



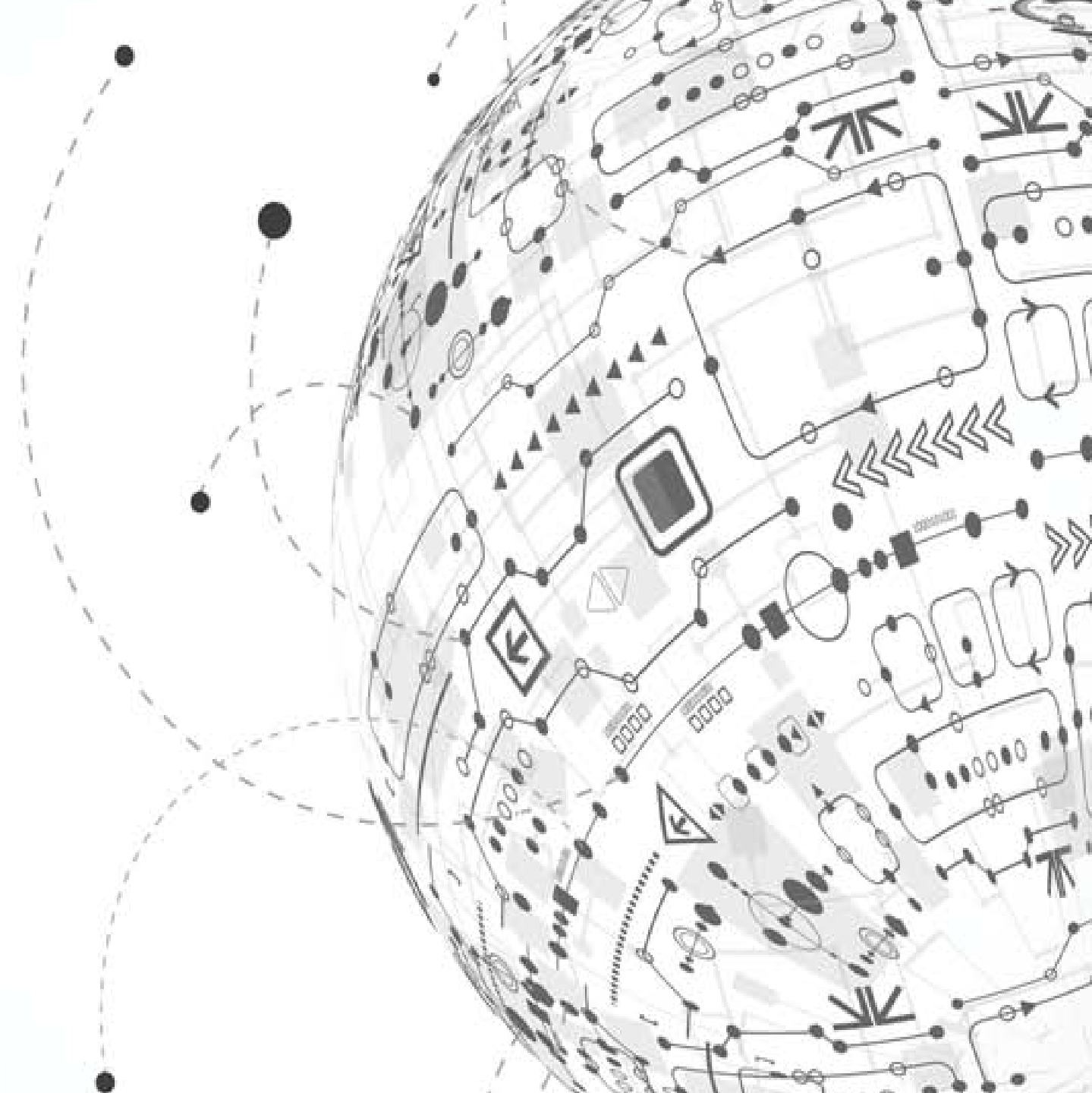
**VALLTERA**  
TECHNOLOGIES

**Game changing, Data Access  
Technology Platform**

**High-Performance Data  
Access Platform (HPDAP)**

[www.VALLTERA-Tech.com](http://www.VALLTERA-Tech.com)

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## **VALLTERA Tech - Platform**

Our platform increase the data access speed and go beyond today's hardware and software limitations.

- **VALLTERA EIO X1 Storage accelerator Appliances scale to:**
  - 100 millions of IOPS (competition only 300 thousand IOPS)
  - Terabytes per second throughput
  - Capacities to the Exabyte level

## **Worldwide best specifications!**

- **VALLTERA BIGData E Storage line 3.5" HDDs and/or SSDs**
- **VALLTERA FASTData V Storage line 2.5" HDDs and/or SSDs**

## **VALLTERA Tech – IP Protection**

- **Our Technology has been protected and patented - USA Patent Law Framework**
- **Additional patents have been filed**
- **Currently several patents in the stage of development**
- **The IP protection for the next 20 - 30 years**
- **Possible patent infringements enable additional income - penalties and license sales**



**VALLTERA**  
TECHNOLOGIES

## **VALLTERA EIO X**

**High-Performance Data Access  
Platform (HPDAP)**



## Unix Power Tools - O'Reilly

“The disk and network subsystems are particularly important to overall performance. Disk bandwidth issues have two general forms:

- maximizing per–process transfer rates and
- maximizing aggregate transfer rates.

- The per–process transfer rate is the rate at which a single program can read or write data
- The aggregate transfer rate is the maximum total bandwidth that the system can provide to all programs that run.”



## Data Storage Performance Limitation

### ▪ Computer Data Storage

- **Primary storage** directly accessible to the CPU (main memory or internal memory)
- **Secondary storage** is not directly accessible by the CPU (external memory or auxiliary storage)

### • Data Access Technology

- **Data Access Device or System** that facilitates data movement between **primary** and **secondary** storage.



- **Performance Metrics**
  - Low Latency / IOPS Scaling
  - Peak Bandwidth / BW Scaling
- Data Sharing
- Capacity Scaling
- Cost Neutral Solution

Currently, NO Difference Between Network and Storage Traffic

## Problems related to legacy storage I/O

- Current approaches to moving data between primary and secondary storage:
  - Slow down application performance & consequently lower system utilization and ROI
  - Applications idle waiting for data to fulfill user requests (quality/level of service) - in GPC applications
  - Require additional engineering resource to mitigate slow data access - in HPC (David Knaak, LLNL, NERSC)

## How it is done today?

- Storage Area Network (SAN) traffic is treated the same way as network traffic
  - There are fundamental differences between storage and network traffic
  - Network traffic assumes moving data between two network nodes
  - Storage traffic assumes transferring data between primary and secondary storage



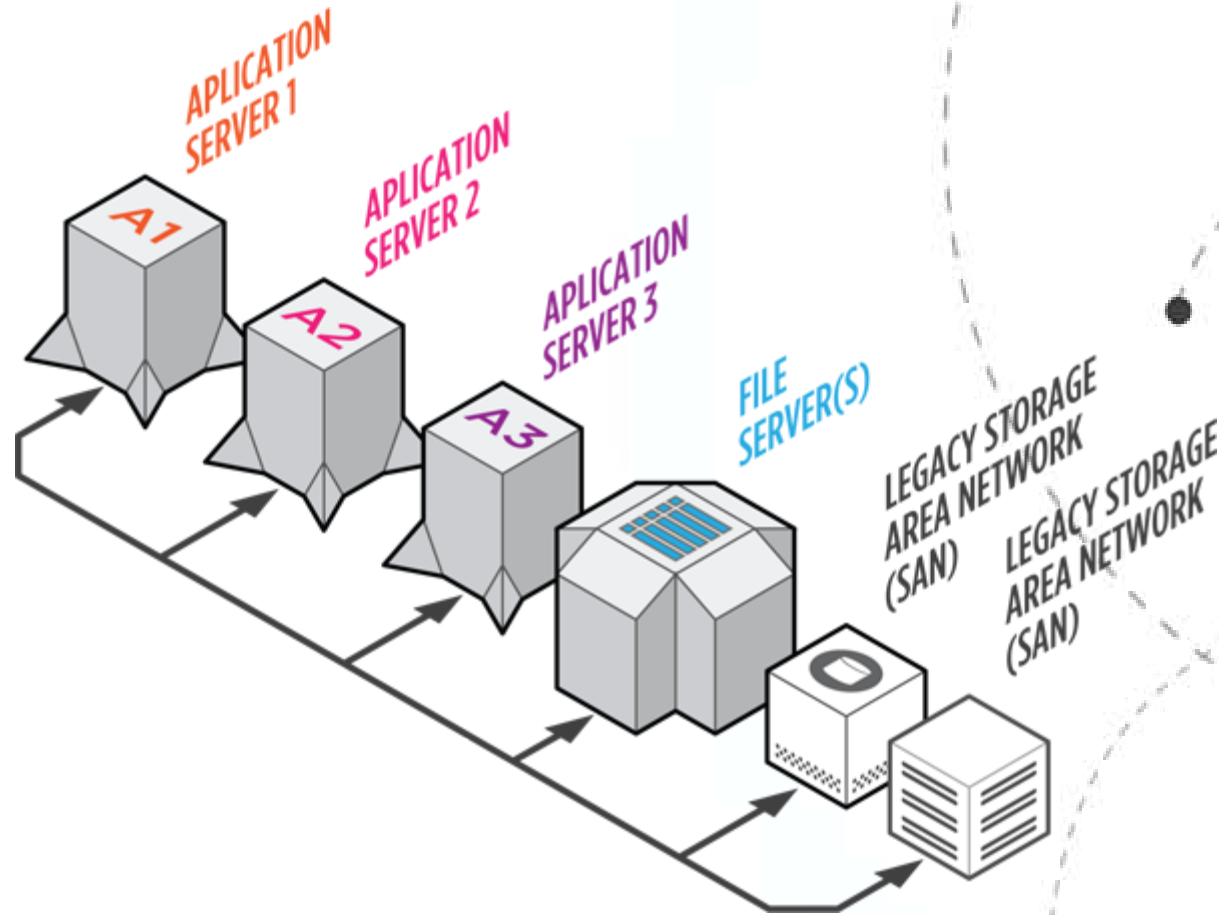
## Legacy Block Storage Performance Issues

- **Generally very high I/O latency**
  - An application has to wait for an I/O to complete (from 100s of  $\mu$ s to 10s of ms or even seconds) – limits number of transactions per second
- **Inadequate I/O bandwidth**
  - Application I/O is inherently bursty – SCSI, SAS, or FC bus/port speed bandwidth limit does not help
- **Limited scalability**
  - Traditional view – there is no need for very large number of clients accessing shared block storage  
(if there is a such need use Parallel File Systems)
- **Segmented LBA storage space**
  - Block storage space segmented and a LUN (typically) cannot be extended beyond a single controller

## Traditional Storage Implementation

### Key issues with traditional Raid:

- **High latency and low bandwidth** – causing
- significant loss of CPU cycles, wasting resources, time and energy (**money**)
- **Implementation and management complexity** – very labor intensive
- **High to very high costs** – causing low ROI



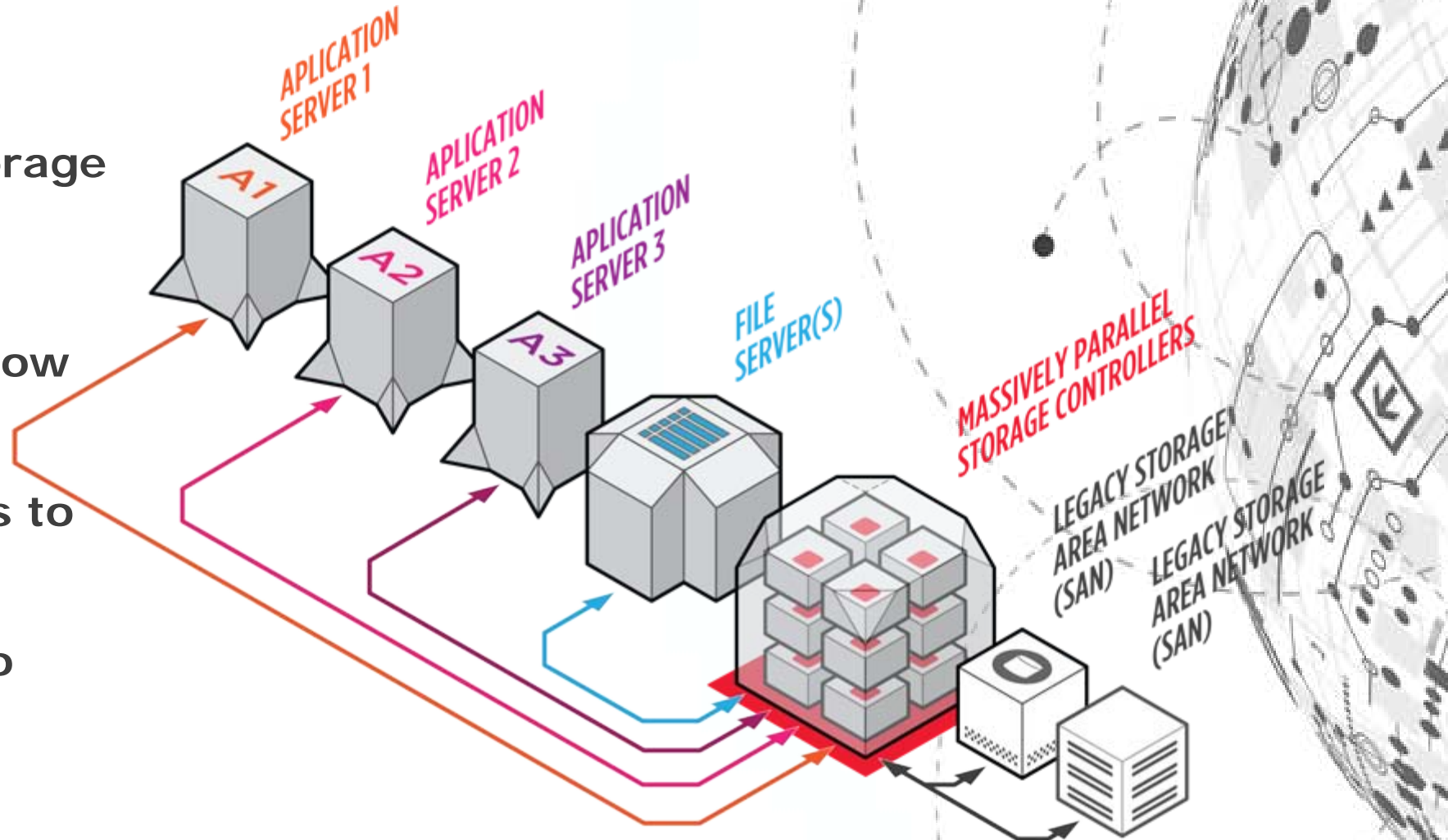
## VALLTERA Tech - The New Approach

- **Speeds up Data Access by redesigning the way data is transferred between primary and secondary storage**
  - New storage hardware architecture
  - New algorithms for efficiently moving data between primary and secondary storage to maintain data coherency across multi-node compute system
- **Community is moving to server caching approach using PCIe SSDs (this works only for read cache)**

## VALLTERA HPDAP - Paradigm Shift in Storage

HPDAP Storage Access Platform provides:

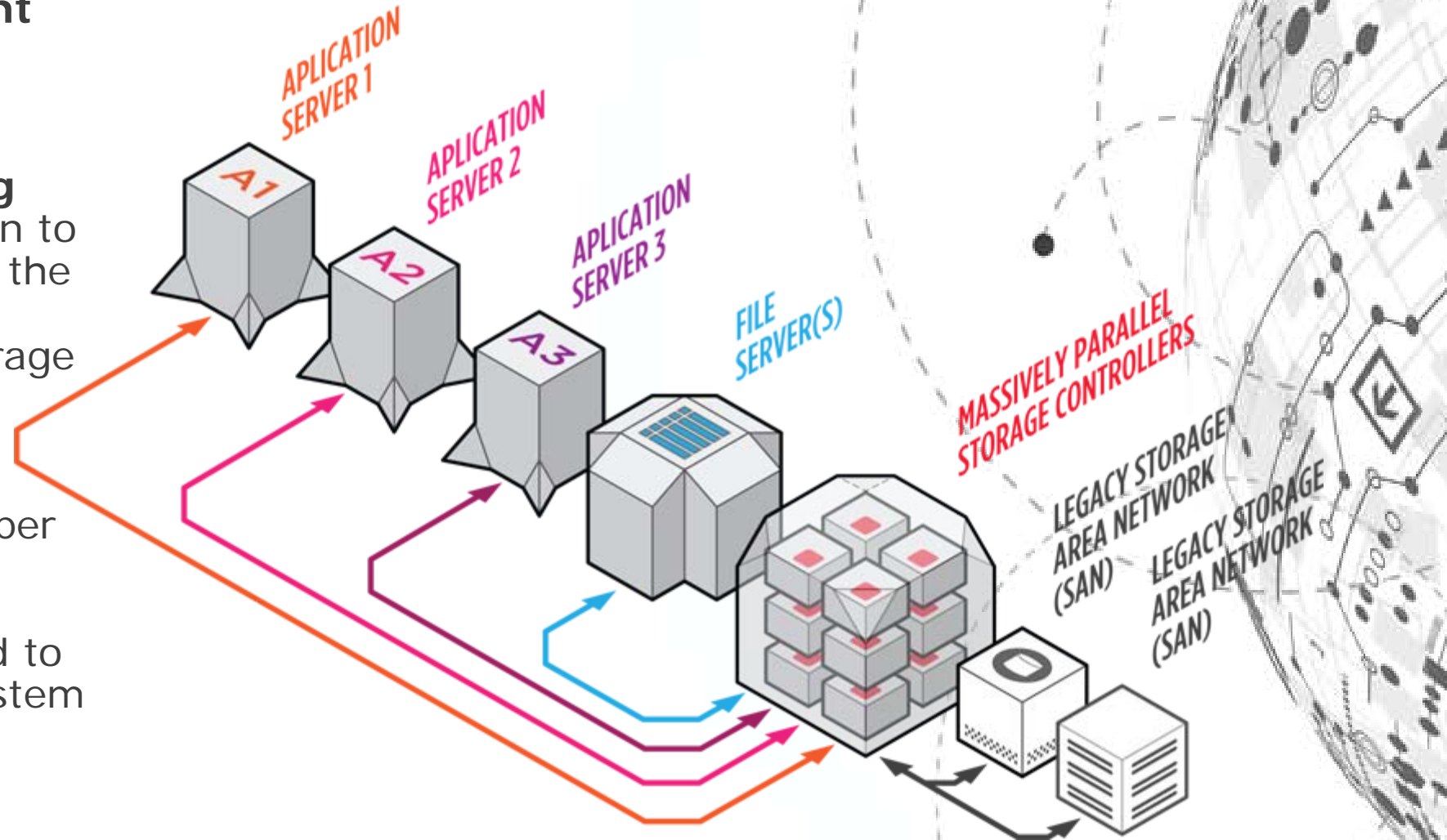
- Dedicated host-side storage controllers
- High performance for throughput, IOPs, and low latency
- Massively parallel paths to servers for data access
- Scale-out capabilities to meet any demands



## VALLTERA HPDAP - Paradigm Shift in Storage

Facilitates Data Movement Between Primary and Secondary Storage

- **Readily supports existing infrastructure** – in addition to tightly integrated solution, the technology can be readily integrated into existing storage and IT infrastructure
- **Superior performance** – 11GB/s and 250.000 IOPS per host controller
- **Ultra low cost** – compared to any comparable storage system



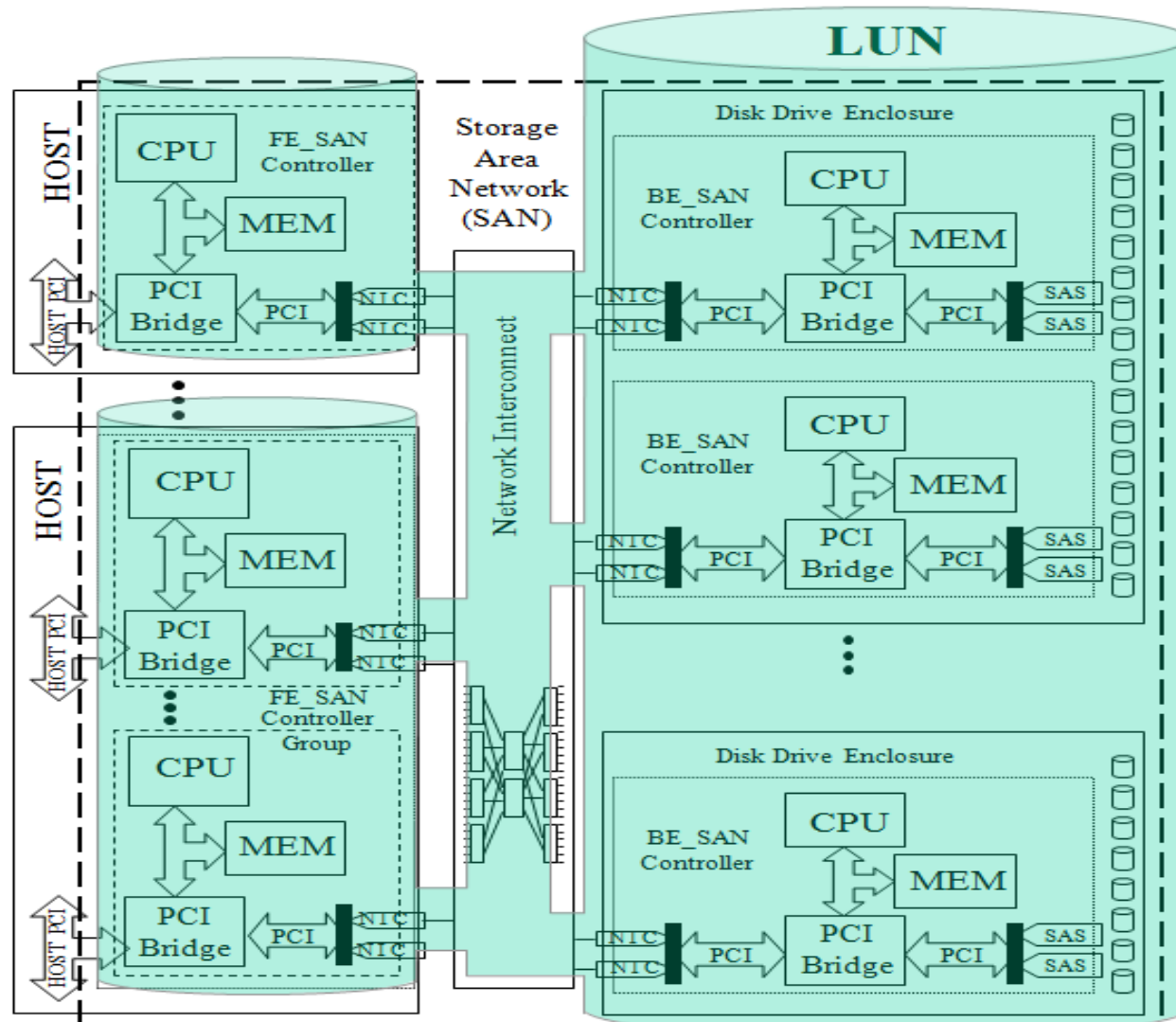
## **VALLTERA Tech - How to solve the problem?**

- **Replace existing Storage Area Network with High-Performance Data Access Platform**
  - Split traditional storage controller into host-side (FE\_SAN) controller and back-end (BE\_SAN) controller
  - Interconnect controllers via Storage Area Network
  - Attach BE\_SAN controllers to a traditional RAID systems or JBOD
- **The benefits of new data access paradigm**
  - Improved application performance
  - Better server utilization
  - Reduction in hardware cost (due to improved efficiency)
  - Lower acquisition and operating cost, TCO
  - Lower power consumption (CO2 footprint)
  - Cost neutral solution compared to traditional SAN environments (potential to become fairly cheap with increased volume)

## VALLTERA HPDAP - Paradigm Shift in Storage

### DAS/SAN Hybrid Storage

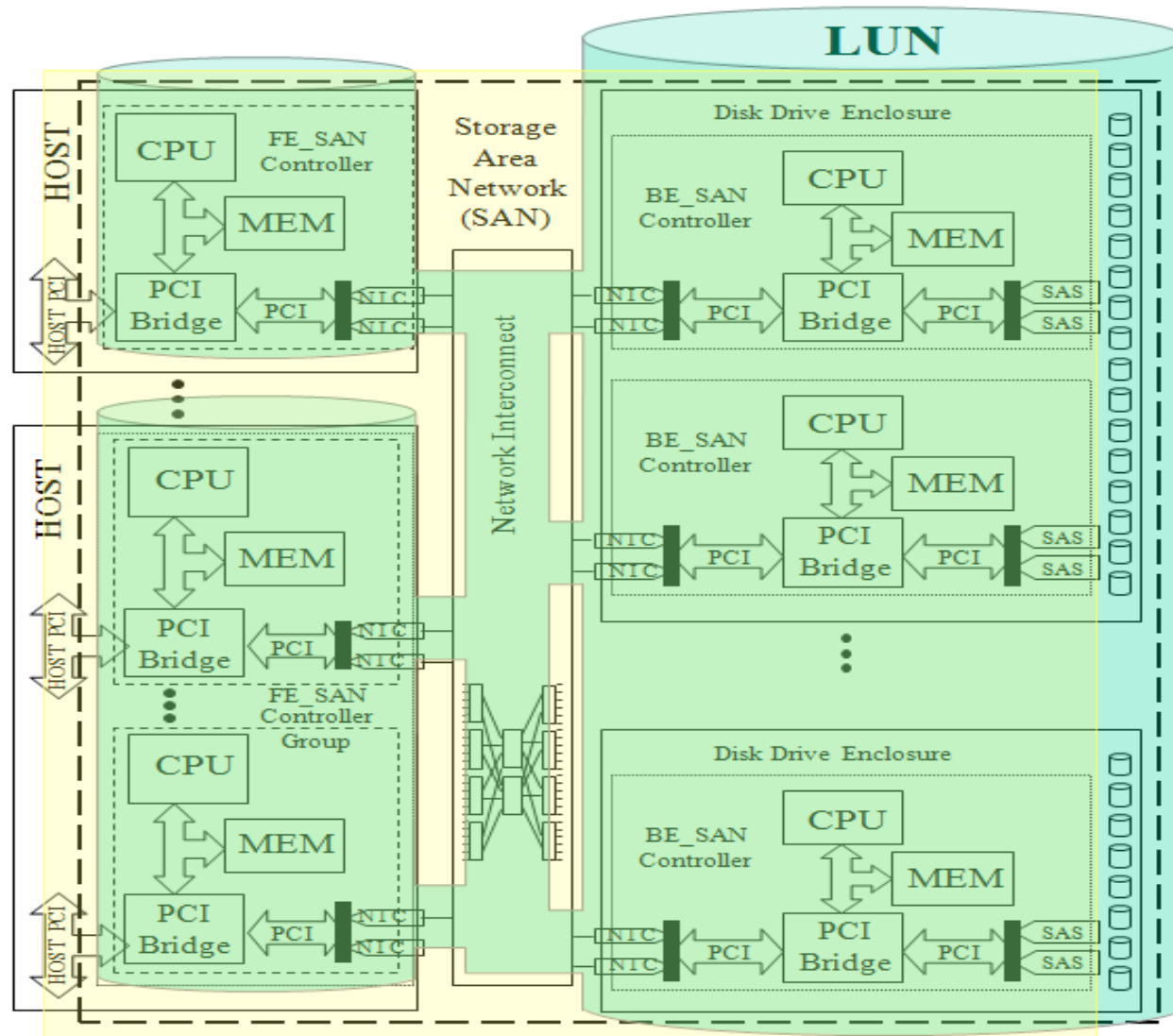
- **DAS – Host FE\_SAN Controller(s)** ↔
  - SCSI compliant host interface
  - I/O bandwidth limited by PCIe bus and memory technology
  - Intel Atom N2600 @1.6GHz delivers 250K IOPS +
  
- **SAN – FE\_SAN BE\_SAN Controller(s)** ↔
  - Distributed scalable LUN architecture
  - Simultaneous shared LUN access – data could be simultaneously written to the same LBAs



## VALLTERA HPDAP - Paradigm Shift in Storage

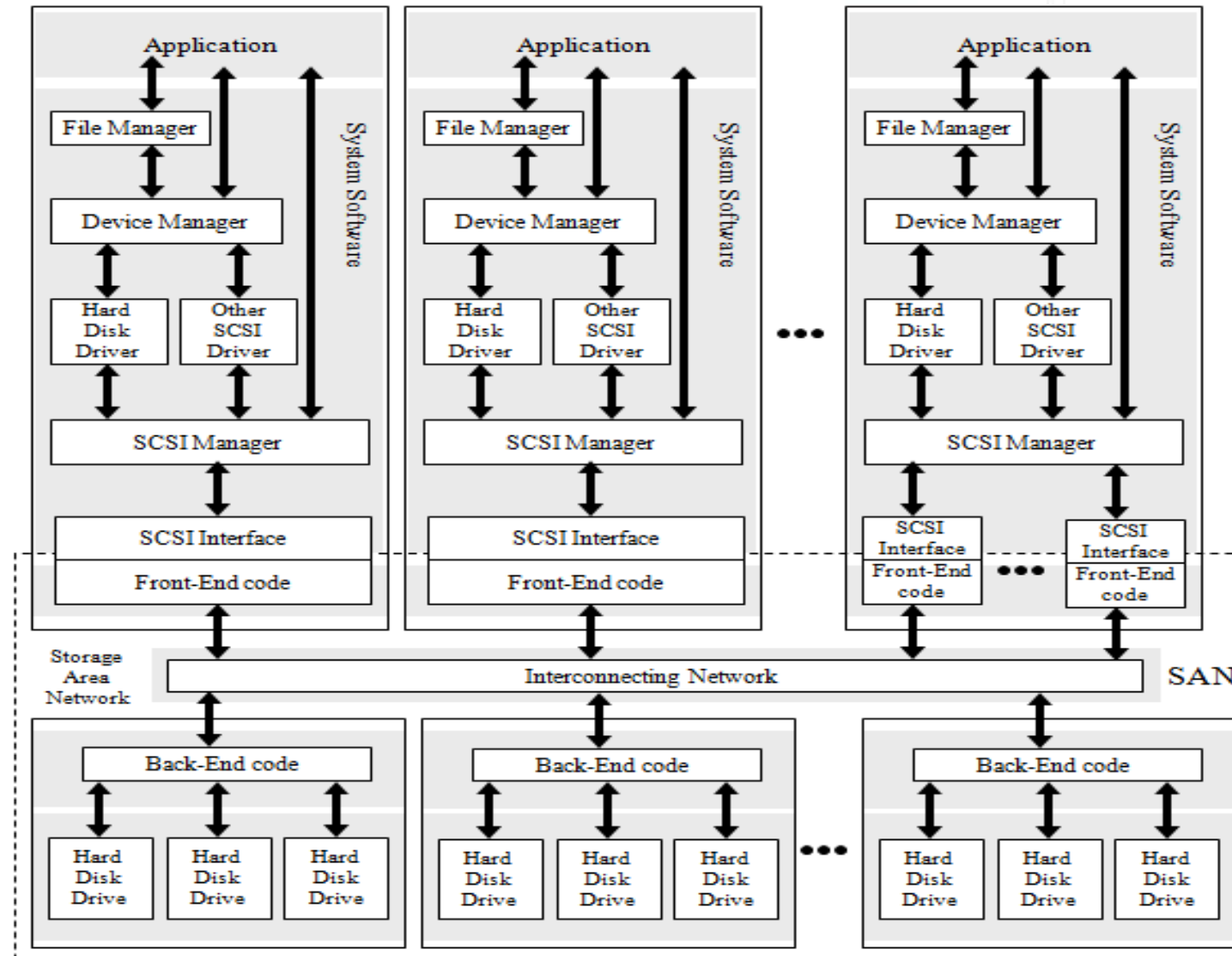
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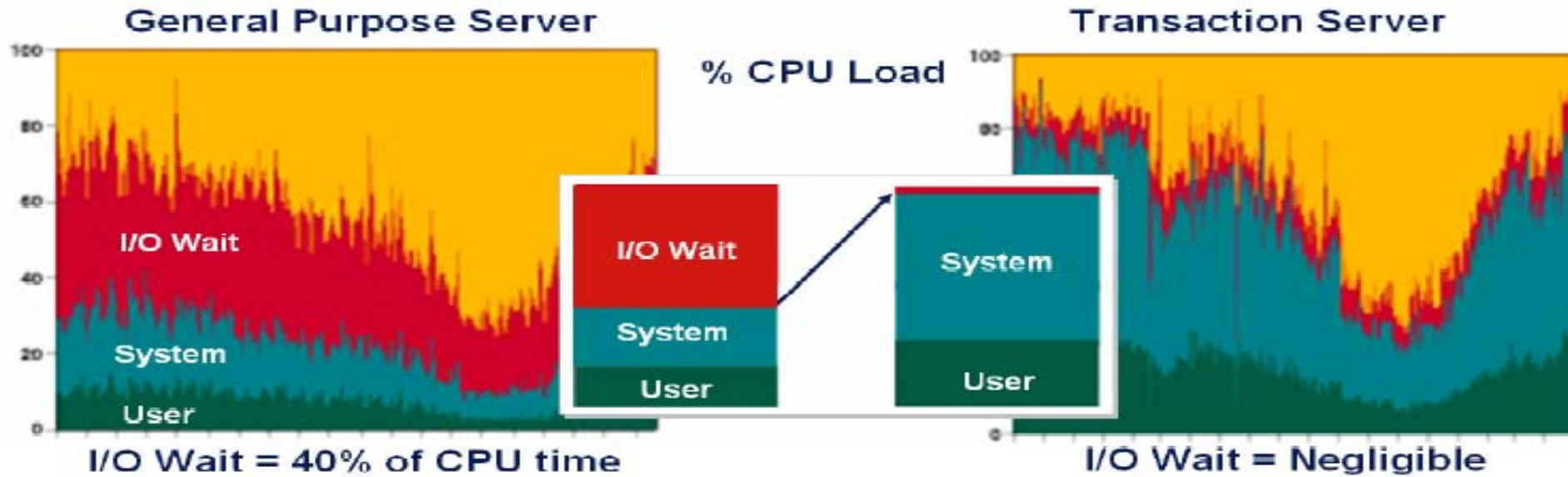




## System view of I/O related layers with HPDAP



## I/O Latency – Legacy vs. SSD (HPDAP)

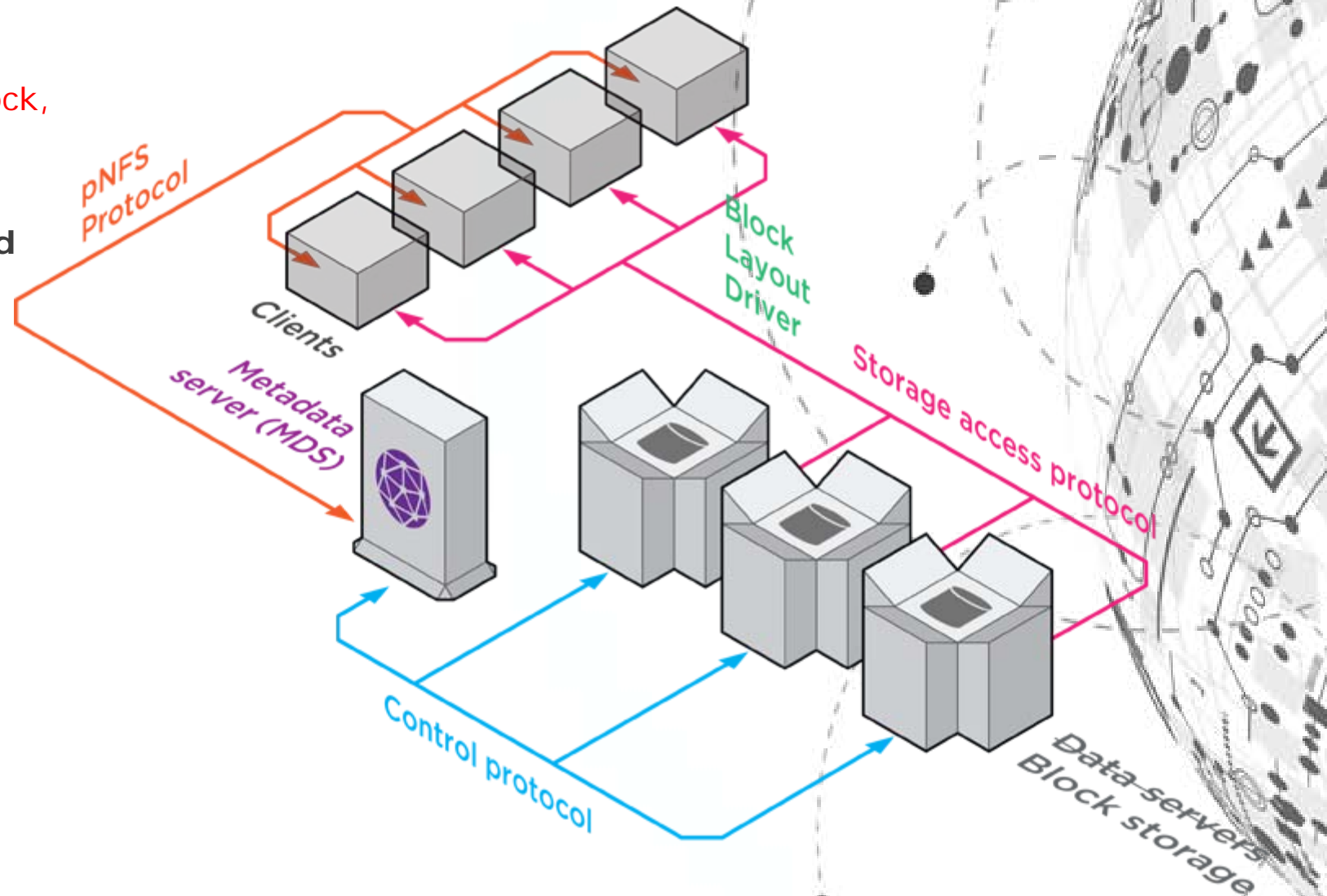


[http://www.soliddata.com/pdf/WP\\_IOSignatures\\_v3.pdf](http://www.soliddata.com/pdf/WP_IOSignatures_v3.pdf)

- SSD and HPDAP significantly improves CPU utilization for I/O intensive workloads
- Increased productivity (accomplish more with fewer hardware resources)

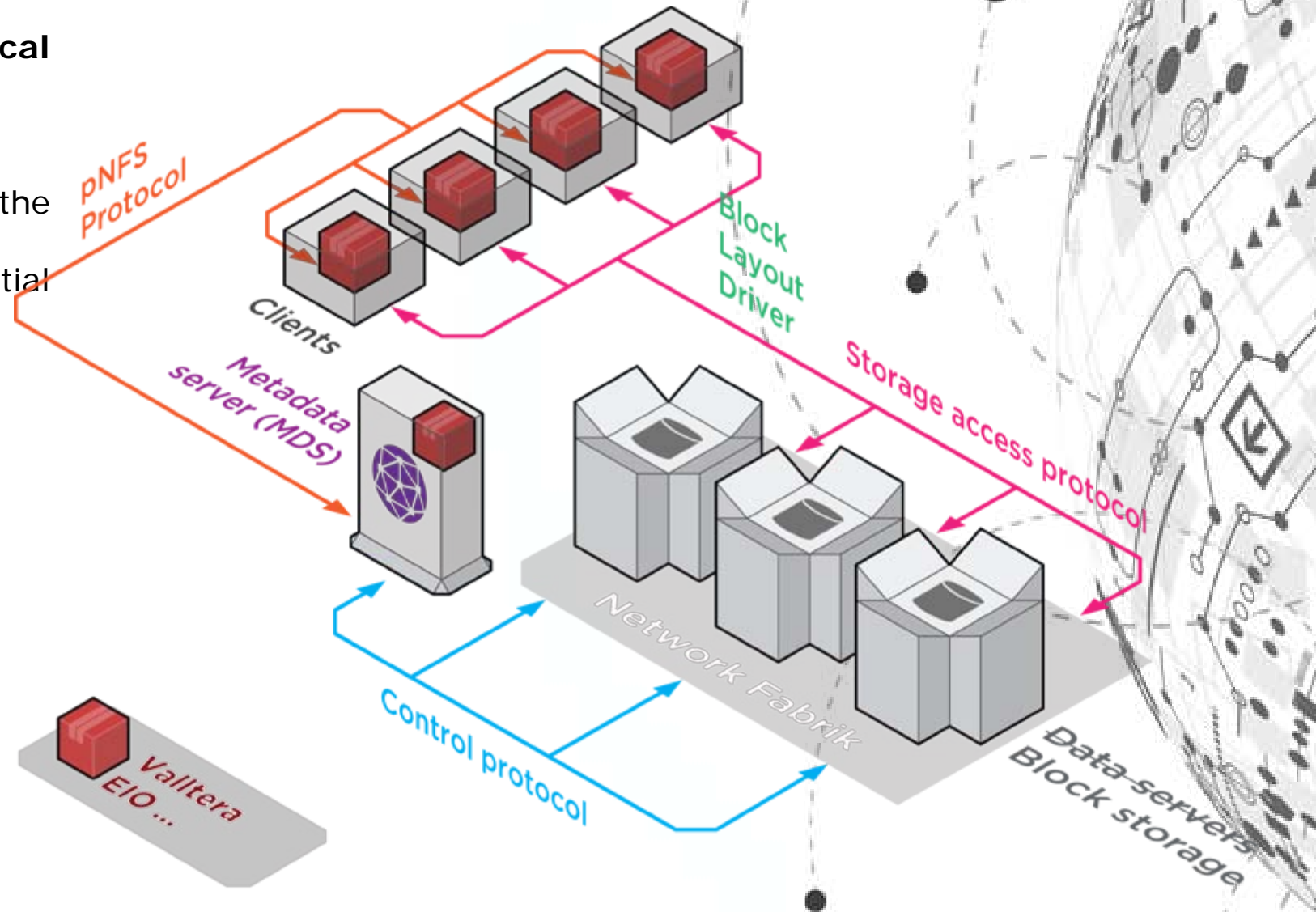
## Legacy pNFS with (Block) Layout Driver

- Only specifies pNFS protocol
  - Supports 3 data classes: **block**, **object**, **file**
- Storage access and control protocols are left unspecified



## pNFS - Block Layout Driver & HPDAP

- pNFS client reads/writes from its local FE\_SAN storage controller
  - I/O speedup provided by HPDAP
- **Data synchronization**
  - I/O synchronization enforced at the block level by HPDAP
  - pNFS together with HPDAP has potential to outperform other file systems



## VALLTERA High-Performance Data Access Platform (HPDAP)

- **Scalable I/O Performance – exceptional performance gains (for both latency and bandwidth)**

HPDAP provides a scalable data storage with emphasis on reliability and performance that scales with the number of FE\_SAN controllers (host ports)

- **Scalable Capacity**

Capacity scales beyond 100s of Petabytes (1024 TB) towards an Exabyte (1024 PB) without impacting the storage system performance

- **Incremental Growth**

HPDAP architecture provides a reliable and flexible solution that scales seamlessly - add capacity and performance when you needed it

- **Reliability**

HPDAP designed with scalability and reliability in mind to recover transactions at the I/O block level



**VALLTERA**  
TECHNOLOGIES

**THANK YOU FOR YOUR ATTENTION!**

**VALLTERA Tech – Investment Contact**

**Have YOU decided to join the  
journey?**

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