PROBLEM STATEMENT

MScFE Capstone Project: High Frequency Trading – Proximity Hosting/Co-Location to Matching Engines

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Project Track

This paper will be a research track studying and analysing the benefits of co-location/Proximity hosting to Matching Engines on HFT.

Problem statement

High-frequency trading (HFT) has in the recent times gained popularity due tremendous increases in trading volumes of HFT strategies. It has also gained much popularity when exchanges started to offer incentives for companies to add liquidity to the market.

To bring this into perspective and borrowing from James Chen, 2019 on an article he wrote about HFT, it is a method of trading that uses powerful computer programs to transact a large number of orders in fractions of a seconds. It uses complex algorithms to analyze multiple markets and execute orders based on market conditions. Essentially, the traders with the fastest execution speeds are more profitable than traders with slower execution speeds. Apart from high speed of orders, high-frequency trading is also characterized by high turnover rates and order-to-trade.

Speed and time are essential ingredients in this trading business. Traders look for ways of reducing the latency. Latency is the time it takes to make and execute trading decisions on HFT.

Low-latency and system turnaround time requirements for HFT systems generally influence trading firms' decisions about their choice of networks and physical hardware location of their servers.

Therefore because of this problem in this trading business, exchanges are building huge data centres where traders can place computers containing their trading algorithms next to an exchange's matching engine, which matches "buy" and "sell" orders. This "co-location" /"proximity hosting" shaves crucial milliseconds from the time it takes to complete a trade. This enables high-frequency traders to more rapidly adjust their quotes as market conditions change and thereby increasing their chances of being profitable.

If traders are located 200 miles away from an exchange, they face a delay of one millisecond whenever they seek to trade a price via their computer screen. Few serious investors can afford to be that late to prices that flash so quickly in this HFT business.

Traders are currently relying on proximity hosting/co-location to cut latency and save milliseconds per trade, giving them a distinct competitive edge.

Goals and Objectives

The goal of this project is to:

- Develop a model of Market microstructure and order matching process that clearly identifies the benefits of co-location based on the degree of proximity.

The objectives of this project is to;

1. Study, analyse and compare the benefits of co-location

2. Develop a model of Market microstructure and order matching process that clearly identifies the benefits of co-location based on the degree of proximity

3. Develop a sample order matching system which can simulate the benefits of co-location using a sample HFT strategy

4. Study the relative expense of co-locating HFT servers for different global markets