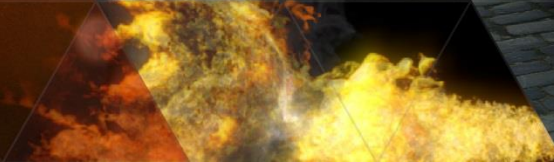
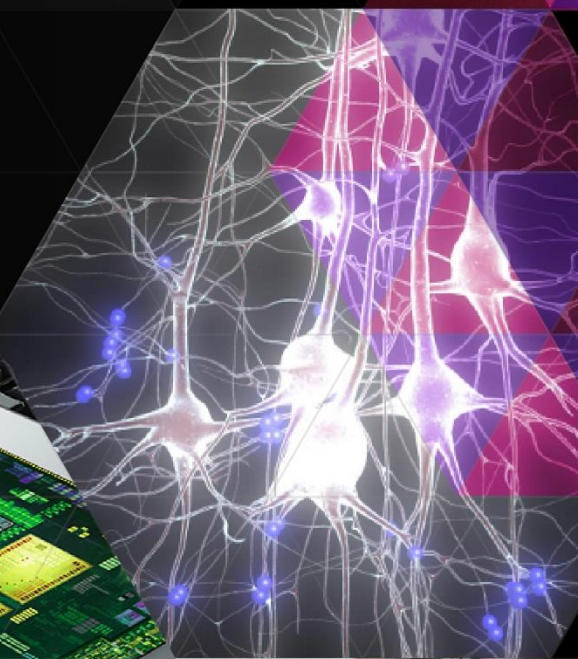
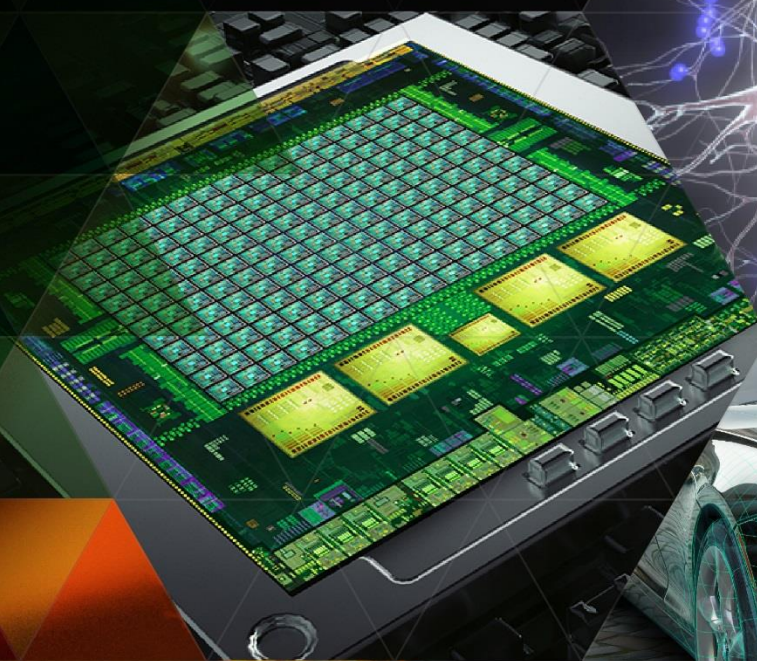




# STRATEGY OPTIMIZATION ACCELERATOR

Babak Barkhordar  
Product Manager

N2N



# Board of Directors



N2N

*COMPANY  
HIGHLIGHTS*

# TRADING STRATEGY

## Pair Trading: How it works!



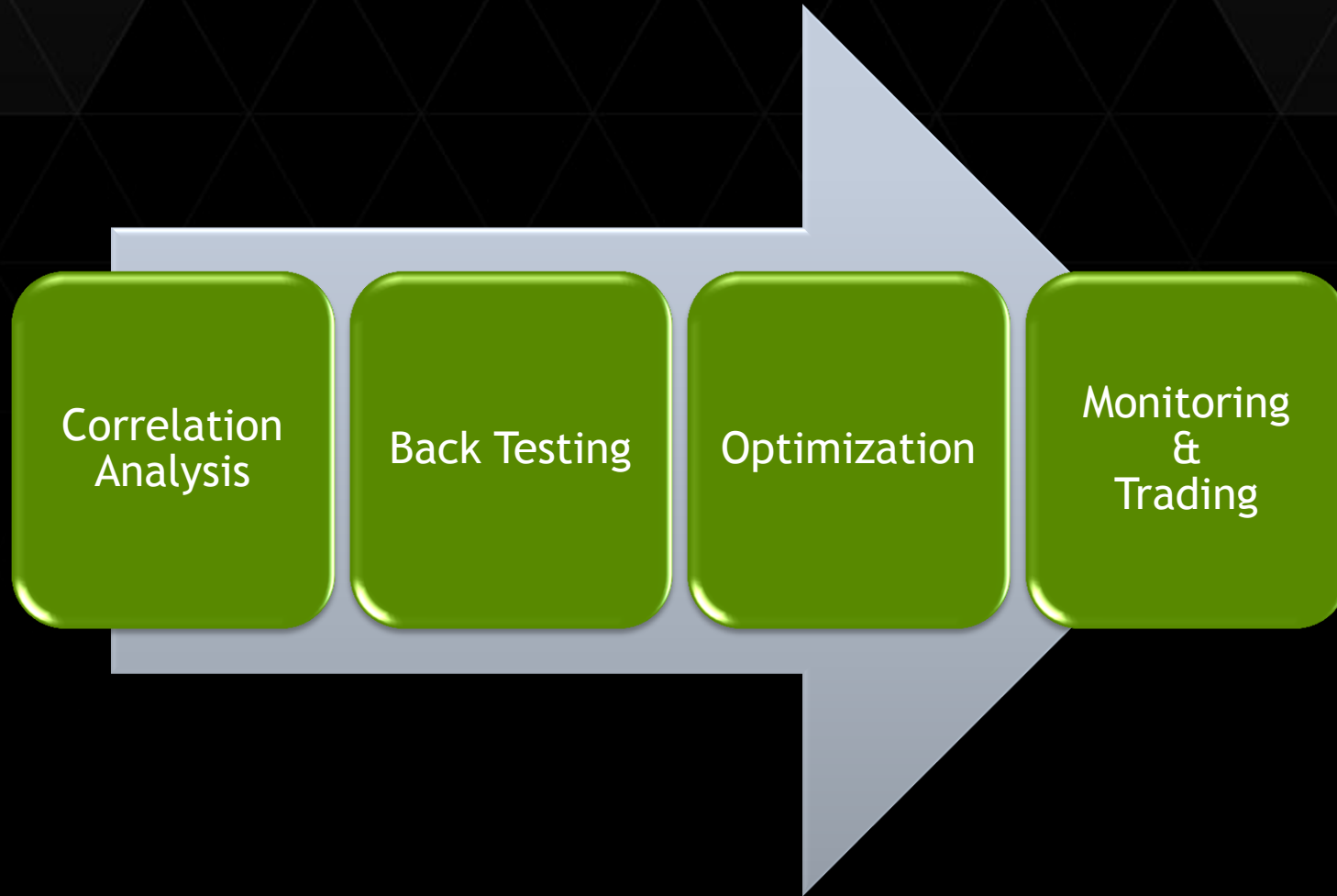
**SingTel vs. StarHub**

# PAIR TRADING STRATEGY

## Benefits

- ▶ Consistent trading profit
  - ▶ Profitable regardless of **market direction**
- ▶ Smaller drawdowns
- ▶ More control on Risk
  - ▶ Avoid **directional** risk
  - ▶ **Hedge** sector and market risk

# STEPS TO IMPLEMENT PAIR TRADING



# PAIR TRADING

## Problems

▶ Back Testing: **Heavy Computation**

# Stocks	# Pairs	Time (Sec.)	Time (Min.)
2	1	4	0.06
10	45	180	3
100	4,950	19,800	330
800	<b>319,600</b>	1,278,400	<b>21,307</b>

$$\#Pairs = \frac{\#Stocks \times (\#Stocks - 1)}{2}$$

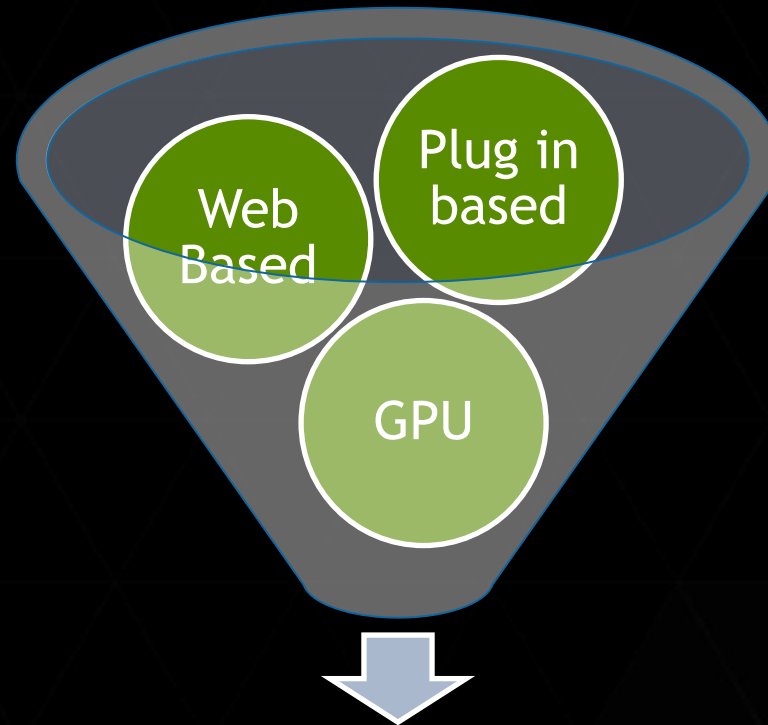
# PAIR TRADING

## Problems

- ▶ Optimizing: **Enormous** Parameters' combinations

Parameters	Start Value	Increment	End Value	# Possibilities
Moving Average	5	1	100	95
Standard Deviation	5	1	100	X 95
Entry Threshold	2	0.01	4	X 200
Exit Threshold	0	0.01	2	X 200
<b>Total Combinations</b>				= <b>361,000,000</b>

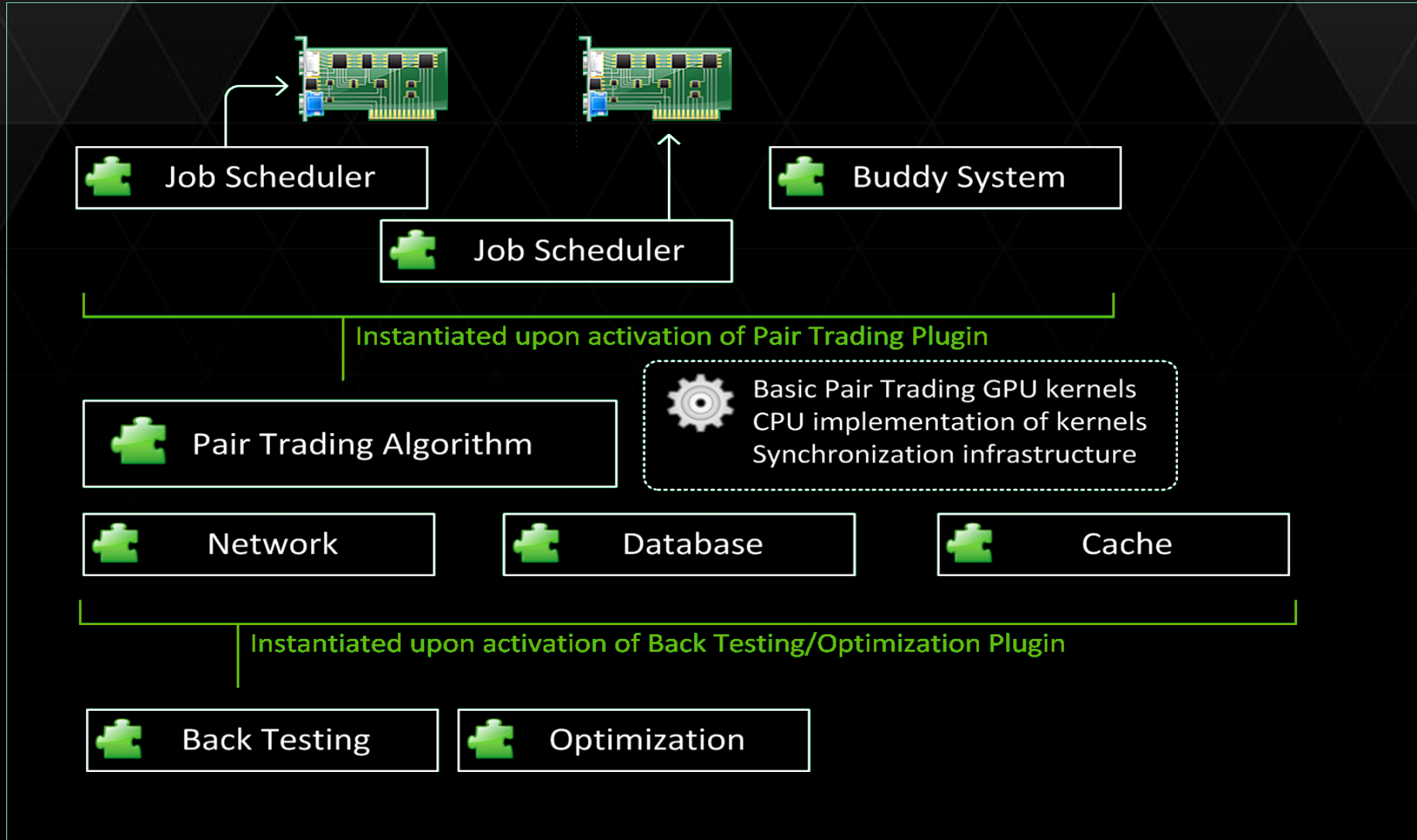
# INNOVATIVE SOLUTION



**N2N Strategy Optimization Accelerator**



# INNOVATIVE SOLUTION

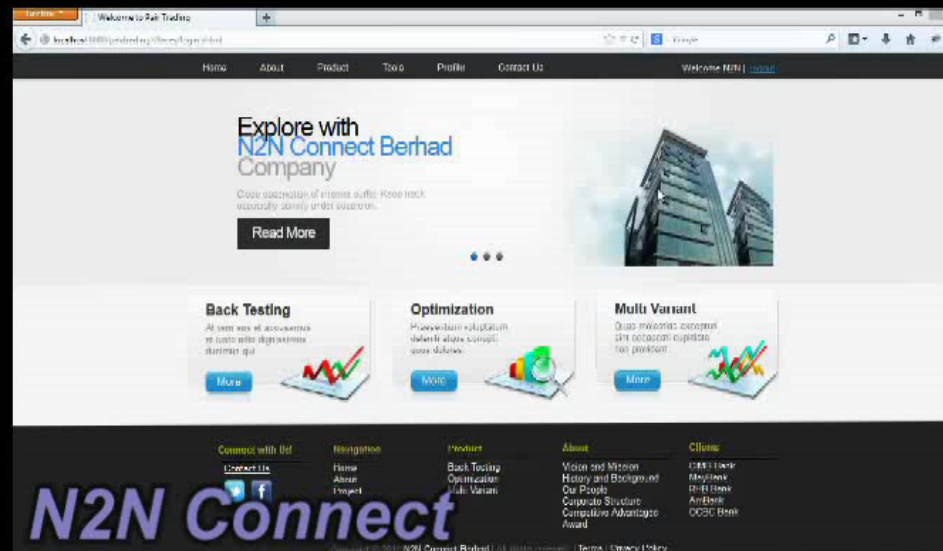


# OUTCOMES

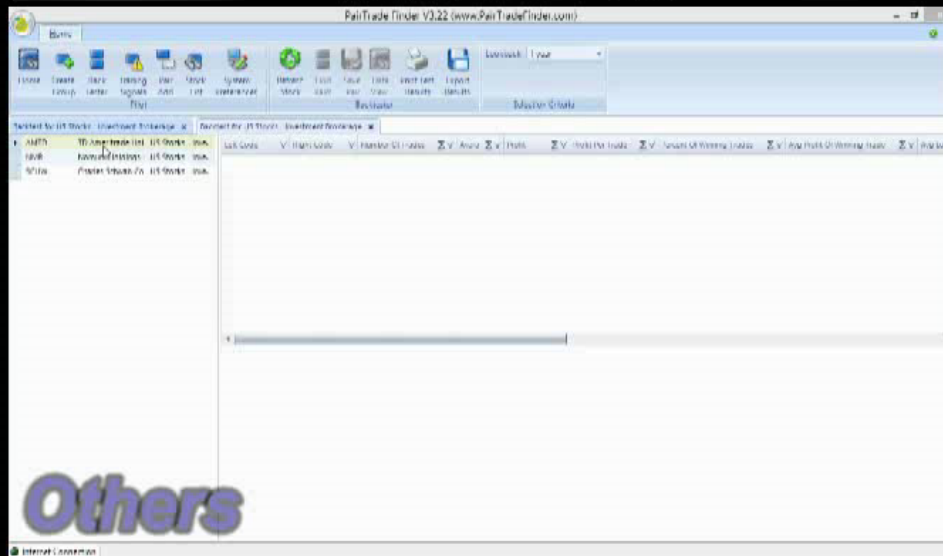
## Technical Outcomes

- ▶ Increase processing Speed, **10 times**, by:
  - ▶ Using **GPU** Technology
  - ▶ Utilizing **Particle Swarm Optimization** Algorithm
- ▶ Provide **fairness** among users through **Scheduler**
- ▶ GPU **memory management** and **segmentation**

# DEMO BACK TESTING



13 Stocks  
Total: 78 pairs



3 Stocks  
Total: 3 pairs

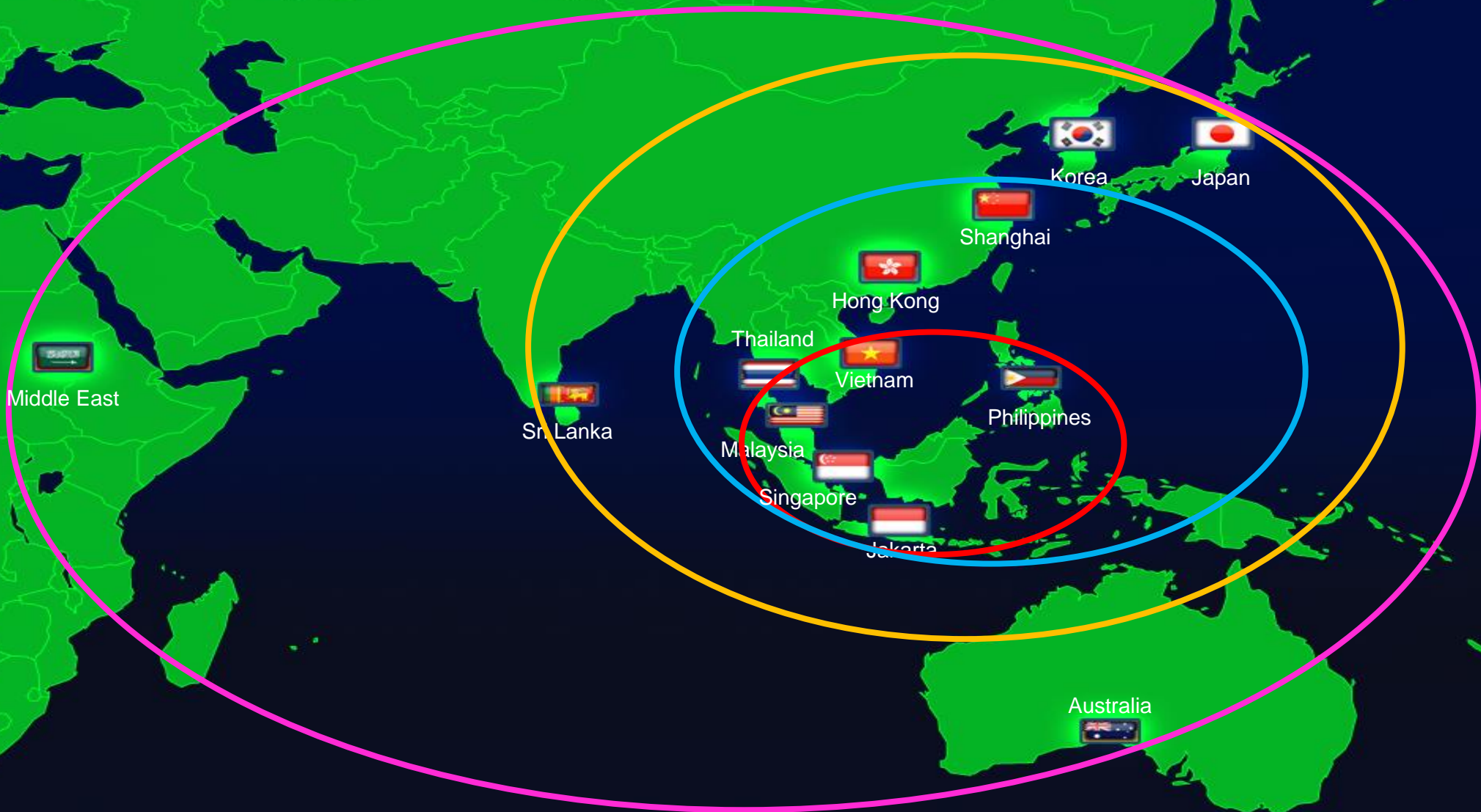


# OUTCOMES

## Business Outcomes

- ▶ **High performance web based** application
  - ▶ Support concurrent users across the world
- ▶ **Pooled** back testing
- ▶ **Optimization** Solution
- ▶ Supporting **Malaysia & Asian** stock markets
- ▶ **Expandable** to other strategies

# COMMERCIALIZATION ROADMAP





CIMB Investment Bank Berhad



Hwang DBS Investment Bank Berhad



Am Investment Bank Berhad



JF Apex Securities Berhad



PM Securities Sdn Bhd



FA Securities Sdn Bhd

*Potential Customers*



*Multivariate Pair Trading*  
*Looking into Advanced Strategies*



*THANK YOU!*