IBM App Connect Enterprise Solution for Financial Information eXchange (FIX) Messaging
IBM App Connect Enterprise SupportPac IA0Q

Financial Information eXchange (FIX®) Protocol

The Financial Information eXchange (FIX®) Protocol is a non-proprietary open standard used by thousands of buy and sell side firms globally to complete millions of financial markets transactions each day. FIX Protocol is used by almost every major stock exchange and investment bank, as well as mutual funds, futures exchanges, bond dealers and other investment firms.

The FIX Protocol specifications define the transport protocol and messaging interfaces required for trade messaging communications between counter-parties. The specification comprises *administrative level* details, defining low level protocol operation and *application level* details, defining the business messages that can be sent between counter-parties.

IBM App Connect Enterprise Solution for Financial Information eXchange (FIX) Messaging

This IBM solution implements the FIX Protocol specifications, providing the gateway for enterprise participation in global financial markets and the technical components for integration of trade communications within the Enterprise Service Bus. Key features:

- IBM FIX Engine bridging between IBM MQ and TCP/IP, enabling connectivity between IBM MQ enabled applications in the enterprise and FIX enabled market participants.
- IBM FIX Message Models (meta-data) defining the FIX message formats, enabling the processing of FIX messages within IBM App Connect Enterprise.
- Supports protocol and message formats for FIX 4.0 through 4.4, FIX 5.0 (EP240) and FIXT 1.1.

IBM FIX Engine

The IBM FIX Engine is a standalone JSE application which implements the *administrative level* requirements of the FIX Protocol, those required to establish and maintain a session between two communicating parties. This handles TCP/IP connectivity, session management, message exchange, encryption, and related requirements.

The IBM FIX Engine bridges FIX messages between TCP/IP and IBM MQ, allowing messages to flow bi-directionally between a FIX enabled counter-party and the Enterprise Service Bus. This enables the integration of FIX messaging with systems and applications which do not natively support the FIX Protocol transport and message formats.

IBM FIX Message Models

The IBM FIX Message Models define *administrative level* and *application level* message formats which enable the parsing, writing and validation of FIX format messages within IBM App Connect Enterprise message flows.

Leverage the IBM Advantage

These components, available and fully supported on platforms such as IBM AIX, IBM z/OS, Linux and more, facilitate the rapid integration of enterprise applications into the FIX trading eco-system. The details of message transmission and message syntax are abstracted allowing development teams to focus on the delivery of business value.
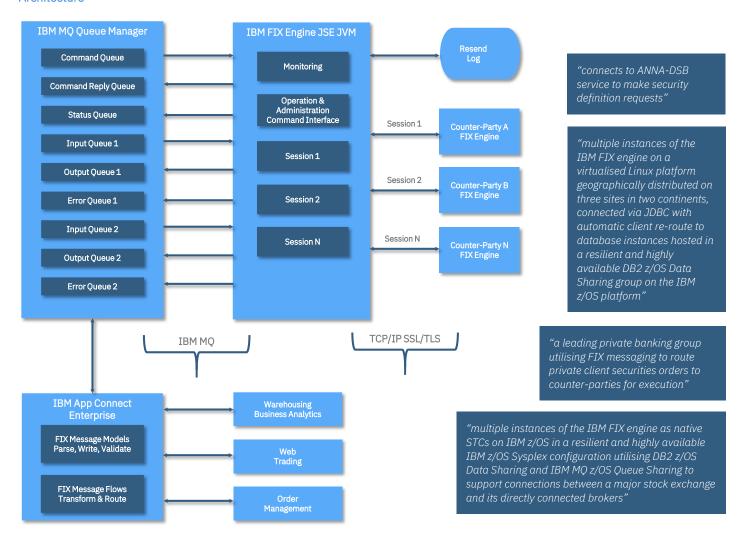
Contact

For further information on the IBM App Connect Enterprise Solution for Financial Information eXchange (FIX) Messaging, contact IBM Expert Labs – Commercial Payments, at dubadsup@ie.ibm.com.

Architecture

IBM MQ Queue Manager

- Command Queue
- Command Reply Queue
- Status Queue
- Input Queue 1
- Output Queue 1
- Error Queue 1
- Input Queue 2
- Output Queue 2
- Error Queue 2

IBM FIX Engine JSE JVM

- Monitoring
- Operation & Administration Command Interface
- Session 1
- Session 2
- Session N

Resend Log

Session 1 — Counter-Party A FIX Engine

Session 2 — Counter-Party B FIX Engine

Session N — Counter-Party N FIX Engine

IBM MQ

TCP/IP SSL/TLS

IBM App Connect Enterprise

- FIX Message Models Parse, Write, Validate
- FIX Message Flows Transform & Route

- Warehousing Business Analytics
- Web Trading
- Order Management

"connects to ANNA-DSB service to make security definition requests"

"multiple instances of the IBM FIX engine on a virtualised Linux platform geographically distributed on three sites in two continents, connected via JDBC with automatic client re-route to database instances hosted in a resilient and highly available DB2 z/OS Data Sharing group on the IBM z/OS platform"

"a leading private banking group utilising FIX messaging to route private client securities orders to counter-parties for execution"

"multiple instances of the IBM FIX engine as native STCs on IBM z/OS in a resilient and highly available IBM z/OS Sysplex configuration utilising DB2 z/OS Data Sharing and IBM MQ z/OS Queue Sharing to support connections between a major stock exchange and its directly connected brokers"

Highlights – IBM FIX Engine

- Support for IBM AIX, IBM z/OS, Linux and Windows with other platforms considered on request.

- Support for secure features such as RACF on IBM z/OS, TLS(/SSL), enterprise access control systems, encryption of passwords in configuration files and integration with enterprise credential management solutions.

- Flexible configuration supporting deployment into highly available topologies.

- Configurable with shared queues and data sharing on IBM z/OS Sysplex to provide resilient highly available operating environment.

- Configurable with multi-instance queue managers, JDBC and DB2 automatic client re-route on distributed platforms to provide a resilient highly available operating environment.

- Supports multiple, flexible end-of-day processing (sequence number reset) and housekeeping options.

Highlights – IBM FIX Message Models

- Defines *FIX envelope*, *administrative level* and *application level* message formats which allow FIX messages to be parsed, validated and written within IBM App Connect Enterprise message flows.

- Consistent with the FIX Repository message structures from the FIX Trading Community.

- Native to IBM App Connect Enterprise; supported on all platforms supported by the IBM App Connect Enterprise.

- Supports protocol and message formats for FIX 4.0 through 4.4, FIX 5.0 (EP240) and FIXT 1.1.

Support Services

- Support, maintenance and subscription provided as an ongoing annualised service.

- Optional 24x7 support service.

IBM FIX Engine

Implementation	Java Standard Edition [1] standalone application; bridges between TCP/IP and IBM MQ for enterprise integration
Operating modes	Acceptor (server) multi-session, initiator (client) multi-session; can act as acceptor or initiator for sessions with FIX counter-parties
Releases supported	4.0, 4.1, 4.2, 4.3, 4.4, 5.0 EP240, FIXT 1.1 transmission protocol with FIX 4.x and 5.x messages Acceptor and initiator support different FIX protocol and messaging versions on different sessions concurrently
FIX tags supported	All
Platforms Supported	IBM AIX, IBM z/OS, Microsoft Windows, Linux [1]
Pre-requisite messaging software	IBM MQ [1]; for integration with IBM App Connect Enterprise and other applications in the enterprise network
Pre-requisite database software	IBM DB2 multi-platform [1], IBM DB2 z/OS [1], Microsoft SQL Server [1], Oracle Database [1]; connectivity with JDB2 type 2 or JDBC type 4
Co-requisite integration software	IBM App Connect Enterprise [1] for message transformation and routing (optional)
Configuration support	Standard Java property files; clearly documented, easy to follow and configure
Configuration security	Sensitive properties such as passwords can be encrypted or extracted from a secure repository using a configuration API
Persistence	Required for implementation of FIX protocol resend features; provided through one of the pre-requisite database products
Persistence; two-phase-commit (2PC)	The IBM FIX engine has been specifically designed not to require two-phase-commit to simplify configuration; the FIX protocol already provides the mechanisms to support resend functionality and possible-duplication identification
Custom business logic	Optionally implemented using IBM App Connect Enterprise transformation and routing features; supported by IBM FIX message models in IACE and illustrated by sample IACE message flows
Transport encryption	SSL/TLS; supports one-way (server) and two-way (server-client)
Performance	1000s of messages per-second possible depending on hardware, software and number of parallel sessions; performance is a function of all operating components, I/O performance, end-to-end link throughput and latency, limited at session level by the single threaded nature of a given session socket-pair
High-availability	With IBM MQ and database server as part of a highly available configuration [3]; a session recovering on failover node generally needs to have visibility of the same MQ and DB2 state as that on the failed node; precise configuration depends on the specific FIX application and its requirements
Operational sequence reset options	Manual (tool), manual (end-session-eod command) on-logon (negotiated), on-logon (unilateral), in-session (while sessions are running); counter-party triggered (LOGOUT with eye-catcher); for end-of-day processing, session and sequence number management and reset
Operational logging	Fully configurable; supported by Apache LOG4J with multiple log-destinations, log levels and log rotation
Operational monitoring	FIX engine provides status messages to queue which may be actioned by other applications or monitoring tools
Operational house-keeping	Automatic (optional); redundant message history deleted on start-up
Operational control	Through command line tools and command queue messages (further configurable trough automation)
Tag 553 (Username) and 553 (Password) support	Supports sending and receiving of FIX tag 553 (Username) and 554 (Password); these are not authentication when received by the FIX engine since the session is expected to be authenticated through SSL/TLS; they will be passed to downstream applications
Tag 141 (ResetSequenceNumberFlag)	FIX tag 141 (ResetSequenceNumberFlag) is supported through configuration

IBM FIX Message Models

Standard and Lenient Message models for IBM App Connect Enterprise	Implemented consistent with the FIX Repository from FIX Protocol Limited; standard models adhere to the FIX specification; lenient models allow for the absence of mandatory elements for flexibility
FIX metadata release supported	4.0, 4.1, 4.2, 4.3, 4.4, 5.0 EP 240; implemented as IACE Ordered Set for performance purposes; can be changed to Unordered Set
FIX tags supported	All
Custom tag support	Custom tags can be added to the message models if required [2]

Documentation and Sample Materials

Documentation	Comprehensive documentation including overview, architecture and availability guidance, configuration and operations reference, tools reference, quick start guide
Quick start guide	Tutorial on setting up and running the acceptor and initiator in a sandbox in thirty minutes
IACE message flow: *TradeCaptureReport*	Create *TradeCaptureReport*; for MIFID II trade reporting
IACE message flow: *SecurityDefinitionRequest*	Create and handle *SecurityDefinitionRequest* with JSON content; for ANNA-DSB security definition requests
IACE message flow: *XML_non_FIX*	Create and handle *XML_non_FIX* with XML content; for FIXML transmission
Configuration property files	Realistic sample configurations for acceptor and initiator instances
Sample Java	API sample for accessing session information from other applications
Sample purge script	Sample SQL for purging old session data
Sample messages	Samples of various FIX messages and versions

Support and Services

Supporting organisation	IBM Ireland Development Laboratory, IBM Expert Labs – Commercial Payments; 15+ years supporting FIX clients and implementations
On-site support	Optional service engagement to support initial/sandbox configuration and skills transfer
Off-site (remote) support	Standard support offering; GMT hours; support maintenance and subscription
Off-site (remote) support 24x7	Enhanced support offering; 24x7 hours; S1 (severity one) production support

Commercial

Pricing model	Annual subscription model; includes licence, standard support offering and optional enhanced support offering Price on application; contact "Dublin Adapters Support" <dubadsup@ie.ibm.com>
Licence, licence scope	IBM Services "Asset" with licence in accordance with *IBM International License Agreement for Non-Warranted Programs;* scope by legal entity in country; no capacity, per-transaction, processing unit or instance charges
Evaluation	SupportPac IA0Q can be made available to clients for pre-sales evaluation under an *Evaluation Agreement*

[1] Multiple versions supported [2] No special support is required for custom tags in the FIX engine [3] No additional cost for additional instances within the same country