Comments on File No. S7-02-10
Concept Release on Equity Market Structure

Thank you for extending the deadline to allow additional comments to the SEC's Concept Release on Equity Market Structure. The "Request" raises many questions that I could give strong yes or no opinions to, but the focus of my response shall be on those areas that I can back up with extensive research and experience.

The purpose of this submission is to alert the SEC that many of the issues that are being investigated in the equities market as potential causes of the May 6th Flash Crash also exist in the Options Market.

A summary of the supporting research can be found at the end of this submission under the title **Quote Rate Pirates are Attacking the Option Market** or can be found at the website (website may be updated from time to time as new data is researched):

http://sites.google.com/site/quoteratepirates/

Quote Stuffing.

It is assumed that High Frequency Trading as a whole adds liquidity and is beneficial to the market, but as implied in the Concept Release questions, there are tactics and methods such as "Subpennying" and "Quote Stuffing" used by some that are counter productive if not illegal.

Subpennying should not be allowed. All entities should be required to trade in the same increment (whole cents/pennies in the equities market). If one wants to better my bid to buy, one should be required to do so in the same increment required of me.

I am adamantly opposed to Quote Stuffing. On September 8th, the Wall Street Journal reported that:

> Securities and Exchange Commission Chairman Mary Schapiro said the agency is looking at a practice others have called "quote stuffing" to assess whether it violates "existing rules against fraudulent or other improper behavior."

This assures me that Quote Stuffing will be investigated thoroughly in the equities market.

The Commission should also be aware that Quote Stuffing is active and growing at a very rapid pace in the Options Market. The research summarized at the end of this submission demonstrates that 5% of all quotes in the Options Market can be attributed to Quote Stuffing. To put that into perspective, the amount of data represented by the 5% is more data than is disseminated in the entire NASDAQ quote feed.

In the Options Market "Quote Stuffing" goes on constantly through out the trading day. In fact on 8/18/2010 (a randomly selected study date) there was on average 38 option symbols per second being attacked by quote stuffing at just one exchange. During these attacks the quote rates often exceed 1000 quotes per second.

This research demonstrates that if left unchecked Quote Stuffing will be disastrous for the Option Market.

Data Integrity and Reliability.

The section, Request for Comments - B. High Frequency Trading - 2. Tools - a. Co-Location and b. Trading Center Data Feeds ends with the question "is the existence of any latency, … fair to investors…" and should a delay be imposed on what is called trading center data?

The consolidated data stream (both quotes and trades) should be the best source of data that money (**no matter how much**) can buy. Under the SEC Commission Regulation NMS ruling of 2005 exchanges are allowed to offer additional data feeds provided the integrity and reliability of the consolidated data stream is not compromised. In today's computer age, too much can be done in the assumed 10ms latency limits to assure a fair playing field.

I see no problem in allowing the San Francisco trader to co-locate in New York to eliminate the latency in receiving the data after it is public. I see no problem in the Exchanges offering trading center data that includes extra information not included in the consolidated data (ie depth of book…), but the trading center data should not be allowed to publish any bid/ask/trade information ahead of the consolidated data stream.

The New York Stock Exchange's OpenBook is by design always equal to or faster than the Consolidated Quote System (CQS). In fact it is common lingo to refer to CQS as the "slow feed" and OpenBook as the "fast feed."

Ray Pollecchia of the NYSE confirmed that users of their OpenBook were not faced with the 15+ second delays on May 6th.

http://www.theatlantic.com/science/archive/2010/08/nyse-tech-delays-contributed-to-the-may-6-flash-crash/61987/

This is wrong! The mandated Consolidated Quote System must be the best system that 'money' can buy. Entities with 'money' must not be allowed to buy data at a point in the data stream before the CQS.

The Option Price Reporting Authority (OPRA) data-feed is the CQS of the option market. As such it has the same mandates of integrity and reliability. OPRA's responsibility is to receive all the information from the eight option exchanges and disseminate it to the subscribers. There is some unavoidable lag caused by

processing and transmitting the data to a central location. This lag must be included in any Direct Connection Feeds offered by the option exchanges.

It is accepted that the individuals working at the exchange where a quote is originated will have a slight time advantage on the information generated at that exchange. But besides that, no entity (individual, institution, or even exchange) should have any advantage over another as far as data timeliness is concerned. In other words the guys at the IBM desk know what is going on with IBM before it reaches the CQS feed. Likewise, the specialist/DMM at the CBOE pit knows what the bid/ask for the IBM Oct 120 call is before it reaches OPRA. But the CBOE specialist/DMM at the IBM pit should not know the IBM stock bid/ask information any sooner than any other CQS subscriber.

Cancellation Fees:
Though not a question in the Concept Release, I would like to address cancellation fees under the General Request for any other comments.

In the Options Market, the Exchanges charge cancellation fees to the Brokers who in turn pass them on to the individual customers. These fees are permissioned under the auspices of preventing unnecessary submission and cancellation of orders as they take up computer time to handle.

It is obvious, from the Quote Stuffing research, that the Exchanges do not charge these fees to some entities. Doing so would bring in hundreds of millions of dollars a day in cancellation fees.

As an individual trader, I request that Cancellation Fees be stopped. If I place an order to buy an option and then some reasonable time later realize that the order is not going to be filled, or market conditions have changed, I should not be forced to keep that order standing for the remainder of the day to avoid paying a fee.

If the Commission decides to use a Cancellation Fee as a method to promote a "Quote Life" and prevent "Quote Stuffing" then charge the fee uniformly and apply it to the desired Quote Life and not for the whole day.

In Summary:
In both the equities market and the option market, Quote Stuffing is very active. The motivation for Quote Stuffing has probably been enhanced by the discovery that the latency between the consolidated data feeds and the trading center data feeds can be increased or at least assured by flooding the consolidated data feeds with unnecessary data. Quote Stuffing must be stopped!

Again thank you for allowing me to present my opinions. I am willing to supply the Commission with any additional research it might need to substantiate my submission.

Harold Lanier

Quote Rate Pirates are Attacking the Option Market
A bigger May 6th is coming

This is a research project in progress, areas of this are unfinished, partially researched and may be speculatively assumed. But the findings are such that it is important to make them available to those that might be able to help stop what is obviously the potential demise of the option market…

For the option market, like any market to be fair, there has to be equal access to the known data. Governmental financial regulations and the SEC have already mandated this. It is this study's purpose to demonstrate that a fair option market is in jeopardy under the current course of action by at least two option exchanges.

Some Definitions:
High-Frequency Trading (HFT) is an algorithmic based, computer generated, trading style that has added competition and liquidity to the equity markets. HFT is legal and generally beneficial to the market, insuring tighter bid/ask spreads and plenty of market volume. But, there are other computer generated activities that are counter productive to the markets and not legal. One of these is called "Quote Stuffing" or sometimes referred to as chatter or flicker. Quote Stuffing is the systematic entry, removal and replacement of quotes (bids to buy, offers to sell, and size of bid or offer) into the market at a very rapid pace.

Allowed to go unchecked, the excessive quote activity caused by Quote Stuffing could potentially cause what computer geeks would know as a denial-of-service attack (DoS) on the computer resources of the market's quote distribution system (data-feed). Stuffing too many bogus quotes into the data stream of legitimate quotes can cause the data-feed to fall behind. The gap in time between when the quote is generated and the time that it is actually posted by the data-feed to the public is often referred to as latency. A quote is said to be "Stale" if it is not the current and most accurate quote.

Nanex has demonstrated in its study of the equities market "Flash Crash" of May 6th that there was a huge data-feed latency potentially caused by "Quote Stuffing."
http://www.nanex.net/20100506/FlashCrashAnalysis_Intro.html and
http://www.nanex.net/FlashCrash/FlashCrashAnalysis.html

In a CFTC Technology Advisory Committee meeting studying the causes of the May 6th Flash Crash, an individual referred to the Quote Stuffers as "Quote Rate Pirates" dubbed after the old "SOES Bandits" slang used for level II traders of the late 1990's - thus the title of this paper.

Quote Stuffing in the Options Market:

David Koran, a programmer at Nanex, and I have created a program that is able to monitor the number of quotes that each option exchange is posting on each option symbol every second of the day. With this program we are able to filter for those option symbols that have an excessive number of quotes per second (referred to as "quote count" or "quote rate" throughout this paper) at the exchange level.

To give the reader a scope of this project, there are roughly 350,000 option symbols coming from over 3,300 stocks. There are 8 option exchanges that potentially trade these symbols. Each option symbol has a bid and ask from each exchange as well as other trade information.

Now suppose a Quote Rate Pirate on just one of these exchanges decided to start placing and changing ("stuffing") quotes on each of the option symbols at a rate of 100 per second. That would result in 35 Million messages per second. Currently a message from OPRA (the central clearing house for option quotes) uses 66 bytes. That would be 2,310 megabytes of data per second from just one option exchange.

There are 10 bits (start bit + 8 data bits + stop bit) in a byte. 2,310 megabytes(MBps) of data is 23,100 megabits(Mbps). A typical DSL line is 3Mbps; a typical cable connection is 12Mbps… The fastest network line is an OC-768 which is 1.33Gb or 1333Mbps. It would take 18 of these OC-768 lines to every entity that wanted to trade real-time options to handle the potential data from just this one exchange should the scenario be allowed to happen. The point is that trying to transmit this much data is not possible (or at least impractical) and will only lead to a disaster.

Another way to look at this is there are (60 x 60 x 6.5) 23,400 seconds in a trading day. If we had 100 updates per second on all options we would have (23,400 x 350,000 x 100) 819,000,000,000 (819 Billion) quotes per day. That is **150 times** the May 6th peak of the sum of all three data-feeds as shown in the Nanex chart...

http://www.nanex.net/FlashCrash/QuoteRates.html

Note: This Nanex chart showing Quotes per Day will be referred to several times throughout this research project. The chart is designed to show general dates when peaks in quote rates occurred. The scale for OPRA data (the red line) is on the left where the scale for the other two data sources is on the right. This two scaled approach is confusing for our research project. It is important for the reader to realize that if the data for all three were put on the same scale, the OPRA data peak on May 6th would be over 5 times the height of the blue CQS data source.

OPRA is projecting maximums of 4 to 5 Million quote messages per second for the year 2011-2012:

http://www.opradata.com/specs/Upd_Traffic_Proj_2011_2012.pdf

The above calculation of 35 Million messages per second is 7 to 8 times OPRA's projections. OPRA is projecting peaks of 15.5 to 20.7 Billion messages per day. The above calculation of 819 Billion messages per day is 40+ times the OPRA projections.

Again remember the above calculations were based on the potential of just one of the eight (and soon to be 9) exchanges. Hopefully, this is enough information to make the reader realize at 100 quote updates per second a disaster is inevitable.

Quote Rate in Perspective:
To help put 100 quote changes per second into perspective, think about the following examples. A humming bird flaps its wings 18 to 78 times per second. The average computer monitor has a refresh rate of 60 Hz which means it reprints the screen 60 times per second (at that rate the eye can not even detect a flicker). A high end TV probably has a 100 Hz rate. Click on this link and you can hear what 100 Hz sounds like

http://www.fearofphysics.com/Sound/100hz.mp3

Data can only travel at the speed of light (186,282 miles per second), and the distance from New York to San Francisco is approximately 2,582 miles. A piece of information can get to San Francisco in no less than .013861 seconds (or approximately 14 ms). This assumes a direct straight line connection, which is not reasonable. The actual time is probably more like 25ms. Using the assumed 100 quotes per second would imply broadcasting one quote every 10ms. The quote is not even valid by the time it reaches San Francisco. In fact the research has shown that when activated the chatter from quote stuffing is averaging over 200 quotes per second with peaks above 2,000 at the PHLX. That would mean that the quote and the following 27 would be "stale" by the time they reach the West Coast.

The point is that 100 quotes per second is a ridiculous number of times to update an option symbol per second. The price of an option is based on the price of an underlying stock or index. Because options are leveraged instruments and are typically traded in nickels and dimes, the rate of change in the price of a stock very seldom, if ever, warrants the updating of prices anywhere near 100 quotes per second.

What does Quote Stuffing in the option market look like?
This 10 second clip of the activity of part of the PHLX's index XEV's option chain captures quote stuffing behavior. The resolution of time on the capture program is not fast enough to capture each change, but it updates enough to display the problem. Note: this is actual speed, not a fast forward…

http://www.nanex.net/Dave/iXEVOption.htm

The clip starts at 14:35:29 on June 22nd. Notice at the start the 111.5 put ask price is in the process of counting up from 0.21 to 5.00. Once it reaches 5.00 it resets to 0.21. Then the 114 put ask price starts counting up from 0.22 to 5.00 (it actually increments in .01 steps, but the capture program is not fast enough to display all of the updates). Then the clip ends with the 121.50 put ask price starting a similar count up.

There is no trading purpose to activity like this. But, it will be shown that it goes on continuously in the option market throughout the day, especially at the PHLX and NQEX exchanges.

What is Legal and What is not?

Financial regulations dating back to 1975 require that there be a fee based public data source (Consolidated Data Stream) for both the stock and option markets. For years as can be seen in this 2005 SEC Commission ruling

http://www.sec.gov/rules/final/34-51808.pdf

it has been debated and accepted that exchanges can offer additional data sources provided "the integrity and reliability of the consolidated data stream must not be compromised…"

In the equities market the mandated consolidated data stream for all NYSE listed stocks is called the Consolidated Quote System (CQS). In the option market it is OPRA.

Under the SEC Commission Regulation NMS ruling most if not all exchanges also have other data-feeds ("Direct Connection Feeds") that entities can connect to for additional fees. Again, these are allowed provided they do not compromise the integrity and reliability of the CQS and OPRA feeds.

A New York located trader connected to a data-feed may have as much as a 50ms advantage over a trader in San Francisco connected to the same data-feed using the same trading parameters. (Based on the assumption that it takes 25ms for the data to reach SF, the same amount of time for both traders to process the data, and 25ms for the trader's orders to get back to New York.) This is a perfectly legal advantage and traders that take advantage of this type of lag are typically "Latency Arbitrage" type traders. This is the justification for many of the co-located computers in and around New York.

Under the "integrity and reliability" requirements above, a New York trader connected to a NYSE Direct Connection Feed must not have an advantage over another New York trader connected to the CQS feed. The Nanex website demonstrates that there was a Direct Connect Feed advantage on May 6th and that this has been occurring quite frequently for some time. It is hoped that the SEC Commission on the Flash Crash will address this issue.

The Nanex study of May 6th demonstrated that it is possible that Quote Stuffing contributed to the lag between the two NYSE data-feeds. If this is the case the Quote Rate Pirates associated with the Quote Stuffing should be found and prosecuted.

More about OPRA:

The Option Price Reporting Authority (OPRA) data-feed is the CQS of the option market. As such it has the same mandates of integrity and reliability.

http://www.opradata.com

OPRA's responsibility is to receive all the information from the 8 option exchanges and disseminate it to the subscribers. There is some unavoidable lag caused by processing and transmitting the data to a central location. Certainly, there are tolerance levels for this lag that allow OPRA data to meet the integrity and reliability mandates. I do not know if the Option Exchanges are delaying their Direct Connection Feeds to account for this lag, and if not, if this a violation of the "integrity and reliability" mandate.

But, what happens if OPRA is flooded with useless data that it has to process? It would be reasonable to assume that an entity with a Direct Connection Feed to an exchange would certainly be able to profit from any gap caused by the flood of data. This becomes an inappropriate or illegal Latency arbitrage! This arbitrage is particularly illegal, if the trader is associated with the cause of the lag in the first place.

I have discussed this issue with Joe Corrigan, the Executive Director of OPRA, his attitude is that OPRA operates at the direction of the 8 option exchanges. OPRA is paid by the exchanges for the amount of data it handles. OPRA's solution to more data is to just create a bigger pipe and require the customers using the data to follow suit. OPRA does not care what manipulations are going on at the Exchange level.

The remainder of this paper will demonstrate that Quote Stuffing is occurring in the option market. Hopefully, it will encourage OPRA, the 8 Option Exchanges, and if necessary the SEC to take action to resolve the issue.

The Original Research:
The original research was done using 100 quote changes per second as a filter. It was found that high quote rates actually started before the beginning of this year. By the first trading day in 2010 there were already over 18,000 occurrences of Quote Stuffing a day, by May 6th the there were over 60,000 per day, by June the occurrences were as high as 380,000 per day. Over 90% of the activity was found to be at the PHLX Option Exchange with the remainder believed to be at the NASDAQ (NQEX) Option Exchange (both owned by NASDAQ). The research was only done on the OPRA best bid/ask and not on the activity that did not affect the best prices.

This research resulted in a complaint to the SEC and PHLX in late June. The complaint focused not only on the potential May 6th like attack on the option market as a financial event, but also as a potential terrorist event. The information was kept relatively quiet because the assumption was that the SEC and PHLX would want to find the "Quote Rate Pirates" before they knew they were being investigated.

The PHLX/SEC investigations probably resulted in the $2.10 cancellation fee rule that was implemented by the PHLX on August 2nd. This additional fee has turned out to be an ineffective solution only hurting the retail customer. It is quite obvious now that the "Quote Rate Pirates" are in the inner circle of the PHLX and the NASDAQ. The research shows that if the PHLX were collecting the $2.10 fee for the unnecessary quotes it would be receiving in excess of $100 Million per day just from the filtered quotes. I doubt seriously that this is the case and conclude that the problem is within the entities that the Exchanges exempt.

What is an acceptable Quote Rate for the option market?
In late 2008, Themis Trading proposed to the SEC that a quote should a stand for 1 second before being canceled (1 second Quote Life) as a way to stop the problems it was seeing in the equities market.

http://blog.themistrading.com/wp-content/uploads/2009/01/toxic-equity-trading-on-wall-street-final.pdf
They continue to be a strong advocate of implementing controls to restore equality to the unfair equity market activities that ultimately resulted in the "Flash Crash" of May 6th.

Nanex concluded its May 6th study with a suggested 50ms "Quote Life" rule for the equities market.

Applying Nanex's suggestion of 50 ms per quote to the option market would reduce a symbol quote count to no more than 20 counts per second per exchange. This would certainly reduce the risk of a catastrophe significantly. However, even this limit would overwhelm all available network capacity. If each of the 8 option exchanges updated a symbol 20 times per second there would be 160 updates per second per symbol (this paper has already demonstrated that 100 quotes per second for all symbols is not sustainable).

That being said, most of our future research will be done using 20 counts per second (50 ms).

Here are some current findings:
In the over 100 quotes per second studies filtered by exchanges (not just by OPRA best bid/ask), NQEX is now as active as the PHLX in number of occurrences. The PHLX frequently has quote counts of over 1,000 quotes per second with peaks reaching 2,131 quotes per second. (Remember this is on one option symbol for one second!). Activity is also found at the BATS, BOX, CBOE and PSE exchanges. As suspected there is a great deal of hidden activity away from the best bid/ask (as demonstrated above, potentially slows down OPRA's ability to disseminate a best bid/ask).

In a study done on the full option data for 08/18/2010 (not just the best bid/ask data), with the filter set to 20 quotes per second (based on the Nanex suggestion of forcing quotes to stand for 50ms) the identified PHLX and NQEX quotes account for 3.92% of ALL of the option quotes for the day. The other 6 exchanges accounted for another 1.03%. This totals 4.95% of the total option quotes for the day.

The 5% may seem like an insignificant number, but it accounts for over 141 Million unnecessary quotes in the day. On the same day the NASDAQ and AMEX equity (not option) quote messages equaled 119 Million quotes. That is where most all ETFs and 4 plus letter stocks are quoted/traded…

The table below is of the activity of 8/18/2010 (no significance to the date, in fact a relatively low data day). The row titled OptionQuoteCounts_20100818a is based on OPRA best bid/ask data with count filter set at 100. The remaining rows with GR in the title are based on the complete option data feed (ie not just the best prices). The rows with _20 are using a quote count filter of 20, the ones with _100 are using 100.

FileName	TotCount	TotSumCount	TotAvgCount	NumOpt	NumUnder	HiHi	HiHiTime	TotOptQuotes	SumCount/OptQuote	
OptionQuoteCounts_20100818a	95,840	22,708,945	237	5,112	692	1,682	10:05:37			
OptionQuoteCounts_20100818_GR_20_PSE	286,911	8,892,296	31	10,084	593	117	12:18:47	2,844,045,222	0.31%	4.95%
OptionQuoteCounts_20100818_GR_20_PHLX	894,714	58,585,646	65	55,355	1,805	1,682	10:05:37	2,844,045,222	2.06%	
OptionQuoteCounts_20100818_GR_20_NQEX	1,065,321	52,773,669	50	38,712	463	893	15:47:57	2,844,045,222	1.86%	
OptionQuoteCounts_20100818_GR_20_ISE	166,282	4,134,637	25	13,129	665	98	10:57:30	2,844,045,222	0.15%	
OptionQuoteCounts_20100818_GR_20_CBOE	239,898	6,571,679	27	28,215	1,409	299	10:35:48	2,844,045,222	0.23%	
OptionQuoteCounts_20100818_GR_20_BOX	81,962	2,635,553	32	12,915	891	446	14:27:43	2,844,045,222	0.09%	
OptionQuoteCounts_20100818_GR_20_BATS	51,574	1,557,982	30	712	76	782	13:11:45	2,844,045,222	0.05%	
OptionQuoteCounts_20100818_GR_20_AMEX	181,498	5,709,127	31	13,460	823	92	14:07:43	2,844,045,222	0.20%	
OptionQuoteCounts_20100818_GR_100_PSE	3	319	106	3	3	117	12:18:47	2,844,045,222	0.00%	1.41%
OptionQuoteCounts_20100818_GR_100_PHLX	126,299	27,142,563	215	7,302	869	1,682	10:05:37	2,844,045,222	0.95%	
OptionQuoteCounts_20100818_GR_100_NQEX	117,984	12,640,748	107	13,469	317	893	15:47:57	2,844,045,222	0.44%	
OptionQuoteCounts_20100818_GR_100_ISE	0	0	0	0	0	0		2,844,045,222	0.00%	
OptionQuoteCounts_20100818_GR_100_CBOE	1,260	161,970	129	228	114	299	10:35:48	2,844,045,222	0.01%	
OptionQuoteCounts_20100818_GR_100_BOX	644	84,916	132	146	67	446	14:27:43	2,844,045,222	0.00%	
OptionQuoteCounts_20100818_GR_100_BATS	358	52,457	147	103	16	782	13:11:45	2,844,045,222	0.00%	
OptionQuoteCounts_20100818_GR_100_AMEX	0	0	0	0	0	0		2,844,045,222	0.00%	

This table shows the first few lines of the detailed study of the GR_PHLX_20 from above. The table is sorted by highest quote count in a second. Individual options are on the left and a summary by stocks on the right.

				38	Symbols per Second		2.06%			<---Option Study	Underlying Study --->					
				23,400			2,844,045,222	121,540								
OptionQuoteCounts_20100818_GR_20_PHLX				894,714	1,682	10:05:37	58,585,646	65	55,355		1,805					
Eq_Idx	Underlying	Option		# >= Filter	Highest	HiTime	SumOfAll	Average	NxCoreSymbol		Under2	Cnts2	Hi2	HiTime2	SumOfAll2	Average2
e	SCHS	2011Feb19 P 15.00		619	1,682	10:05:37	356,517	576	oSCHS_1119N15.00		SCHS	4,384	1,682	10:05:37	1,551,018	354
e	XXIA	2011Feb19 C 10.00		2,850	1,639	10:11:35	1,101,682	387	oXXIA_1119B10.00		XXIA	6,896	1,639	10:11:35	2,145,657	311
e	XXIA	2011Feb19 C 12.50		1,838	1,620	10:11:38	758,639	413	oXXIA_1119B12.50		NATI	8,242	1,338	9:59:33	2,256,866	274
e	SCHS	2011Feb19 P 17.50		1,189	1,579	10:05:37	539,503	454	oSCHS_1119N17.50		CPKI	3,162	1,330	10:29:20	418,743	132
e	SCHS	2011Feb19 C 17.50		1,533	1,574	10:05:37	573,284	374	oSCHS_1119B17.50		BGG	3,104	1,262	15:33:10	1,318,129	425
e	XXIA	2011Feb19 P 12.50		192	1,366	10:30:35	50,698	264	oXXIA_1119N12.50		EXTR	3,388	1,188	10:29:15	1,242,503	367
e	NATI	2010Dec18 P 30.00		4,080	1,338	9:59:33	1,597,998	392	oNATI_1018X30.00		ELX	4,422	1,085	11:29:29	1,850,535	418
e	CPKI	2011Jan22 C 16.00		276	1,330	10:29:20	53,066	192	oCPKI_1122A16.00		AKS	2,164	1,054	13:39:21	489,924	226
e	BGG	2011Jan22 C 17.50		2,814	1,262	15:33:10	1,293,854	460	oBGG_1122A17.50		FEIC	1,822	1,048	15:52:07	118,717	65
e	NATI	2010Dec18 C 30.00		1,381	1,221	10:29:34	282,216	204	oNATI_1018L30.00		SYNA	505	998	15:25:55	69,556	138
e	CPKI	2011Jan22 P 16.00		534	1,205	10:29:31	133,221	249	oCPKI_1122M16.00		LTD	1,800	973	10:52:13	140,212	78
e	EXTR	2011Mar19 P 2.50		2,767	1,188	10:29:15	1,171,531	423	oEXTR_1119O02.50		NFLX	7,121	958	10:29:15	352,308	49
e	EXTR	2010Dec18 P 2.50		434	1,137	10:48:26	59,991	138	oEXTR_1018X2.50		NTRS	566	955	15:42:54	53,524	95
e	NATI	2011Mar19 P 30.00		1,794	1,098	15:09:18	317,109	177	oNATI_1119O030.00		DISH	516	946	10:02:49	74,415	144
e	ELX	2011Jan22 C 9.00		55	1,085	11:29:29	18,448	335	oELX_1122A9.00		NBL	186	939	14:57:45	28,495	153
e	AKS	2010Sep18 C 18.00		804	1,054	13:39:21	394,168	490	oAKS_1018I18.00		JCI	326	919	15:28:17	82,520	253
e	FEIC	2011Mar19 C 17.50		391	1,048	15:52:07	31,155	80	oFEIC_1119C17.50		CCRT	1,081	916	10:28:03	157,554	146
e	SYNA	2011Mar19 P 30.00		97	998	15:25:55	35,556	367	oSYNA_1119O030.00		USB	821	903	12:49:55	79,019	96
e	LTD	2010Nov20 P 25.00		71	973	10:52:13	25,729	362	oLTD_1020W25.00		ARMH	223	884	10:35:48	46,166	207
e	NFLX	2011Mar19 P 145.00		71	958	10:29:15	10,579	149	oNFLX_1119O145.00		HUN	192	872	10:55:54	70,319	366
e	NTRS	2010Sep18 C 50.00		160	955	15:42:54	23,287	146	oNTRS_1018I50.00		MSA	2,760	830	15:45:04	190,571	69
e	DISH	2010Dec18 P 19.00		71	946	10:02:49	30,211	426	oDISH_1018X19.00		CSCO	2,824	825	9:55:42	188,498	67
e	NBL	2010Aug21 C 70.00		46	939	14:57:45	14,978	326	oNBL_1021H70.00		V	536	819	13:41:03	34,907	65
e	XXIA	2010Nov20 P 10.00		872	938	11:01:14	83,363	96	oXXIA_1020W10.00		RYL	950	815	15:46:06	215,211	227
e	ELX	2011Jan22 P 10.00		3,586	931	14:54:40	1,620,241	452	oELX_1122M10.00		IP	1,552	812	15:16:31	212,673	137
e	JCI	2012Jan21 C 35.00		71	919	15:28:17	31,868	449	oJCI_1221A35.00		RRGB	288	806	10:21:04	24,414	85
e	CCRT	2011Jan22 C 4.50		760	916	10:28:03	132,768	175	oCCRT_1122A4.50		SLW	357	795	13:35:39	25,566	72
e	USB	2010Sep18 P 22.00		116	903	12:49:55	49,340	425	oUSB_1018U22.00		CVE	34	786	10:29:28	6,714	197
e	ARMH	2011Jan22 C 15.00		157	884	10:35:48	41,284	263	oARMH_1122A15.00		CHK	1,536	784	10:12:25	90,953	59
e	HUN	2011Feb19 C 14.00		121	872	10:55:54	66,195	547	oHUN_1119B14.00		MICC	157	774	12:56:31	13,266	84
e	SCHS	2010Nov20 P 17.50		299	856	10:00:33	25,882	87	oSCHS_1020W17.50		NTRI	284	773	11:18:33	25,098	88
e	CPKI	2011Jan22 C 15.00		56	843	10:29:24	7,833	140	oCPKI_1122A15.00		HAL	2,785	768	15:48:27	80,892	29
e	MSA	2011Mar19 P 22.50		614	830	15:45:04	61,537	100	oMSA_1119O22.50		BAX	1,537	767	11:49:07	57,371	37
e	CSCO	2010Oct16 P 23.00		173	825	9:55:42	19,470	113	oCSCO_1016V23.00		ETFC	404	764	11:25:33	56,452	140
e	V	2010Sep18 C 75.00		63	819	13:41:03	4,503	71	oV_1018I75.00		XLI	471	762	11:02:49	27,728	59
e	RYL	2010Oct16 P 15.00		255	815	15:46:06	118,888	466	oRYL_1016V15.00		ATI	1,007	739	10:39:24	72,555	72
e	V	2011Mar19 C 95.00		6	813	13:41:03	2,940	490	oV_1119C95.00		PNRA	1,102	731	15:53:14	81,905	74
e	IP	2012Jan21 P 20.00		247	812	15:16:31	122,900	498	oIP_1221M20.00		NEM	2,733	725	13:53:30	146,338	54
e	RRGB	2011Mar19 C 17.50		27	806	10:21:04	4,818	178	oRRGB_1119C17.50		STI	1,329	723	10:08:34	114,587	86
e	V	2010Dec18 P 55.00		5	801	13:41:03	2,470	494	oV_1018X55.00		RF	1,982	721	15:50:55	187,084	94

As can be seen the Quote Rate Pirates are active in the Option Markets. If the PHLX was collecting the $2.10 cancellation fees on this activity (obviously the Pirates are somehow excluded) the fees would be $123,029,856.60 for the day - that rule only hurt the individual trader.

Solution:
So how would such a 50ms rule be implemented? One simple solution would be as follows. All option exchanges now have a cancellation fee policy in place, but they are geared toward the consumer customer (who obviously is not the "Pirate" causing the problem). Redirect those fees and computer resources to a rule that states that all orders must stand for 50ms as in the Nanex scenario or even 1 second as in the Themis suggestion. Drop the computer overhead of tracking cancellations fees on the retail customer's occasional attempt to buy an option and changing their mind and focus the attention on where the problem exists.

Nanex concluded its May 6th study with the following recommendations. I think the same should be applied to the option market.

1. **Quote and trade data must be time stamped by the exchanges at the time it is generated. This will ensure delays can be detected by everyone.**

   Reasoning: Changing the procedure to time stamp at the time a quote or trade is generated is a near trivial exercise. It probably comes as a surprise to many that time stamping isn't done that way now.

2. **Quote-stuffing should be banned.**

   Reasoning: It is a manipulative device designed to overload the quotation system. Quote and trade dissemination (*data feed*) is a finite resource, and should be treated as such.

3. **Add a simple 50 millisecond quote expiration rule: a quote must remain active until it is executed or 50ms elapses. If the quote is part of the NBBO, it may be improved (higher bid or lower offer price) at any time without waiting for the expiration period.**

   Reasoning: The exchanges must protect the integrity of the National Best Bid/Offer system. What is the point of having a National Best Bid/Offer, if not everyone in your nation (*apologies to Alaska/Hawaii*) can reasonably execute a trade against it? 50ms is approximately the time it takes light and electronic communication to travel from New York to California and back. It is impossible to transmit information any faster. This rule would not limit quote/trade rates. So long as trades are executing, quotes can update thousands of times a second. Only a small percentage of quotes today would be affected and the potential for catastrophically high rates would be minimized.