



Accelerate Everything.

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**Computational Storage Is the Answer for Huge Data and Deep Problems (Apparently)**

Andrew Maier, Director of Solutions, Flash Memory Summit 2019 (with some help from Stephen Bates ;-))

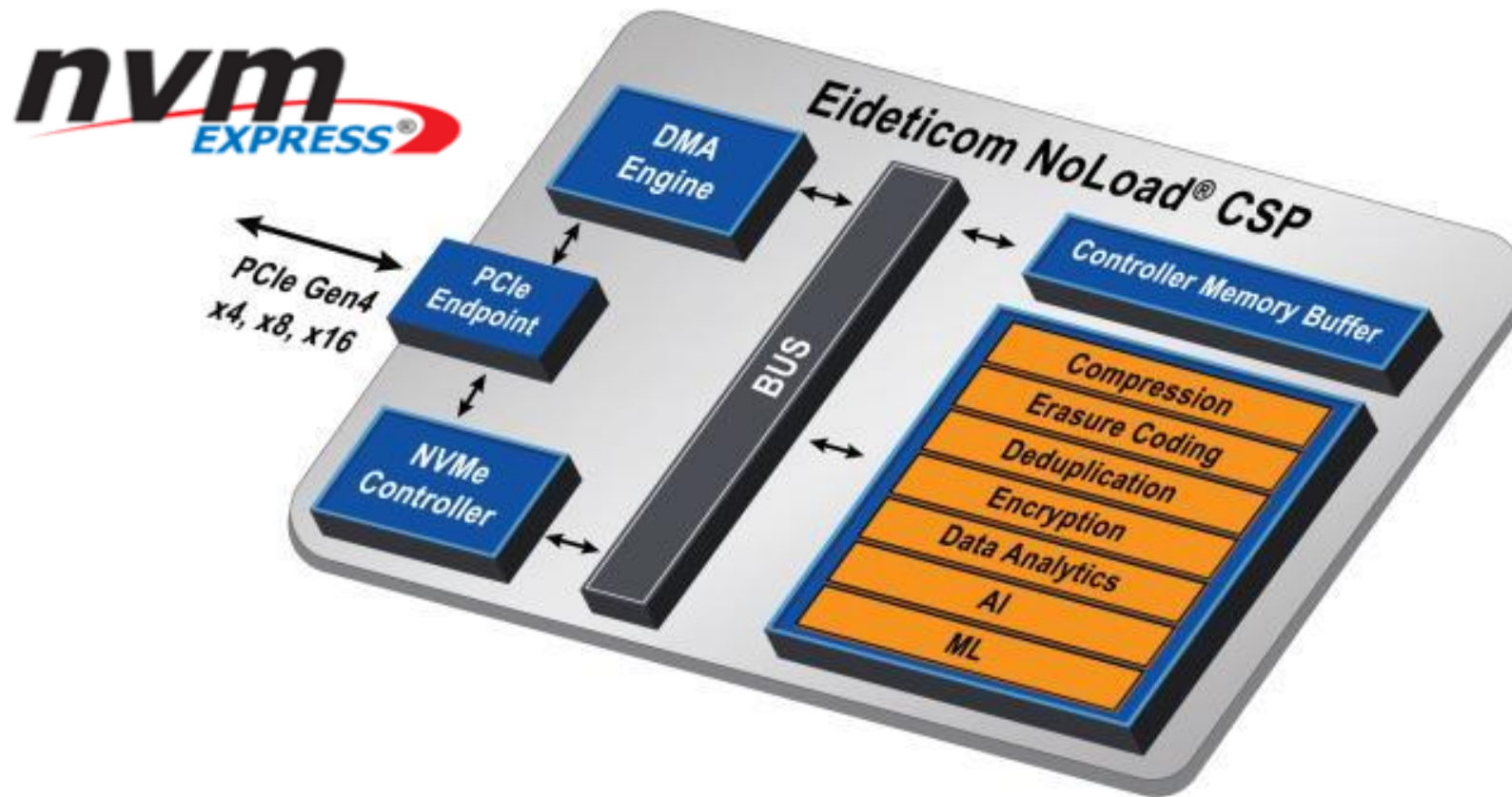


# **B.C.S** **(Before Computational Storage)**

# Let There Be Light!

## Computational Storage Standardization

Birds of a Feather Meeting - FMS2018



**Best-In-Class Storage and Analytic Acceleration delivered via an NVMe-based Computational Storage Processor.**

## NoLoad<sup>®</sup> CSP U.2

- Standard U.2 NVMe form-factor: Utilizing SFF-8639 connector
- BittWare 250-U2

**nvm**  
EXPRESS<sup>®</sup>



## NoLoad<sup>®</sup> CSP Alveo

- Standard GPU form-factor: x16 PCIe
- Deployed on Xilinx Alveo U200, 250 or U280

**nvm**  
EXPRESS<sup>®</sup>



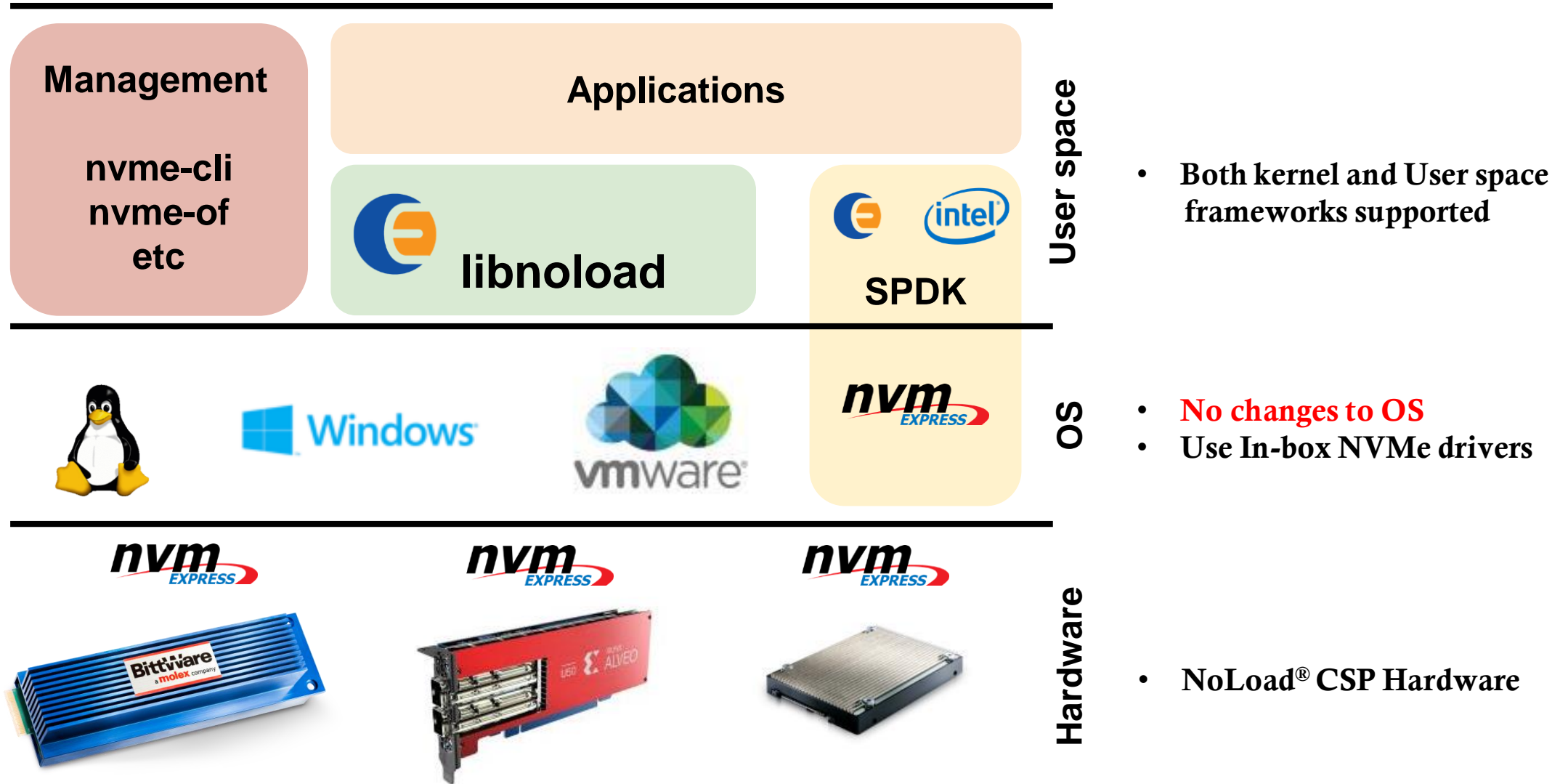
## NoLoad<sup>®</sup> CSP E1.S EDSFF

- Standard E1.S NVMe form-factor
- BittWare 250-E1.S Hardware

New!

**nvm**  
EXPRESS<sup>®</sup>







# **A.C.S**

## **(After Computational Storage)**

## Bottom Line

- 6x more transactions per sec
- 2.5x more efficient
- 4x reduced NAND costs
- Improved QoS



## Details

- Eideticom's NoLoad CSP
- Xilinx Alveo U280 (HBM)
- Dell R7425 PowerEdge server
- RocksDB
- Linux Operating System
- 2 NoLoad instances with compression offload





## Bottom Line

- Significant improvement in **Job Throughput** and **Cost per Job Reduction**
- Lower TCO/TCA
- Improved QoS

## Details

- Eideticom's NoLoad CSP
- Xilinx Alveo
- Dell R7425 PowerEdge server
- Hadoop MapReduce
- Linux Operating System
- NoLoad CSP with compression and EC offload



## Bottom Line

- 2+ GB/s compression per NoLoad U2
- 26X improvement in CPU loading
- ZFS performance scales linearly with number of NoLoads

## Details

- Eideticom's NoLoad CSP in U.2
- ZFS updated to integrate directly with Eideticom's NoLoad CSP
- Benchmarking on Dell AMD EPYC server
- Supports Burst Buffer architectures by providing a fast storage layer
- Test set with 30% compressible data



Dell R7425 AMD EPYC Server



Scalable number of NoLoad U2s

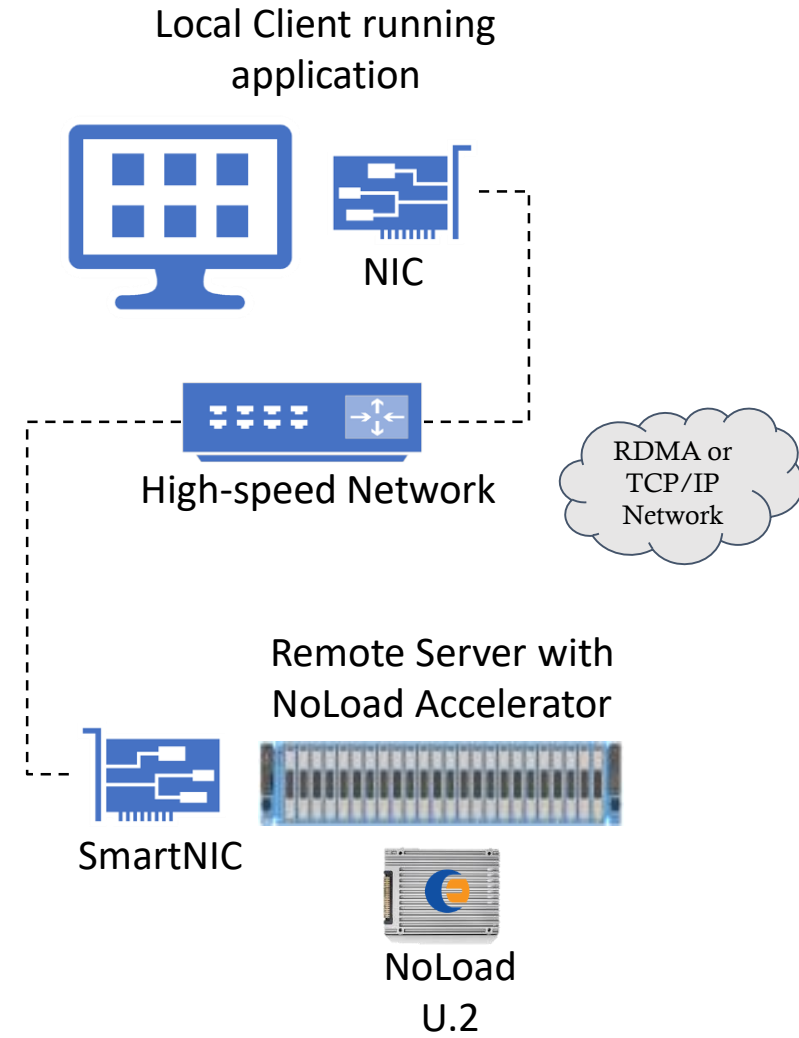
Dell NVMe SSDs

## Bottom Line

- NoLoad Accelerators located in a remote server can be accessed by any client with a RDMA or TCP/IP connection

## Details

- Disaggregation of NoLoad Accelerators using NVMe-oF
- NoLoad Accelerators identify as NVMe Namespaces, which can be accessed/shared using NVMe-oF
- NoLoad Accelerators (compression, EC) shared across RDMA & TCP/IP
- Broadcom BCM58800 SmartNIC



- The large consumers of accelerators (hyperscalers) want vendor-agnostic, consumable interfaces, software and management stacks. NVMe gives them all that.
- Eideticom's NoLoad CSP is the world's first UNH certified NVMe-based CSP.
- Using NoLoad we can accelerator customers applications and filesystems.

**This is all getting standardized so customers can enjoy a scalable, vendor agnostic framework for acceleration and computational storage!**



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