SHENGLI
TECHNOLOGIES

Lessons from Developing FPGA based Advanced Trading Systems for China's Capital Markets

Louis Liu

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Personal Profile

SHENGLI TECHNOLOGIES

Louis Liu

CEO

- Serial entrepreneur, close to 30 years of industry experience
- Datek Online, Island ECN
- Founder of Sonic Trading, acquired by BNY Mellon
- Previously MD of BNY Mellon
- BA and MS from Columbia University

U.S. Experience

- SOES, SelectNet
- SuperDot
- SuperMontage
- Order Handling Rule- ECNs
- NYSE and NASDAQ buying ECNs
- REG NMS
- Dark Pools

China experience: Shengli

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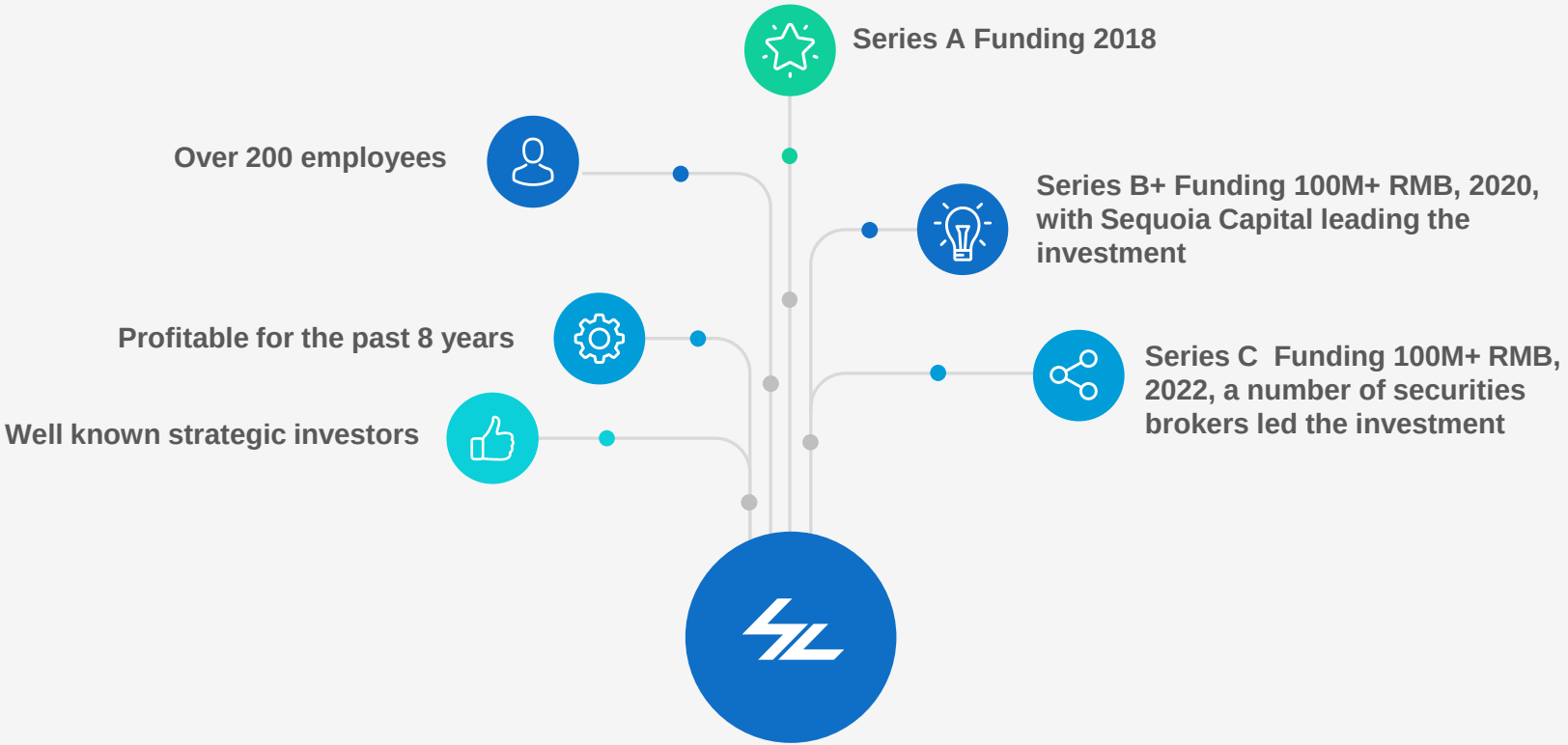

Shengli Trading Ecosystem

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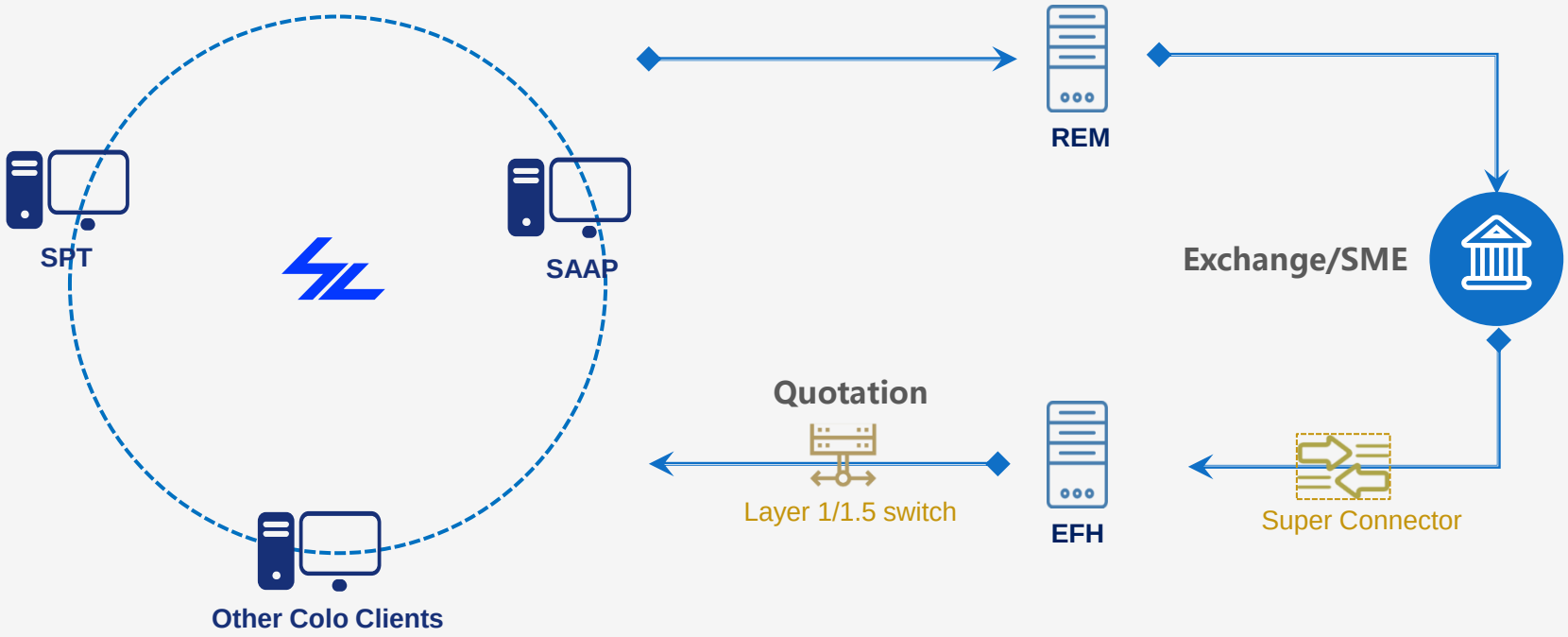

Products

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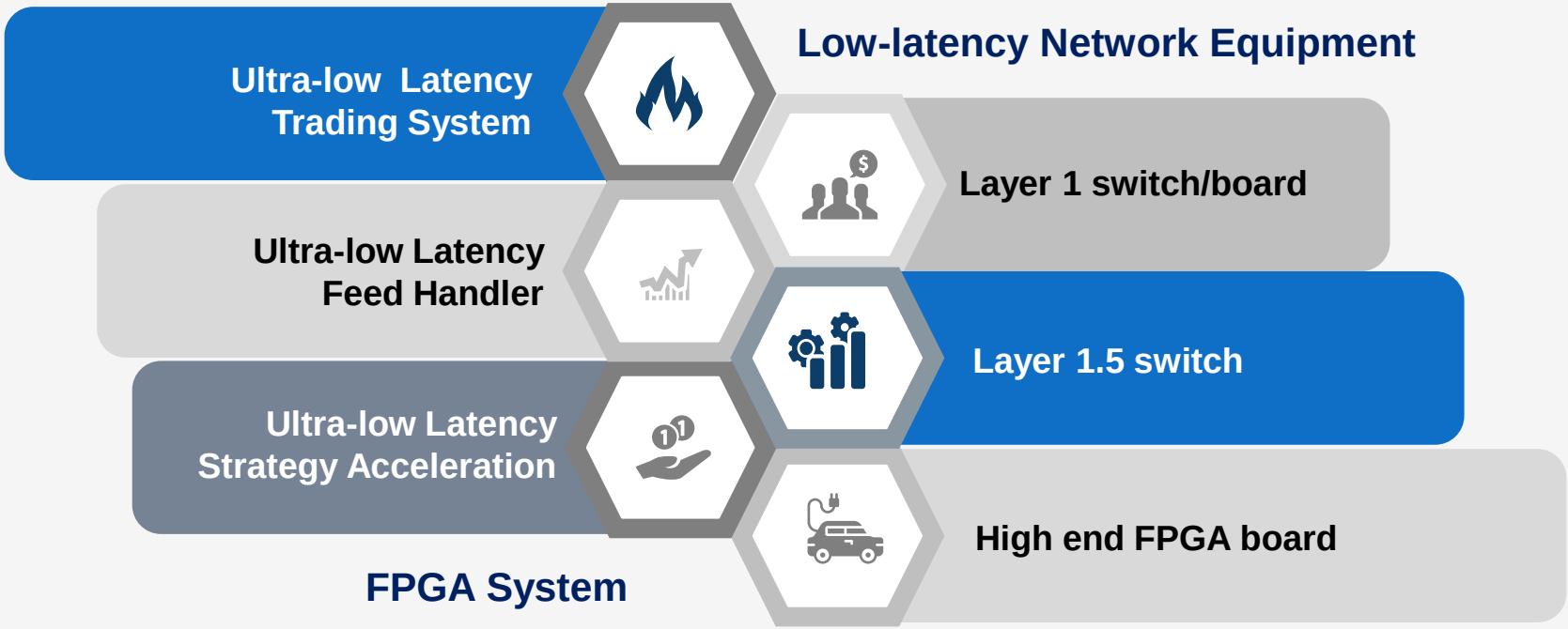

Solutions

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Securities Brokers

- REM Ultra-low Latency Trading System
  - Securities Edition
  - Option Edition (Market Maker)
- EFH Ultra-low Latency Feed Handler
- RiskGuard
- Layer 1/1.5 switch/board
- High end FPGA board
- Customized HPC

Futures Brokers

- REM Ultra-low Latency Trading System
  - Futures Edition
- EFH Ultra-low Latency Feed Handler
- Layer 1/1.5 switch/board
- High end FPGA board
- Customized HPC

Trading Firms

- SAAP Hardware-based Program Trading System
- Trading Simulator
- SPT Program Trading Platform
- Customized HPC

Partners & Clients (partial list)

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Shengli Network Equipment Series 1/2

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SLink_33048_H

MG11_41100

NF11_41100

Model	Number of Ports	Interface	Application	Weight	Note
SLink_33048_H	48	SFP+	Nodewatch/4I4 4O/level1 switch	9.5kg	Intel Agilex® 7 FPGA Adopt dual card design Support firmware remote upgrade Support optical module information acquisition Support fan and power status detection Support ILO function
MG11_41100	2	QSFP+	Over the Counter System	940g	Intel Agilex® 7 FPGA Board size: 3/4 length, full height PCIe board FPGA : AGFB027R24C2E1V PCIe x16 : Gen3.0/Gen4.0; QDR-IV : X2 144Mb 1066MHz; DDR4 : X2 32GB DualRank ECC RDIMM
NF11_41100	2	QSFP+	Market Data	290g	Intel Agilex® 7 FPGA Board size: half-height, half-length PCIe board FPGA : AGFB014R24B1E1V PCIe x16 : Gen3.0/Gen4.0; DDR4 : X2 2GB

Shengli Network Equipment Series 2/2

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SLink_41016_L

SLink_31016_L

SLink_5X036_L

SLink_3X048_L

SLink_32112_L

Model Type	Data Channel	Switching Delay	Total Latency	Data Rate	Product Characteristics	Weight
SLink_41016_L	16	0.25-3ns	<3ns	1G/10G/25G/ 40G/100G	• Low latency, flexible application and almost no performance jitter • No additional cabinets and power supply are required • It can be directly inserted into the server	170g
SLink_31016_L	16	0.25-1ns	<1.3ns	1G/10G/40G	• Low latency, flexible application and almost no performance jitter • No additional cabinets and power supply are required • It can be directly inserted into the server	180g
Slink_5x036_L	36	<2ns	<4ns	1G/10G/40G	• 1U Standard, supporting 40G • Almost no performance jitter	8.25kg
SLink_3x048_L	48	0.25-1ns	<3ns	1G/10G	• 1U Standard, almost no performance jitter • Implement topology between switches • Multiple switches are cascaded to form with more ports	8.95kg
SLink_32112_L	112	<2ns	<4ns	1G/10G	• 2U Standard with up to 112 physical ports • Almost no performance jitter	10.65Kg

Not STAC Benchmarks

REM EMS Overview

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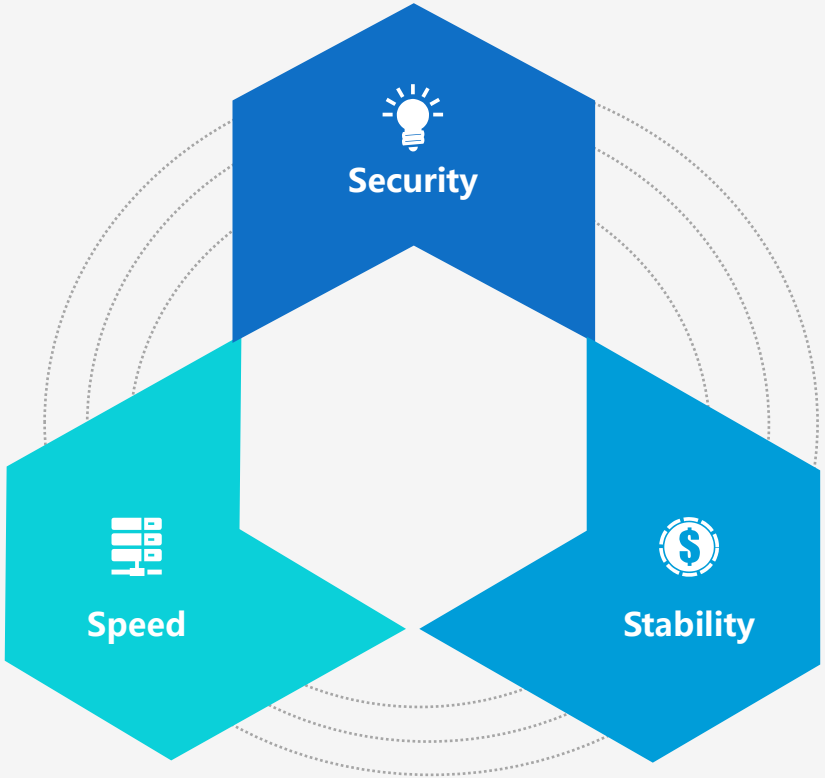

System Functions

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01 Business Management

02 Risk Management

03 Operation and Monitoring

04 System Configuration

FPGA Hardware Technology

Mature Technology

Ultra-low Latency

High Availability

EFH Introduction

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EFH

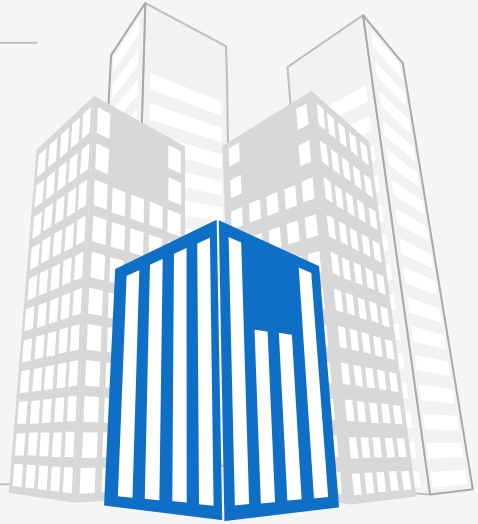
Shengli Extreme Feed Handler（EFH）is the first, revolutionary product, built on cutting-edge FPGA technology to provide market data handling and distribution in China.

01.Shanghai Stock Exchange

Binary market data
Level-1, Level-2 book, ETF options market data

02.Shengzhen Stock Exchange

STEP market data
Level-1, Level-2 book, ETF options market data



03.Build full order book

Based on tick-by-tick data

04.Indices market data

05.Bond market data

EFH: Professional Version

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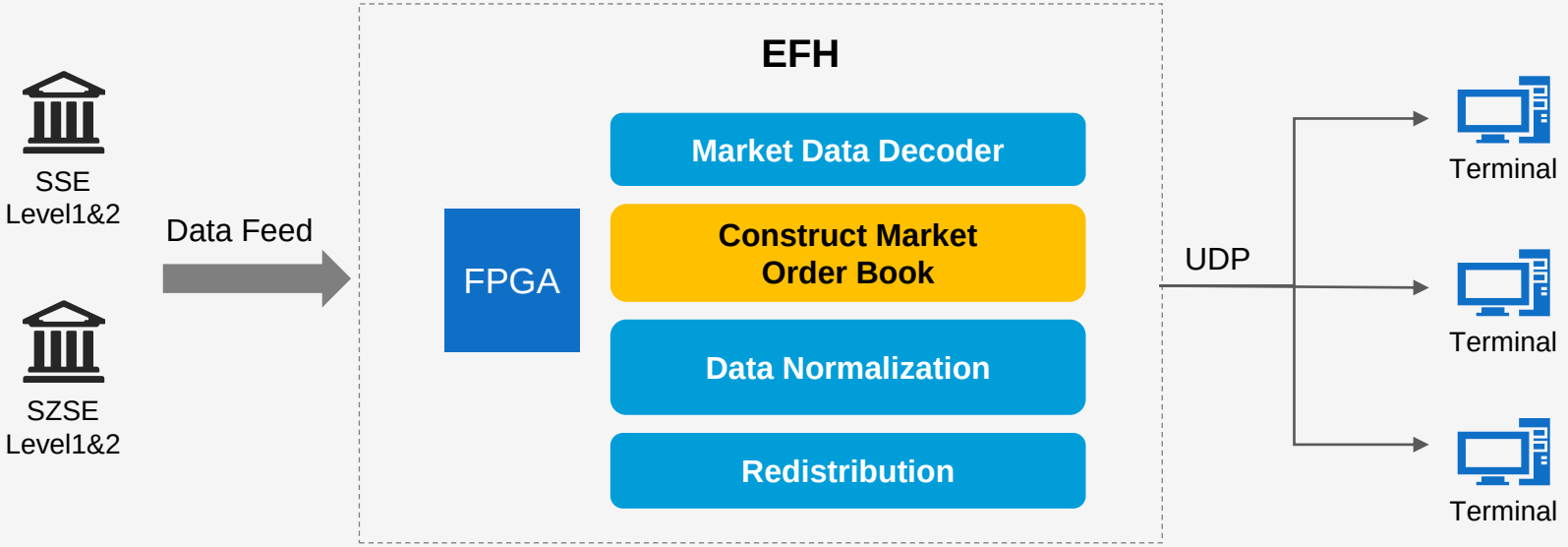

Shengli Solution - RiskGuard

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- RiskGuard is an ultra-low latency pre-trade risk control system developed by Shengli's team based on FPGA technology. The system is built entirely around preventing abnormal transaction risks.
- The system is deployed at the network link level, and customers are directly connected to the exchange gateway. It not only prevents quantitative investors and member companies from being warned or punished by regulatory agencies due to abnormal transactions, but at the same time can achieve ultra-low latency performance.

System Features

<500 ns average latency

System load capacity exceeds 1 million messages per second

Risk checks are completely performed in hardware

Over 20 transaction compliance checks

Rapid deployment without affecting the current business

Technical Highlight 4: Improve Performance and Simplify Deployment

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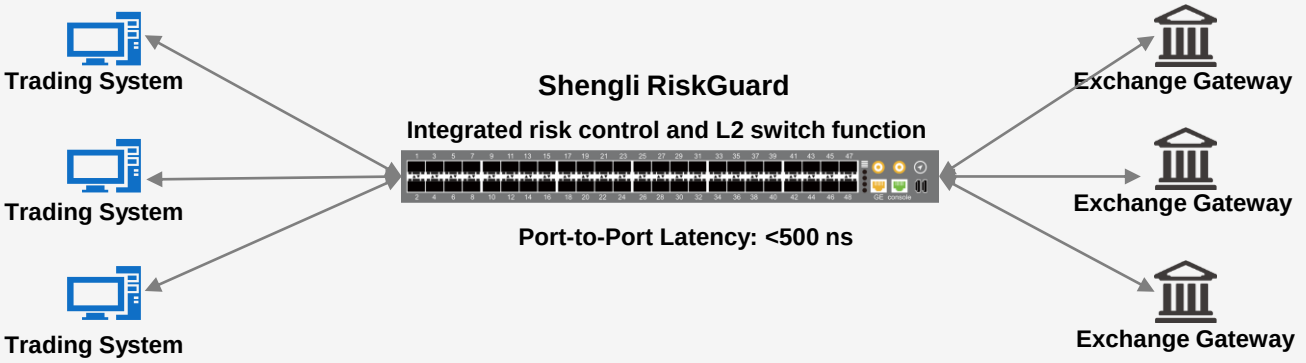
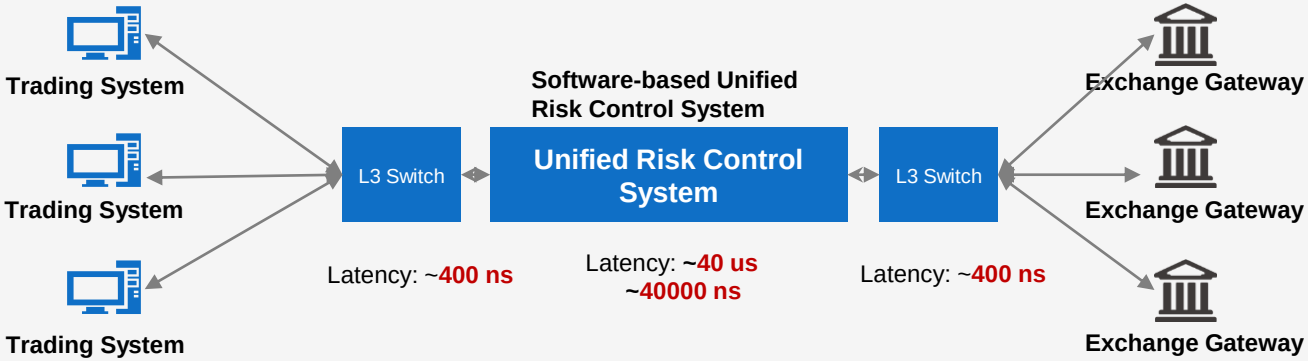


VS



Not STAC Benchmarks

Lessons

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- Be adaptive
- Be prepared to deal with imperfect or no information
- Be imaginative with your solutions
- Be prepared for the worst, because anything can happen

THANKS! -

TRADE WITH EDGE

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