

Capacity. Persistence. Performance.  
Scale-in Software for Capital Markets Computing



# Challenge: Maximizing modern hardware

## Negative impacts of RAM limits, disk I/O and accelerator I/O:



**1**

**RAM limits require more hardware and more time splitting data and distributing jobs**

**2**

**Persisting work-in-progress relies on storage I/O, which slows everything down**

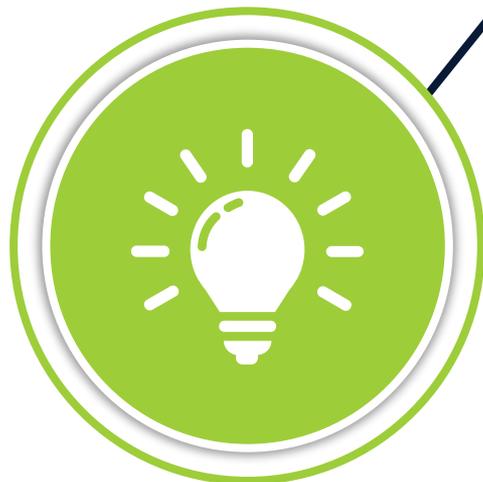
**3**

**Low-level programming is needed to optimally feed HW accelerators**

# Solution: RAM-level performance using NVM



Helium is an ultra-fast system software that solves all three problems:



1

High-performance system-level data access software that emulates RAM using SSDs, expanding addressable memory into the tens of terabytes

2

Provides persistence with negligible performance penalty while allowing multiple uses of data dictionaries

3

Lets applications bypass OS to address FPGAs & GPUs without complex, low-level coding

HELIUM™

# Process More Data, Faster



With Helium, you can:



1

**Dramatically expand direct access to data without adding servers, or...**

2

**...achieve current performance levels at a fraction of the price\*, and...**

3

**...put server-level capability on workstations or laptops**

\* A server with 1TB of SSD is about ¼ the cost of one with 1TB of RAM

# Use Cases



Financial risk analytics



Persistent data frames  
(Python/Spark)



Financial back testing



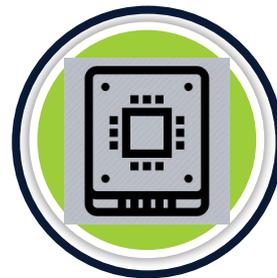
IOT data ingest and  
indexing



Java object persistence  
(hibernate)



Blockchain and DL



Storage engine for SSD  
optimized DBs



Time series DBs

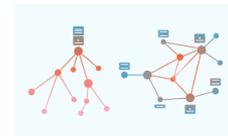
# Use Case: Blockchain

Distributed ledger technology is built on blocks and transactions pointing to each other

These pointers are typically saved using databases like RocksDB or LevelDB

A single transaction might consist of thousands of DB lookups and inserts

**Helium as the storage engine dramatically increases transaction rates, reduces latency and jitter**



**>10X Increase**

# Use Case: Backtesting in the Cloud

Cost of 1M Sim/Hr of “conventional cloud” with Helium vs without:

**AWS Nodes**

**Annual  
Operations  
Cost**

**\$1.1M**

**Cost per  
Simulation**

**\$0.00012**

**- 40%**

**AWS Nodes w/Levyx**

**\$650K**

**\$0.00007**

*Not STAC Benchmarks*

# Helium Implementations



# Business Benefits



## Freedom

Through dramatically expanded addressable application memory



## Confidence

Through automatic persistence



## Efficiency

Through concurrent access to the same data dictionaries by multiple users



## Speed

Through optimized data flow for maximum CPU/FPGA/GPU processing utilization



## Savings

Through leveraging lower cost SSD over higher cost RAM

# Thank You

Visit <https://helium.levyx.com> to try the community version of Helium



Levyx