

## DFS - Market Wide Speed Bump

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## Abstract

This document provides the detailed functional description of the ISE's Market Wide Speed Bump system.

## Revision History

Release	Date	Author	Version	Description
1.0	5/29/2013	E. Salem	0.1	First draft.
1.0	7/3/2013	E. Salem	0.2	Second draft
1.0	8/12/2013	E. Salem	1.0	First version
1.0	9/26/13	B. Hallnan	1.1	Incorporate comments and technical updates.
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1.0	11/26	B. Hallnan	1.3	Fix error in Section 3.1.
1.0	12/17	B. Hallnan	1.4	Updates to Section 3.1.
1.0	1/24/14	B. Hallnan	1.5	Update email notification per SIR 259069..

## Reviewers and Approvers

This document is subject to review and approval. The records of reviews and approvals are stored on file with the ISE Product Management team.

This document was reviewed by the people identified on the cover page, and email verifications of review were saved in the project directory.

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## 1 Introduction

Market Makers have requested that we provide them with a safety net to prevent catastrophic loss due to an over-abundance of market-wide trading (presumably at “bad” prices).

To do so, the Market Wide Speed Bump application leverages the current per-product Market Maker Protection feature and the *OFIQuoteActivationMopsRequestMessage*.

The application runs as a BSI adapter, one per Market Maker **NEW in 0.2>>>**Group<<<. It listens for the Market Maker’s per-product Market Maker Protection broadcast to determine if the number of broadcasts per configurable time period exceeds a configurable threshold. If it does, the *OFIQuoteActivationMopsRequestMessage* is sent for the Market Maker in question.

### 1.1 Usage Notes

The content of the specification has been extended, modified and restructured, as compared to the previous iteration.

Newly added functionality is marked with **green START and END markers**.

Modified functionality or major rewrites are marked with **yellow START and END markers**.

If the functionality has not been changed, but the text has been reordered somewhat, or if trivial adaptations have been done, then this has not been marked in any way. **Text marked in blue** refers to subjects that are in any way open issues at this stage, but should be resolved for the final version of the document.

## 2 Infrastructure

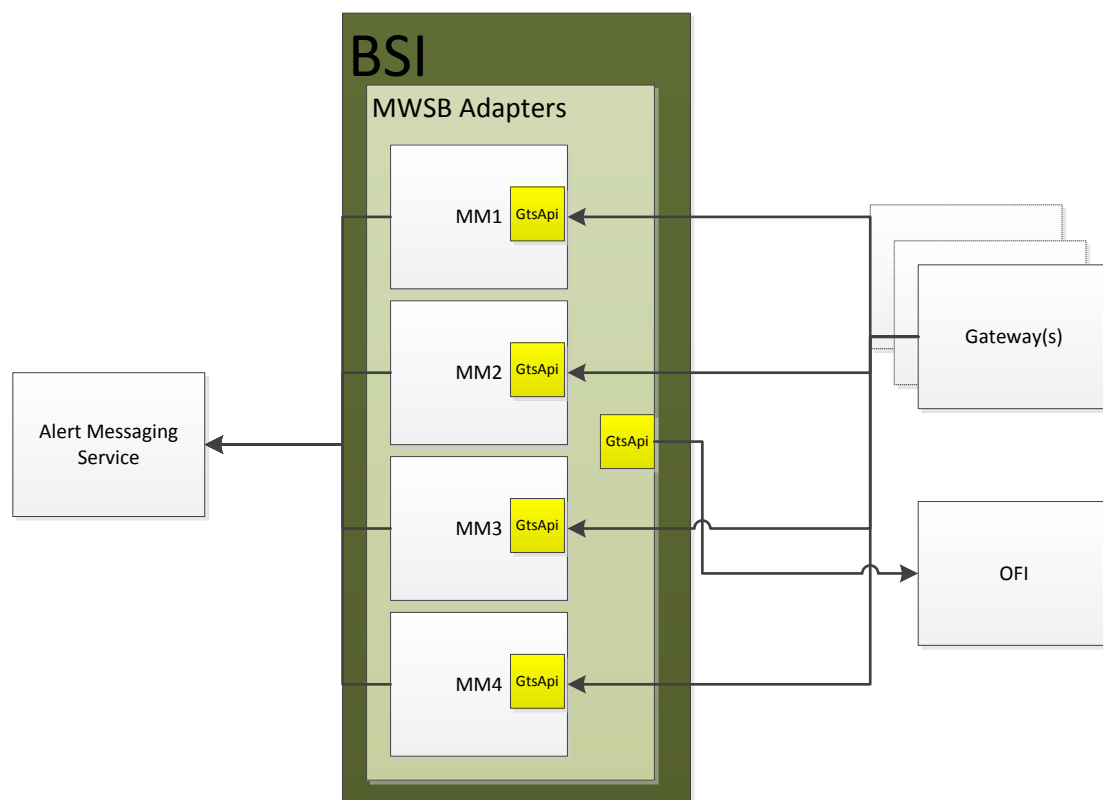
Market Wide Speed Bump (MWSB) runs as set of BSI Adapters, which inherit from the AdapterBase class.

Each instance of the Adapter represents one Group of Market Maker Business Units and logs on to a gateway with a user belonging to each Business Unit. Each session subscribes to the PrivateQuoteBroadcast on which curtailment information is delivered.

In addition, all MWSB adapters in a particular BSI share a single MOPS user, which logs on to an OFI and submits the OFIQuoteActivationMopsRequestMessage.

MWSB sends alerts via email and ISE's Alert Messaging Service. >>>NEW in v1.2

**START<<<**The email SMTP server address, internal recipients and external recipients are configured via the Config Client. See the operations guide, *PTO – MWSB Operations Guide*, for more information. >>>NEW in v1.2 END<<<



## 3 Interfaces

### 3.1 Core

The MWSB adapter interfaces with the Optimise Core system via the Direct Trading Interface (DTI). The MWSB uses the ISE Development Department's DTI wrapper library, the GtsApi.

#### 3.1.1 Subscriptions

Each instance of the MWSB adapter has its own session for broadcast subscription. Each registers a market wide subscription for the PrivateQuoteBroadcast for each of the available exchanges >>>Changed in 1.3 (available via Reference Data ViewDB table MarketView). >>>

The adapter ignores and discards any QuoteEvent that does not have a QuoteEventType of "Suspended" and a QuoteEventReason of "MARKET\_MAKER\_PROTECTION". QuoteEvents that have a QuoteEventType of "Suspended" and a QuoteEventReason of "MARKET\_MAKER\_PROTECTION" indicate a product/instrument-type wide curtailment has occurred. Only these events contribute to the MWSB's business logic processing.

#### 3.1.2 Transactions

All instances of the MWSB adapter in a BSI share a single MOPS session that is used to issue the OFIQuoteActivationMopsRequestMessage. The following fields are specified on the message:

- reqHdr.tranType = QUOTE\_ACTIVATION\_MOPS\_REQUEST
- >>>Deleted in 1.4reqHdr.PartitionId = ALL partitions from all markets >>> NOTE parameter still valid, but default value will be used.
- data.quoteActivationData.businessUnitID = <MWSB Business Unit>
- data.quoteActivationData.activationType = INACTIVATION
- >>>NEW in 1.0>>>data.quoteActivationData.locked = TRUE<<<

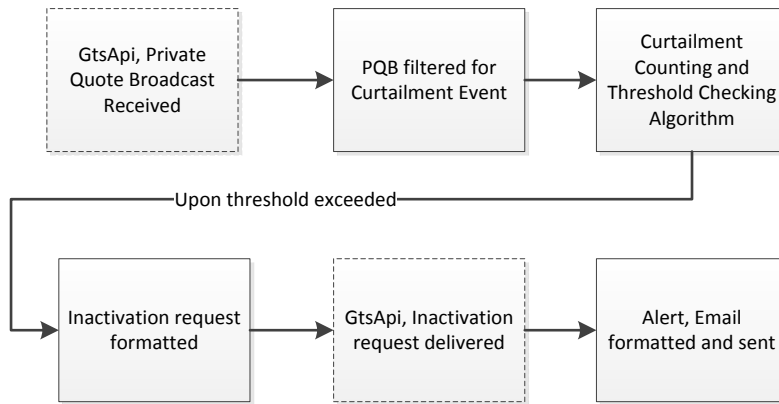
>>>Deleted in 1.4 The partition list is built from the Reference Data ViewDB table ProductView. >>>The session is logged in when the first adapter in the BSI instance starts. The session is logged out when the final adapter stops.

#### 3.1.3 Core Connection Loss

In the event a broadcast session connection to the core is lost, MWSB relies on GtsApi's reconnection mechanism to reconnect to the same or a backup gateway. Once reconnected, MWSB ignores any retransmitted broadcasts.

## 4 Flow Architecture

The MWSB operates entirely within threads provided to it by the GtsApi and BSI framework.





## 5 Functional Processing

**>>>NEW in v1.2** At startup, the adapter reads from Reference Data's View DB table MarketView to obtain a list of exchanges, and then subscribes for the Private Quote Broadcast.

**>>>**

Upon receiving a PQB, the MWSB inspects each QuoteEventGrp. Each QuoteEventGrp with a QuoteEventType of "Suspended" and a QuoteEventReason of "MARKET\_MAKER\_PROTECTION" causes the MWSB to queue an object (the Curtailment Record) representing the current time (taken by DateTime.Now), product ID, and the QuoteEventGrp's instrument type on a .NET Queue<T> (the Queue).

It then removes any Curtailment Records which have a timestamp older than the configurable time window (the Time Window).

Finally, it checks the size of the Queue. If it is greater than the configurable number of allowed curtailments (the Threshold), the MWSB enters the inactivation transaction, sends the Alert Messaging Service alert, and sends the alert email.

### 5.1 Business Unit Group

**>>>Changed in R1.0 v1.1 START <<<**Each adapter serves a group of business units. All curtailments from all business units in the group are funneled onto a single Queue per adapter. When the Threshold is exceeded, all business units in the group are inactivated. Note that inactivation is market agnostic. **>>>Changed in R1.0 v1.1 END <<<**

**>>>NEW in R1.0 v1.1**Intraday update of the BU group assigned to a BU is not supported. **<<<**

### 5.2 Business Unit Gateway Login

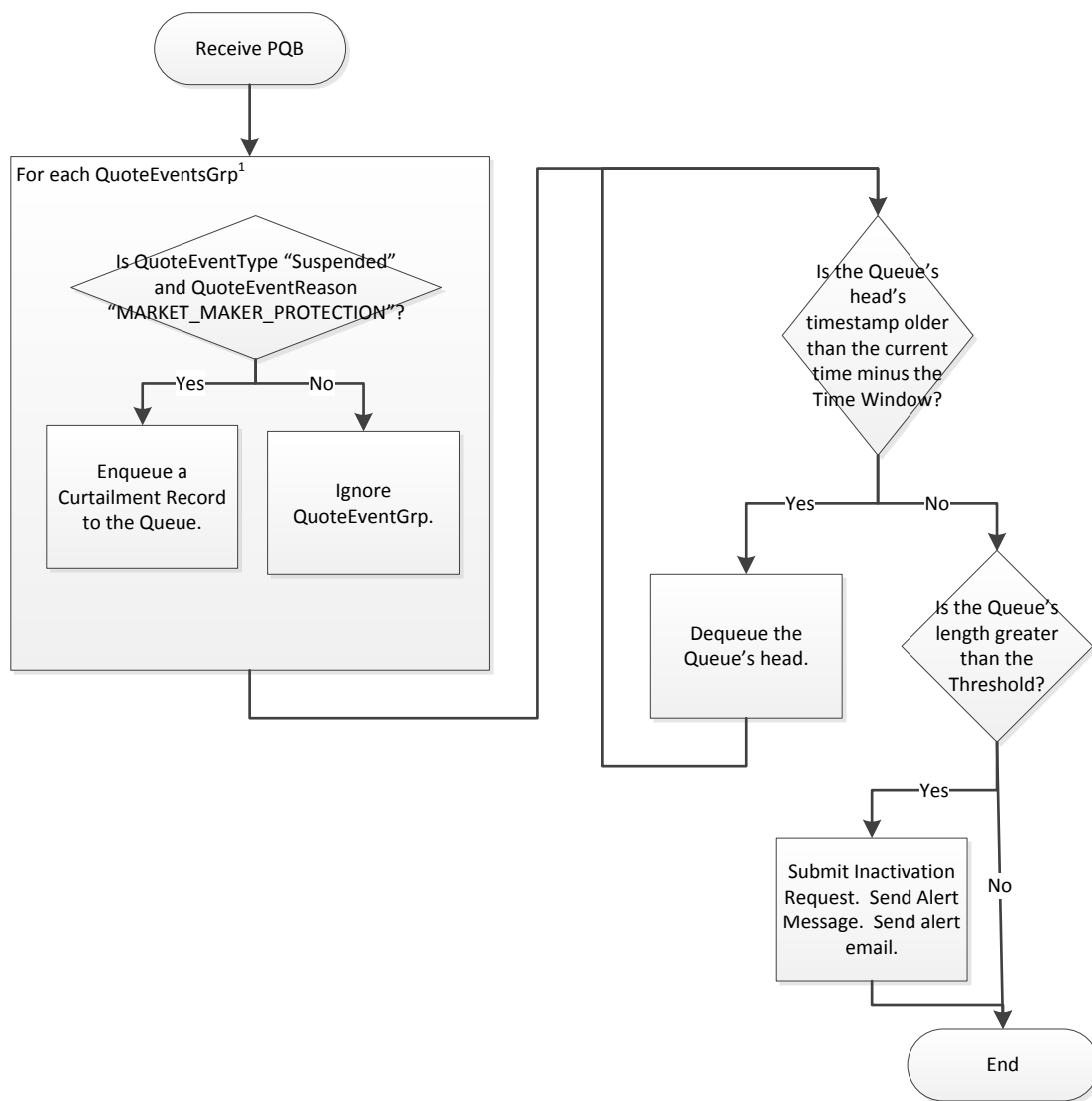
Each Business Unit must login to a gateway. The MWSB session's user name and password are derived from the business unit name in the following manner:

**>>>Changed in R1.0 v1.2**

Username <Business Unit Name>-MWSB\_<BSIInstanceID>

Password <BusinessUnitName><BUID>**<<<**

### 5.3 Flow Chart



#### NOTES:

[1] Multiple curtailments are possible in a single PQB. For example, if the BU curtails in both simple and complex instruments in a product in a single transaction.

>>>Changed in R1.0 v1.2 START<<<

## 5.4 Alert Generation

The MWSB will generate alerts for the events identified in the following table. Examples of alerts follow the table.

Event Type	Alert Type	Alert Recipients	Comment
Market wide product inactivation triggered	Alert	MOPs via MPT	Alert must report the following: GroupID Group Name Time of Inactivation Curtailment threshold Curtailment threshold time interval
	Email	Configured email recipients	See example below table. The subject line must say :Market Wide Speed Bump Threshold Exceeded, and the email must report the Instance ID, BU name, market name, time, and list of products and related timestamps.
Quote Activation Request failed at Matcher	Alert	MOPs via MPT	Sent when a BU group exceeds the threshold, but the Quote Activation request fails at the Matching Engine. The alert must report the BU name, GroupID, Instrument Type, List of failed products and that the failure occurred at the Matching Engine.
Quote Activation Request rejected at OFI	Alert	MOPs via MPT	Sent when a Quote Activation request fails at the OFI. A single alert will be sent per request failure. The alert is a system error alert.

The MWSB also sends an email to a configurable email address whenever a threshold is exceeded with the following format: >>>Changed in v1.5 START<<<

From: mops@ise.com [mailto:mops@ise.com]  
Sent: Monday, November 18, 2013 5:08 PM  
To: Zhou, Qiaoqi  
Subject: Mwsb.MwsbApp.ap22 - Market Wide Speed Bump Threshold Exceeded

Business Unit Group, id: 4 name: KNT01M, containing business units: KNT01M, KNT02M has exceeded its Market Wide Speed Bump threshold of 1 curtailments in 600 seconds. It has been inactivated market-wide. The following product curtailed during the time window: prodId: 2372 prodName: FF market: XISX curtailedAt: 14:22:38.210 >>>Changed in v1.5 END<<<

>>>Changed in v1.2 END <<<

## 6 Configuration

>>>NEW in 1.2 START>>>See the document *PTO – MWSB Operations Guide* for detailed configuration information. >>>NEW in 1.2 END>>>  
>>>Moved to PTO in 1.2 -- entire config section >>>

## 7 Operations Dashboard

The Operations Dashboard will support monitoring of the MWSB application as well as the gateway connection status of MWSB users.

App Support will have the ability to start or stop either instance of the application, and the application up/down status should be displayed on the dashboard.

### 7.1 Connection Status

Each service group should expand to display the adapters that it is currently hosting, and each adapter should show the following statistics:

- Total Number of BUs/Users that belong to that adapter
- Number of BUs/Users that are currently connected
- Number of BUs/Users that are currently not connected
  - If possible, the adapter should list the BUs/Users that are disconnected.

### 7.2 Color Coded Alerting

If ever there is an instance where not all users for an adapter are connected, the adapter should turn red; the service group should turn red as well, and the MWSB application should turn yellow. If both service groups ever turn red, the MWSB application should turn red. This will alert App Support to the issue for further investigation.

### 7.3 Gateway Disconnect Event

In the case of a gateway disconnect, a user will automatically attempt to reconnect a configurable number of times (per GTSAPI). If the user fails to reconnect, the MWSB application should send an event to the Ops Dashboard notifying App Support of the issue. The event should include the BU, adapter or BU group, and time of the disconnection.

## 8 Failover

The MWSB runs in a blind hot/hot configuration. This means that two instances of every logical adapter (i.e., Business Unit Group) run in parallel. Should a threshold be exceeded, both instances will send the inactivation request, which will simply race to the matchers.

In order to accomplish this configuration, the adapters can be split up into any number of BSIs.

Each adapter in the pair should run on different physical servers and be configured to attach to different gateways.

In addition, each adapter in a pair must be configured with different users.

Due to the fact that MWSB uses a local timestamp for Time Window calculation, its output is non-deterministic with respect to its gateway-originating input. Therefore, it is possible that one adapter will trigger, while its pair will not.