customer.Id	Num	12	Yes	
Party full name	PartyInqRs/PartyRec/PersonPartyInfo/PersonData/PersonName/FullName	C-96	Req'd	Customer.FullName	Varchar	150	Yes	
…								

There are additional aspects to consider when mapping that are beyond the scope of this document:

- Aggregation – Mapping multiple columns to one element
- Decomposition – Splitting a value within an element into multiple fields
- Validation – Validating input within elements of the request
- Translation – Translating or formatting of internal codes for abstraction, presentation or language translation
- Derivation – Creating new fields for input or output, based on the request or response message.

6.1.2 Extending the IFX Schema

In the process of modeling the target SOR to IFX, it is likely that there are elements within the SOR that have no direct mapping into IFX. It would be impossible for the IFX Specification to cover every aspect of a financial SOR, so there will inevitably come a time where adjustments need to be made to the schema to support unique characteristics of the underlying system. There are several strategies for handling …

6.1.3 Namespaces

Managing extensions to the IFX Schema requires consideration of the context in which the Specification is being used. The approach to creating or using a namespace…

6.2 Define the Service Interface

In this step, the interface is created that can be used to generate code stubs for implementation, and can be used by clients to create their interface to the service. See the *Web Services Supplement* for …

6.3 Generate XML Bindings

This step captures the process to transform the defined schema into object bindings for the implementation language to be used to realize the service. See the *Web Services Supplement* for …

6.4 Implementation & Deployment

After completing the preceding steps, all that remains is implementation and deployment of the service. These aspects of development are highly specific to each business. For reference, see the *Web Services Supplement* for an example …

7 Use Cases

The following Use Cases are presented as common scenarios where a Service Oriented Architecture may be leveraged in this domain. The goal is to present situations where the design fulfilling the scenario could be varied between an implementation using a set of fine-grained services or one delivering a set of composite services that combine fine-grained services.

7.1 Create and Fund a New Account

7.1.1 Use Case Description

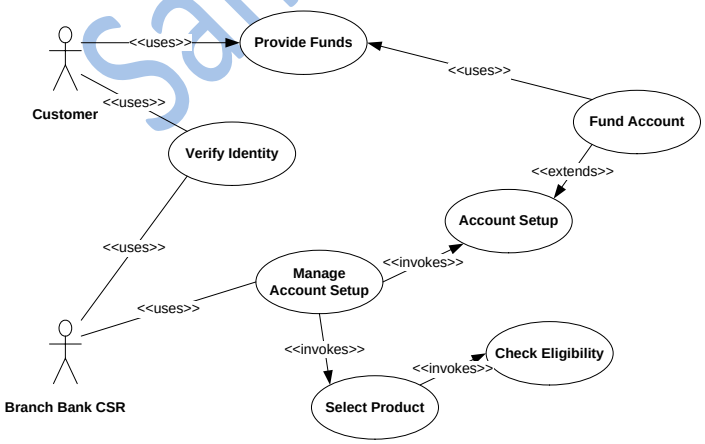
In this scenario, an established party (customer) wishes to create and fund a new account. This scenario is executed in a branch office. The branch office Customer Service Representative (CSR) verifies the identity of the party and confirms that he/she is a customer of the financial institution. The CSR then requests the set of products that are available to the party. The party selects a product, and the CSR provides the party with a list of funding options. The party selects one of these options. The CSR completes the transaction by submitting the selections, with which the system creates the account, associates the account with the party, and executes the transactions necessary to fund the account.

BUSINESS PROCESS FLOW

1. CSR validates existing Customer.
2. CSR presents available products.
3. Customer selects product.
4. CSR presents funding options.
5. Customer selects funding.
6. CSR adds account.
7. CSR adds Party Account Relationship.
8. CSR adds Funding Transaction

The process can be depicted as shown in Figure 1.

Figure 1 - Open and Fund Account Use Case



7.1.2 Applicable IFX Objects

In this case, the following elements would be considered entities:

Each of these entities requires unique identification and has a lifespan within the System of Record. For these entities, the IFX BMS was used to locate similar objects (see *Appendix A – IFX BMS Object Search*).

Entity	IFX Object
Customer	Party
(Financial) Product	ProdIntRate
…	…
Transaction	Credit, Xfer

7.1.3 System of Record Mapping

Mapping an IFX Message to the SOR data model is the process of creating logical links between IFX Message elements and distinct data model attributes.

XML Schema elements	SOR model entity
Party	**Customer**
PartyRec/PartyId	Id
PersonPartyInfo/PersonData/PersonName/FullName	FullName
PersonPartyInfo/PersonData/Contact/PhoneNum/Phone	PhoneNumber
PersonPartyInfo/PersonData/Contact/Email/EmailAddr	Email

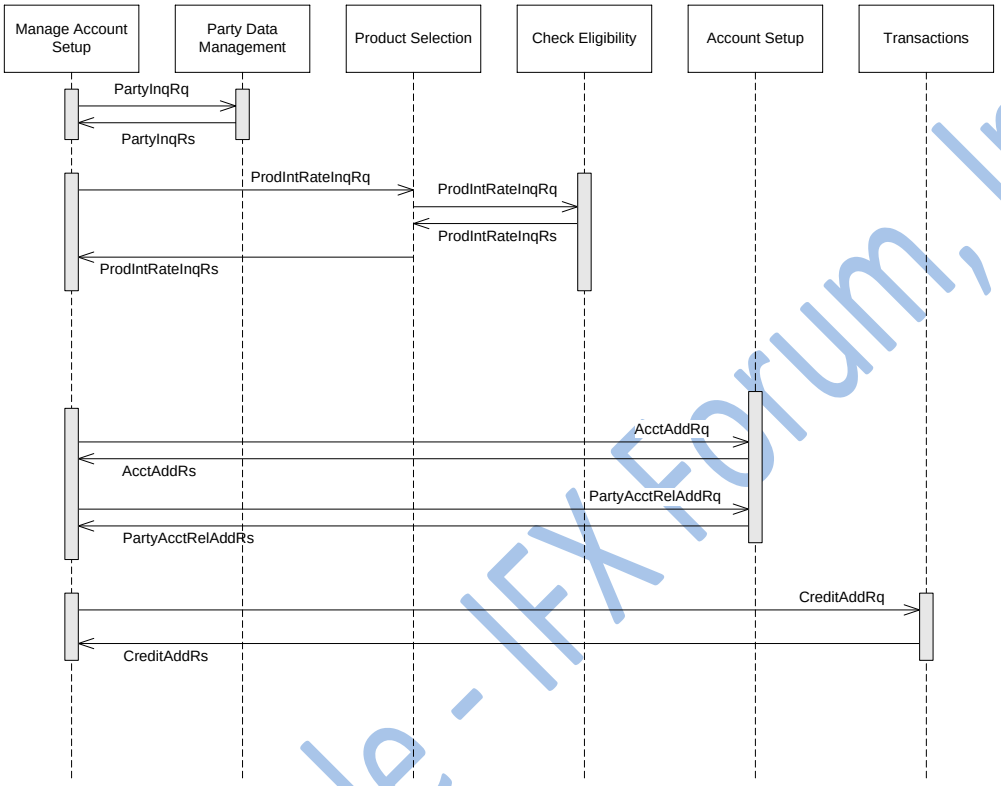
The core of the mapping document includes a map from the column to the fully qualified aggregate within IFX. Typically included are the type mapping, usage constraints, and notes related to validation or conversion between IFX and the SOR.

Business Reference	XPath element reference	Type	Usage	Table Column	Type	Length	Req'd	Note
Service Input								
Party Identifier	PartyInqRq/PartySel/PartyKeys/PartyId	NC-36	Req'd	Customer.Id	Num	12	Yes	Primary key
…								
Service Output								
Party Identifier	PartyInqRs/PartyRec/PartyId	NC-36	Req'd	Customer.Id	Num	12	Yes	
Party full name	PartyInqRs/PartyRec/PersonPartyInfo/PersonData/PersonName/FullName	C-96	Req'd	Customer.FullName	Varchar	150	Yes	
Home phone number	PersonPartyInfo/PersonData/Contact/PhoneNum/Phone			Required	Varchar		Yes	
…								
…								

7.1.4 Service Definition

One way to describe a high-level service that implements particular business capabilities is to describe the interaction of the underlying technical services necessary to realize the desired result. The UML sequence diagram below represents this use case.

Figure 2 - Open and Fund Account Message Sequence



Appendix A – IFX BMS Object Search

This appendix will help the reader locate a BMS Object that may be abbreviated or just have a different, but synonymous, name for the topic being researched. The online BMS is a good tool for doing research but, if the topic has been abbreviated in the BMS, the topic may be difficult to locate. If the reader is a member of the IFX Forum, a pdf file containing all of the BMS documentation is available for download from the Architecture area of the members-only website. The pdf can be used to search for a keyword that will point to an object of the BMS. This appendix is valuable if the pdf is not available. To use this appendix effectively, search using a keyword such as Mortgage, Payment, Statement, etc.

BMS Object Name	Keywords
Acct	Deposit Account, Loan Account, Certificate of Deposit, CD, Time Deposit, Credit Account, Rewards Account, Mortgage Account, Secured Loan Account, Unsecured Loan Account.
AcctAcctRel	Sweep, Interest Distribution, Overdraft, Notional Pooling.
AcctHold	Account Hold, Permanent Hold, Check Hold, Court Order Hold, Restriction, ACH Hold, Authorization Hold, Collateral Hold, Secured Account Hold.
…	…
Trn	Transaction, Credit, Debit
Xfer	Transfer, Credit, Debit

8 Appendix B – IFX Messages

IFX Message names adhere to a consistent pattern – *ObjectActionDirection* – where *Object* is the name of the IFX Object that will be acted on, *Action* is one of the "verbs" (or methods) shown below and *Direction* is either Rq (Request) or Rs (Response). It is not necessary to implement…

Two special cases are noteworthy: Authorization and Status. The IFX Specification facilitates inquiry and modification of the Authorization and Status aggregates associated with a specific object by implementing a Record construct that can be targeted by a message. For example, …

Name	Message	Description
Add	Add	The xxxAdd Messages support creating a new instance of the specified xxx object.
Advise	Advise	The xxx Advise Message is used to notify interested parties that an xxx object was created or modified. The Advise Message set does not…
Aud	Audit	The xxx Audit Message supports the ability for the client to trace the message history…
AuthInq	Authorization Inquiry	The xxx Authorization Inquiry Message is used to request an inquiry of authorization information for the specified xxx object.
AuthMod	Authorization Modification	The xxx Authorization Modify Message is used to change authorization information for the specified xxx object.
Can	Cancel	…

Name	Message	Description
…		
Rev	Reversal	…
StatusInq	Status Inquiry	…
StatusMod	…	…
Sync	…	…

9 Appendix C – Data Representation

9.1.1 Data Types

IFX uses common primitive data type representation, as well as definition for types commonly used within IFX Objects (Date, Time, Phone Numbers etc.) Please see the BMS section 3.3 for detailed description of the supported data types.

9.1.2 Abstract vs. Concrete Aggregates

Abstract Aggregates were introduced for ease of modelling and building the BMS. Abstract Aggregates contain characteristics common to groups of data elements. An Abstract Aggregate will never appear …

9.1.2.1 Aggregate Extension

Non-abstract Aggregates can also be extended to create a more robust model. Extensions of an Object retain the structure of their base object, but …

9.1.3 Keys (xxxKeys)

The Keys Aggregate contains a set of attributes that, when used together, form a unique identifier of the object. In other words, the Keys of the object can be used to locate a unique/single occurrence of an object in a datastore. The Keys Aggregate may …

9.1.4 Reference (xxxRef)

A Reference Segment is an indirect reference to another object. On the wire, it will usually contain the ID or Keys of another IFX Object, but …

9.1.5 Selection (xxxSel)

A Selection Aggregate is an indirect reference to a collection of objects. On the wire, it will usually contain object-supported selection criteria for the target object. The Selection Aggregate is not meant for ad hoc reporting, but rather inquiries …

```
< xxxInqRq >
    ...
    < RecSelect >
        (/DebitRec/DebitInfo[DebitType=CashWithdrawal] |
/DebitRec/DebitInfo[DebitType=CreditCardAdvance]) &
/DebitRec/DebitInfo/CompositeCurAmt[CompositeCurAmtType=Debit & CurAmt >
=100.00]/CurAmt
    < /RecSelect >
< /xxxInqRq >
```