

# Comments on SEC Rule 613

File Number S7-11-10 Consolidated Audit Trail Release No. 34-62174

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Securities and Exchange Commission  
100 F Street NE  
Washington, D.C. 20549-1090

Via: Commission's Internet comment form: <http://www.sec.gov/rules/proposed.shtml>

Re: File Number S7-11-10 Consolidated Audit Trail Release No. 34-62174

Ladies and Gentlemen,

As professionals who have designed, built and implemented order processing and monitoring systems for a major exchange and who have participated in numerous "post-mortem" exercises, we submit the following comments.

The proposed SEC Rule 613 which focuses on the collection of customer and order detail transactional information is essential. However, we hope it will include additional metrics to support effective market reconstructions.

A full deterministic reconstruction requires capturing the prevailing market vital signs and operational conditions at any given time. Furthermore, capturing these metrics offers the possibility of real time monitoring and market surveillance.

Augmenting the transactional details with system and market *environmental* information provides a critical context for a comprehensive understanding of market events.

Metrics such as the following should be captured:

- system performance and load
- capacity and queuing
- network states and latencies
- inter market connectivity and timing ('self help') order rates
- order and market data latencies
- quote rates
- algorithm (algo) identities and their modi operandi (MOs)
- etc

For example, some proposed theories explaining the May 6<sup>th</sup> event a.k.a. "Flash Crash" suggest that wrongly time-stamped delayed quotes due to system queue overloads played a major role. However, this explanation is not based on, or fully correlated with, a captured timeline of queuing capacity information. The queuing information could have been easily collected in real time and would have immediately shed light on the event.

The capture of vital signs significantly expedites the identification of the root cause of unusual market events. The greater the number captured, the greater the set of metrics available for analysis and pattern recognition.

## Scenario

*Please note: The purpose of the following scenario is to illustrate the importance of collecting the suggested additional metrics and how they might be used. It does not represent the actual event that occurred on May 6th. All data shown is for illustration purposes only. The thresholds to determine severity (red, amber and green) where chosen for the purpose of illustration and could be calibrated as appropriate.*

The following visualizations show how, having captured the vital signs of ‘queue dwell time’ and ‘aggregated system utilization’, an event, such as a ‘quote variance’ across exchanges, can be analyzed for its root cause.

### Inter Exchange Quote Variance Scenario:

(1) Fig. 1 shows a ‘quote variance’ *event* at a given time interval.

(2) Fig. 2 shows the estimated ‘queue dwell time’ *metric* during that same time interval.

Note: there is a strong correlation: ‘queue dwell time’ *metric* to the ‘quote variance’ *event*.

(3) Fig. 3 shows the estimated ‘aggregated system utilization’ *metric*, again for the same time interval.

Note: there is a strong correlation: ‘aggregated system utilization’ *metric* to the ‘queue dwell time’ *metric*.

This scenario leads to the inference that high ‘aggregated system utilization’ (probably due to high order rate) was the cause of the high ‘queue dwell time’, which was in turn the cause of the ‘quote variance’ event. This leads to the deduction that overloaded system resources, showing high ‘aggregated system utilization’, was the root cause of the ‘quote variance’ event.

Figure 1 shows a ‘quote variance’ *event* for a hypothetical stock, with the symbol of XYZ, across two exchanges during the timeframe 14:41:00 to 14:48:59.

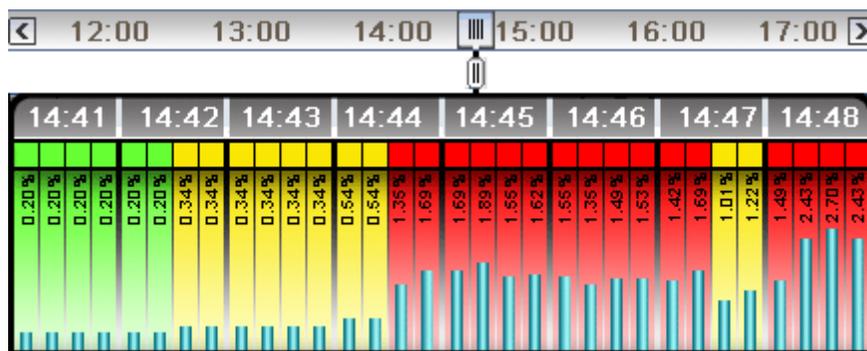


Fig. 1- Quote Variance Event for Stock XYZ (Exchange 1 vs. Exchange 2)

Figure 2 shows the estimated ‘queue dwell time’ *metric*. Note: there is a strong correlation between the ‘queue dwell time’ *metric* and the ‘quote variance’ *event*.

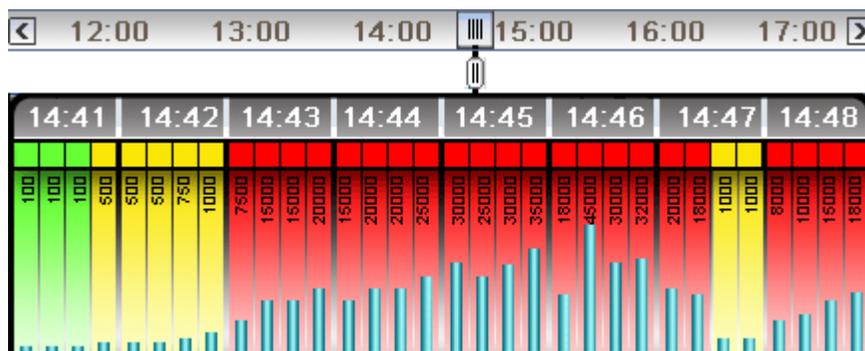


Fig. 2 – Queue Dwell Time Metric (Exchange 1)

Figure 3 shows the estimated ‘aggregated system utilization’ *metric*. Note: there is a strong correlation between the ‘aggregated system utilization’ *metric* and the ‘queue dwell time’ *metric*.

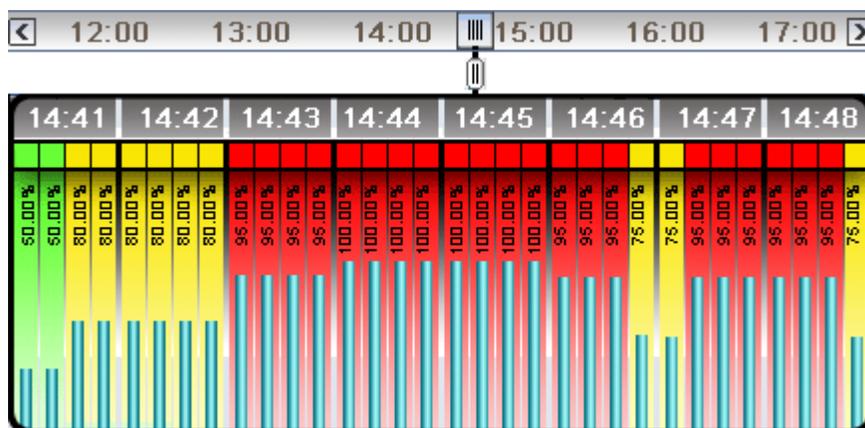


Fig.3 – Aggregated System Utilization (Exchange 1)

It is clear that delays or overloaded networks and systems can have adverse effects on the market, leading to phenomena such as: asymmetric information flow, market fragmentation, and dislocated liquidity. Therefore, real time latency information is essential for the reconstruction of the market state.

Given today’s high frequency trading environment, using algorithmic power and speed to decipher events can help demystify the ‘algorithmic aura’, substantially reducing the need for after-the-fact reverse engineering and forensics.

A substantial portion of the metrics and data feeds needed is available today.

The vital signs should be properly stamped and disseminated via a ‘vital signs’ data channel/market feed and as ‘state-full events’ (e.g. when a queue or system goes into an overload state, and when that condition returns to normal). Those events should be communicated in standard format, ideally in real time, using one of the standard market extensible languages (FIXML, XBRL, etc.).

## Centralized Monitor

With this information, a centralized monitor, “God’s Eye”<sup>1</sup>, could be constructed and made available for all authorized market participants on an appropriate level, where the timelines of all the major market participants and activities could be correlated, processed and queried, providing a market operation decision support system for both real time monitoring and post trade analysis.

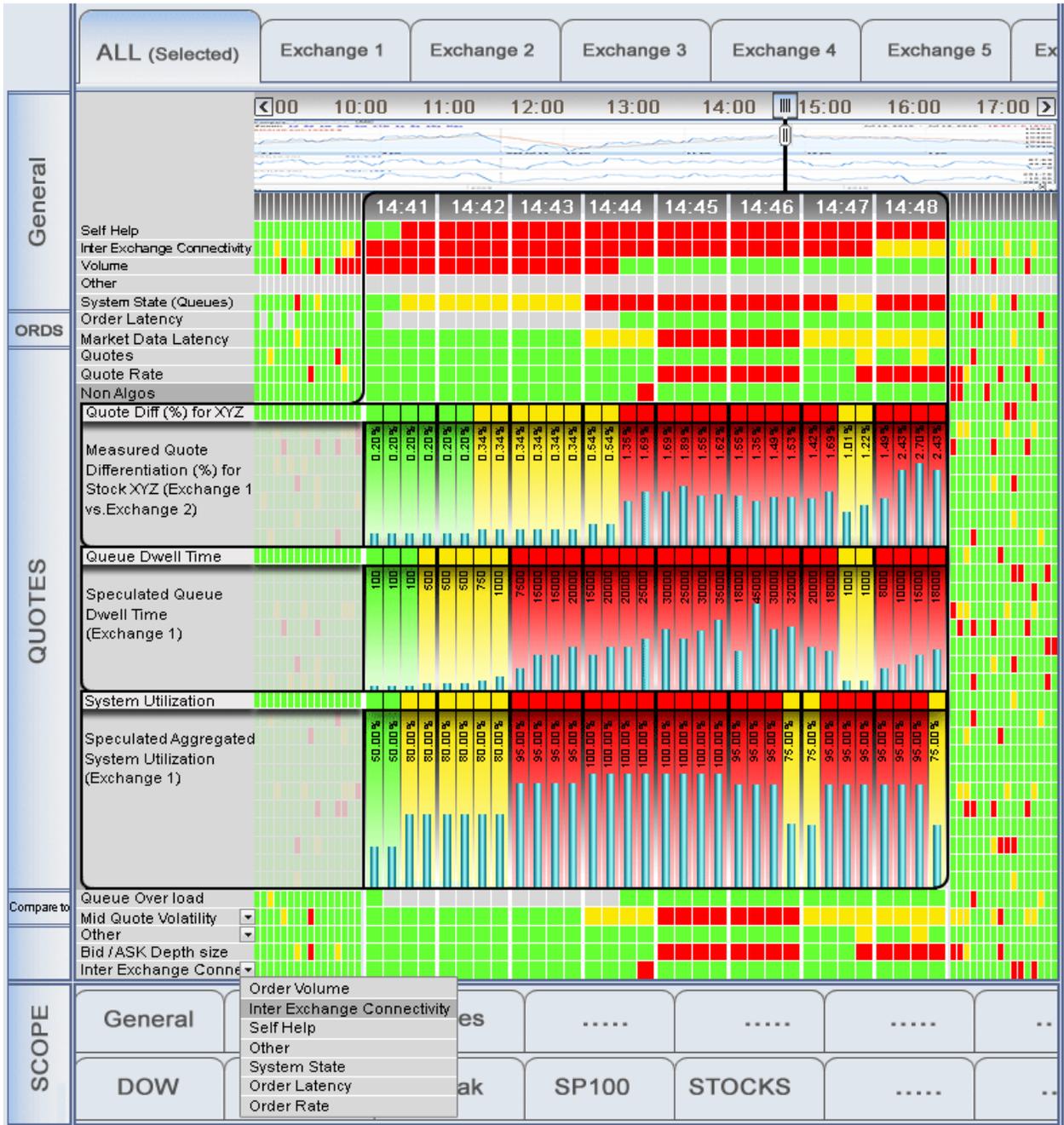


Fig. 4 – A Possible Centralized Monitor

<sup>1</sup> Technology Advisory Committee, *Technological Trading in the Markets*, July 14, 2010, U.S. Commodity Futures Trading Commission, Tab 4 +15pages – “The CFTC should take on the role of God’s Eye ..”

The information for this centralized monitor should be collected 'out of band' to avoid 'tunnel vision', i.e. each participant should constantly report its own state and its perceived state vis-à-vis the other participants. That way a full, deterministic, comprehensive, real time market status can be assured.

This monitor could be used as an early warning for a variety of market functions, such as:

- circuit breaking
- price movement
- self help conditions
- system capacity
- market fragmentation and dislocated liquidity
- other exceptional market conditions

Such a monitoring system could be a launching pad/gateway to additional monitoring and research tools. We are currently in the process of developing tools for detailed transactional analysis for the extension of a centralized monitor to include visualizations and tools for detailed customer and order analysis to facilitate reconstructions and real time market surveillance which we are happy to share with any interested party.

## **Summary**

We strongly suggest that the proposed Rule 613 be expanded to include the capturing of market vital sign metrics and operational status to facilitate reconstructions and to offer the possibility of real time monitoring and surveillance of the market's state and condition.

We thank the Commission for the opportunity to comment on this proposal and are pleased to offer our services to the SEC, or any other interested party.

Respectfully Yours,

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