Latency Innovation

May 26, 2016

File No. 10-222: IEX Is Un-American, Its Application Must Be Killed Immediately

Dear nice people at the SEC,

IEX is definitely un-American, if it becomes an exchange, IEX will not only change the US trading landscape, but it will also, irreversibly, like a virus, spread world wide. Its application to become an exchange must not succeed. This danger to America and the wider world is real. Not just imaginary.

If IEX's application is granted, if IEX is allowed to prevent high frequency trading quotes and orders from being altered in less than 350 microseconds, it will be an economic disaster.

The high frequency trading industry will have to abandon its core trading strategies; including the all important price/time arbitration trades which play crucial roles in price discovery and price accuracy. In turn, reducing a vital American industry's abilities to latency arbitrage markets honestly and fairly, will cause volumes to drop significantly.

Approving IEX's application will negatively affect the profits of every single HFT fund and every single American exchange. Even worse, imagine if IEX infects the rest of the world; the HFT industry would be forced to abandon its most lucrative trading strategies not just in America, but world wide. This must not and will not be allowed.

The HFT industry is critical for the stability and profitability of financial markets; especially in turbulent, flash periods. HFT also plays a vital liquidity provider role; it helps ordinary investors connect with companies that use public markets to raise funds.

HFT is what makes America, America. All the HFT hedge funds and all the other exchanges (NYSE, NASDAQ, BATS) that welcome this business, by creating bespoke HFT products, are American. IEX is not.

IEX is Un-American

In America "greed is great" and markets should be "played like a piano". IEX's attempt to introduce a small, micro, delay is un-American. Haven't they heard of the HFT "arms race" and the important "race to zero"? IEX's notion of investor equality sounds European, possibly French. In truth, however, I suspect, it is much, much, worse. I suspect IEX could actually be North Korean! Or possibly even another "K", Kenyan! I wish I could get a glimpse at Jeff Sprecher's evidence. I wish he wasn't being so diplomatic, but I can understand why; as the CEO of not just America's, but the world's largest exchange, it's important that his statements are of the highest standards.

Fortunately I can leave investigating IEX's real birth place, to smarter people than me. I have reached out to Donald Drumpf's people. He is the smartest and greatest. No, I mean he is the greatest and smartest and also the bestest of the best, and he knows all the best ones. Not to mention the great and smart ones. He proved the current US president, is a Kenyan muslim, he can help prove IEX's birthplace and possibly also its religion. Although we may have to pay Drumpf extra; his top notch, investigative skills aren't cheap. Also small 'child sized', gold-plated coins are expensive.

The only good news is, even if IEX wins, none of this will affect HFT trading strategies at the other real American exchanges. IEX might be able to help real investors on one exchange, but it can't do anything about those trades on other exchanges.

Still, a precedent cannot and must not be allowed. Kill IEX's application. Please listen to the wise counsel of Citadel. Firms like Citadel and every American exchange, not IEX, are the real champions of investor rights. Again, not IEX. Citadel is correct in identifying IEX's 350 microseconds as a pothole and it's absolutely proper for Citadel not to point out the varying internal latencies of the other real American exchanges.

If you find yourself agreeing with this, well, you may be in for a shock. Now's probably a good time to go get some full fat NYSE yoghurt.

IEX is American as Apple Pie! It's the Underdog in Every American Movie

I'm not sure why Captain UnAmerica at the NYSE believes IEX nationality is important and I apologize for my mischievous open, but since IEX's application has brought out much nonsense, hypocrisy and plain old lies, it's just hard not to partake;-) I've also been watching too much John Oliver.

You'll Get Better Odds in Vegas

Trading markets are neither fair nor healthy; if there are those that can "play markets like a piano", what about the ordinary investors who cannot afford fancy, expensive, high speed automated musical instruments.

Unlike Vegas, where the gambling regulator reviews all gaming software to ensure fairness and the casinos black list rogue gamblers, HFT algo gaming software is not reviewed by the trading regulator for fairness and exchanges actually profit from rogue trading activity.

A simple pre-review of HFT trading algorithms would actually eliminate a significant amount of manipulation and reduce wild market swings. If it isn't obvious, a proper review and test of algorithms would also significantly reduce the risk of flash crashes.

Given the knock on impact of these crashes to the US economy, US national security should actually trump hedge fund secrecy.

Disappointment and Confusion
The unnecessary delays to IEX's application are disappointing and confusing. I would prefer not to comment on IEX's application, largely, because I believe IEX's application should have been approved already on its merits alone. I'm also worried my story is a bit noisy and a 'distraction' from its application. Unfortunately this 'distraction' is why IEX is needed and must be disclosed.

The real truth about IEX's application and why it is much needed, has been drowned out in half truths, lies and even incredulously, bad Seinfeld jokes (only the NYSE could make Seinfeld unfunny).

The Truth Is Out There
US electronic trading markets are being manipulated at will and the retirement funds of millions of actual Americans, are being high frequency scalped, every second of the trading day. All under the watch of the most powerful financial regulator in the world with, arguably, the world's most useless market data tool.

Some Introductions
In early 2013 I became a customer of the NYSE and purchased Open Book Ultra data; I was writing a book on how to calculate the cost of latency and required microsecond time stamped data. After I analyzed NYSE's technical systems documents and market data "yada yada yada", the SEC made me an official whistle blower against the NYSE.

Sorry. Did I "yada" over the best bit? Before I go over that bit, it is important to note that before going to the SEC, I first went to the NYSE and told them about their market data problems. The NYSE's response was laughter. What is it with NYSE and comedy?

Yada Yada Yada: NYSE 50 Shades of Brown
I would describe my affair with NYSE as painful and torturous. A relationship that at times caused me to question my sanity. It's fair to say it wasn't a healthy relationship for either of us. Although, if I'm totally honest, towards the end I did enjoy paddling the NYSE with the big board.

To list all of the NYSE's faults would take a long time, so I'll just cover 3 important ones (at the end of this letter I have attached some of my previous SEC research which has more details).

NYSE Problem 1: Equities Matching Engine Time Stamp Error
A software programming error resulted in incorrect time stamps in NYSE's matching engine. Resulting order book is sequenced incorrectly and the market cannot be recreated. NYSE confirmed this problem to me, in writing, but doesn't feel it is important to inform the market.

NYSE Problem 2: Market Data Book Building Design Flaw
This problem should have been apparent to anybody who has ever had to read NYSE's technical design documents; no market data was really required. NYSE's design flaw in creating its order book, means the book is sequenced incorrectly and the market cannot be recreated (even with the correct time stamps). NYSE's poor software design (not a programming bug) makes it impossible to determine the correct order of market events.

This design might have worked in the 1980's, but even then they were pushing their luck. To make matters worse NYSE's suggested work arounds to its design flaw, simply further demonstrated its lack of expertise; the flaw was so fundamental it could never be worked around. Suggesting incorrect work around solutions exposed that they truly did not understand how to design a book feed correctly! Again NYSE confirmed this problem to me, in writing, but doesn't feel it is important to inform the market.

NYSE Problem 3: Very Poor Time Synchronization and Very High Internal Latency
NYSE's internal servers were out of synch by as much as -3 milliseconds which mean't receiving systems has time stamps that were earlier than the sending systems. In the race to zero, NYSE's time traveling messaging technology went beyond zero,

On the other hand, NYSE's 'accordion' internal latency, for it's real time, low latency feed, was also as high as 4 seconds. That's quite a bit more than zero. Again, this can mean it is impossible to determine the correct order of market events. Amazingly, NYSE was comfortable with its operating performance. 4 whole seconds!

Too Many Problems For a High Standards SRO
Problems 1 & 2 are bad enough; providing market data competently is a basic function of any exchange. Problem 3 however, allows the whole market to be manipulated with ease and even anonymity. When you consider that NYSE data is used worldwide, the harm its low standards cause, impacts almost every electronic trading market on Earth. This is just one of the reasons why I have just forwarded some of my NYSE SEC research, to UK and European regulators, who may wish to evaluate any potential ICE/NYSE bid for the London Stock Exchange.

Talking Sideways Shamefully
Given all of NYSE's internal problems, it's quite difficult to take its desire to help investors seriously. Indeed, with all of the NYSE's many, many problems, bereft of shame, the NYSE's CEO and senior staff, cry crocodile tears when commenting on the damage IEX's fixed latency will cause. NYSE's lack of honesty and public disclosure is quite simply shameful.

Years Later, Still Unknown Unknown$
The total financial losses incurred by market participants, from using corrupted NYSE market data, are still unknown.

In addition, all these years later, it is still unknown whether US trading markets have problems with monotonic time. A big part of the problem is that most people in the trading industry don't know about the significance of monotonic time. Most people will first have to look up what monotonic time means; which is quite crazy given the significance of exchange time synchronization and its importance in precisely identifying when an event actually occurred on an exchange!

Noisy NYSE's Nonsense

All of NYSE's, easily preventable, problems should automatically disqualify the NYSE from being able to comment on another firm's application to become an exchange. Since it can't even run its own exchange, 'NOISY' should focus on getting its glass house in order before throwing boomerang-shaped rocks at brick houses.

The NYSE is an expert on low latency and exchange standards, like Donald Drumpf is an expert on business. They are also both quite delusional, but worryingly, the influence they are able to exert is frightening.

High Speed Hypocrisy and More Crocodile Tears

All the 'clever' HFT funds monitor and measure exchange latencies meticulously and continuously; they are the first to know when a quote is stale. They also know all exchanges have varying internal latencies (some like the NYSE very high). No exchange has zero latency! Why is the latency of existing exchanges invisible? Why don't any of the HFT fund or exchanges, that care about protecting investors, talk about this invisible latency when they speak of the perils of IEX's small fixed latency?

The SEC should also be familiar with the concept of internal exchange latency. Which makes its open question to the market most puzzling, "Would delays of less than a millisecond in quotation response times impair a market participant's ability to access a quote or impair efficient compliance with Rule 611?". A fixed delay of 350 microseconds is inconsequential and actually quite valuable.

The Race to Zero is Not a Technical Marvel of Humanity

IEX's small fixed latency is falsely proclaimed as an impediment to technical progress; that US markets will be left in the technical dark ages. This reasoning is wrong. In an age of ever increasing technical sophistication and higher costs, a small fixed latency protects investors and acts as an equalizer. If it's not obvious, night and day (or 'light speed') disparities in trading speeds, between market participants, cannot by definition be described as "fair and equal access".

See No Evil, Hear No Evil Regulation

NYSE's market data exposes critical weaknesses in the SEC's ability to accurately conduct market surveillance using MIDAS. The data I provided the SEC clearly demonstrates that that because of all the underlying time stamp inaccuracy and cross exchange synchronization problems, the market can NEVER accurately be recreated and audited. It also proved NYSE's systems were very easy to manipulate, which in turn made the wider market easier to manipulate.

Beware the Curse of Gold-Plated Greek Gods
The $2 million the SEC spent on MIDAS, to 'oversee' the market, was useless and better spent on a Rube Goldberg machine made from actual real gold. At least that could be resold to a hedge fund looking to decorate their offices; no hedge fund would spend $2 million on MIDAS. If I were the SEC I would ask for my money back; MIDAS is not fit for the purpose it was sold. Please, please, get a refund and spend that money appropriately. Please help supplement the American exchanges that are so poor they cannot buy time synchronization technology (or don't have the money to learn how to use it properly). Until they do, MIDAS will never work…actually even if they do there are still problems!

Shoe String Budget Exchanges
Time synchronization problems are a result of exchanges not spending a few hundred thousand dollars on precision timing systems (including buying the right technology, learning how to use it, setting it up correctly and operating it properly). As a result it is simply impossible to precisely determine when an event precisely occurred in any electronic market (equities, commodities, derivatives, currency etc). Exchanges with weak time synchronization corrupt the wider market which makes forensic auditing impossible. It's just best guessing really.

Rats to CATS
The exchanges and market's poor time synchronization problems mean that the SEC's very late CATS, will never work in its current design.

All of these problems put together, further demonstrate that markets are indeed broken and wide open to manipulation.

B. Pure Merits of IEX's Application

If the SEC wishes to learn about de minimis delays and market manipulation that's fantastic, but that should not be attached to IEX's application.

"The Fastest Possible Response"

IEX does provide the fastest possible response; for both it's users and the market. Based on an interpretation of IEX's intent to protect honest traders, it provides the fastest possible response; faster would not protect investors and significantly slower would cause harm.

"Without A Programmed Delay"

IEX doesn't use a programmed delay, its delay is consistent and only 350 microseconds, which is nothing when compared to NYSE's internal delays. IEX has also demonstrated high operating standards (unlike NYSE) and real market investors endorse it. So why the delay and additional hurdles? When BATS said it wished to be the fastest exchange, there was no requirement to comment on how its speed would impact the market or whether markets are being manipulated. So why the change in IEX's requirement? Who is 'pressing' for this?

350 Fixed Microseconds Versus Unknown

A small fixed delay like IEX's provides many advantages to real investors. In addition to providing protection to real investors from high frequency scalpers, the consistent delay provides a higher degree of certainty that the price is actually real. This is diametrically opposite to 'ghost prices'/'flickering quotes' facilitated by current exchanges and used to manipulate markets and scalp trades by HFT.

350 Fixed Microseconds is Nothing!

When latencies between existing exchanges, varied high internal latencies within an exchange and inaccurate time stamps (like NYSE's) are factored for, IEX's 350 microseconds does zero damage to anyone conducting LEGITIMATE trades. It only harms high frequency scalpers and the exchanges that bend over backwards for that order flow.

Not All Latency is Bad

Latency can benefit or harm, depending on the amount and the manner deployed. IEX's nominal, fixed, latency benefits honest trading activity, it only harms the profits of HFT firms conducting high speed fraud and the exchanges that do more than turn a blind eye.

Market Medicine

It should be obvious that IEX is much needed investor medicine for a very unhealthy market.

There are those, like the NYSE and NASDAQ, that would like to poison the market further with their speed bump or pegging 'innovations', with duplicate names no less. The timing of these noble acts of 'investor protection' are quite miraculous. They are absurd, naked attempts to confuse investors; these products do not add market value, quite the opposite, they will hurt the market. The SEC should not permit this, but it probably will.

Until the SEC actually takes actions to protect honest investors, IEX offers its users some protection from wider spread market manipulation. IEX's price certainty, using its fixed time certainty, should not be undervalued.

Scratched Record…Scratched Record…Scratched Record

But, I am going to repeat myself; the markets problems are nothing to with IEX's application. If other firms are granted exchange licenses on business models and order types that simply cater to speed and can actually harm markets, why is IEX's application delayed?

C. Should the Commission be concerned about market manipulation? If so, specifically, what should the Commission focus on?

Err…yes please do concern yourself with market manipulation, but…er, weren't you already keeping an eye on market manipulation? Before we get into manipulating, what about scalping?

Investors vs Speculators vs Scalpers

Why is there no difference in the way they are treated? Why does the SEC not have clear definitions? High frequency speculating is bad enough, but isn't it obvious that 'investors' who hold instruments for fractional seconds, offer zero value to America.

Why is Scalping Permitted?

Even if it is 'tarted' up in mathematics and technology, isn't it obvious that high frequency scalping is not healthy for the market!

IEX's 350 microseconds does zero damage to investors or even speculators, but it does hurt the high frequency scalpers, that's why they are crying the loudest at IEX's application. It's just crocodile tears.

Follow The Money

Follow the millions of 401k money, from millions of real investors, to HFT hedge funds and the HFT enabling exchanges (who also take their 'penny of flesh').

Look at how many times an instrument is 'invested' in for seconds or less and then resold, and resold and resold; after all the fast HFTs have had a tiny, tiny, microsecond, nibble, it then 'efficiently' and 'successfully' makes into the pension fund of a real investor.

Has the SEC ever analyzed how long, i.e. how many seconds, US financial instruments are 'invested' in by HFT? Might I suggest, this is an area you 'explore'?

Again, why is scalping permitted? What value does it provide to real investors.

High Frequency Myths- Liquidity Providers

The market is often informed that HFT funds are important providers of liquidity. This is a little true, but mainly false. If any HFT trades involve holding long positions for more than one trading day, then yes, these trades provide liquidity, these firms hold assets or inventory. However, since most HFT trades only involve temporary (microseconds, milliseconds, seconds, minutes) positions, these firms do not posses any assets; they merely 'hot potato' them.

More High Frequency Myths- Tighter Spreads

What numbers are being used to calculate these tighter spreads? Hmnnn I'm guessing they use ghost/flickering quotes, the ones with the all the fantastically unbelievable great prices. No wonder we have these fantastic about tighter spreads!

No Crystal Ball or Psychic Required

If you wish to learn about market manipulation, may I recommend "Flash Boys"; Michael Lewis, does an excellent job in presenting some core market problems and clear investor dangers.

However, I believe there are people in the SEC that know about market manipulation and have done for a number of years.

Some really smart people at the SEC have put together some great research analyzing quote cancellations and HFT order flow. Your own findings provide all the evidence needed for market manipulation.

Why aren't these people at the SEC allowed to draw a straight line through these 'dots' and take action?

Manipulation Help Required

It would seem if the SEC is making open requests for manipulation information, the situation is quite critical.

It would seem that the SEC's forensic audit of exchanges quote systems, as well as the trading systems of HFT funds, has turned up zero market manipulation.

So please allow me to help further if I may. I have been writing a book on market manipulation. I realized, a bit late, that simply trying to warn the regulator about manipulation was not going to work; admonitions have low success rates in creating market change.

So I'm using inside knowledge of the market; exchange weaknesses, market time synchronization problems, manipulation strategies and the regulator's inability to forensically audit markets, to create a 'how to guide'. Things like; how to use NYSE's market data and a laptop to reverse architect its internal systems. Or how to manipulate the wider market by co-locating at the NYSE, given its weak trading technology and basic surveillance.

Sorry I'm Late For Duty

I wasn't really sure what to do with the additional manipulation material I have.

Initially I tried to educate the NYSE; I gave the NYSE all the material I gave the SEC, including the deck with a page titled, "The Smoking Gun", but when the NYSE told me that 4 seconds of internal latency was within normal operating bounds, I realized I really was wasting my time. 4 seconds of internal latency for a 'real time', microsecond feed should never be considered normal. So after I uncovered more problems, I didn't bother giving the NYSE any of my additional manipulation or surveillance weakness findings (naturally they may dispute these findings, but this is the same exchange that didn't know how to design a basic book feed). Even the SEC only has a limited portion of the manipulation material.

Whistle Blower Limit

After confirming, with the NYSE, my original whistle blowing allegations were correct, I tried to give the SEC additional NYSE manipulation material. However, I must have maxed out how many times I could whistle blow against the NYSE, because the SEC declined further information about the NYSE.

I found that decision most confusing, but 'want not waste not'; it makes for great book material.

"How to Manipulate Electronic Trading Markets and Get Away With it"

I'm trying to do it in a comic book format; it seems most appropriate given the situation. I will donate all profits to charities (homeless, food banks, domestic violence support).

I figured why let one section of the market get away with it? If I can help everyone manipulate markets, I can make it a more level playing field. While I may call it manipulation, since the SEC hasn't punished any HFT firm for this activity, it must be perfectly legal!

At some point the exchanges and ALL regulators will have to upgrade their technology and processes, to prevent manipulation. So maybe I can help create or manipulate change.

D. Back To Market Manipulation: A Few Areas of Additional Concern

Liar, Liar, Pants on Fire

There are so many outrageous lies told by some of the financial industry's most senior figures, one might mistakenly think that US trading markets are the most technically sophisticated, provide the most equitable access and are the most regulated; down to every single trade or quote amendment. This misinformation damages markets.

Captain UnAmerica and Doc Lightspeed from UnMarvel

It's not healthy for any financial market when the CEO's of the two largest exchanges talk nonsense. The market and wider public looks to these individuals to provide facts, not jokes and hyperbole. It is more than simply disappointing; the misinformation they spread hurts ordinary investors.

Captain UnAmerica and His Red Book

The NYSE's CEO's use of terms such as 'un-American' to smear IEX, can only be described as Mcarthy-esq and part of the same fear mongering tactics employed by Donald Drumpf, aka Dr Strange Glove. The executive boards of both the ICE and NYSE should be embarrassed.

Doc Lightspeed and Mismathematics

Take for example the following quote from the CEO of NASDAQ:

"The number of order types would climb from about 360 currently to around 5,000 if a millisecond standard were approved"

Where did the "around 5,000" number come from? Can I please see the maths? Is NASDAQ creating thousands of new order types to protect investors? Why did they wait so long?

Unfortunately NASDAQ's CEO doesn't stop there! The NASDAQ's CEO believes markets move at close to the speed of light.

The speed of light is 299 792 458 metres/sec. It's very, very fast! Modern, end to end, communications systems however, even the ones that use optical fiber or microwaves, are still much, much slower, many orders of magnitude slower. All modern communications are bound by the laws of physics (the market can't cheat these laws!) and physical transport links only represent one portion of a large technology stack, as such, end to end communication still takes a minimum amount of time. Laughably there is still a big difference between the two.

It is entirely possible however, that, when you compare the technology speed differences, between real investors and high frequency scalpers, there's so many zeroes, so many orders of magnitude in difference (and money required), the difference between the two, could be described as light speed. This is not something to laugh at.

High Speed Smoke and Mirrors
The problem though, is this talk of light speed technology sounds impressive and quite normal; but it's all part of the high speed illusion. In this illusion, the race to zero is benign and the small segment of the market that outspends the rest to implement 'light speed' technology, uses it speed advantages to trade in the best interests of the market.

[SideNote]
[I really don't get it. Both the NYSE and NASDAQ are essentially technology exchanges of the 80's. So how did the NYSE invent time traveling messaging technology and who built NASDAQ's light speed systems? How is that both exchanges still have so many systems problems! Exchanges are supposed to be able to distribute market data properly and conduct IPOs without falling over. If these firms can't handle the very basics of running an exchange, then why are they still permitted to function?]

Mock Light Speed Misdirect
In my analysis of electronic markets, the only one activity that falls close to the 'light speed', or rather 'mock light speed', category, is a particular type of HFT activity; exchange co-located algorithms trading.

It's not so much that markets 'move' at mock light speed; it's more that markets 'are moved' at mock light speed. Electronic markets are highly interconnected and some market events move at extremely high speeds, but many of these events are manufactured; they're actually just 'bait and switch' fraud at mock light speed.

High Frequency Fraud
All events in the real world, whether physical or digital, take a minimum amount of time before they reach any exchange. Contrary to what powerful people will tell you, real world events, the events that cause real price movements, do not move at light speed.

High frequency quote cancellations and amendments that happen within low microsecond time frames cannot be based on any REAL world events; there simply is not enough time for these events to filter through to exchanges and affect any existing prices. These high speed quote cancellations, are simply fraud. They all share one singular purpose, to manipulate NBBO order flow (Note: IEX puts a big spanner in this strategy!).

Even market data updates within co-location environments, take a minimum amount of time to traverse from an exchange switch all the way through to HFT software. Further time is required to make a corresponding decision and send a legitimate quote update or cancellation back. A legitimate, market event driven, quote update takes a minimum amount of time; from exchange switch, into HFT switch, into algorithm, the algorithm makes a decision, the update goes back through switches into exchange systems.

New TCR
A proportion of quote updates and cancellations happen in time frames that are so small, that it is impossible for this activity to be legitimate; it is market manipulation.

Please investigate these high frequency quote updates/cancellations, investigate the impact on the NBBO and also investigate the trades made before and after by the firms making these quote updates/ cancellations.

I have filed a new TCR with the SEC regarding this criminal activity.

E. Conclusion

Pure Merits Please
None of the market's manipulation problems have anything to do with IEX; its application should be approved on its excellent merits alone. Please approve its application without delay and any restrictions.

F. Conclusion Plus

The Truth is Painful But Obvious
The use of new technology in financial markets is often promoted as a great equalizing democratizer; this is no longer the case and has not been for a long time. In truth there has always been a subset of market participants that have been faster through technology investment. At some point though, this market subset became an entire HFT industry, fuelled by technology driven, unequal access, advances such as exchange direct feeds and co-location. If it requires millions of dollars to simply participate and many millions more to 'win' in the new era of American trading, isn't it obvious the 'light speed' trading speed differences damage the market.

The Great Hi-Tech Algo Scalping Con
Where do HFT profits come from? Do they come from sophisticated mathematics and smart short or long term positions? Or do they come from the extra scalping costs borne by the retirement funds of millions of regular Americans and the increased costs borne by American companies that use public markets to raise funds, all while HFT firms sit in the middle and provide much needed 'liquidity'.

Create A Real Investor Protection Act
Might I suggest an act that incorporates:
-Minimum quote 'life'; no more flickering or fake quotes.
-Minimum hold period for an instrument (at least a few seconds!); reduces market volatility.
-No retail flow order flow purchases by 'intermediaries'.
-Full disclosure of which venues retail brokers are connected to, latency transparency reports and maximum latency execution SLAs for retail trades.
-All exchanges and execution venues (lit or dark) are required to install nanosecond time stamping infrastructure and implement a coordinated Execution Venue Time Synchronization Protocol.
-Shut down shady hedge funds by analyzing their historic trades (they are required to keep by law) to determine where a fund has attempted to manipulate the market. It's actually very easy to find; start with high frequency quote amendments within microsecond time frames at the American exchanges.

Forward Thinking SEC
CATS is too late; if or by the time it ever does get built and deployed, the requirements

will have further changed. Rather than use the usual suspects, try some alternative data experts; firms like Amazon or Google. In addition to expertise with large data sets they also have significant artificial intelligence expertise that should be incorporated in a forward thinking CATS.

Courage Required
Some brave folks at the SEC permitted IEX to exist in the first place, I hope the SEC shows more of that courage and grants IEX's application, without delay.

It really is a simple decision; do you wish to protect sub second scalping or do you wish to protect the rights of ordinary investors; investors who wish to invest in an instrument longer than a few seconds.

Kind Regards,

Massoud Maqbool
CEO Latency Innovation Corp
SEC Whistle Blower against NYSE, NASDAQ

P.S

Legal Evil Knievel's
The NASDAQ's threat to sue the SEC in order to protect investors and financial markets from IEX, is hilarious and for lots of reasons quite dumb. It also stinks of desparation. The SEC should call the NASDAQ's bluff.

NASDAQ TCR 1382573934158
A few months after filing my SEC TCR against the NYSE I filed a TCR against the NASDAQ. Before I purchased market data from the NYSE I had purchased a very small amount of market data from the NASDAQ.

It would appear NASDAQ made the same design mistakes as the NYSE. I am still waiting for this to be confirmed, the SEC still has the NASDAQ TCR.

Hurt Feelings or Impugned Reputations
If any exchange or hedge fund feels I have hurt their feelings and wish to take legal action. Please do. As an official whistle blower against both the NYSE and the NASDAQ, I am afforded a certain degree of protection (something the NYSE had to be reminded of) but I'm not relying on that.

It would seem the SEC has never properly audited exchanges; if it had done so it would have, or should have, found all of NYSE's problems. Further, a simple audit of an exchange's internal data would betray all the evidence required of market manipulation and the trading firms involved.

Show Me the Data

So legal action is great. As part of the ‘discovery’ process I will ask for your glorious trading data - all of it, everything I can get my hands on to prove how widespread the problems are. The Amazon cloud infrastructure I setup to take the NYSE apart is still live.

I will happily audit any firm that desires legal action; I would love access to your private data. Just ask the NYSE what I did with it’s public data; initially I thought we were playing a duel of chess, then I thought it might be checkers, in the end I realized I was playing fronthand backhand with them. Poor NYSE.

So please don’t waste time sending ‘cease’ letters; I am not going to stop;-)

P.P.S

The never ending quest for alpha among the HFT fraternity, seems to bring out a few alpha male ‘crazies’; again that’s a waste of my time. I’m more interested in your data than your alpha-ness and well let’s just say that Leo T. Gaje doesn’t personally invite all of his students to become one of his instructors;-)

G. Open letter to IEX

Dear IEX,

If I may say so ‘chin up’ and congratulations! Get some T-shirts printed with IEX is UN-AMERICAN, wear them with pride. If you weren’t doing something right, if you weren’t truly changing things for real investors (ordinary and professional), you wouldn’t be facing so much vitriolic nonsense.

No matter what happens with the SEC decision. You are not going anywhere, you will continue to grow and get stronger. More investors will seek your safer trading venue. SEC staff will change and at some point the right people will make the right decision.

If I may further say, don’t just be ‘American’, be ‘European’, be ‘Japanese’. The high frequency sub second trading industry started in America because of changes to already weak SEC regulations. The HFT industry scalps investors all over the world, particularly in high volume fungible markets. They employ the same scalping techniques to ‘slow tax’, everyday, ordinary investors. These markets are in need of safe venues like yours and I am sure some of your larger trading supporters, would also like to trade on any overseas venues you create. Who knows…maybe some forward thinking regulators might even give you full exchange status overseas, before the SEC does!

H. My Comments on the Comments

Dear NYSE,

Hello! How are you! It has been a while since we've last spoken. I see you're up to your same old tricks. Naughty, naughty, NYSE!

It's amazing that when it comes to the rights of protecting investors, the NYSE decides it appropriate, to reference Seinfeld. Does that mean you think the rights of investors are a joke, a comedic matter?

Ok. I like Seinfeld as well.

Maybe the NYSE could turn its trading floor into a walk-on comedy stage…maybe Seinfeld himself will even come? If you get the Ferrari's out front again and get some coffee (IPO a barrista coffee chain?), maybe Jeff and Jerry could do, 'coffee in cars' together? Maybe, when you build that comedy stage, you could diversify, and add a few 'poles'.

Oh NYSE, if you are suggesting IEX is serving 'full fat yoghurt', does that make the brown stuff you serve, 'chocolate with sprinkles'?

Ok NYSE, so when I think of your exchange, all the other exchanges like the NYSE and all the high frequency scalping hedge funds, I'm reminded of a Seinfeld episode where the gang all make a bet, to see who can hold out the longest without 'smiley faces'. The outright lies you and the other firms make, about protecting investors, all make you masters of your domain.

Interestingly the Soup Nazis also works! You're the Soup Nazis and IEX is Elaine, with all your recipes. There's more; Neuman very, very late with the mail, Kramer turns his apartment into a studio.

But probably the most apt episode of them all is the two-part finale. You may recall a 'slower' gentleman is robbed, by a much 'faster' party, all while the gang look on, video it and chuckle with a few jokes. At the end the robber, Seinfeld and his friends were all locked up under the Good Samaritan Law. The irony is hilarious! Enjoy the chuckles NYSE.

If there is a process for granting exchange licenses, then there should be a corresponding process for removing them. I would like to nominate NYSE for losing its license. Give it to IEX.

NYSE's Comments
NYSE's IEX Comments Are Fantastic Comedy…Thank you Captain UnAmerica or should I say…Neuman!

"Exchanges play important roles in the national market system. The Securities Exchange

Act of 1934, as amended ("Exchange Act") and Regulation National Market System ("Regulation NMS")1 impose high standards and obligations on registered exchanges that are critical to the functioning of the national market system. In addition, unlike broker-dealers, exchanges are self-regulatory organizations ("SROs") with the obligation to enforce compliance with the Exchange Act, the rules promulgated under the Exchange Act by the Commission, and the exchange's own rules.2

The exchanges all operate trading venues that publicly display quotations. These quotations are fundamental to the functioning of the securities markets. Without publicly displayed quotations, price discovery would be severely impaired and investors would be unable to assess the quality of the executions they receive."

Er what about your very high internal latency, does that not impair price discovery? Don't your very, very, very, very, very stale market data prices hurt investors and the whole market?

"The Commission also relies on SROs to operate the national market system plans, which form the backbone of industry-wide coordinated activities such as the dissemination of consolidated quotation and trade information and the volatility controls found in the limit up limit down bands and trading pauses. The Commission has also directed the SROs to develop the consolidated audit trail. For these reasons, the Commission holds SROs to high standards that differ from the obligations of a broker-dealer operating a registered alternative trading system ("ATS")."

Where were these standards when you designed a book building methodology that cannot recreate the market as it simply occurred? Or what about testing your matching engine software to a high standard?

"The unfair advantage would be further compounded if IEX were approved as a registered exchange and IEX's displayed quotes were granted protected quotation status under Regulation NMS. If IEX's displayed quotes were considered protected under Regulation NMS, market participants would be required under the Order Protection Rule to route orders to IEX before executing at a worse price available on another market. Because of the informational advantage of IEXS and the intentional delay added by the POP, IEX members with institutional and retail customer orders would have to consider whether best execution obligations required such members to use the IEXS for any unexecuted portion of orders rather than routing themselves. "

Sorry I'm going to sound like a scratched record here but as my evidence, your really, really bad internal latency causes this problem constantly. Your really, really stale quotes look like they are great prices and because of the Order Protection Rule, orders get routed to your exchange (which is great for your volumes, nudge, nudge, wink, wink). Since the price is old, the orders actually end up getting executed at an inferior price. An inferior price that is created by HFT! They simple ignore the NBBO when they want, they create these old prices and cancel them at will, with your 'ka-ching' assistance.

Fantastic business model; by having the slowest systems you can increase your order flow and save money on not buying new technology 'ka-ching, ka-ching' double the rewards.

Your example is right, the market does get screwed but they get screwed on your exchange the most. Simply because you have the worst possible understanding of latency and time synchronization.

"IEX is explicit in its marketing materials that its SOR has an information advantage. If IEX as an exchange would allow one of its members (i.e., its affiliated broker-dealer, IEXS) to make routing decisions based on trade execution information and intentionally delay the same information to other market participants, this built-in time advantage would unfairly discriminate against IEX members that are not its affiliates."

Err you have a direct feed for your HFT clients and then the consolidated feed for your other retail investors. No speed difference, or competitive advantage here right. I mean the retail investors could spend millions more on co-location and direct feeds so it's a totally different situation. Right (nudge, nudge, wink, wink).

Citadel's Comments

"Every time they are showing the best price, by law I have to send my order there whether the price is stale or not," says Jamil Nazarali with trading behemoth Citadel. "It's not a speed bump, it's a pothole," says Nazarali,

If IEX's 350 microsecond speed bump, makes it a pothole, does that make NYSE's internal delays of 4,000,000 microseconds a black hole, or wait should it be a worm hole? Don't you measure this latency? All the clever hedge funds do.

Eight Year Old Boy and Slow Lunch Line

Dear fictitious 8 yr old boy. Please learn as many musical instruments you possibly can, so when you grow up, you too can finger strum the market, that is if you are not doing that already. While you are engrossed chatting away to the lunch lady in the slower line, you may have missed something that happens in the fast line. While, the fast lane does indeed appear exciting and does move very fast. It's so fast, that it's quite easy to miss, that some of your french fries have been 'taken', maybe even some of your tasty tater tots. If you're really slow and not paying attention, sometimes, they take the beef out of your beef burger. What's worse is after they take it, they tell you it's better for you, you looker slimmer for it. Have you lost weight? You're looking great. Don't be tricked by it.

I: Some Excerpts From My SEC Material

I must apologize for my 'non-sugary' tone towards the end of my communication with the SEC; it was my first time as a whistle blower and it's fair to say over the course of approximately 18 months, I found the process frustrating.

Also, while I did seek the NY Attorney General's help for a more independent investigation into the NYSE, I would like to highlight I was never dumb enough to suggest taking legal action against the SEC. I would very much like a stronger independent SEC.

I have not publicly released all the material –the material should not be required, it shouldn't have anything to do with IEX's application!

NYSE's Problems, Why MIDAS is flawed, How the Market Got Time so Wrong and is Open to Manipulation… Why the SEC is Powerless!

Massoud Maqbool, SEC Whistle Blower
June 25th 2014
www.LatencyInnovation.com

Confidential

CONTENTS

Background

- **In early 2013 I purchased 3 months of NYSE Openbook Ultra historical data**
- **After discovering numerous problems with NYSE's market data and internal time synchronization I filed a complaint with the SEC, particularly since NYSE didn't take the problems seriously.**
- **The SEC was quick to open an investigation under the whistleblowing program.**
- **Unfortunately the SEC relied too heavily on NYSE's ability to investigate itself (a flawed process).**
- **When the SEC was given further opportunities to understand NYSE's problems it declined!**
- **It's quite evident from the SEC's emails it does not understand the implications of all of the problems at NYSE.**
- **After more than 6 months NYSE finely acknowledged a problem with it's matching engine (it still disputes the other problems). That was when the SEC got back in touch with me!**
- **BUT NYSE's MATCHING ENGINE PROBLEM HAS NOT BEEN MADE PUBLIC BY NYSE OR THE SEC….WHY? DON'T NYSE'S CUSTOMERS DESERVE TO KNOW?**

NYSE actions fall under negligence….maybe even fraud*! The Ice and numerous investment banks were also informed, but no action was taken. All of these firms have opened the door to class action lawsuits by their customers

* Fraud: wrongful or criminal deception intended to result in financial or personal gain. In this circumstance NYSE has sold flawed data to customers but has not publicly informed those customers.

NYSE Openbook Ultra Problems

DESCRIPTION

Ultra HISTORICAL	Ultra REAL TIME	Ultra HISTORICAL (CLIENT)
Created directly from OpenBook REAL TIME, it does not pass through a feed handler. Available as an end of day file that is supposed to match the REAL TIME feed.	Clients decode the REAL TIME data by writing or purchasing a feed handler based on NYSE specifications.	Clients create this HISTORICAL data by storing the REAL TIME data (which has passed through the client feed handler).

PROBLEMS

1. NYSE MATCHING ENGINE TIME STAMP ERROR

[redacted]

NYSE HAS CONFIRMED THE ERROR (NOV 2013) BUT HAS NOT PUBLICLY NOTIFIED CLIENTS

2. NYSE CHANGED THE BOOK BUILDING LOGIC

[redacted]

NYSE WEBSITE DOCUMENTATION STILL LISTS THE ORIGINAL FLAWED BOOK BUILDING LOGIC

3. NO [redacted]

[redacted]

NYSE DOES NOT BELIEVE THAT [redacted] **IS A PROBLEM**

4. MISSING PRICES/QUOTES

[redacted]

the HISTORICAL (CLIENT)

NYSE DOES NOT BELIEVE THIS IS AN ISSUE

5. POOR TIME SYNCHRONIZATION (AND HIGH INTERNAL LATENCY)

NYSE time synchronization is very poor for a microsecond time stamped feed. Time stamps become unreliable; receiving systems had earlier time stamps than sending systems (by as much as 3 milliseconds).

NYSE HAS STATED THAT IT HAS NO TIME SYNCHRONIZATION OR LATENCY PROBLEMS

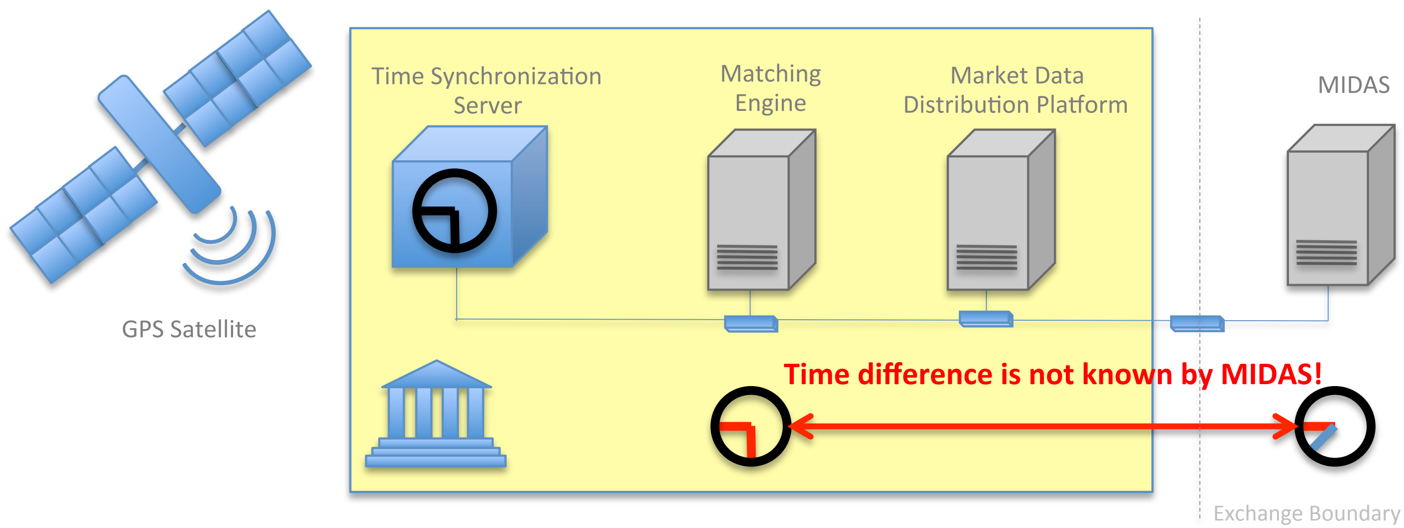
NYSE and the SEC has known about these problems since 2013 but NYSE data clients are still unaware

MIDAS is Flawed and Not Forensic!

- In order to understand exactly what happened, you need to know precisely when it happened!.......Market Information Data Analytics System (MIDAS) cannot do this!
- Each exchange has different internal delays before a quote or order message is distributed via its market data feed.
- The time stamp each exchange uses is not synchronized across the US market. You cannot say with certainty a quote/order occurred at a particular venue because it simply has an 'earlier' time stamp.
- That 'earlier' time stamp may actually be old if internal latency and time inaccuracies are factored for; since these vary, it is impossible to determine precisely when each quote/order occurred and the precise order of events.
- Even within an exchange, time between servers may be poorly synchronized.
- NYSE's market data feed showed examples of servers that were out of synch by as much as -3 milliseconds; the market data distribution server had a time stamp that was 3 milliseconds earlier than the source matching engine!
- At best MIDAS can provide a 'guestimate' as to which quotes/orders occurred when, but it is definitely not forensic.

The SEC's 'precise' identification of the source of the flash crash is quite alarming; how can a forensic conclusion be reached from data that is most certainly in the wrong order?

Exact Time Inside an Exchange Unknown



The time delay between when the Matching Engine time stamps the price and when MIDAS receives it is unknown. As the data below shows, an exchange can have high internal latency.

Even if MIDAS time stamped to the nanosecond, the time stamps could not be used to determine the exact time an event occurred at the exchange (let alone across the US Equities market).

NYSE internal latency is as much as 4000 milliseconds, i.e. 4 seconds!

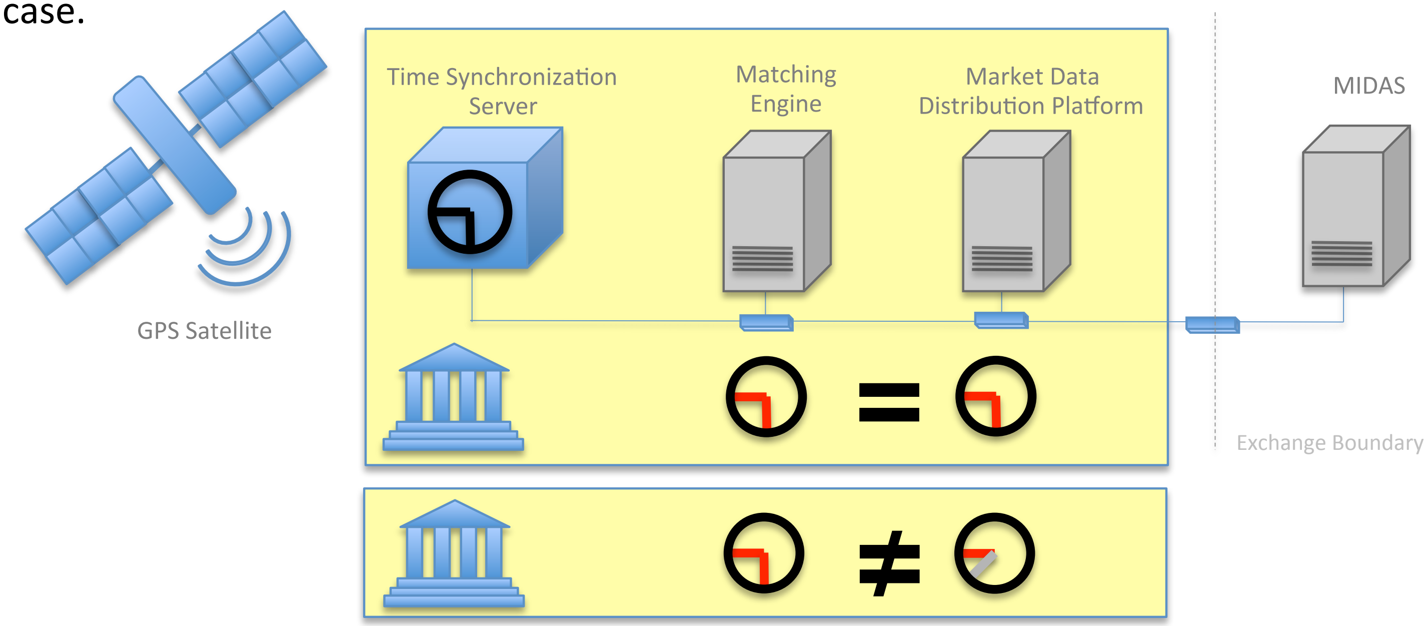
Matching Eng Time*	Mkt Data Dist Time*	Internal Latency	Symbol	Price	Volume	Side
37309568	37313622	**4054**	BRK A	152500	1	B

***Time in milliseconds since midnight. Data is from NYSE OpenBook Ultra Historical**

MIDAS has no visibility into an exchange's internal latency

Exchange Time Stamps Are Unreliable

The time on the Matching Engine and Market Data Distribution platform should be exactly the same, but this is not the case.



In poorly designed networks, time will will differ significantly as machines will synchronize to a central Time Server at different times and each machine will have a different amount of drift in between resynchronization.

NYSE's Market Data Distribution Platform has an 'earlier' time than its source matching engine. NYSE has time synchronization and accuracy problems!

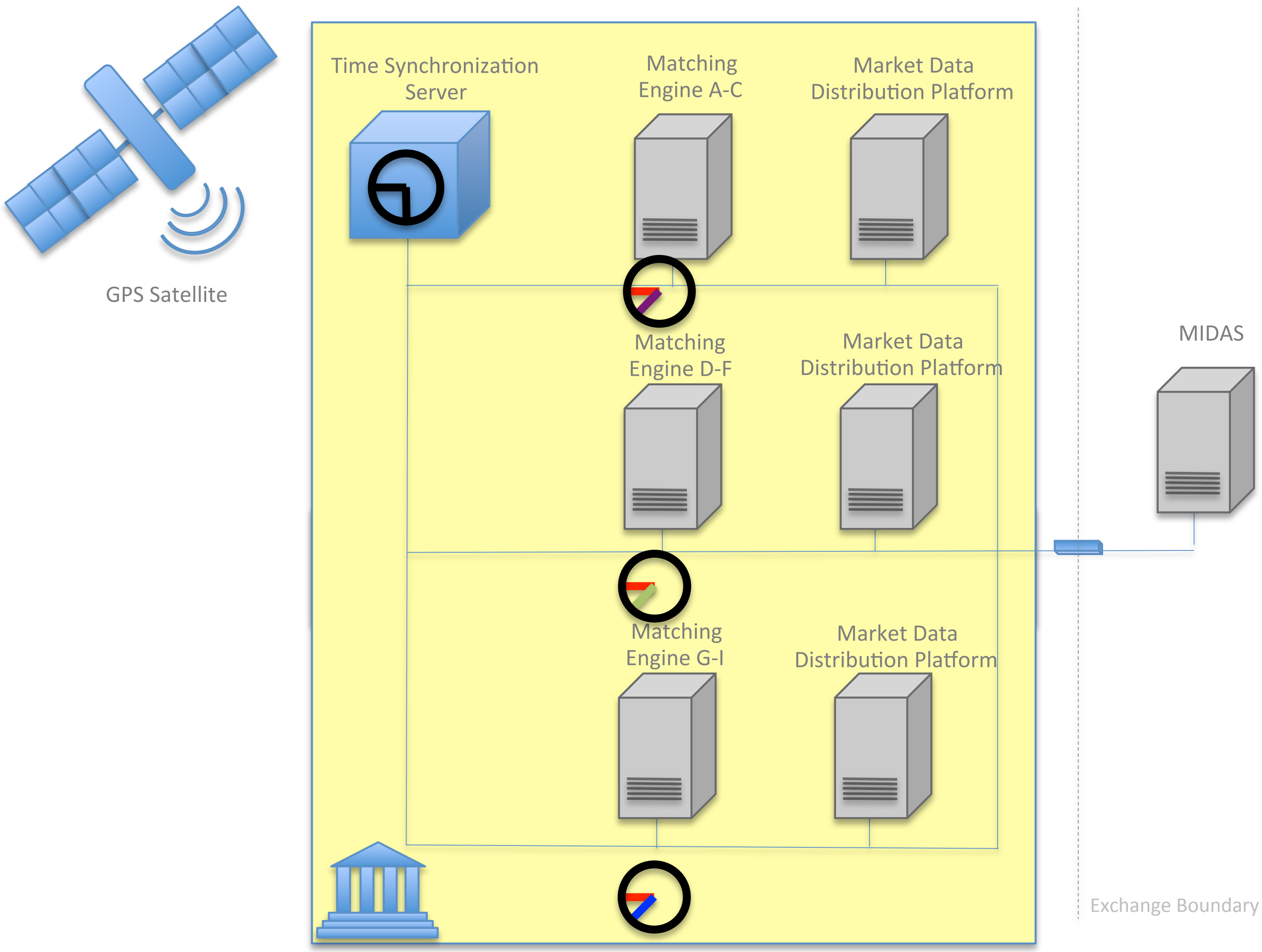
Matching Eng Time*	Mkt Data Dist Time*	Internal Latency	Symbol	Price	Volume	Side
47977399	47977396	-3	AAP	79.04	100	B
47985079	47985076	-3	ACG	8.12	8400	B
47995529	47995526	-3	ACH	10.96	1206	B

*Time in milliseconds since midnight. Data is from NYSE OpenBook Ultra Historical

MIDAS does not have any visibility into an exchange's time stamp accuracy, the timestamp may be highly inaccurate!

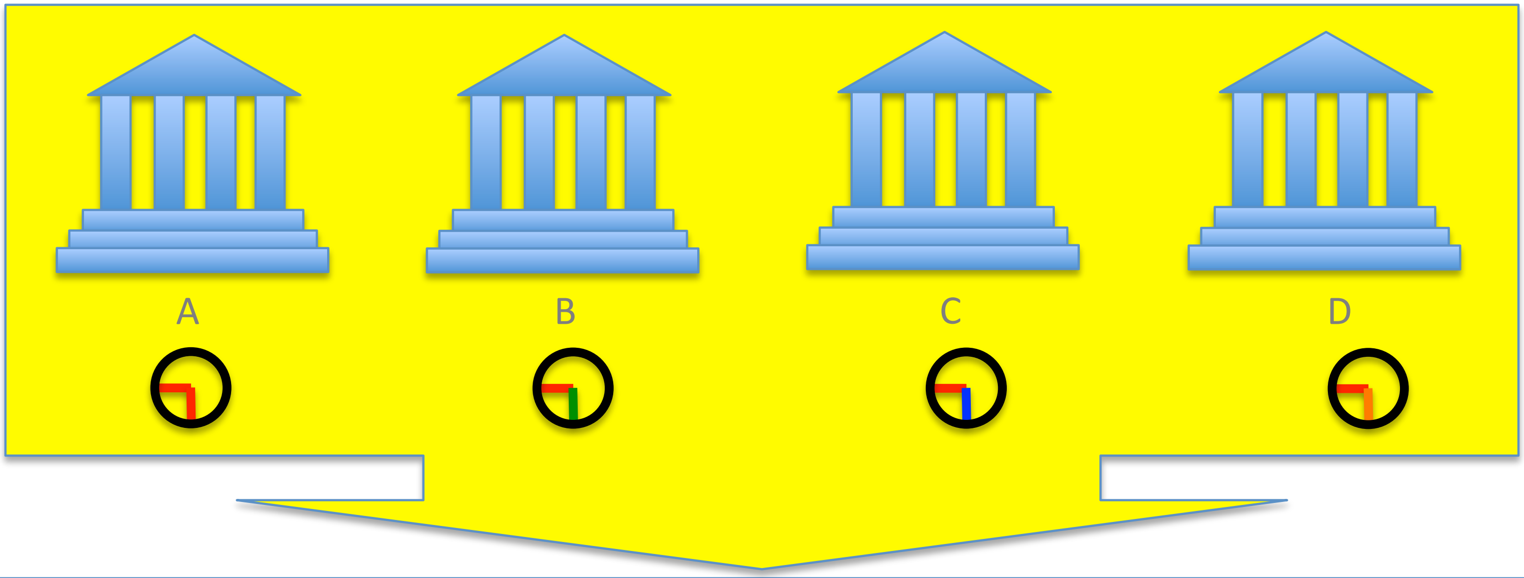
Event Order Inside Exchange(s) Unknown

Symbols are split across multiple servers for load balancing. Each server will have a different amount of drift, a different time stamp and accuracy!



MIDAS cannot even tell you with certainty when and in which order a price/quote occurred at 1 exchange! How can MIDAS do this for multiple exchanges?

Event Order Outside Exchange(s) Unknown



Is it really **9.30.000.000** exactly on each exchange?

NO! The exchanges do not synchronize at the same times, nor do they have the same amount of drift*!

No way to know what the 'exact' time on each exchange is!

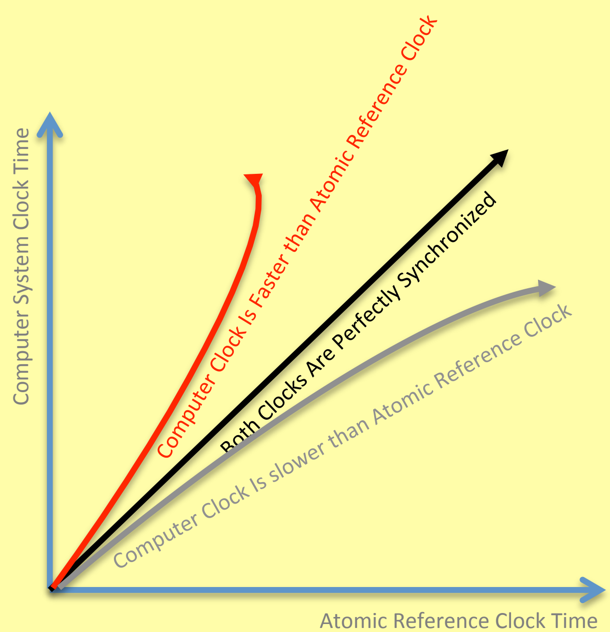
Time synchronization across exchanges must be centrally planned, coordinated and strictly monitored/ enforced! E.g by the SEC! Otherwise will never be able to determine the precise time and order of an event.

Impossible for MIDAS to say with precise when an event actually occurred in the US Equities market!

* Each exchange will also employ different servers, time synchronization technology and have different data center environmental factors such as heat.

Worse! Computer Time is Misunderstood

Time in modern computer systems is not a constant straight line. Time drifts and because of the nature of synchronization, time goes 'backwards' when a computer resynchronizes! This leads to numerous processing errors, since software systems (and their creators) are oblivious to this.



Clock Accuracy & Drift Impacted by:

- Heat
- Manufacturing variances
- Operating Systems
- Magnetic fields
- Air pressure

Estimates vary, but computer grade clock quartz crystals have a drift of approximately 1 microsecond every second. This drift will increase further because of the above factors.

Computer clock accuracy and drift are variable factors

Time Goes 'Backwards'!

The Exchange Time drifts from the 'real' GPS Time.

Exchange Server resynchronizes with GPS Time. Both now match again.

But these prices have time stamps that make them seem as if they actually occurred earlier

ID No	GPS Time	Exchange Time	Price	Symbol	Side
1	9.30.00.000.000	9.30.00.000.000	1.01	XYZ	B
2	9.30.00.000.001	9.30.00.000.001	1.1	XYZ	B
3	9.30.00.000.002	9.30.00.000.002	1.2	XYZ	B
4	9.30.00.000.003	9.30.00.000.003	1.3	XYZ	B
5	9.30.00.000.004	9.30.00.000.008	1.4	XYZ	B
6	9.30.00.000.005	9.30.00.000.013	1.5	XYZ	B
7	9.30.00.000.006	9.30.00.000.018	1.6	XYZ	B
8	9.30.00.000.007	9.30.00.000.024	1.7	XYZ	B
9	9.30.00.000.008	9.30.00.000.030	1.8	XYZ	B
10	9.30.00.000.009	9.30.00.000.009	1.9	XYZ	B
11	9.30.00.000.010	9.30.00.000.010	2	XYZ	B
12	9.30.00.000.011	9.30.00.000.011	2.1	XYZ	B
13	9.30.00.000.012	9.30.00.000.012	2.2	XYZ	B
14	9.30.00.000.013	9.30.00.000.013	2.3	XYZ	B
15	9.30.00.000.014	9.30.00.000.014	2.4	XYZ	B

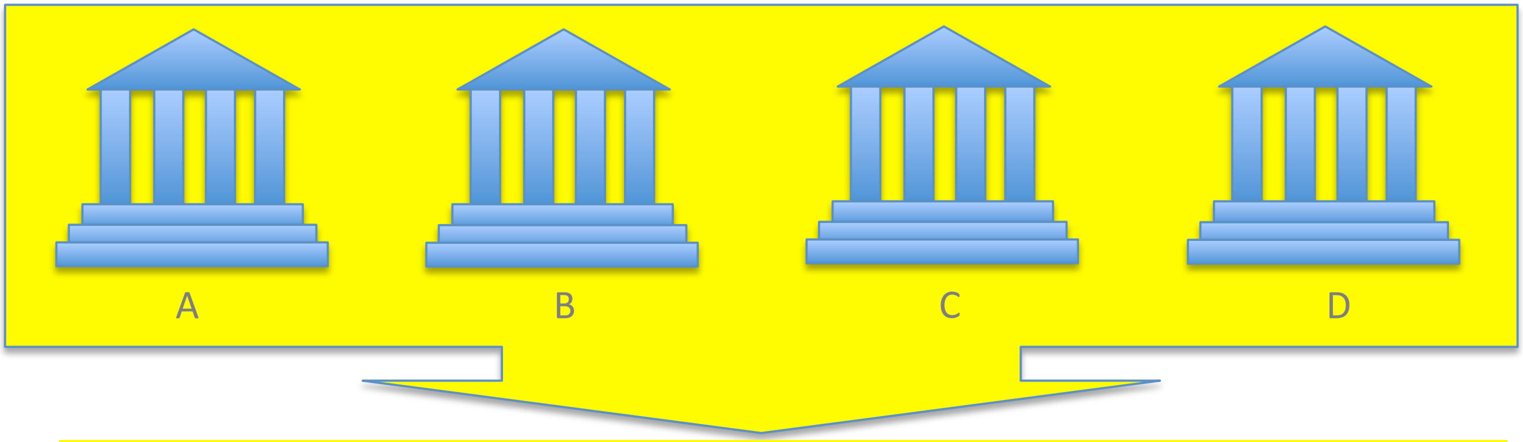
The basic purpose of a time synchronization server is to 'correct' time when it drifts, a 'correction' will cause time to go 'backwards'! Time correction is a basic function of time synchronization; but this basic fact and its impact on sorting data by time has been misunderstood by too many firms (including the time server vendors).

If the data is sorted by Exchange Time, prices will appear in the wrong order because of time resynchronization.

If the data is sorted by ID No the correct order will be obtained, but the time at which an event occurred at will be wrong in some cases (but impossible to detect).

Poor time synchronization will result in data errors because prices are processed in the wrong order, MIDAS can not solve these problems

Market Distortion; High Internal Latency



Exchange	SIP Time	Internal Latency*	Price	Symbol	Side
A	9.30.00.000.001	4000	1.52	ABC	B
B	9.30.00.000.001	5	1.49	ABC	B
C	9.30.00.000.001	4	1.48	ABC	B
D	9.30.00.000.001	5	1.47	ABC	B

Stale price

New Prices

SIP processes exchange BBO prices in the order they arrive. What if an exchange has high internal latency?

It distorts the market! As the real market price may differ significantly from the 'stale' price particularly in fast moving markets. If exchange A's price is 'stale' (e.g. like NYSE's 4 secs internal latency) and the real market price is lower (or higher for Offers), the 'stale' price will become the NBBO. Under Reg NMS orders will have to be routed to that exchange (like NYSE because of it's high internal latency).

If the market drops or increases rapidly from high volumes, any exchange that has under provisioned will see latency increase and its BBO will become the NBBO regardless of overall market direction.

There is more incentive for an exchange to have systems that have high latency or suffer from an increase in latency as market volume increases

* Internal latency is unknown for most exchanges, even NYSE's internal latency numbers are unreliable because of its poor time synchronization capabilities

Market Manipulation; [redacted]

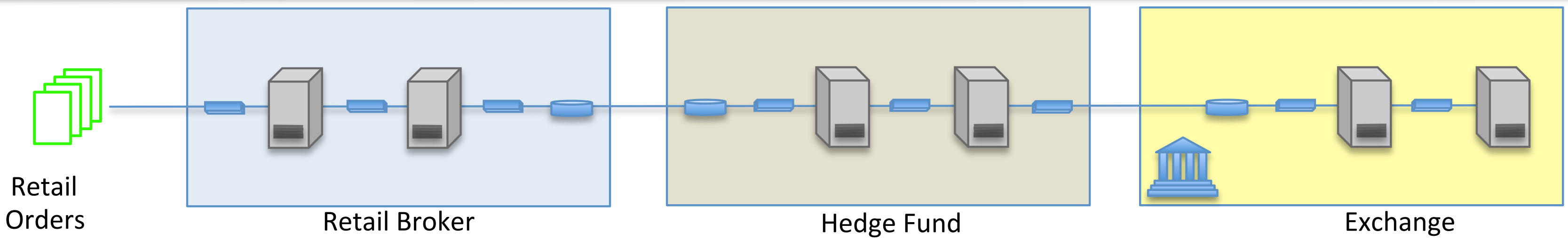
[redacted]

D	9.30.00.000.001	5	1.47	ABC	B

[redacted]

* Internal latency is unknown for most exchanges, even NYSE’s internal latency numbers are unreliable because of its poor time synchronization capabilities

Market Manipulation: $ For Order Flow



By purchasing enough retail orders, hedge funds can determine the direction of a stock's price.

- Payment for order flow is motivated by profit not altruism! So how do retail customers benefit?
- Do retail brokers ensure the best possible price is obtained for their customers?
- What is the real cost to the retail customer? Has the SEC ever investigated this?
- Increased latency will in most cases lead to increased cost! How long can the order be held for?
- What if the latency delays between customer, broker, hedge fund and execution venue are incorporated? What is the maximum permissible latency?
- Shouldn't customers be told what the latency for their order was? Can they opt out of $ for orders?

Has the SEC ever investigated hedge fund trading decisions made after purchasing retail orders?

Recommendations/ Next Steps

NYSE Problems; Inform Clients!

- The impact of NYSE's problems will be different for each firm based on their software design and their use of NYSE's data.
- Customers should be immediately informed of these problems so they may start to investigate how the errors have impacted their businesses and the potential financial costs (from bad trading decisions or not making a trade).
- NYSE's data should be investigated further to determine how widespread the problem is e.g. how often was the BBO wrong based on matching engine error, processing the data in the wrong order or if data is lost.

NYSE and the SEC has known about these problems for over 6 months but NYSE data clients are still unaware. This data is used in a variety of ways by various types of participants such as other exchanges to determine the NBBO and other market data providers to create stock indexes.

SEC Oversight of Time Synchronization

- The only way to forensically analyze the market and determine the precise order of events and when they occurred, is by implementing strong time synchronization across the entire US market.
- Strong time synchronization with nanosecond level granularity and precision can be achieved by using the right combination of hardware, software, network design and processes.
- Time synchronization must be coordinated, monitored/audited and enforced centrally.
- Time synchronization should not only be limited to exchanges, but all possible execution venues such as dark pools and any firms that internalize trades.

Without strong time synchronization any MIDAS type analysis will be flawed. Time synchronization must be enforced across the US market. Otherwise SEC monitoring or auditing capability will be significantly limited.

SEC Retail & $ Order Flow Investigation

- The SEC has launched an investigation into internalization and whether best prices are achieved but what about investigating specifically on behalf of retail customers?
- High latency will most like lead to significant price slippage, but there are no requirements for retail brokers to be told about the latency of their trades.
- Institutional and professional traders have more leverage to determine latency compared to retail customers.
- When payment for order flow, its increased latency and reduced price execution transparency are factored for, aren't retail customers being abused? Especially since retail customer are not told about payment for order deals and do not have the ability to opt out.

HFT impact on retail customers should be investigated. Direct feeds are too expensive for retail customers and are contrary to fair and equal access principles. Unfortunately any SEC investigation into internalization or payment for order flow will not be forensic because of the time synchronization problems.

Latency Innovation

September 16 2014

Dear Mr Polise,

Thank you kindly again for your response dated July 17th, I apologize again for the delay in not scheduling time earlier with the SEC to discuss potential issues at NASDAQ. I have time available on September 17th from 9am or the 19th after 11am EST?

Please note I still have my concerns regarding the SEC's approach to investigations. This is actually why I reached out to the Attorney Generals of New York in my previous email. The investigative approach taken by the Attorney Generals is very different from that of the SEC's. The SEC was first informed of problems with NYSE's data over a year ago, yet your agency still has not commented publicly because the investigation is "still open". In contrast, the Attorney General's track record is to make the market aware of problems early on in an investigation; so that market participants may determine the extent of their exposure and any losses suffered. The Attorney Generals also seek further information from any affected market participants to discover the breadth of the problem. I may be wrong here, but I also do not believe the Attorney Generals, unlike the SEC, would decline to hear further evidence from a whistle blower that had already found serious flaws in NYSE's Market Data Analytics Lab (MDAL) tool.

You are correct in highlighting that the SEC has repeatedly tried to setup time with me to discuss NASDAQ (although not the 'et al' for some reason?). I don't know, however, if you were made aware that while your office attempted to contact me on this subject in Dec 2013, it was only after NYSE conceded they had made mistakes in Nov 2013, and it was two months after I had filed the original NASDAQ et al problems TCR. Which again leads me to conclude that had I not continued with my research, the NYSE and wider problems I highlighted may never have been discovered. It would also mean that my TCR around NASDAQ et al would have continued to be ignored by the SEC.

Becoming a SEC whistle blower in the summer of 2013 against the NYSE was never a simple light-hearted decision. I was as transparent as possible with the NYSE and immediately informed them of my decision and for over 6 months provided the NYSE and the SEC with my research. Misguidedly, I tried to help both, the NYSE and the SEC, understand the nature of the problems, which ranged from the obvious to the quite complex. After 6 months of denials, NYSE finally conceded market data problems; there was a matching engine problem with their live feed and their book building logic was actually wrong. During that period, however, the SEC declined my offer to learn about my follow up research. Is it a standard SEC practice to refuse to obtain more information from a whistle blower? Because I must admit I am still confused as to why your agency would refuse follow up on information about the NYSE, particularly, since your agency made me a whistle blower in the first place. I appreciate your office gets many tips. However at this point in the process I had already proved and verified with NYSE that it had an obvious error with corrupt time stamps in its MDAL tool. I had highlighted a number of other NYSE 'weaknesses' including the fact that it took NYSE 3 months to work out its market data files were in a binary format, not text or csv. Its (incorrect) book building logic was in email format, not in a standard document (an audit offense at any trading firm). And the fact that were crystal clear discrepancies between NYSE's technical documents and the actual market data they described, which alone should have raised numerous red flags.

The SEC was informed of these and many other mistakes NYSE had made, yet peculiarly, the SEC still relied on NYSE to investigate the problems uncovered by my research. Shouldn't an independent investigator investigate? Relying on the firm that had unknowingly created the problems in the first place, was never going to be the 'wisest' approach. It was NYSE's hubris, which led individuals to laugh when first informed of market data issues, when instead they should have taken the problems more seriously. In the end it turned out neither NYSE nor the SEC found any of the problems independently or collectively, even though both were informed where to look.

I am not surprised that NYSE's investigation didn't find anything but I am disappointed the SEC was unable to discover these problems. It would seem that the NYSE did too good a job in minimizing the MDAL problem by simply describing it as 'trial', even though on multiple occasions it had asked me to commit to a contract and more importantly, the 'trial' was for the tool, not the (corrupt) market data I had paid for. By minimizing the MDAL problem, ignoring its other problems (NYSE said they were going to ignore the file format, support and documentation problems!) as well as the SEC's indifference to market data or system errors (based on NYSE market data contracts, which absolve it of all responsibility and negligence, and are approved by the SEC) it would appear that neither the NYSE or the SEC investigated the problems associated with the matching engine and NBBO market distortion seriously.

Had either the NYSE or the SEC asked I would have provided them with some of the information below.

Some Research I Would Have Discussed With the SEC Last Year

With the limited amount of market data I have and without the specific details of NYSE's matching engine software error, it is difficult to conclude whether NYSE had a problem with monotonic time or whether the time stamp errors were all related to a matching engine software bug. I do not believe that neither the NYSE (or the SEC) knows this for sure either, unless it has reviewed every individual error to confirm it as a matching engine bug problem and not a monotonic time problem? As NYSE's weak time synchronization architecture and negative clock drift numbers initially supported an argument for monotonic time related problems. It is also unknown whether the NYSE has actually conducted a thorough review of ALL of its market data feeds and systems. As mentioned their previous investigation into Open Book Ultra was proven to be inadequate. Interestingly, there doesn't appear to be any SEC or FINRA guidelines directing the correct use of monotonic time (or even guidelines to use monotonic time!). The SEC and FINRA only seem to have, outdated, guidelines on synchronizing time. It's quite possible that exchanges or trading firms, that use time synchronization networks, have at least one line of code that incorrectly uses time. Has the SEC or FINRA ever conducted an audit of how network synchronized time is used by trading software and whether or not monotonic time is being used correctly in all required instances?

Market Distortion and Manipulation

The NYSE market data and research I provided the SEC with was a perfect example of why the market is open to distortion and manipulation. There was also enough information, if understood, to realize why the SEC's MIDAS tool is powerless and can only identify simple market manipulation.

NYSE didn't believe 4 seconds of internal latency was "excessive", other exchanges my also (incorrectly) agree. Unfortunately, high internal latency distorts the wider equities market and will lead to incorrect NBBO calculations and negatively impact 'best execution'. NYSE stale prices will cause orders to be incorrectly routed to NYSE. The actual prices those orders are executed at will differ from the advertised market data price.

Does the SEC have any guidelines and limits on internal exchange latency? Might I suggest the SEC consider this?

NYSE's high internal latency indicates underinvestment in its technology systems, which can be more easily exploited to manipulate the market, by simply overloading NYSE systems with high numbers of any combination of quotes, order or trades. NYSE in particular is open to further manipulation because of its poor time synchronization capabilities and high latency numbers, which can be used to 'hide' activity. NYSE market data can also be used to reconstruct its internal system architecture, making it an easier target for HFT firms.

Fair Markets?

Much has been written about whether the markets are rigged or broken. Reg NMS may have reduced spreads and improved prices by providing more competition through new execution venues. But increased competition also means increased fragmentation, which leads to increased market participation costs. HFT firms with their multi million dollar budgets for direct feeds, co-location and dedicated hardware have huge execution advantages over 'slow' retail customers. These advantages include ultra low latency (essentially letting them know what future prices will be such) and the option to execute on the venue of their choice. Meanwhile retail customers face high latencies and often don't have a choice where their orders are executed (payment for order flow). But there is inadequate oversight of this new fragmented market as a result of outdated policies and regulations that only apply to historical market structures and technologies. In this new highly technical market, retail orders and 'slower' institutions are not equal trading partners with HFT firms.

Some HFT firms will undoubtedly take advantage over these built-in market inefficiencies to the detriment of slower firms. Given that the vast majority of retail orders have no say in where their order is ultimately executed and that less technically advanced institutions are unaware of these problems, would it not be reasonable to describe the markets as rigged? I wouldn't describe them as 'fair'. For example, an HFT firm can trade through the 'best' price knowing that the NBBO is actually wrong, it knows that the current exchange with the NBBO has a history of high internal latency and this price is stale. The HFT firm can choose to execute on the exchange which it thinks has the best price (and lower internal latency). The retail customer does not have this choice. Again this is closer to a rigged than fair market.

MIDAS is Powerless to Detect Manipulation

MIDAS doesn't have the ability to identify this manipulation because of the extremely high volume of quotes/trades occurring and poor time synchronization across US exchanges. Current SEC/FINRA time synchronization requirements only require synchronization accuracy of 1 second! Using numbers from marketdatapeaks.com the average number of messages per second is over 6 million. During periods of high market activity the volume can be much higher. Question. How can MIDAS correctly sequence 6 million plus quotes, orders and trades from over a dozen different venues that each have a different degree of time synchronization accuracy? Answer. It can not. Since it can not sequence them correctly, it has a huge unsequenceable 'haystack' of 6 million quotes, order or trades, which can not be used to identify sophisticated market manipulation.

What about instances of cross-market manipulation? The US equities, commodities and derivatives markets are all highly interconnected; updates in one market, impact the others. It's very difficult to identify cross-asset class sophisticated manipulation. If regulators can not conduct adequate surveillance and can not identify legitimate market activity from illegitimate activity, then they can not protect the market from criminal behavior. On this basis, can the markets not be described as broken?

CAT NMS Flawed

I really do hate being "Mr. Negative" but unfortunately it's not only MIDAS that is flawed, the newly proposed CAT NMS system will also have audit trail sequencing problems. Since its time synchronization solution is not that much of an actual improvement over the current requirements! Although the time stamp "accuracy" is now at 1 millisecond versus the original 1 second, which in theory suggests a 1000 fold improvement, up to 50 milliseconds of clock drift is also permissible, which means the drift might be 50 milliseconds less or 50 milliseconds more. That means the true range is 100 milliseconds, which is only a 10 fold improvement over the original 1 second or 1000 milliseconds and still a 'haystack' of 600,000 . But wait…it doesn't end there…the improved CAT NMS is supposed to capture ALL events, including quote, order and trade cancellations/amendments. Which means the number of messages per second in CATS NMS will be much higher than the current 6 million messages per second. CAT NMS will still have an unsequenceable data 'haystack' in the hundreds of thousands to millions!

While increasing the granularity of synchronization required and reducing permissible clock drift, through use of more precise synchronization technology, will further decrease the size of the 'haystack', it will not ultimately solve the problem. As ultimately each exchange’s synchronization practices and technologies will differ. During the course of my research I only found one possible solution that addresses most of the problems, interestingly it would seem that FINRA came close to the answer!

Raising Awareness

NYSE's clients deserve to know about the market data problems so that they may determine their risk or losses. I'm hoping we don't have to wait for the SEC or the NYSE to go public. It could take years. The wider market should also be made aware of the distortion and manipulation problems. I am hoping one of the press organizations copied will conduct some research into these issues.

Since the SEC does not wish to discuss NYSE I have included questions I believe should have been asked. Please note I do not expect any answers from the SEC to the questions at the bottom since the NYSE investigation is "still open", but unless the right questions are asked the process will never improve. I believe the SEC's investigation into NYSE and its investment decision in MIDAS should be independently reviewed, particularly in light of the fact that MIDAS cannot provide adequate market surveillance. As such, I would like to inform you that I have reached out to Senator Mark Warner's office, member of the Senate Banking Committee. Maybe Senator Warner or other members of the committee will investigate further. As a last alternative method of obtaining answers, a class action suit against the NYSE is also being explored

Currently there are significant gaps in the regulatory oversight of exchange technology, which disadvantages ordinary investors and allows some market participants to game the system. Regulators have not kept up to date with the demands of modern interconnected electronic markets. These regulatory gaps include weak time synchronization requirements (all US executions venues can afford to pay for better synchronization technology!), no maximum internal latency number guidelines and no guidelines around maximum permissible work loads on servers. Addressing these would make it more difficult to distort and manipulate US markets.

Kind regards,
Massoud Maqbool

Managing Director
Latency Innovation Corp

Questions:
Did the SEC actually review NYSE's market data when it was originally provided with my research?
Did it compare NYSE direct data with its MDAL data?
Why was NYSE or the SEC unable to find the problems I discovered?
Did the NYSE tell the SEC there were no problems?
Did the SEC believe NYSE?
How much research was conducted in those 5 months?
Why did the NYSE never ask the whistle blower about the problems?
Did the SEC or the NYSE ignore the research provided or did neither understand the material?
Why would a regulator refuse follow up information from a whistle blower?
Why hasn't the SEC forced the NYSE to go public on the problems it has found to date?
How far back do the problems go?
Has the SEC reviewed other NYSE market data products for similar problems?
How far back was the data reviewed?

Has the SEC compared the faulty data to 'correct' data to determine:
How many times the BBO was wrong?
How many times the book was wrong?

Has the SEC investigated NYSE client feed handlers and data to determine:
If they are losing data?
If they are processing data in the incorrect order?

J: John Oliver

Dear Mr Oliver,

If I may say, kudos and thank you, for the important issues you have covered and the way you have covered them; intelligently, compassionately and very humorously. Your digital activism is brilliant, but if I may respectfully say, you have potential to create much more change and even some high speed mischief.

The SEC has openly asked for help in protecting markets from manipulation. It really needs it and so does the world. High frequency scalping and manipulation is not simply an American problem. These firms work globally and it's not simply rich people on rich people stock market crime; everybody pays a price. Anyone who has any kind of retirement fund is definitely affected, but so is anybody who eats, drinks, buys clothes or travels.

Widespread manipulation of equities markets also has a negative impact on prices in coupled markets such as commodities and derivatives markets. Market manipulation artificially increases the prices of everyday goods such as food and oil; its widespread impact should not be underestimated.

These problems are at least worth a 'web special', but I'm hoping more.

I'm hoping you will join me in setting up a hedge fund that makes America the greatest country in the universe. Our hedge fund trades will be designed to exploit SEC loopholes so that we may help the SEC identify which loopholes the SEC needs to plug. We can only help the regulator by exploiting it; it needs direct evidence of market manipulation, masses of indirect information is simply not enough for the SEC.

All profits, except 2 dollars, will be donated to charities of your choice. We will take a dollar each and make a 'trading places' style bet of your choosing.

No Money Down
Now, you may be thinking HBO money is good, but it's not setup your own hedge fund money good. Don't worry, it's covered we can use the SEC's brand new equity crowd funding laws to raise money.

Super Money
While we are at it we should also probably setup a Super PAC that promotes some sort of political change and needs to buy expensive market research from our hedge fund, as well as pay our hedge fund outrageous consulting fees for anti-manipulation legislation.

Possible Names for Our HFT
Scarlet Pimpernel HFT
Rose Water HFT
America Already is the Greatest HFT
Vampire Piranha HFT
John Oliver HFT

Still Not Sure?
“Hi, I’m John Oliver, I’m a stand up comic who owns a hedge fund”; best introduction at any New York dinner party ever.

Follow up to your dinner part introduction; “I may or may not be under investigation by the SEC, technically I’m actually helping them, really, I am, honest”.