## HFT Trading Application – v0.1 (Stocks)

## Application Overview:

This application will obtain option data for stated symbols. Then using various predictive methods and the constants associated with them it will:

1. Collect data until the constants effecting the algorithm reach a suitable standard deviation (SD).
2. This means the constants used in these algorithms will be iteratively calculated using realtime data over the period of up to a week until the set standard deviation is met.
3. Once this SD is reached the algorithm will use the constants as iteratively determined and commence simulated trades.
4. If the simulated trades maintain a sustainable profit for a specified amount of time the algorithm will begin live trading.
5. If a stop-loss value is hit the algorithm will cease trading for that particular symbol.

## Technical Overview:

* WPF
* Windows Azure (eventually)
* Domain Driven Design
* ORM – Dapper – Micro-ORM – High performance
* Dynamo IOC
* Big Data approach, store as much data locally as possible.

## Initial Steps:

1. WPF Form containing autocomplete search for companies.
2. On select of company the company is persisted in list (checkbox).
3. A graph is populated with realtime data for each the companies.
4. This data can be manipulated all the properties of the data can muted.
5. Another page for the analysis of data where per symbol calculated graphs are produced. (use quantlib to generate this)
6. Database contains symbol and order details.

## Predictive Algorithms:

### I:

* Using a chunk of realtime data by time interval for instance. It quantifies the change between each tick in the data.
* It then looks at historical data and checks to see if there are any matches to the pattern of data and from this data is gives an indicator to whether the change is likely to be positive or negative and for how many ticks this is likely (this is used to purchase stock and then sell).

### II: (used with I to confirm market direction)

* Searches various news feeds via API’s and obtains data about a company/symbol.
* The data is discretized for hourly, daily and weekly intervals.
* Using the news/data about the company, various statistical methods are applied to see whether the news is generally positive or negative.

## Development:

### Sprint I:

* Realtime model of data for a symbol.
* Input -> Symbol
* Output -> Dynamic model that contains all market information for that particular symbol.

### Sprint 2:

* Database to store collected realtime data for up to one week for each symbol.

### Sprint 3:

* WPF UI for data visualisation.
* Main page:
  + Autocomplete for companies
  + Listview for companies being viewed, with checkbox to toggle displayed data which is realtime.
  + Toggles for displaying various pieces of market information, default is just realtime stock price (could be volume etc).
  + Toggles to show analysis or particular information (i.e. extrapolated curve that is being generated by predictive algoithms).

### Sprint 4:

* Design predictive algorithms.
  + Store constants in db under algorithm name.
  + Implement algorithm to take in realtime market data and return indicator could be % likely to increase/decrease.