CFTC Technical Advisory Committee
Sub-Committee on Automated and High Frequency Trading – Working Group 1

Participants

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What is the definition of high frequency trading within the context of automated trading systems (ATS)?

- The term "HFT" has many connotations. We have approached the above question by focusing on how HFT provides a mechanism for various types of interaction with a marketplace.
- The definition is intentionally neutral with regards to trading strategies and avoids mentioning the following:
  - Holding times
  - Cancellation ratios
  - Good or bad behavior, e.g. liquidity provision or market abuse.

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What is the definition of high frequency trading within the context of automated trading systems (ATS)?

Draft Definition, May 2012:

High frequency trading is a form of automated trading that employs:

(a) algorithms for decision making, order initiation, generation, routing, or execution, for each individual transaction without human direction;

(b) low-latency technology that is designed to minimize response times, including proximity and co-location services;

(c) high speed connections to markets for order entry; and

(d) high message rates (orders, quotes or cancellations).

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The draft definition is intended to:

- Utilize carefully chosen language that has a recognized **legal** interpretation.
- Emphasize a **mechanical** description of high frequency trading that is deliberately neutral regarding types of trading strategies and how they interact with the marketplace;
- Utilize **cumulative** criteria, so that only a trading system that meets all 4 criteria can be defined as “high frequency”;
- Provide a **broad** basis for other working groups to build upon, notably Working Group 2 (Multiple Categories of HFT) and Working Group 3 (Oversight, Surveillance and Economic Analysis);

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(a) algorithms for decision making, order initiation, generation, routing, or execution, for each individual transaction without human direction;

- Orders sent to an electronic marketplace[1] **must** be generated by computer-based decision making – "the algorithm" - as opposed to being sent by a human (e.g. "point-and-click").
- This broad definition can include any automated trading system including broker- or vendor-supplied execution algorithms.
- A **transaction** is defined as a bid, ask, order or trade. This is intended to cover providing liquidity to the market as well as taking liquidity from the market.

[1] An electronic marketplace can be an exchange, alternative trading system, swap execution facility or other source of electronic liquidity.

(b) low-latency technology that is designed to minimize response times, including proximity and co-location services;

- The algorithm **must** utilize low latency technology to minimize its time to access the marketplace.
- This covers a broad range of solutions specifically deployed for reducing latency, including the hardware and software utilized to run the algorithm.
- To minimize network latency the algorithm should be as close as possible to the marketplace, and will utilize proximity and co-location solutions[2] depending on what is available for the market place or appropriate for the trading strategy employed.

[2] Proximity and co-location services include those provided by an exchange, broker or vendor to reduce the latency of accessing an electronic marketplace.

(c) high speed connections to markets for order entry;

- The algorithm **must** utilize a high speed connection to the marketplace.
- This covers direct access to a market, whether through membership or sponsorship, or a broker or vendor supplied software designed to facilitate trading speed.
- If the algorithm utilizes latent broker DMA connections to the marketplace then it does not meet this criteria.
- Note that the definition intentionally focuses on the speed of order entry as opposed to the speed that an algorithm may require for market data, including bids, asks, trades and news feeds.

(d) high message rates (orders, quotes or cancellations).

- Many algorithms[3] meet the criteria defined in (a), (b) and (c), but to be considered high frequency, the algorithm **must** employ high rates of messages submitted to the market.
- The question of what constitutes a "high message rate" requires wider discussion since it incorporates factors such as:
  - the beneficial owner behind the activity;
  - the length of the observation period;
  - comparison with the overall market activity during that period;
  - relative concentration or fragmentation of activity.

[3] It would be challenging to tag individual trading strategies sent to the marketplace, though it **is** straightforward to identify **types** of connections – e.g. denoting a connection that is used for broker execution algorithms or DMA, vendor-specific systems, or a single participant's proprietary trading system. Where multiple participants share the same broker connection, each individual firm should be clearly identified to facilitate market surveillance.

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Summary

- It is important to recognize that high frequency trading is a means rather than an end in itself, and that there are many types of market activity that can be potentially labeled as “HFT”;
- The definition is intended to be used in context with the findings of Working Groups 2 and 3, particularly with regards to identifying specific types of strategies that require HFT, as well as identifying abusive practices that should be prohibited.
- A broader definition of HFT allows for inclusion of future practice as well as current practice.
- A narrower definition of HFT may lead to a regulatory arbitrage.

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Sample Reference Papers:

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- **The Flash Crash: The Impact of High Frequency Trading on an Electronic Market.** Kirilenko, Kyle, Samadi and Tuzun, May, 2011.
- **The Microstructure of the 'Flash Crash'.** Easley, Lopez de Prado, O'Hara, October 2010.
- **Regulatory Issues Raised by the Impact of Technological Changes on Market Integrity and Efficiency.** IOSCO, October 2011.
- **The Synchronized and Long-lasting Structural Change on Commodity Markets: Evidence from High Frequency Data**. Bicchetti and Maystre, UNCTAD, March 2012.
- **Rise of The Machines: Algorithmic trading in the Foreign Exchange Market.** Charbourd, Chiquoine, Hjalmarsson and Vega, October 2009.
- **Identifying Informed and Liquidity traders in Futures Markets.** Fishe and Smith, September 2010.
- **The Impact of High Frequency Trading on Stock Market Liquidity Measures.** Kim and Murphy, July 2011.
- **Low Latency Trading.** Hasbrouck and Saar, October 2010.
- **The Activity of High Frequency Traders.** Brogaard, December 2011.
- **High Frequency Trading and the New Market Makers**. Menkveld, August 2011.
- **A Dysfunctional Role of High Frequency Trading in Electronic Markets.** Jarrow and Protter, March 2011.
- **Direct Market Access in Exchange Traded Derivatives: Effects of Algorithmic Trading on Liquidity in Futures Markets.** Karagozoglu, March 2012.
- **The Volume Clock: Insights into the High Frequency Paradigm.** Easley, Lopez de Prado, O'Hara, March 2012.
- **High Frequency Trading and Price Discovery**. Hendershott and Riordan, February 2011.