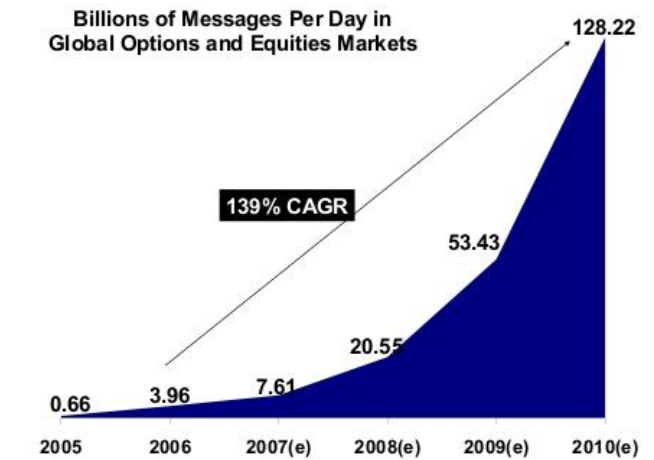


## Background:

Since 1867 when the New York Stock Exchange first opened, the person with the quickest access to information was the person to make the most money. This has continued to this day. The problem that has arisen today however, there is considerably more information for traders.

Currently our sponsor's system can handle one million messages per second, but this is not fast enough for the near future since market data is experiencing a compounded annual growth rate of 139 percent. Low latency is a priority for traders. Just as when the New York Stock Exchange opened, the person to receive and act on financial information first is the person to make the most profit, only now the time to receive and act on information has gone from days to milliseconds.



Source: TABB Group Estimates

## Objective

Research the industry and identify what key competitors are employing in their solutions. Develop a prototype system including both hardware and software solutions and ultimately create a system that can handle an input message rate of three million market ticks per second.

*IPRO 313 High-Speed  
Market Data Ticker System*

## Accomplishments

- Researched low latency solutions and how they can be applied to our system
- Researched industry leaders solutions
- Researched other possible solutions that can be explored in the future
- Analyzed the market use for the technology researched
- Developed a functioning ticker plant
- Developed a prototype of our ideal system architecture
- Developed a working system including: LVC, data generator, and client end application.
- Tested different hash algorithms to better optimize our system
- Tested different networking technologies.
- Determined that ram is not a key factor in effecting the performance of our system
- Benchmarked different systems to see impact on our market data ticker system

## Future Work

- To optimize our source code
- To build system that we have identified as our ideal system
- To test the optimized system on different hardware.
- To research other technologies and their application to our problem
- To test the cell processor architecture in the PS3 on our high speed market data ticker system.
- To test the system on the Nvidia Tesla System
- To test more variables in our system including:
  - Other networking options
  - More processors
  - 64 bit vs. 32 bit
  - Dual vs. Quad core processor

## Team Designations

**Design Team** – The responsibilities of the design team included handling all IPRO deliverables, research into the problem and possible solutions as well as coordinating the work of all the teams

Philip Pannenko, C.S. – Team Leader

Devaraj Ramsamy, B.A.

Kenneth D. Buddell, B.A.

**Hardware Team** – The responsibilities of the hardware team included the researching of companies in the high speed market data industry, such as their solutions. Also they were responsible for determining what effect hardware has on a high speed data stream system.

Michael Lenzen, MATH – Sub Team Leader

Noh Hyup Kwak, ECE

Jong Min Lim, ECE

Yunseok Song, ECE

**Software Team** – The responsibilities of the software team included writing the code for the individual modules that the system consists of as well as testing and optimizing them.

Jong-Yon Kim, B.A. – Sub Team Leader

Jesus Allan C. Tugade, C.S.

Jong Su Yoon, CS

Usman Jafarey, CS

Young Cho, CS