



# Architectures for Accelerating IO with Flash for Key Financial Services Workflows

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# DDN | The Leading Supplier to HPC, Data Intensive Global Enterprises & Web/Cloud

## History

Founded in '98

World's Largest Private Storage Company  
Double Digit Growth, Profitable, Self Funded  
Global Development & Sales Presence

## Headquarters

Santa Clara and Chatsworth, CA

## Financial Services

Powering 40% of Leading  
Global Investment Banks



World-Renowned & Award Winning



# Adding Flash Where it Counts - Options

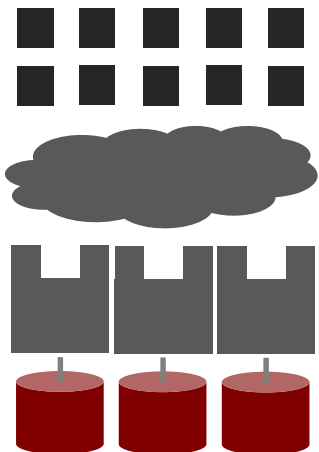
1

## All SSD PFS

PFS HSM for Data Tiering to HDD namespace

Generic PFS I/O

Millions of Read and Write IOPS



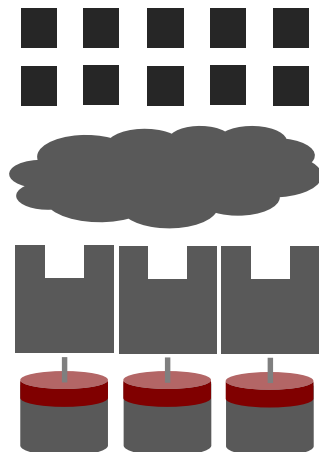
2

## Read+ Cache (SFX)

Block-Level Read Cache

Instant Commit, DSS, fadvice()

Millions of Read IOPS



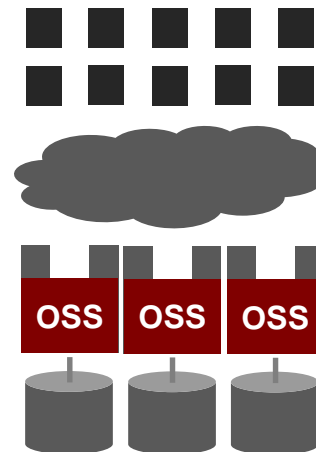
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## File Heat

PFS-level Read cache

Heuristics with **FileHeat**

Millions of Read IOPS



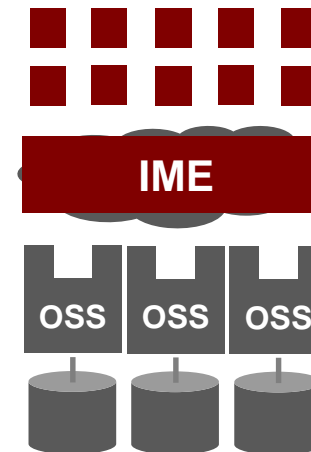
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## Burst Buffer (IME)

I/O level Write and Read Cache

Transparent + hints

10s of Millions of Read/Write IOPS



# Parallel FS Deliver Unmatched Acceleration for Key Financial Services Workflows



Up to **240% faster**  
FSI back-testing and  
risk management

*Comparing STAC audited results  
KDB150528 vs KDB121101 (STAC-  
M3.β2.1T.YRHIBID )*



**452%** faster application  
performance for risk  
management and  
analytics

End User Production Results.  
Not STAC Benchmarks



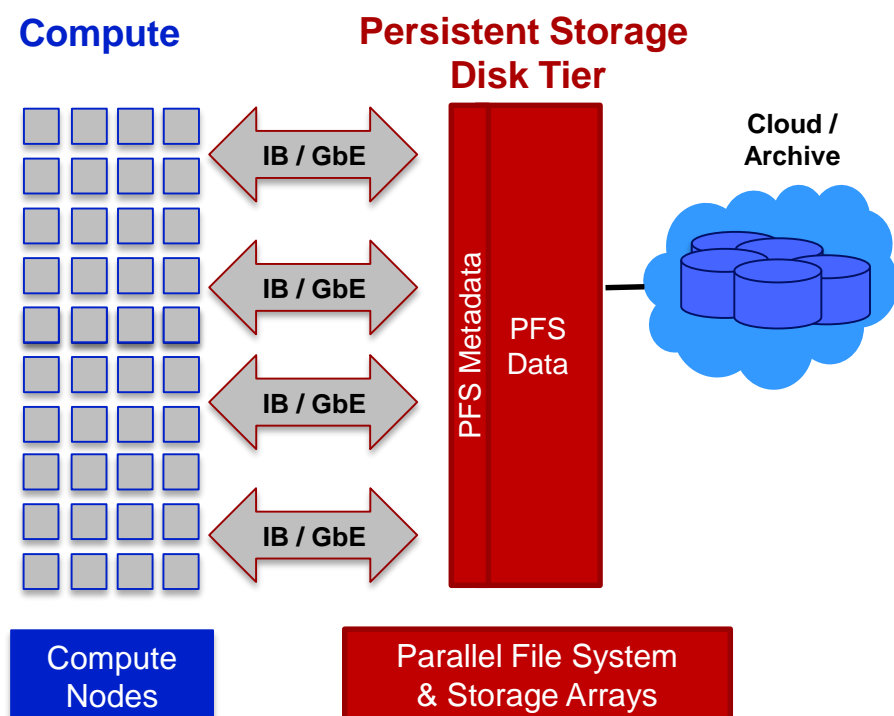
1-Trillion Row  
**Big Data Queries**  
in less than 20s.

End User Cited Results.  
Not STAC Benchmarks

# The Power of Parallel Systems

## Many Times Faster than Traditional Architectures

**PFS Powers > 40% of The World's Largest Financial Services Firms**



### ► Delivers Faster Results

- Integrate Data Silos
- TB-PBs of Data
- 100s – 10,000s of Cores
- 10,000s of SIMULTANEOUS queries
- Extreme Performance and Infrastructure Scalability

### ► Demand Driven Scaling

- Supporting 10,000s of clients
- Easy Scaling of Infrastructure

### ► High Productivity

- Higher density solution = Lower data center footprint
- Seamless Data Management

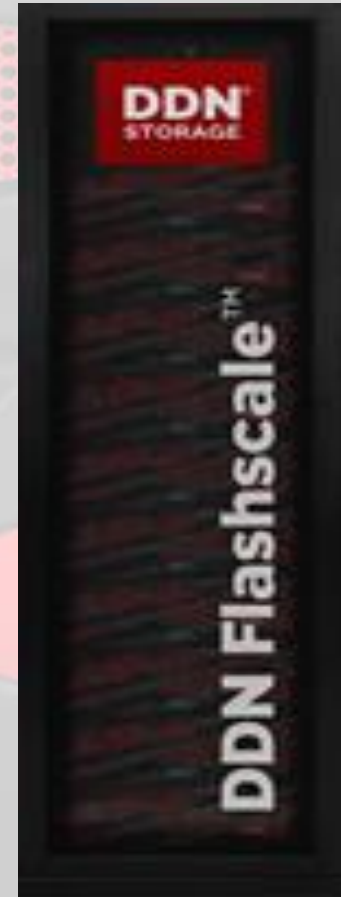
**What is Flashscale?****The Fastest Scale Out & Scale Up All Flash Array  
For Both IOPS & Bandwidth Acceleration**

**SSD FOR MIXED  
WORKLOAD BLOCK &  
FILE SYSTEM**

- **FASTEST, LOW LATENCY & BEST COST SSD**
- **Up to 600GB/S & 6M IOPS, up to 5 PB/RACK**

**Select Flashscale Use Cases**

- **Large Unstructured Data Set Acceleration**
  - Real time analytics
  - IOT Analytics – sensor generated data
- **Complex Modeling**
- **Latency Sensitive Large Databases**



## What is IME?

- DDN Developed Software Technology
- Accelerates Applications & Workflows
- Functions as a High Performance Burst Buffer in Front of File Systems
- Uniquely Groups SSD Drives to Deliver Optimal Performance and Reliability

## Select Use Cases

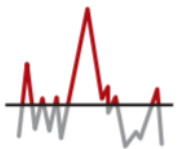
- Burst Buffer
- File System & Application Acceleration
- Read-Optimized I/O Acceleration

## Burst & Compute



- Up to 1000X APP & FILE SYSTEM SPEED UP
- PREDICTIVE BURST BUFFER
- Over 75 TB NVMe in 4U

**CACHE IS ONLY THE BEGINNING.  
RIGHT OUT OF THE BOX, IME DOES SO MUCH MORE ...**



### BURST BUFFER

Most cost & space efficient way to provision peak performance



### PFS ACCELERATOR

Lowers latency and remove POSIX bottlenecks



### APP OPTIMIZER

Dynamically aligns mal-formed I/O into striped writes without code mods



### CORE EXTENDER

Unlike DRAM, no dataset is too big for IME with TBs or PBs of fast, cost effective NVM

# Thank You!

Keep in touch with us



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