SNIA PERSISTENT MEMORY + SUMMIT 2021 COMPUTATIONAL STORAGE

FROM DATACENTER TO EDGE : VIRTUAL EVENT
APRIL 21-22, 2021

NVMe Computational Storage: A New Hope for Accelerators and DPUs

Stephen Bates, CTO, Eideticom

NVMe is a transport

Michael Cornwell, Microsoft.

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The future of storage is offload™

Sean Lundy, Eideticom.

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Dare to imagine

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(BN) Before NVMe

Applications

Libraries

Drivers

Hardware

Customer is **sad**

(AN) After NVMe

Applications

Libraries

NVMe

Hardware

Customer is **happy**

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The Three Cs

Compatibility

- Interop between vendors
- One software stack

Consumability

- Upstream driver support
- FOSS libraries

Composability

- Direct attach (PCIe)
- Fabric attach (TCP or RDMA)
- CXL in the future?

Customer is **happy**

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Eideticom

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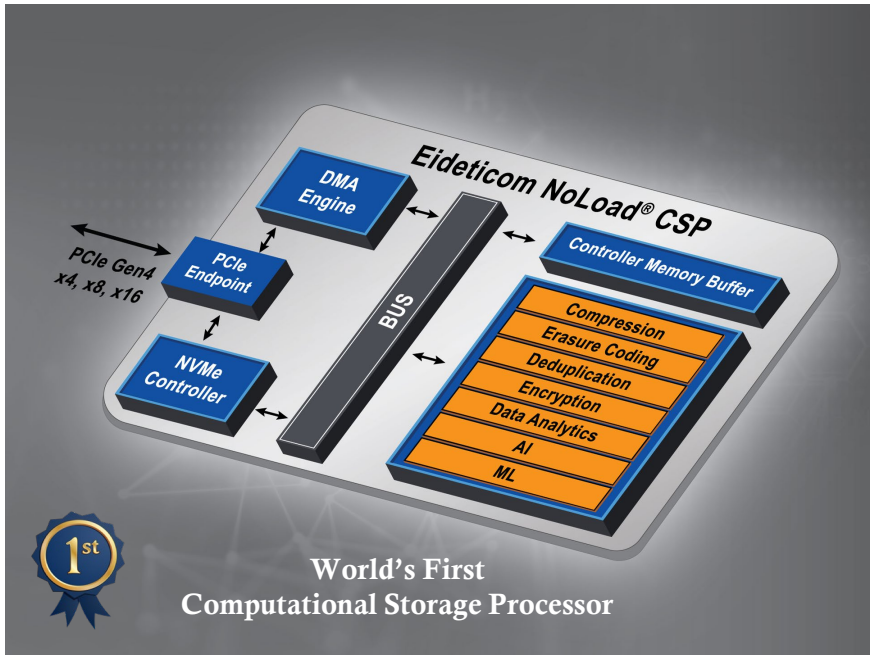
NoLoad Production Solutions



NoLoad U50

NoLoad SmartSSD

NoLoad U2

Transparent Compression **Database Acceleration** **Data Analytics**

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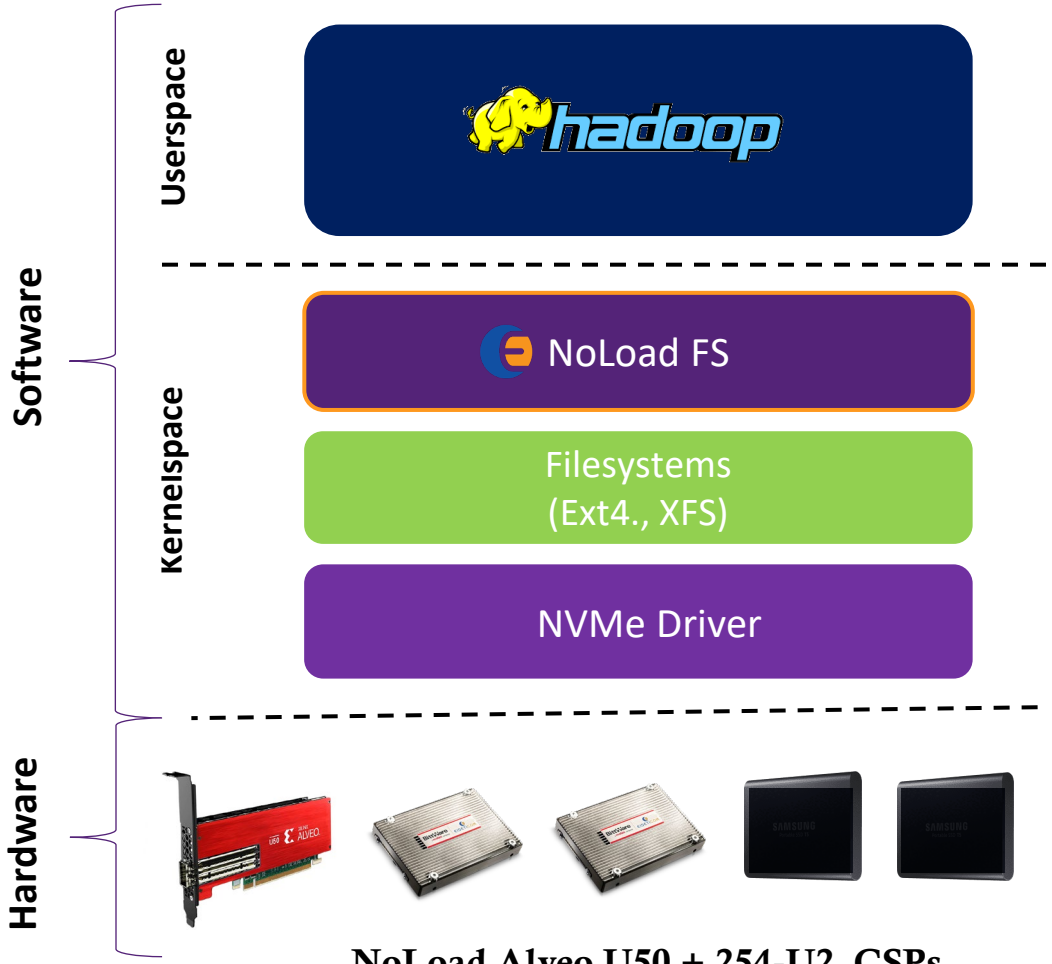
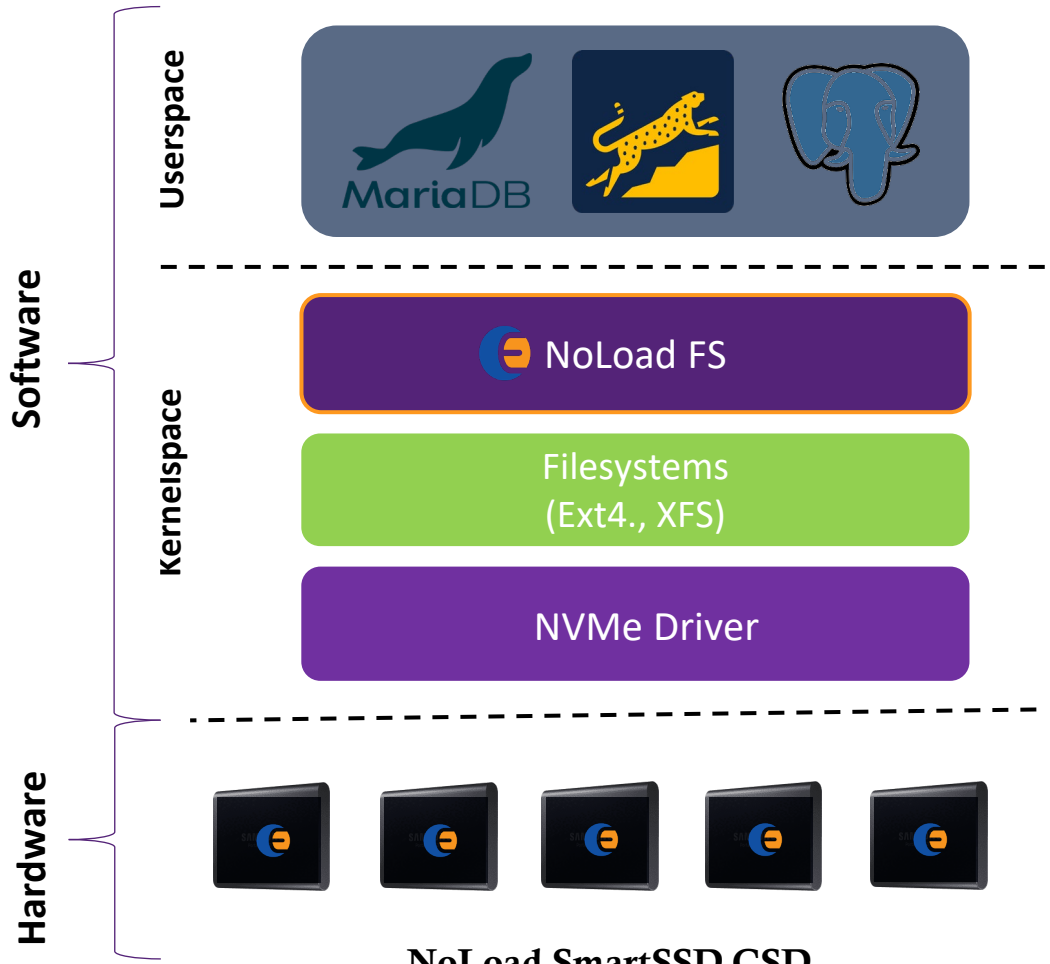


NoLoad Alveo U50 + 254-U2 CSPs
+ NVMe SSDs



NoLoad SmartSSD CSD

Acceleration without Application Changes

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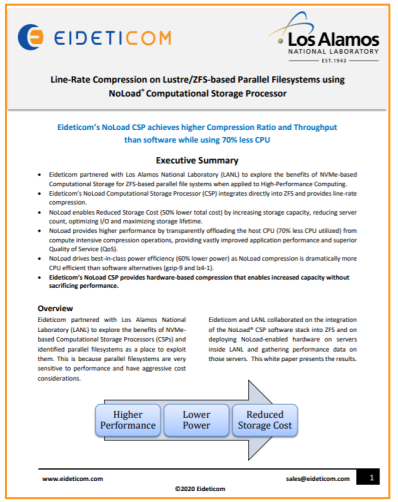
Los Alamos NATIONAL LABORATORY EST.1943

"The Eideticom NoLoad devices have demonstrated that we can offload storage functions onto accelerators enabling line-rate compression, improving CPU utilization, and reducing memory bandwidth pressure."

Brad Settlemyer, Senior Scientist, Los Alamos National Laboratory

"Eideticom's NoLoad provides hardware-based compression that enables increased storage capacity (lower $/TB) without sacrificing performance"

Reduced Cost **Higher Performance** **Lower Power**


EIDETICOM Los Alamos NATIONAL LABORATORY EST.1943

Line-Rate Compression on Lustre/ZFS-based Parallel Filesystems using NoLoad® Computational Storage Processor

Eideticom's NoLoad CSP achieves higher Compression Ratio and Throughput than software while using 70% less CPU

Executive Summary

- Eideticom partnered with Los Alamos National Laboratory (LANL) to explore the benefits of NVMe-based Computational Storage for ZFS-based parallel file systems when applied to High-Performance Computing.
- Eideticom's NoLoad Computational Storage Processor (CSP) integrates directly into ZFS and provides line-rate compression.
- NoLoad enables Reduced Storage Cost (50% lower total cost) by increasing storage capacity, reducing server count, optimizing I/O and maximizing storage lifetime.
- NoLoad provides higher performance by transparently offloading the host CPU (70% less CPU utilized) from compute intensive compression operations, providing vastly improved application performance and superior Quality of Service (QoS).
- NoLoad drives best-in-class power efficiency (60% lower power) as NoLoad compression is dramatically more CPU efficient than software alternatives (gzip-9 and lo4-1).
- **Eideticom's NoLoad CSP provides hardware-based compression that enables increased capacity without sacrificing performance.**

Overview

Eideticom partnered with Los Alamos National Laboratory (LANL) to explore the benefits of NVMe-based Computational Storage Processors (CSPs) and identified parallel filesystems as a place to exploit them. This is because parallel filesystems are very sensitive to performance and have aggressive cost considerations.

Eideticom and LANL collaborated on the integration of the NoLoad® CSP software stack into ZFS and on deploying NoLoad-enabled hardware on servers inside LANL and gathering performance data on those servers. This white paper presents the results.

Higher Performance | Lower Power | Reduced Storage Cost

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The future of storage is NoLoad®

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Thank you

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