Scalable & Smart Storage Class Memory Layer for Big Data

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Analytics Needs to be **FASTER** to be Part of Active Business Operations

Apps

Analytics

- Multi-Device Testing
- Continuous Integration
- Continuous Deployment
- Data Exhaust
- App Tuning
- Data Ingest
- App Use
- Predictive Modeling
- BI & Reporting
- Exploration
- Data
- Agile Development
- Feedback
- Development

Needs to be FASTER to be Part of Active Business Operations.
Making Analytics OPERATIONAL

It is **NOT** your traditional (Historical) analytics...

- Part of **minute by minute** business operations
- More complex, **more moving parts** - not just a few batch jobs
- Aggressive SLA’s; system must **run at the speed of business**
What are the CHALLENGES?

• Re-computing lost data on failure causes work pauses

• Staging and swapping working sets is too slow

• All engines want to control resources, but need to work in concert

• Compute needs lots of Memory (RAM)!
How can we **MEET** these Challenges?

- Staging and swapping data must be **RAM fast**

- But **RAM** for compute engines must be **plentiful**

- **High concurrency** to support complex work flows

- **Mitigate spikes** and thrash

- **Distributed visibility** of activity across compute clusters
Reducing the **FRICTION** needs...

Storage Class Memory & Fast Network Fabrics

- Enabling a solution for operational deep analysis workflows
- Store intermediate data and swapped data frames and sets in SCM
- Able to modify and do pre-work on SCM based data
- Swap and manage active and ready sets using SCM
- Move from SCM to SSD to mechanical disk in background
The New Memory Stack

- L1 Cache: Active working sets, compute
- L2 Cache: Waiting sets, hot meta data
- L3 Cache: Staged in/out data, ready sets
- DRAM: Archival data (archival memory)
- SCM
- SSD
- Spinning Disk

Speed & Cost vs. Capacity
Managing the Memory Zoo

About time for a layer to manage it all?

• Why can’t one compute framework (e.g. Spark (Tungsten)) do it?

• Separate code memory management and in-memory accelerators

• Balancing and QoS management needs complete distributed visibility

• Allow best of breed, emerging and custom solutions

• Standardize interfaces to allow multiple vendors
Distributed smart memory layer... supporting multiple systems
Handling **MULTIPLE** needs in one fabric

Early stages (ingest, ETL)

Later stages (data driven insights & actions)

Need for High Throughput

Need for Low latency

Analytics Work Stage
Leveraging the COMMON GROUND

- Fast, resilient to faults, highly concurrent, predictable performance
- Greater scale in workloads per cluster
- Cluster multi-tenancy can work (in the real world) and provide SLA’s
- Promotes a vibrant ecosystem
- Reduces duplicate work for memory mgmt. and common functions
... FAST OPERATIONS across the pipeline for Multiple Concurrent Apps ...
Reducing FRICTION in your Analytics
PLUGGABLE distributed memory layer ...

Smart Distributed In-Memory Object Store
... for MANAGED FLEXIBILITY...

- Flexible regions and interfaces for ‘Best of breed’ engines
- Extensible Core
- Pluggable stores
...and FAST OBJECT ACCESS across the pipeline
### Building on a PROVEN In-memory Technology

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#### API’s
- Metadata/Catalog
- Smart Data Tiering
- High Throughput
- Table Stores

#### Features
- Tunable Consistency
- In-Memory Distributed Sys
- Low-latency Comms.
FAST OBJECT ACCESS across the pipeline...

Ingest → ETL → Analytics → App Use

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PLE × ISTOR

...TOTAL PERSISTENCE: fast recovery on fail!
DEMO: FRICTION vs. FRICTIONLESS Analytics

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PLEXISTOR

Performance Metrics

Dashboard (Freeboard.io)
Thank You!

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