

THE OPTIONS CLEARING
CORPORATION

ENCORE - Data Distribution Services Guide Overview and Implementation Reference

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Document Organization

This document is one of a set of three intended to provide a detailed description of all aspects of the new Data Distribution Services system:

Part One: Data Distribution Services Overview. This section is intended for a reader that needs to understand the Data Distribution Services (DDS) system. This part of the guide contains the information one would need to read in order to understand the design concepts and the data delivery services being developed and implemented.

Part Two: Developer Reference – Non-Proprietary Transmissions. This section is intended for use as a Non-Proprietary Transmission mapping reference for FIXML developers. This part of the guide includes the current InTRACS record to DDS mappings, FIXML elements, transmission layouts, message structures, samples, and ODS mappings for each transmission.

Part Three: Developer Reference – Proprietary Transmissions. This section is intended for use as a Proprietary Transmission mapping reference for FIXML developers. This part of the guide includes the current InTRACS record to DDS mappings, FIXML elements, transmission layouts, message structures, samples, and ODS mappings for each transmission.

Glossary of Terms

You should be familiar with the following terms prior to reading this guide.

Batch – In a computer, a batch job is a program that is assigned to the computer to run without further user interaction. In larger commercial computers or servers, batch jobs are usually initiated by a system user. Some are defined to run automatically at a certain time.

DDS (Data Distribution Services) — The ENCORE module that will be replacing the InTRACS Outbound Data Service (ODS) system. DDS will support both batch and real-time data delivery and will utilize the FIXML data formatting standard.

ENCORE – The next generation clearing system being implemented within OCC; this system is replacing the InTRACS system.

Event Driven Processing – A business event is a meaningful change in the state of the enterprise, such as the opening of a new customer account, clearing a trade, or the matching of a transfer. Event driven processing is system behavior that is initiated by these business events rather than system events—such as time based scheduling. Event driven systems possess the following attributes: 1) Individual treatment of transactions; 2) Push delivery systems; and 3) Electronic notification.

FIXML (Financial Information eXchange Markup Language) – The XML derived grammar of the FIX protocol. A FIXML implementation will have message format validation, cleaner, more expressive structure, and leverage existing standards. The initial goal is to provide the ability to embed FIXML messages within traditional FIX header and trailers to minimize the impact on existing implementations.

InTRACS – The legacy clearing application within OCC. This system is batch in nature and was written primarily in COBOL with terminal based user screens; this system is being phased out by the ENCORE clearing system.

Messaging – There are two major messaging server models: the point-to-point model and the publish/subscribe model. Messaging allows programs to share common message-handling code, to isolate resources and interdependencies, and to easily handle an increase in message volume. Messaging also makes it easier for programs to communicate across different programming environments (languages, compilers, and operating systems) since the only thing that each environment needs to understand is the common messaging format and protocol.

ODS (Outbound Data Service) — The information delivery mechanism within InTRACS. This system is batch in nature and delivers fixed-length COBOL records via NDM (Network Data Mover) or via FTP (File Transfer Protocol) at the end of each business day to the appropriate subscribers.

Package – A Package is a collection of DDS transmissions that are grouped together based on selections made when the subscription was created.

Pull Delivery Model – In this information delivery model, the observer—or client—requests information from the information owner. An example of this model is the download of a document from a web page.

Push Delivery Model – In this information delivery model, the information owner distributes the data to the observer as it deems appropriate. An example of this model is the sending and delivery of an email message.

Real-Time – A level of computer responsiveness that a user senses as sufficiently immediate or that enables the computer to keep up with some external process (for example, to present trade data as trades are executed and cleared). *Real-time* is an adjective pertaining to computers or processes that operate in real time. Real time describes a human rather than a machine sense of time.

Recipient – The entity (Clearing Member Organization, Exchange, Regulatory Agency or Service Bureau) that owns the systems where DDS delivers data for processing or retransmission.

STP (Straight-Through-Processing) – The seamless integration of systems and processes to automate the trade process from end-to-end--trade execution, confirmation and settlement--without the need for manual intervention or the re-keying of data.

Subscriber – The entity (a Clearing Member Organization, Exchange, or Regulatory Agency) that requests a package of transmissions and owns the data that is transmitted to recipients.

XML (eXtensible Markup Language) – A simple and flexible text format derived from SGML (ISO 8879). Originally designed to meet the challenges of large-scale electronic publishing, XML is also playing an increasingly important role in the exchange of a wide variety of data on the Web and elsewhere. Special purpose XML languages and standards are commonly developed with several hundred already adopted since XML 1.0 was released in February 1998.

Data Distribution Services Overview

Introduction

The Data Distribution Services (DDS) project began when the Options Clearing Corporation (OCC) started researching the core set of data that needs to be distributed to Clearing Members each day. The OCC then examined these core data requirements with the existing outbound transmissions generated by the InTRACS system. As a result of this research, the OCC determined that the number of outbound transmissions could be reduced from 34 to eight. The eight transmission layouts decided upon were shaped by the OCC's initial research, through its understanding of how Clearing Members use this information, and how ENCORE processes derivatives data.

Not only is it important to deliver the correct information, but it is also imperative that OCC provide that information in a timely manner and in the right format. The industry is clearly globalizing and the OCC needs to be positioned to not only participate in this marketplace, but to act as a leader by supporting the adoption of standard industry protocols and by contributing to their definition. To this end, OCC has chosen to utilize XML — specifically FIXML — as its standard outbound data format.

The FIX protocol has traditionally displayed dominance on the order execution side of the market and is starting to be used for back-office processing. The timing of the DDS deployment provides the OCC with the perfect opportunity to both help define the standard back-office interactions and put the new specification into practice in a very real, mission-critical system. To complement the forward reaching content definitions, the delivery mechanisms being considered are aiming at one goal — flexibility.

Given the nature of the business, some processing will be transactional in nature—trade processing — while other parts of the business flow are fundamentally batch in nature — finalization of positions. In order to accommodate each of these system processing models, DDS supports both a real-time data delivery mechanism for transactional data and a batch data delivery mechanism for bulk data processing and for transactional data not processed by the recipient in a real-time environment.

DDS is addressing several issues apparent in the existing system. First, as the rate of change within the market is increasing, the older fixed length transmission formats are proving inflexible—both expensive and risky to retouch. Both OCC and the recipients of its data are requiring a faster, cheaper, easier means of modifying the transmission content. Second, as the industry pushes toward a straight-through-processing business model (STP), the viability of a pure batch system is called into question. To adapt to this new model of pass-through information where data is propagated as soon as it is verified and processed, we are designing a real-time delivery mechanism as part of DDS that will complement the real-time trade and post trade processing implemented within prior releases of ENCORE.

These concepts are discussed in detail in the following sections.

DDS Subscription Concepts

DDS creates a flexible facility within ENCORE to maintain the profiles of the organizations that subscribe and/or receive data service, series, or prices from OCC. The DDS subscription system provides a centralized view of all of these profiles from a master file setup and audit perspective.

The following are the main entities that make up the DDS subscription system:

- Subscribers
- Recipients
- Packages

Subscribers, Recipients and Packages

A subscriber represents the entity (clearing member, exchange, regulatory agency) that is the final beneficiary of DDS data.

A recipient represents the entity (clearing member, exchange, regulatory agency or service bureau) that owns the systems where DDS data will be delivered for processing or retransmission.

Flexibility in the setup of subscriber and recipient profiles is achieved through the various setup scenarios that are available:

- An entity can act as a subscriber and recipient at the same time.
- A subscriber can have its data distributed to one or more recipients.
- A recipient can receive data for multiple subscribers.

For organizations that want to receive proprietary data from the ENCORE DDS module, a minimum of one subscription needs to be defined. For Clearing Members that require the separation of data files between groups of accounts, a separate subscription will be created for each group of accounts. Security will follow the same data-level security protocols that are applied to accounts in ENCORE.

Once a subscription has been created, the DDS transmissions that will be received for that subscription need to be defined. Organizations have the ability to bundle one or more transmissions as a package (e.g., Exercises and Assignment transmissions in an E&A Package, Prices, Security List and Security Definition transmissions in a Master File Package).

Each of the packages set up are then assigned one or more recipient destinations. A recipient could be the same organization that subscribes to the data service or a different entity (e.g., a service bureau). A recipient destination can be a file to be pushed to the recipient's data center, a file to be pulled by recipient's data center, or a message queue (MQ) where messages are delivered in a real-time mode. Although all transmission types are available in batch mode, not all are available in a real-time mode.

Packages to be delivered in batch mode will become available in their entirety when processing of the last transmission in the package is complete. Messages for transmissions included in

packages to be delivered in real time will be sent out as soon as the individual messages are generated within the ENCORE system.

A frequency code can also be associated with a given package. The frequency code determines how often the package will be created. The available options are:

- Daily – every OCC business day;
- Equity/Index Expiration – day of the month when standard equity and index options expire;
- Futures Expiration – the day of the month when futures expire;

The maintenance within ENCORE of the subscribers, recipients and packages will be performed by Member Services at the request of organizations subscribing or receiving DDS transmissions.

Real-Time End Of Day Messages

For all transmissions that can be delivered in a real-time mode (via MQ), an end of day (EOD) message will be transmitted. An EOD message will be sent for all messages associated with a specific transmission when the transmission is complete. The EOD message will:

- Indicate that no more messages will be sent for the transmission associated with the EOD message;
- Provide a total count of messages associated with the EOD message for the given cycle;

EOD messages will be delivered only to those organizations that subscribe to the data in real-time mode.

A sample message is provided below:

```
<FIXML ... >
<DDSEODMessage
  BizDt="2005-01-09"
  MsgTypeCode="TRADE"
  SchemaVer="FIX 4.4"
  TransType="TRADES"
  TransSubType="MATCHED"
  TransProductSet="OPTN"
  FinalizationCycle="ENCORE Equity Index Finalization"
  NoMessagesSent="177966" />
</FIXML>
```

The combination of MsgTypeCode, SchemaVer, TransType, TransSubType, TransProdSet and FinalizationCycle uniquely identifies the transmission associated with the EOD message. The NoMessageSent field represents the number of messages sent as part of the transmission associated with the EOD message.

The DDS EOD message will have a proprietary content and format and will not be proposed as an addition to the FIX Protocol Standard due to its unique functionality for our purposes. The detailed content for these messages is provided as part of each transmission's section.

Data Delivery Processing

Batch Flow

Within the ENCORE processing environment, OCC will offer both a data publishing and a data delivery service. For those recipients that choose **not** to have OCC push data out to the recipient's system, the Pull Delivery Model illustrated in Figure 1 will be employed. In this scenario, OCC will publish the recipient's data to a secure data storage device and it will be incumbent upon the client system to initiate the data transfer. Assuming the data files being requested have been published, OCC will service the request; if the publishing of the file has not yet occurred, a reply notifying the requestor that the file is not available will be sent. The hardware and software requirements for the client system in this scenario are discussed in the subsequent section.

Interactions / Confirmations

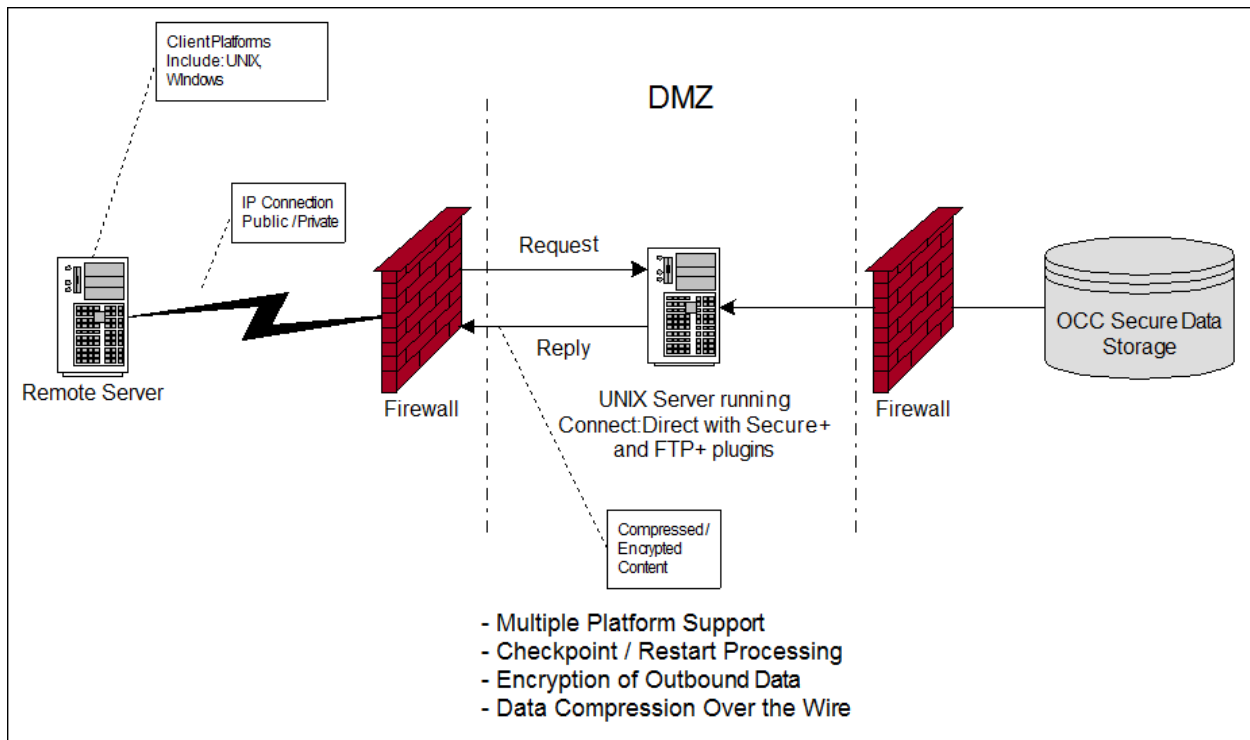


Figure 1 – ENCORE Pull Delivery Model

For those recipients that choose to have OCC push data out to the recipients' system, the Push Delivery Model illustrated in Figure 2 will be employed. In this scenario, OCC will have access to a remote server in the recipient's data center and will initiate the transfer of that recipient's data files as they become available. The hardware and software requirements for the client system in this scenario are discussed in the subsequent section.

Interactions / Confirmations

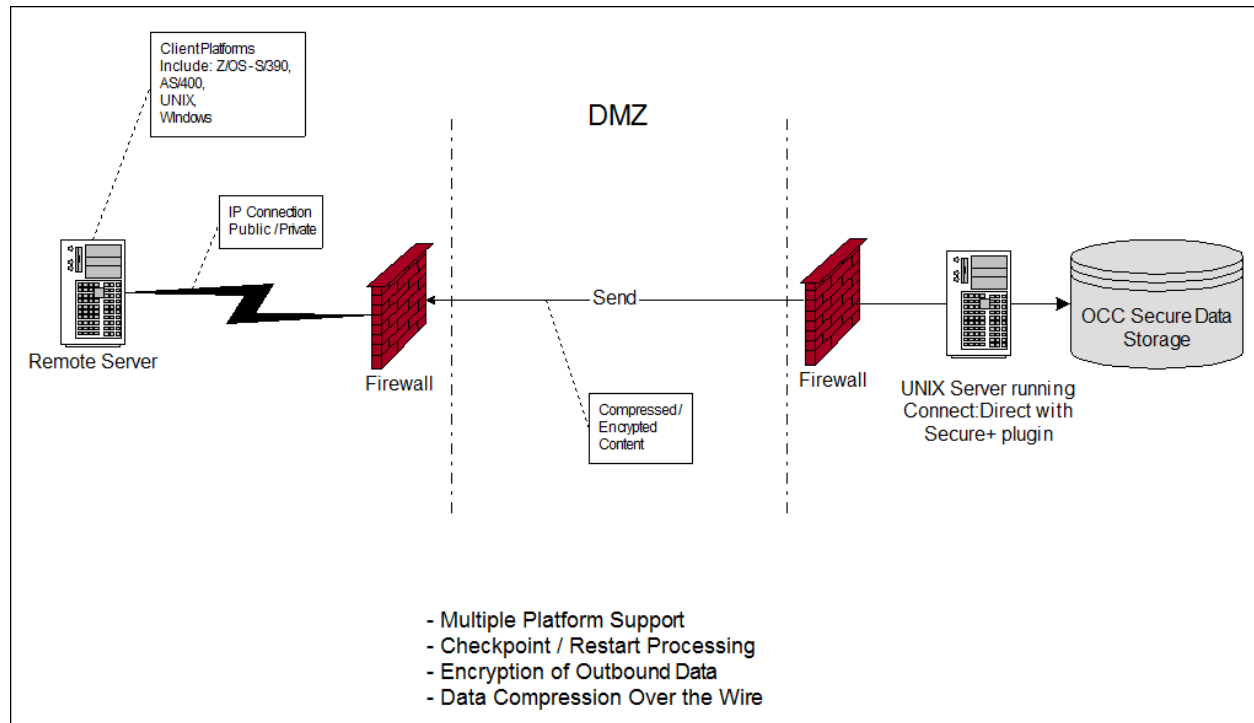


Figure 2 – ENCORE Push Delivery Model

Real-Time Flow

One of the new features of ENCORE DDS is the availability of transaction-based records — trades, post trades, etc. — in a real-time environment. For example, as a real-time trade is validated, the DDS system will be notified and will generate an output message to be sent to real-time DDS subscribers that will state the terms of the trade and the status of the trade — Accepted, Rejected, or Busted.

To enable the delivery of these real-time messages, OCC is leveraging the real-time architecture introduced with Real-Time Trade Processing in ENCORE Release 3.0. This infrastructure has been proven and it offers native data security, guaranteed delivery, and high-throughput capacity. The hardware and software requirements for the client system in this scenario are discussed in the subsequent section.

Interactions / Confirmations

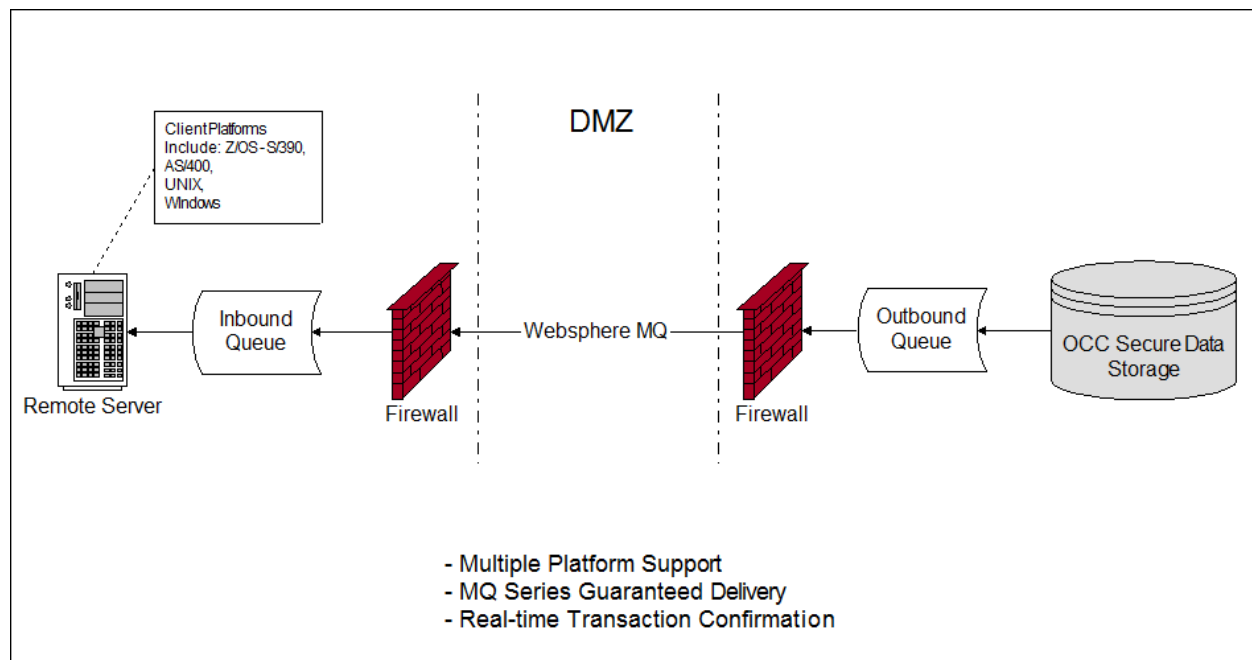


Figure 3 – ENCORE Real-Time Data Delivery Model

System Components / Requirements

Hardware

There should be no additional hardware requirements resulting directly from implementing the DDS system. For those organizations that do not currently have an IP channel established with OCC, additional network hardware may be required — in those cases, OCC will coordinate the channel setup.

OCC will continue to support several different IP connection options for data delivery. For private line communications, OCC will support T1 broadband connections as well as ISDN dial-up connections. In addition to private line access, OCC will now be supporting public line transmissions as a separate but equal alternative. With the ENCORE implementation of DDS, OCC has the ability to both encrypt and compress data, making the Internet option more viable and secure for its membership.

Software for Push File Delivery

For those organizations that currently communicate with OCC via Connect:Direct (NDM) or that are, for other reasons, licensed Connect:Direct users, the change required to migrate to the new delivery structure is minimal. The change consists of node configuration changes and confirmation of an IP channel to OCC.

Organizations that do not have a Connect:Direct license and intend to receive data from OCC through a Push mechanisms will need to acquire the software for the platform of their choice.

As part of the DDS implementation, OCC will also be able to secure its NDM transmissions by leveraging the Secure + plug-in for Connect:Direct. As such, organizations that wish to secure their NDM transmissions from OCC can choose this option, as long as Secure + is part of their Connect:Direct installation and the proper configurations are setup.

Compression over the wire (a feature provided as part of the Connect:Direct products) will be more widely used to accommodate the higher volume of data.

So far as platform support is concerned, the following installations are available and have been validated:

- NT/2000/2003: Connect:Direct Java for Windows
- UNIX (most versions): Connect:Direct for UNIX
- Z/OS Connect:Direct for OS/390

Software for Pull File Delivery

OCC plans to standardize the software used by the organizations to retrieve data service files from its servers. But at the same time, the OCC will also make sure to offer flexibility with regard to the supported platforms and the types of communication. The drivers for this change originate from the need to better accommodate the data delivery requirements for DDS with a particular focus on data volume and encryption.

Due to the expansion in message formats (XML vs. flat files) we anticipate a certain growth in the size of the FIXML files created. Compression over the wire can be used as a viable alternative to decrease the bandwidth usage. Additionally, the ability to provide data encryption becomes mandatory in order to support secure transmissions over various types of communication lines, including the public internet.

The product selected by OCC that meets these requirements is FTP+, a software product from the Connect:Direct line of products sold by Sterling Commerce. FTP+ behaves like standard FTP (e.g., it uses the same commands as FTP) but uses NDM as an underlying transmission protocol. This makes the setup of scripts for data retrieval a relatively simple task. Data security is provided through the Connect:Direct Secure+ Option for cryptographic security which is included with the product.

Connect:Direct FTP+ is also firewall-aware. A simple configuration option lets you specify which firewall has been opened for use by FTP+.

Connect:Direct FTP+ is a Java application requiring at the minimum the Java Runtime Engine (JRE) 1.3 and it is supported on the following operating system environments:

- UNIX: AIX, HP-UX, Sun Solaris, Linux (Intel)
- Windows: NT4, Windows 2000, XP Professional

The product can be downloaded from the Sterling Commerce Web site. To install FTP+ on your system, simply run the wizard-based installation. In a separate document OCC will provide to its data recipients a configuration manual which will provide further assistance in the configuration and setup of the communication with OCC's server. For more info visit: www.sterlingcommerce.com.

All recipients that choose to retrieve DDS data from OCC's server will need to use FTP+ on one of the supported platforms. FTP+ is licensed on the server (at OCC) and is free of charge for all data recipients.

Recipients that are already licensed Connect:Direct users and wish to receive data from OCC through a pull mechanism can do so by configuring the proper connections to the OCC's servers.

Software for Real-Time Messaging

The real-time messaging solution being implemented by OCC is based on the WebsphereMQ product suite. Again, the performance requirements, security requirements, and guaranteed delivery requirements were all factors in the selection of this solution. The use of this solution is a natural extension of the existing real-time architecture implemented by OCC as part of ENCORE Release 3.0.

For those organizations that already possess MQ or for those organizations that already communicate with OCC via MQ, the only work required to prepare for real-time messages, from an infrastructure perspective, is the definition and configuration of a new channel (that is, no new software is required).

For those organizations that do not currently possess an MQ license, WebsphereMQ will need to be purchased and a new MQ IP channel with OCC will need to be configured. Should an organization choose not to purchase MQ, all requested data will still be available in the form of file-based transmissions at the end of the processing day, as all transmissions that are available in real-time are also available in batch mode.

FIXML Schema Concepts

FIXML Schema is the data standard for OCC's Data Distribution Services project. The FPL (FIX Protocol Organization) has defined several standards, and the next section describes where FIXML Schema fits in with the other, closely related standards.

FIX Versions

FIX (Financial Information eXchange) has long been considered by the capital markets as the de-facto open standard for trade processing between buy and sell side firms. Currently, messages are created using the traditional "tag=value" method. FIXML is the XML (eXtensible Markup Language) version of the current standard where FIX tags have been converted to XML data elements. FIXML was initially developed using the Document Type Definition (DTD), but FIXML release 4.4 has been developed using XML Schema. DTD and XML Schema are both standards provided by the World Wide Web Consortium (W3C). However, Schema was developed more recently and addresses many concerns raised by the community about DTD. Key differences between the FIX, FIXML DTD, and FIXML Schema standards are outlined in the following table.

FIX	FIXML DTD	FIXML Schema
Current standard for financial data	Adoption by few for internal systems only	New Standard for XML financial data
Relies on FIX session layer	Transport independent	Transport independent
Compact messages	Large messages sizes with verbose field names	Transport optimized for size and processing of XML relying on abbreviated field names
Tag=value format	XML based	XML based
Message structure defined by FIX volume releases	Message structure defined by DTD	Message structure defined by W3C XML Schema
Custom datatypes created by FIX	Limited datatype support in DTD	Advanced datatype support from W3C Schema
Weaker model for financial data since there are no multiple levels of nesting	Well suited for dynamically repeating data elements	Well suited for dynamically repeating data elements
Standard extension through tag number request	Extension through use of custom elements is not well defined	Advanced extension mechanism employing object-oriented concepts
Validation depends on FIX engine	Automated validation available using standard XML tools	Automated validation available using standard XML tools with improved data format and constraint checks

Obtaining the FIXML Schema and OCC Extensions

FIXML Schema including OCC's extensions will become available in the near future as one package. The distribution location will be communicated. Currently, the base FIXML Schema, without OCC's extensions, is available for review on the FIX Protocol (FPL) web site at www.fixprotocol.org.

The OCC is working with several committees to make sure that the maintenance and usage of the FIXML schema standard is and continues to be a true industry standard. The committees are supported by the Fix Protocol (FPL) organization, the Futures Industry Association (FIA), Broker Dealers, Futures Commission Merchants, Exchanges, Clearinghouses and Vendors. These committees will ensure that strict adherence to the standard remains in place and that the standard will maintain industry-wide acceptance.

For more information about the various committees that were created to support the standard, go to the FPL web site at www.fixprotocol.org.

Usage

There are many files included in the OCC FIXML package. For all parsing and validation, start with the file **fixml-occ-4-4.xsd**. All other files that are used are included from this base file.

To read DDS FIXML messages, OCC recommends using an XML parser that adheres to the W3C* 1.0 and 1.1 XML recommendations and not the byte by byte method typically used for "flat file" parsing. In order to support new future business needs, OCC reserves the right to add at any time previously unused tags, which are already part of the FIXML schema, to the DDS FIXML messages. If the parsing mechanism recommended above will be used, the addition of new tags will have no impact on the programs that read in the DDS FIXML messages.

Following the XML standard, DDS messages will not include elements or attributes that do not contain a value. This would include both NULL values and empty string values.

The FIXML Schema imposes an order to the message but this order only applies to the component blocks included in the message. This means that within a given component block the tags (attributes) can be present in any order. In addition, there is no sort order imposed on the data content of the message. For example, this means that the SecurityList messages (the DDS equivalent of the Series file) will not be sorted per symbol or per any other tag. On a more general level it should also be noted that if a DDS Recipient receives a batch file containing more than one message type (e.g. Positions + Trades), this batch file will not be sorted per message type. Position messages and trade messages may be commingled throughout the file depending on how the particular file was built.

* - The World Wide Web Consortium (W3C) is an international consortium where Member organizations, a full-time staff, and the public work together to develop Web standards.

FIXML and FIXML Extensions Version Identification

FIXML versions are identified explicitly in the schema file names and also with constant attribute values defined in the fixml-component-base schema file.

FIXML Schema File Versioning

FIXML Schema employed the file naming convention developed for FpML. The major and minor version numbers of the FIX version represented by the schema are appended to all FIXML schema file names. This approach was taken to explicitly force users to recognize when counterparties have changed their version of the schema.

FIXML Message Versioning

The FIXML root element <FIXML> contains five attributes that define the version of the message. The FIXML root element is defined in the **fixml-components-base** schema file.

Attribute Description Format Example

Attribute	Description	Format	Example
v	FIX Version	N.N	4.4
r	FIX Version release date (used to designate errata releases between FIX versions)	YYYYMMDD	20030618
s	Schema Release (used to designate schema releases between errata releases)	YYYYMMDD	20040109
xv	FIXML Extensions Version	N.N	1
xr	FIXML Extensions Originator	String	FIA

```
<FIXML r="20030618" s="20040109" v="4.4" xr="FIA" xv="1"
xmlns="http://www.fixprotocol.org/FIXML-4-4">
  ... Message ...
</FIXML>
```

Batch Files vs. Real-Time MQ Transmission

Real-time transmissions of FIXML messages via MQ will treat each message as a separate event and therefore each message transmitted via MQ will include the above referenced FIXML tag.

Batch files follow a different implementation. A batch file will include an additional tag to communicate to the XML parser that multiple messages are contained in the file as follows:

```
<FIXML r="20030618" s="20040109" v="4.4" xr="FIA" xv="1"
xmlns="http://www.fixprotocol.org/FIXML-4-4">
  <Batch>
    ... Message ...
    ... Message ...
    ... Message ...
  </Batch>
</FIXML>
```

FIX Concepts

The FIX protocol has developed several concepts that are repeated in many of the message types. This section will provide specific detail on these concepts.

CFI Code

As of FIX 4.3, the CFI Code field was added to the FIX Protocol in an attempt to provide a standards-based source of security type values by using values defined in the ISO 10962 standard: Classification of Financial Instruments (CFI code). This code will appear in every transmission that contains the Instrument Block (product/series/contract information).

A subset of ISO 10962 values applicable to FIX usage is identified below. The official standard and set of possible values are maintained by the ISO 10962 standard and any discrepancies below should be considered typographical errors using the ISO 10962 standard as the correct set of values. To obtain the ISO 10962 standard, please contact the ISO 10962 secretariat and/or visit the ISO web site at <http://www.iso.ch>.

The ISO 10962 standard defines a six (6) character code in which each character's position value carries a special significance (attribute) and set of values. Note that "X" represents an unspecified or unknown attribute, thus it is not always necessary to specify every attribute (character position value).

Note: The corresponding FIX 4.2 SecurityType field value is identified within brackets [] in the list below.

The following is a high-level subset of possible values applicable to FIX usage:

EXXXXX = Equity Shares (various)
DXXXXX = Debt (various)
FXXXXX = Future [FUT]
MRCXXX = Misc., Referential Instrument, Currency [FOR]
MRIXXX = Misc., Referential Instrument, Index [n/a]
OCXXXX = Option - Call [OPT]
OPXXXX = Option - Put [OPT]
XXXXXX = [NONE and ?]

Note: "X" represents an unspecified or unknown attribute and many of the values above containing "X" can be further defined according to the CFI standard (e.g., Voting rights are the third character of Equity Common Shares).

Detailed subset of possible values applicable to FIX usage:

Definition for Options (code defined by character position)

Char 1 Category	Char 2 Group	Char 3 Scheme	Char 4 Underlying Asset	Char 5 Delivery	Char 6 Stdized/Non- Std
O =Options	C =Call P =Put M =Other X =Unknown (n/a)	A =American E =European X =Unknown (n/a)	B =Basket S =Stock- Equities D =Interest rate/notional debt sec T =Commodities C =Currencies I =Indices O =Options F =Futures W =Swaps M =Other X =Unknown (n/a)	P =Physical C =Cash X =Unknown (n/a)	S =Standardized terms (maturity date, strike price, contract size) N =Non- standardized terms X =Unknown (n/a)

Examples

OCXXXS	Standardized Call Option
OPXXXS	Standardized Put Option
OCXFXS	Standardized Call Option on a Future
OPXFXS	Standardized Put Option on a Future
OCEFCN	Nonstandard call option on future with European style expiration and cash delivery
OPASPN	Nonstandard put option on stock with American style expiration and physical delivery
OCEICN	Nonstandard call option on an index with European style expiration and cash delivery

Non-Standard designation will use OCC's definition of this term: Non-Standard terms of settlement or multiple deliverables.

Definition for Futures (code defined by character position)

Char 1 Category	Char 2 Group	Char 3 Underlying Asset	Char 4 Delivery	Char 5 Stdized/Non- Std	Char 6 N/A Undefined
F =Futures	F =Financial Futures C =Commodity Futures M =Others X =Unknown (n/a)	A =Agriculture, forestry, and fishing B =Basket S =Stock-Equities (for financial future) or Services (for commodities futures) D =Interest rate/notional debt sec C =Currencies I =Indices (for financial futures) or Industrial Products (for commodities futures) O =Options F =Futures W =Swaps M =Other X =Unknown (n/a)	P =Physical C =Cash X =Unknown (n/a)	S =Standardized terms (maturity date, strike price, contract size) N =Non-standardized terms X =Unknown (n/a)	X =Not applicable / undefined

Examples

FXXXS	Standardized Future
FFICN	Nonstandard Financial Future on an index with cash delivery
FFSPSX	Standard Future on an equity with physical delivery
FXXXN	Nonstandard future – contract type specified in symbology – not provided in CFI Code

Non-Standard designation will use OCC’s definition of this term: Non-Standard terms of settlement or multiple deliverables.

Market Identifier Code (MIC)

As of FIX 4.3, Exchange Codes used in FIX are those defined in the ISO 10383 standard: Market Identifier Code (MIC). A MIC will be used whenever exchange information is included in a message. The official standard and set of values are maintained by the ISO 10383 standard and any discrepancies below should be considered typographical errors. Always refer to the ISO 10383 standard for the correct set of values. These values are maintained by ISO 10383 secretariats and as of the time of this publication the web site link to view current list of MIC values is: <http://www.iso15022.org/MIC/homepageMIC.htm>

Note: Refer to the current ISO 10383 standard for the complete list. The following list is a subset of the complete list and is designed primarily to support exchanges that interact with OCC.

Exchange Acronym	MIC
AMEX	XASE
BATS	BATO
BOX	XBOX
CFE	XCBF
C2	C2OX
CBOE	XCBO
CBOT	XCBT
CME	XCME
HEGX	HEGX
ISE	XISX
NQLX	XNQL
ONE	XOCH
PBOT	XPBT
PHLX	XPHO
PSE	XPSE

Party Component Block

The FIX Party Component Block will be used in all applicable FIX Reports to represent OCC Account Information. Below is a sample of this block and the corresponding translations:

<Pty ID="OCC" R="21"/>	➔ Clearing Group
<Pty ID="00352" R="4">	➔ Clearing Member Number
<Sub ID="M" R="26"/>	➔ Account Type
</Pty>	
<Pty ID="XYZ" R="38"/>	➔ Account ID

Occasionally, additional information will be listed in the Party Component Block when applicable. For example, in the Trade Capture Report for a CMTA trade, the Give-Up information will be listed in the block. In this case, the block will look like the following example:

<Pty ID="OCC" R="21"/>	➔ Clearing Group
<Pty ID="00551" R="4"/>	➔ Clearing Member Number
<Sub ID="M" R="26">	➔ Account Type
</Pty>	
<Pty ID="XYZ" R="38"/>	➔ Account ID
<Pty ID="00792" R="14"/>	➔ Give Up Clearing Firm

Instrument Component Block

The Instrument Component Block will be used in all applicable messages to describe OCC cleared products. Below are sample(s) of this block and the corresponding translations.

OPTION EXAMPLE

```
<Instrmt
  Sym="AOL"           → Product Symbol
  ID="KW"            → OPRA Code
  Src="J"            → FIX enumeration for OPRA
  CFI="OCASPS"       → See CFI Code description on page 19
  MMY="200311"       → Expiration Month and Year
  MatDt="2003-11-22" → Expiration Date
  StrkPx="47.50"     → Strike Price (Decimal format)
  StrkQt="47 1/2"    → Strike Price (Exchange Quote)
  StrkCcy="USD"      → Strike Currency
  StrkMult="1"       → Strike Multiplier
  StrkValu="1"       → Strike Value
  Mult="100"         → Contract Multiplier
/>
```

FUTURES EXAMPLE

```
<Instrmt
  Sym="AOL1N"        → Product Symbol
  ID=" AOL1N"        → Product Symbol
  Src="8"            → FIX enumeration for Exchange Symbol
  CFI="FFSPSX"       → See CFI Code description on page 19
  MMY="200311"       → Expiration Month and Year
  MatDt="2003-11-22" → Expiration Date
  Mult="100"         → Contract Multiplier
/>
```

In some messages, such as the Security Definition Report and Security Update Report, additional fields will be included in the Instrument Block to further describe the option or futures product.

The StrkMult and Mult fields have been provided in the Instrument Component Block because they are often used by OCC to calculate settlement values and in-the-money values.

FIXML Data Types (as used by OCC)

FIX Data Type	FIX Definition	OCC Definition	Example
Integer	Sequence of digits without commas or decimals and optional sign character. Integer values may contain leading zeros.	Leading zeros will be removed.	723
Float	Sequence of digits with optional decimal point and sign character. Float values may contain leading and trailing zeros.	Leading and trailing zeros will be removed. The number of decimal points will be limited to six.	245.3967
Qty	Float field capable of storing either a whole number of “shares” or a decimal value containing decimal places for non-share quantity asset classes	Whole numbers only	25
Price	Float field representing a price. The number of decimal places can vary and prices may be negative values.	The number of decimal places will be limited to six.	3.12
Amt	Float field typically representing a Price times a Qty.	The number of decimal places will be limited to six.	392785.23
Percentage	Float field typically representing a percentage. The number of decimal places can vary.	The number of decimal places will be limited to six.	0.95
Char	Single character value that can include any alphanumeric character or punctuation except the delimiter. All character fields are case sensitive.		Y
String	Alpha-numeric free format strings that can include any character or punctuation except the space delimiter. All character fields are case sensitive.		GUI

MultipleValue String	Alpha-numeric free format strings that can include any character or punctuation. Can contain one or more space-delimited values. All character fields are case sensitive.		A 1 A 2
Currency	String field representing a currency type using ISO 4217 Currency code (3 character) values.	Three character Currency code will be used	USD
Exchange	String field representing a market or exchange using ISO 10383 Market Identifier Code (MIC).	Four character MIC will be used	XAME
Month-Year	String field representing a month of a year. An optional day of the month can be appended or an optional week code. Valid formats: YYYYMM, YYYYMMDD, YYYYMMWW	Only valid format is YYYYMM	200311
UTCTimestamp	Time/date combination represented by local time and its offset from UTC (also known as GMT). The format is YYYY-MM-DDThh:mm:ss-hh:mm	Only valid format is YYYY-MM-DDThh:mm:ss-hh:mm	2003-11-25T03:45:23-05:00
UTCTimeOnly	Time-only represented in UTC (also known as GMT) is HH:MM:SS-hh:mm	Only valid format is HH:MM:SS-hh:mm	03:45:23-05:00
UTCDateOnly	Date represented in UTC (also known as GMT) in YYYY-MM-DD format		2003-11-25
LocalMktDate	Date of local market (vs. UTC) in YYYY-MM-DD format. This is the "normal" date field used by the FIX protocol.		2003-11-25

UTC Timestamp

All FIX Reports that include transaction times, creation times, update times, etc., will be reported in a time/date combination that includes local time and the offset from UTC (Coordinated Universal Time, also known as GMT). The UTC Timestamp is represented by the format, YYYY-MM-DDThh:mm:ss-hh:mm. To indicate the time zone (i.e., the difference between the local time and UTC) the time is immediately followed by a plus or minus sign (+ or -) followed by the difference from UTC represented as hh:mm. Adjustments are made for Daylight Savings Time.

For example:

To indicate 3:45:23 am on November 25, 2003 for Eastern Standard Time which is five (5) hours behind Coordinated Universal Time (UTC), one would write:

2003-11-25T03:45:23-05:00.

Implementation Detail on Empty Values

Any attributes which are omitted from a FIXML message should be considered empty or as having no value. The example below shows this behavior in FIXML for an Option instrument:

```
<Instrmt
  Sym="AOL"           → Product Symbol
  ID="KW"            → OPRA Code (options only)
  Src="J"            → FIX indicator for OPRA
  CFI="OCASPS"       → See CFI Code description on page 19
  MMY="200311"       → Expiration Month and Year
  MatDt="2003-11-22" → Expiration Date
  StrkPx="47.50"     → Strike Price (Decimal format)
  StrkQt="47 1/2"    → Strike Price (Exchange Quoted)
  StrkCcy="USD"      → Strike Currency
  StrkMult="1.0"     → Strike Multiplier
  Mult="100"         → Contract Multiplier
/>
```

Futures instruments have no Strike attributes. Therefore, whenever possible the attributes are omitted and should be considered to have no value.

```
<Instrmt
  Sym="IBM1N"        → Product Symbol
  CFI="FFSPSX"       → See CFI Code description on page 19
  MMY="200311"       → Expiration Month and Year
  MatDt="2003-11-22" → Expiration Date
  Mult="100"         → Contract Multiplier
/>
```

Fields No Longer Used or In Limited Use

Several fields in the existing OCC InTRACS Data Service will not be used or will be in limited use in the FIXML Data Service. Several of these data fields are proprietary to OCC and are not used in the ENCORE system. Other fields were used in the InTRACS system for many records that are not required in the ENCORE system.

Fields No Longer Used

A summary of the fields not used in the FIXML Data Service is provided below.

Fields	Comments
Product Kind	Users can refer to the CFI Code to determine if the instrument is an equity, index, etc. There is not a direct mapping to these fields.
ONN Product Code	Users can refer to the CFI Code to determine if the instrument is an equity, index, standard, leap, etc. There is not a direct mapping to these fields.
Contract Size	This concept no longer exists in ENCORE. However, users can refer to the Mult field in the Instrument block for all products except Foreign Currency. Foreign currencies do not map.
Clearing Member CNS Code	No longer available

Fields in Limited Use

Several fields that were listed in the InTRACS Data Service will only be included in certain transmissions. In order to eliminate repeating data throughout transmissions, Clearing Members should go to the source of the information. For example, in the InTRACS Data Service, mark prices were included in the Open Positions record. In ENCORE DDS, price information should only be included in the Price transmission. For this reason, mark price has been eliminated from the Positions transmissions.

Likewise, in the InTRACS Data Service, the CUSIP field is provided in all records. Since the CUSIP number is related to the underlying deliverable and not the option, OCC will only include it with the Settlement and the Security Master transmissions. All Clearing Members who need the CUSIP should refer to these transmissions.

Fields that will be eliminated from certain transmissions are shown in the following table.

Fields	Comments
CUSIP	CUSIP is only included when there is data related to the underlying stock. The information is included in the Security Master and the Settlement transmissions.
Mark to Market Value Pay/Collect Indicator Settlement Price	Futures settlement price information is only included in the Price and Settlement transmission. Field settlement price is not included with trade activity.
Settlement Dates	Settlement date only displays when there is settlement activity. It will not display in the exercise and assignment transmissions.
As of Date	Only displays in the Trade transmission when there is activity.
Exchange Code	Only displays in the Trade transmission when there is activity and the Security Master.
Mark Price	Only displays in the Price transmission.

FIX Reference Materials

Information on the current FIX 4.4 specification can be found at:

http://www.fixprotocol.org/specification/fix-44_w_Errata_20030618.zip (ZIP of MS Word)

http://www.fixprotocol.org/specification/fix-44_w_Errata_20030618_PDF.zip (PDF of MS Word)

In each message layout for a given transmission, FIX tag numbers have been included for ease of reference to FIX documentation. This data will not be included or referenced in the FIXML schema provided by OCC.

The following is a list of FIX Reports used by OCC for the purpose of Data Distribution. In some cases, these reports have been modified to accommodate OCC business needs. Therefore, the message layouts included in this document may not exactly match the FIX 4.4 release specification.

Assignment Report	<i>Volume 5 – FIX Application Messages: Post-Trade</i>
Market Data Snapshot/Full Refresh	<i>Volume 3 – FIX Application Messages: Pre-Trade</i>
Position Maintenance Report	<i>Volume 5 – FIX Application Messages: Post-Trade</i>
Position Report	<i>Volume 5 – FIX Application Messages: Post-Trade</i>
Security Definition Report	<i>Volume 3 – FIX Application Messages: Pre-Trade</i>
Security List Report	<i>Volume 3 – FIX Application Messages: Pre-Trade</i>
Trade Capture Report	<i>Volume 5 – FIX Application Messages: Post-Trade</i>

The following are new reports created by OCC and are proposed for the next FIX specification.

Adjusted Positions Report
Contrary Intention Report
Security Definition Update Report
Security List Update Report

Summary

We hope that Part One of this guide provided you with the conceptual information necessary to understand the Data Distribution Services (DDS) system being designed, developed, and implemented by The Options Clearing Corporation. Essentially, the DDS system will:

- Provide an extensible and scalable method for data transfer
- Standardize data transfer using the FIXML schema format
- Allow more flexibility when setting up new subscribers and recipients
- Provide a centralized view of financial organizations
- Provide real-time transactions
- Provide a data publishing service as well as a data delivery service

The Options Clearing Corporation is working with several committees to make sure that the maintenance and usage of the FIXML schema standard is and continues to be a true industry standard. The committees are supported by the Fix Protocol (FPL) organization, the Futures Industry Association (FIA), Broker Dealers, Futures Commission Merchants, Exchanges, Clearinghouses and Vendors. These committees will ensure that strict adherence to the standard remains in place and that the standard will maintain industry-wide acceptance.

For the most recent reference documents and other information, go to www.fixprotocol.org.

If you have additional questions or comments, please contact your Member Services representative or The Options Clearing Corporation Help Desk at one of the following telephone numbers:

1.800.621.6072 (U.S.)
1.800.424.7320 (Canada)

Or, you can get DDS help by e-mail at the following address: ddshelp@theocc.com