



Global Exchanges and Markets Committee

Message Throttle Parameters

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Document History

Revision	Date	Author	Revision Comments
0.1	November 23, 2009	Borys Harmaty	initial draft:
0.2	Jan 13 2010	Borys Harmaty	Significantly Redrafted as a result of committee meeting on the date of November 12, 2009.
0.3	Jan 14 2010	Borys Harmaty	Business Flow Diagrams Added.
0.4	January 20, 2010	Ryan Pierce, FPL	Reformatted to conform with Gap Analysis standards. Revised text. Changed business flow so that: Quote Status is used to reject a Quote Quote Request Reject is used to reject a Quote Request Mass Quote Acknowledgment is used to reject a Mass Quote Noted uncertainty concerning ThrottleScope Removed enumerations for UserStatus
0.5	January 26, 2010	Ryan Pierce, FPL	Added an exception to the Business Message Reject rule. Modified the proposed Entitlements message to conform to the 0.6 version of the Gap Analysis and added an enum for throttles to EntitlementType.
0.6	February 3, 2010	Borys Harmaty Ryan Pierce, FPL	Made changes in accordance with January 28, 2010 GExMC meeting. Removed Applications messages and related fields. Business message reject to be used by application and gateways. Added ThrottleStatus to Quote Status Report. Added BusinessRejectReason of "Throttled messages rejected on request"
0.7	February 8, 2010	Borys Harmaty Ryan Pierce, FPL	Made changes in accordance with February 4, 2010 GExMC meeting. <ul style="list-style-type: none"> · Updated workflow text and diagrams. · Removed EntitlementType of Throttle Limits. · Moved ThrottleGrp up one level in PartyEntitlementsReport. · ThrottleScope inherits enums from EntitlementType. · Reformatted to remove unnecessary message tables. · Replaced proposed ExecInst and QuoteQualifier with a new field: ThrottleInst. · Added new field ThrottleCountIndicator. · ThrottleLevelAction renamed to ThrottleAction, changed enums. · ThrottleType of Rate renamed to Inbound Rate. · ThrottleTimeUnit uses enums from OrderDelayUnit(1429). · Added new throttle-related fields to numerous messages.
0.8	February 19, 2010	Ryan Pierce, FPL	Made changes in accordance with February 19,

			<p>2010 GTC meeting:</p> <ul style="list-style-type: none"> · Removed Party Entitlements support. This will be addressed in a different Gap Analysis. · Documented different computation methods for rate, and that this is outside the scope of this proposal. · Typo cleanup. Fixed typo where NoPartyDetails was referenced instead of NoThrottles
0.9	February 26, 2010	Ryan Pierce, FPL	<p>Made changes in accordance with February 25, 2010 GExMC meeting:</p> <ul style="list-style-type: none"> · Removed ThrottleScope · Reformatted graphics
0.10	March 9, 2010	Ryan Pierce, FPL	<p>Made changes in accordance with March 9, 2010 GTC meeting:</p> <ul style="list-style-type: none"> · Typo corrections
0.11	April 13, 2010	Ryan Pierce, FPL	<p>Incorporated changes in accordance with April 13, 2010 GTC meeting in response to suggestions received during the public comment period:</p> <ul style="list-style-type: none"> · Added ThrottleAction = Warning · Renamed ThrottleGrp to ThrottleParamsGrp · Created ThrottleResp component for ThrottleInst, ThrottleStatus, and ThrottleCountIndicator · Added ThrottleParamsGrp to UserNotification · Added UserStatus = Throttle parameters change · Syntax changes, abbreviations added · Text added to indicate that this isn't a quality of service (QoS) or a session level proposal. · Components added to data dictionary
0.12	April 18, 2010	Ryan Pierce, FPL	<p>Following internal review:</p> <ul style="list-style-type: none"> · Typo corrections and clarifications · Documented XML abbreviation status for "Count" · Assigned FIXML abbreviations for components · Changed FIXML abbreviation for Throttle to Thrttl
0.13	April 26, 2010	Ryan Pierce, FPL	<p>Following further internal review:</p> <ul style="list-style-type: none"> · Renamed RefMsgTypeGrp to ThrottleMsgTypeGrp · Instead of reusing RefMsgType, creating a new field ThrottleMsgType

1 Introduction

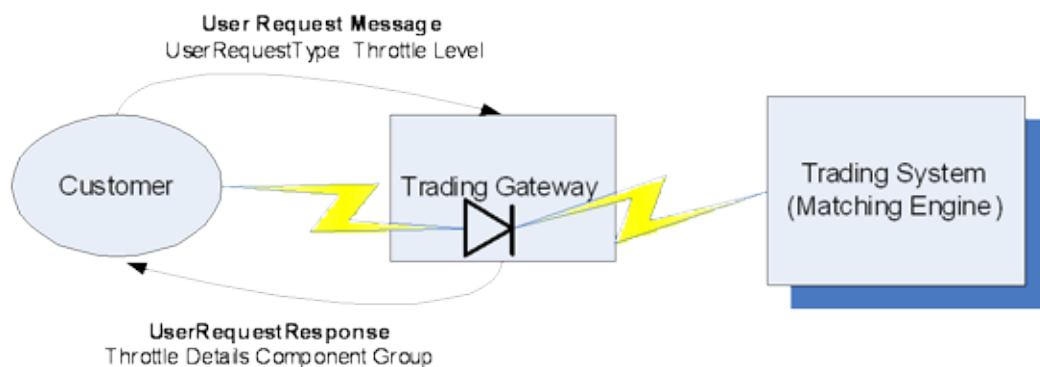
Exchanges and Markets are subject to large spikes in volume from various Direct Market Access (DMA) sources including ALGOs, Smart Order Routers and other concentrators of order/quoting flow. These spikes in flow can cause the exchanges to slow down dramatically once a certain overall rate of messaging has been reached and sustained for a period of time.

Many exchanges provide “throttle” mechanisms that provide a method of slowing down messages, rejecting messages or disconnecting sessions above a certain rate of messages. A throttle is normally set at level of so many messages per unit of time per a session, on other exchanges an alternative method of number of outstanding requests may be used. Additionally, some exchanges provide the ability to throttle by message type or take action on a message given that the message is throttled.

The purpose of this document is to provide a standard, extensible way for throttle parameters to be communicated between the exchange/market and the messaging source. The objective of this proposal is to convey this information at the application level as throttle parameters that are set by the market venue between the venue and the trading counterparty. These parameters are similar to throttle arrangements that may currently be set in user profiles/setup or "rules of engagement" documents. This proposal does not address quality of service (QoS) or throttle control at the session layer.

2 Business Workflow

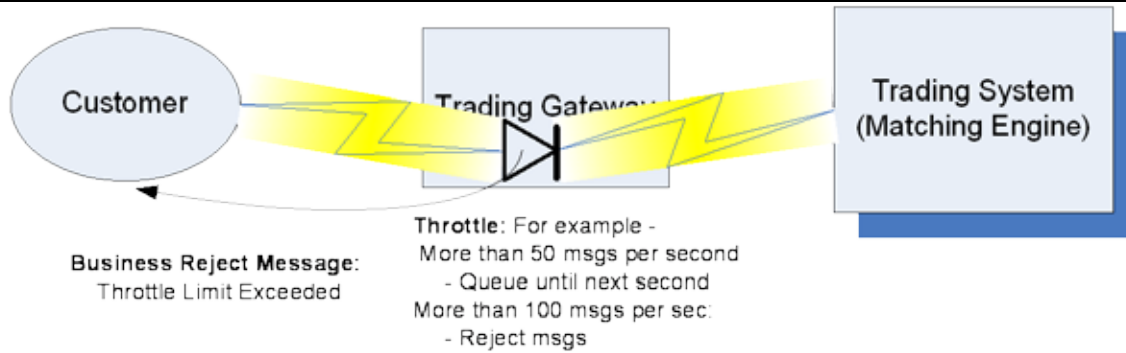
Upon initial engagement with the market, practitioners will discuss messaging requirements, networking requirements and the throttles to be applied. Throttles are usually not dynamic and are subject to a business negotiation, although in some cases they may simply be applied according to the policies of the exchange.



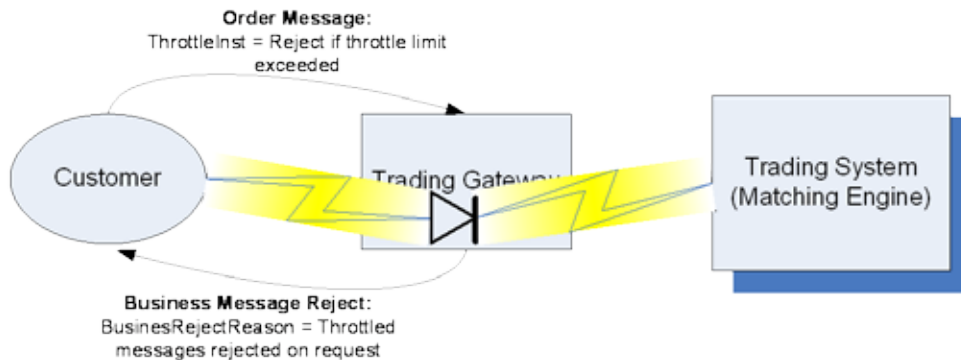
In the FIX session itself, the market can provide the capability to advise the market participant about throttle settings that are set for the session and if the throttle is enabled. Upon request, the market participant is informed of the types and levels of throttles imposed upon the participant's session.

Throttling capabilities are provided commonly at the session level, and in some cases functionality is also provided at the application level.

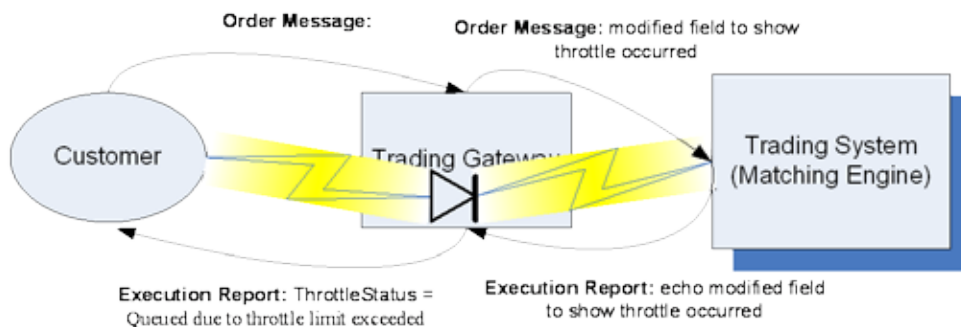
- a) At the session level, the throttle is usually specified in messages per second and secondarily can also specify different actions to be taken should the throttle be exceeded depending upon the messaging level (queue, reject, disconnect.) Another throttle type is to allow only a certain amount of messages outstanding. Different throttles for different message types can be specified. The messages will be rejected by a Business Reject Message, usually by a component outside of the trading system itself when the throttle is exceeded.



- b) At the application level markets may support the ability for the message to request that it be rejected instead of queued. For example, certain high frequency algorithmic order flow is highly latency sensitive and large delays imposed by throttling would adversely impact it, so firms may prefer that it be rejected should a throttle limit be exceeded. However, certain retail customer order flow must be represented in the market, and queuing would be preferable to rejection, Note that market rules may define only one behavior or markets may configure a default behavior per session or per party. A market may convey throttling information in FIX without allowing the user to override the default on a per-order basis.



- c) Messages that are throttled can provide an indication that they were throttled on the message response. Normal processing by the trading system occurs, the field indicating throttle is usually modified by a component outside the trading system.



3 Issues and Discussion Points

3.1 Issues

Issue: What message do we use to indicate that a throttle has been applied at the session level?

Response: At this point, session-level changes are outside the scope of this gap analysis.

Issue: ThrottleScope has Messages as a type. What other scopes do we need? (Parties are covered in entitlements.)

Response: During the December 3, 2009 GExMC call, it was suggested that this be added, although its function is not clear. This is an issue for discussion.

Further response: At the February 4, 2010 GExMC meeting, ThrottleScope was redefined to reference the business functions defined in the field EntitlementType, which is a new field proposed in the Entitlements Gap Analysis. At the February 19, 2010 GTC meeting, we desired to remove the dependencies between this Gap Analysis and the Entitlements Gap Analysis. This dependency was not detected as of that call and should be addressed.

Further response: At the February 25, 2010 GExMC meeting, ThrottleScope was removed.

Issue: A business need to indicate throttle level based on business concepts such as a Party is needed. Previously, this Gap Analysis included an addition to the Party Entitlements Report message.

Response: This is now de-coupled to reduce the dependencies between the two proposals. Either a future Gap Analysis, or an amendment to the Entitlements Gap Analysis, will be required to meet this need.

Issue: Different calculation methods are possible for rate based throttles. For example, assume a limit of 100 messages per 1 second.

- Fixed window: Every second, the counter resets to 0 and increments for every message sent. If more than 100 messages are sent before the next second, they are throttled.
- Sliding window: For every message received, the recipient looks back one second. If 100 or more messages were received in that time period, the current message is throttled.

Assume that a firm that sends no messages from 12:00:00.000 to 12:00:00.899 and then sends 100 messages at 12:00:00.900. The firm then sends 100 more messages at 12:00:01.100. In fixed window calculations, this would be allowed. In sliding window calculations, the second 100 messages would be rejected.

Response: It is possible that additional computation methods exist. As such, computation method is outside the scope of this Gap Analysis. Information on computation method must be communicated by bilateral agreement.

3.2 Activities Identified

The activities identified in this Gap Analysis are:

Activity required	Response message
Indicate throttle nature, level, other information	User Request / User Response
Indicate throttle applied to message	Execution Report, Quote Status Report
Rejection of Order/Quote/Cancel when throttled	Business Message Reject
Request Action to be Taken upon Throttle	Include in originating Message itself; if the action is taken the responding message will indicate reason.

3.3 Related Items

Time to Market: Several respondents mentioned that rejection on throttle works crudely and the more important element is the extent of delay. Additional requested fields are: Time to Market which measures the latency to the market and allows for rejection of the Order/Quote if “stale”.

4 FIX message tables

4.1 User Response

User Response

Tag	FieldName	Req'd	Comments	Action	Mapping Usage and Comments
StandardHeader		Y	MsgType = "BF"		
923	UserRequestID	Y			
553	Username	Y			
926	UserStatus	N			
Component block < ThrottleParamsGrp >		N	Indicates throttle limits	Add	
927	UserStatusText	N	Reason a request was not carried out		
StandardTrailer		Y			

4.2 User Notification

User Notification

Tag	FieldName	Req'd	Comments	Action	Mapping Usage and Comments
StandardHeader		Y	MsgType = CB		
component block <UsernameGrp>		N	List of users to which the notification is directed		
926	UserStatus	Y	Reason for notification - when possible provide an explanation.		
Component block < ThrottleParamsGrp >		N	Indicates throttle limits	Add	
58	Text	N	Explanation for user notification.		
354	EncodedTextLen	N	Must be set if EncodedText field is specified and must immediately precede it.		
355	EncodedText	N	Encoded (non-ASCII characters) representation of the Text field in the encoded format specified via the MessageEncoding field.		
StandardTrailer		Y			

4.3 Execution Report

The Execution Report is modified as follows:

- Add new optional component ThrottleResponse prior to StandardTrailer.

4.4 Quote Status Report

The Quote Status Report is modified as follows:

- Add new optional component ThrottleResponse prior to Text(58).

4.5 Mass Quote Acknowledgement

The Mass Quote Acknowledgement is modified as follows:

- Add new optional component ThrottleResponse prior to StandardTrailer.

4.6 New Order Single

The New Order Single is modified as follows:

- Add new optional field ThrottleInst prior to StandardTrailer.

4.7 Order Cancel Replace Request

The Order Cancel Replace Request is modified as follows:

- Add new optional field ThrottleInst prior to StandardTrailer.

4.8 New Order Multileg

The New Order Multileg is modified as follows:

- Add new optional field ThrottleInst prior to StandardTrailer.

4.9 Multileg Order Cancel Replace

The Multileg Order Cancel Replace is modified as follows:

- Add new optional field ThrottleInst prior to StandardTrailer.

4.10 New Order Cross

The New Order Cross is modified as follows:

- Add new optional field ThrottleInst prior to StandardTrailer.

4.11 Cross Order Cancel Replace Request

The Cross Order Cancel Replace Request is modified as follows:

- Add new optional field ThrottleInst prior to StandardTrailer.

4.12 New Order List

The New Order List is modified as follows:

- Add new optional field ThrottleInst prior to StandardTrailer.

4.13 Quote

The Quote is modified as follows:

- Add new optional field ThrottleInst prior to Text(58).

4.14 Mass Quote

The Mass Quote is modified as follows:

- Add new optional field ThrottleInst prior to StandardTrailer.

4.15 Business Message Reject

While the structure of the Business Message Reject message itself remains unchanged, an additional exception to the rule stated in FIX 5.0 SP2 Volume 1 about using application-level reject messages instead of the Business message Reject must be added:

4. In the event a message is received, fulfils session-level rules, but exceeds maximum throttle limits. In this situation a Business Message Reject with BusinessRejectReason = “Throttle limit exceeded”, “Throttle limit exceeded, session will be disconnected”, or “Throttled messages rejected on request” should be issued; other application-level messages should not be used in this situation.

5 FIX component blocks

5.1 ThrottleParamsGrp component block

This component is used to represent Throttles. This will be added to the User Response message. While we anticipate this may be added to the Party Entitlement Report message to convey the information at a more granular party or party relationship level, that is outside the scope of this proposal. User Response messages convey throttle information per user or per session. Consideration has been given to extending this component block to the Logon, but session-level changes are outside the scope of this proposal.

<i><Component block ThrottleParamsGrp></i>						
<i>Tag</i>	<i>Field Name</i>		<i>Req'd</i>	<i>Action</i>	<i>Mappings and Usage Comments</i>	<i>Comments</i>
1610	NoThrottles		N			Indicates number of throttles to follow.
à	1611	ThrottleAction	N			Required when NoThrottles > 0.
à	1612	ThrottleType	N			Required when NoThrottles > 0.
à	1613	ThrottleNoMsgs	N			Number of messages per time interval, or number of outstanding requests. Required when NoThrottles > 0.
à	1614	ThrottleTimeInterval	N			Can be used only when ThrottleType = Inbound Rate. Indicates, along with ThrottleTimeUnit, the interval of time in which ThrottleNoMsgs may be sent. Default is 1.

à	1615	ThrottleTimeUnit	N			Can be used only when ThrottleType = Inbound Rate. Indicates, along with ThrottleTimeUnit, the interval of time in which ThrottleNoMsgs may be sent. Default is Seconds.
à	Component block < ThrottleMsgTypeGrp >		N			Indicates MsgType values that this throttle counts. If not specified, the definition is implicit based upon bilateral agreement.
</Component block ThrottleParamsGrp>						

5.2 ThrottleMsgTypeGrp component block

This component is used to convey a list of MsgType values.

<Component block ThrottleMsgTypeGrp>						
Tag	Field Name		Req'd	Action	Mappings and Usage Comments	Comments
1618	NoThrottleMsgType		N			
à	1619	ThrottleMsgType	N			Required when NoThrottleMsgType > 0.
</Component block ThrottleMsgTypeGrp>						

5.3 ThrottleResponse component block

This component is used to convey information about the throttle status on response messages, e.g. Execution Report, Quote Status Report, etc.

<Component block ThrottleResponse>						
Tag	Field Name		Req'd	Action	Mappings and Usage Comments	Comments
1685	ThrottleInst		N	Add		
1609	ThrottleStatus		N	Add		
1686	ThrottleCountIndicator		N	Add		
</Component block ThrottleResponse>						

6 Appendix A - Data Dictionary

Tag	Field Name	Action	Data type	Description	FIXML Abbreviation	Add to/Deprecate from Message type or Component block
380	BusinessRejectReason	Add new enum value	int	Code to identify reason for a Business Message Reject message. 0 = Other 1 = Unknown ID 2 = Unknown Security 3 = Unsupported Message Type 4 = Application not available 5 = Conditionally required field missing 6 = Not Authorized 7 = DeliverTo firm not available at this time 18 = Invalid price increment 8 -Throttle limit exceeded 9 -Throttle limit exceeded, session will be disconnected 10 -Throttled messages rejected on request	@BizRejRsn	
924	UserRequestType	Add new enum value	int	Indicates the action required by a User Request Message 1 = Log On User 2 = Log Off User 3 = Change Password For User 4 = Request Individual User Status 5 -Request Throttle Limit	@UserReqTy p	

926	UserStatus	Add new enum value	int	1 = Logged In 2 = Not Logged In 3 = User Not Recognised 4 = Password Incorrect 5 = Password Changed 6 = Other 7 = Forced user logout by Exchange 8 = Session shutdown warning 9 = Throttle parameters changed	@UserStat	
1609	ThrottleStatus	Add new Tag	int	Indicates whether a message was queued as a result of throttling. 0 = Throttle limit not exceeded, not queued 1 = Queued due to throttle limit exceeded	@ThrtlStat [NEW: Throttle -> Thrtl]	ThrottleResponse (TBD)
1610	NoThrottles	Add new Tag	NumInGroup	Indicates number of repeating groups to follow.		ThrottleParamsGrp
1611	ThrottleAction	Add new Tag	int	Action to take should throttle limit be exceeded. 0 = Queue Inbound 1 = Queue Outbound 2 = Reject 3 = Disconnect 4 = Warning	@Actn	ThrottleParamsGrp
1612	ThrottleType	Add new Tag	int	Type of throttle. 0 = Inbound Rate 1 = Outstanding Requests	@Typ	ThrottleParamsGrp
1613	ThrottleNoMsgs	Add new Tag	int	Maximum number of messages allowed by the throttle. May be a rate limit or a limit on the number of outstanding requests.	@NoMsgs	ThrottleParamsGrp
1614	ThrottleTimeInterval	Add newTag	int	Value of the time interval in which the rate throttle is applied.	@TmIntvl	ThrottleParamsGrp

1615	ThrottleTimeUnit	Add new Tag	int	Units in which ThrottleTimeInterval is expressed. Uses same enumerations as OrderDelayUnit(1429). 0 = Seconds (default if not specified) 1 = Tenths of a second 2 = Hundredths of a second 3 = milliseconds 4 = microseconds 5 = nanoseconds 10 = minutes 11 = hours 12 = days 13 = weeks 14 = months 15 = years	@TmUnit	ThrottleParamsGrp
1618	NoThrottleMsgType	Add new Tag	NumInGroup	Number of ThrottleMsgType fields.		ThrottleMsgTypeGrp
1619	ThrottleMsgType	Add new Tag	String	The MsgType (35) of the FIX message being referenced. [Uses enums from Tag 35]	@MsgTyp	ThrottleMsgTypeGrp
1685	ThrottleInst	Add new Tag	int	Describes action recipient should take if a throttle limit were exceeded. 0 = Reject if throttle limit exceeded 1 = Queue if throttle limit exceeded	@ThrtlInst	ThrottleResponse (TBD) Additionally separately added by itself to: New Order Single Order Cancel Replace Request New Order Multileg Multileg Order Cancel Replace New Order Cross Cross Order Cancel Replace Request New Order List Quote Mass Quote

1686	ThrottleCountIndicator	Add new Tag	int	Indicates whether a message decrements the number of outstanding requests, e.g. one where ThrottleType = Outstanding Requests. 0 = Outstanding requests unchanged 1 = Outstanding requests decreased	@ThrttlCntInd [NEW: Count -> Cnt which was first used in FIX 5.0 EP63 but not added to the Repository.]	ThrottleParamsGrp
	ThrottleResponse component	Add new			@ThrttlRsp	Add component to: ExecutionReport QuoteStatusReport MassQuoteAcknowledgement
	ThrottleParamsGrp component	Add new			@ThrttlPrm	Add component to: UserNotification UserResponse
	ThrottleMsgTypeGrp component	Add new			@ThrttlMsgTyp	Add component to: ThrottleParamsGrp

7 Appendix B - Glossary Entries

Term	Definition	Field where used
Throttle	A network capability to limit the number of messages sent into an exchange or market in an amount of time, or to limit the number of message requests outstanding. Usually handled by a component outside of the matching/trading engine.	ThrottleParams Grp

8 Appendix C - Usage Examples