



FIX Performance Session Layer Release Candidate 3 Technical Proposal

~~June~~ July 2016

v0.1-2

Proposal Status: Public Comment

For Global Technical Committee Governance Internal Use Only

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|------------------------|---------------|--------------------|--|
| Submission Date | | Control Number | |
| Submission Status | Submitted | Ratified Date | |
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1 Introduction

The High Performance Working Group was formed with the goal of improving the fit-for-purposefulness of FIX for high performance.

Recent improvements in the speed of hardware, software, and network connections (such as in co-location solutions) are putting pressure on the FIX protocol and highlighting some inefficiencies of the current version of the protocol (e.g., excessive echoing of input values, inefficient encoding). New financial applications such as high-frequency trading and market data feeds pose new performance requirements. In recent years, several financial organizations have avoided the performance limitations of FIX and introduced new proprietary protocols that are optimized for speed. These proprietary interfaces have been offered, sometimes along with a FIX interface, to support high-speed transactions and/or data feeds.

The current performance limitations of FIX can be removed by making changes and additions at multiple levels of the protocol. At the *application* level, there is a need to define less-verbose versions of some FIX messages and to streamline the message flow. At the *presentation* level, there is a need to provide new encodings that are faster and more compact than the traditional Tag=Value encoding of FIX. At the *session* level, there is a need to specify a new lightweight session protocol with basic recovery options. The High Performance Working Group is drafting a set of specifications and guideline documents to address all these aspects.

FIX Performance Session Layer (FIXP) is a lightweight protocol designed to replace FIXT for high performance use cases. It supports both point-to-point exchange of application messages as well as multicasts for market data and the like.

Notable FIXP features:

- Negotiable delivery guarantees, supporting asymmetrical flows
- Separates session identifier from business entity identifiers
- Well isolated from other layers:
 - Binary encoding, but wire format independent for both session and application messages
 - Transport independent; works on TCP streams as well as datagram oriented transports

1.1 Authors

| Name | Affiliation | Contact | Role |
|---------------|------------------|--|--------------------|
| Don Mendelson | Silver Flash LLC | Donmendelson@gmail.com | FIXP subgroup lead |
| | | | |
| | | | |

2 Requirements

New requirements for this Release Candidate beyond those already specified for earlier releases.

2.1 Business Requirements

2.1.1 FIXP with SBE message encoding

For high performance, some users of FIXP wish to use SBE for encoding of the session messages. The SBE messages for FIXP should be standardized by distributing a SBE message schema for FIXP. The schema will be disseminated as an XML file conformant to the SBE XML schema. (Tracked as issue #7 in GitHub.)

2.1.2 Integration with FIX Repository

Some users wish to integrate tools for FIX Repository with FIXP message descriptions. This is equivalent to work done in the past for FIXT session layer. The artifact will be disseminated as an XML conformant to the FIX Repository XML schema. (Tracked as issue #6 in GitHub.)

2.1.3 Mutual Credentials Exchange

To support mutual authentication, a Credentials field should be added to the NegotiationResponse message. Previously, the client sent Credentials to the server, but the server provided no credentials back to the client. This could help prevent spoofing of the server. Since Credentials is an optional field, it will be decided by agreement between counterparties if and how it should be used. (Tracked as issue #1 in GitHub.)

2.2 Technical Requirements

2.2.1 Technical Enhancements

- Issue #2: SessionID in consistent position to optimize multiplexed sessions
- Issue #4: Multicast session lacks keepalive interval

Issue #2 was proposed for performance optimization of multiplexed sessions while issue #4 addressed a gap in the specification. Prior to the change, there was no specified threshold for a multicast receiver to know when a session timeout or data loss occurred.

2.2.2 Documentation Clarifications

Vague wording in the specification was addressed for these issues:

- Issue #3: Clarify multicast as single Topic or multiplexed flow
- Issue #8: Use precise language for requirement levels
- Issue #9: Precise definition of data types
- Issue #16: Send topic with heartbeat on multicast

3 Issues and Discussion Points

Even after the enhancements of Release Candidate 3, the following issues remain for future discussion.

3.1 Out-of-Band Recovery

The working group discussed various scenarios for recovery of lost messages via a side channel. This may be required for one-way transports, such as UDP multicast. It may also be desirable for performance reasons to keep recovery out of the critical path of message flow for high performance trading. Although this is achievable with FIXP, we have deferred adding specific features to the protocol to support it until there is a demonstrated need and proven solution.

3.2 Session Fault Tolerance

Another area of possible future enhancement is handling of technical faults. FIXP might provide a protocol for fail-over to a backup transport to carry on a trading session, or protocol rules would be defined for firing actions on faults, such as order cancel on disconnect.

4 References

| Reference | Version | Relevance | Normative |
|---|---------|--|-----------|
| FIX Performance Session Layer Release Candidate 1 Technical Specification | | Full specification as approved for RC1 in September 2014 by the FPL GTC. | |
| FIX Performance Session Layer Release Candidate 2 Technical Specification | | Submitted to GTC for approval September 2015 2015 | |
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5 Relevant and Related Standards

| Related Standard | Version | Reference location | Relationship | Normative |
|-----------------------------------|----------------|--------------------|--------------------------------------|-----------|
| <u>Simple Open Framing Header</u> | RC1 | | Optional usage at presentation layer | |
| Simple Binary Encoding | Draft Standard | | Optional usage at presentation layer | |
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6 Intellectual Property Disclosure

| Related Intellection Property | Type of IP (copyright, patent) | IP Owner | Relationship to proposed standard |
|-------------------------------|--------------------------------|----------|-----------------------------------|
| None | | | |
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7 Definitions

| Term | Definition |
|------|------------|
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8 Deliverables

8.1 Specifications

Full specifications for FIXP are available in separate document *FIX Performance Session Layer: Release Candidate 2 Technical Specification Standard - RC3*.

8.2 Resources

8.2.1 SBE Message Schema for FIXP

File name SBESchemaForFIXP.xml

8.2.2 Repository File for FIXP

File name FixRepositoryForFIXP.xml

Appendix A - Usage Examples

Examples are provided in the specification document.

Appendix B – Compliance Strategy

Not yet developed.