NVMe the next onset storage paradigm

a Cintegral - Liqid - OWC Project

What is NVMe and what are the benefits

NVMe stands for Non-Volatile Media Express. It often contains NAND Flash memory that comes in several physical form factors such as M.2, U.2 and PCI-E ver 1.3b. NVMEpress.org

Our focus has been to decrease the onset offload duration. While increasing the security and ingest potential between onset technicians, and their Post Production Facilities. In 2017 Cintegral partnered with Orange Co. based Kingston enterprise technology a leader in flash based data center technology. To implement, modernize, and certify the front end of digital production to Post Production pipeline for 2D, Large Format, HDR, VFX, and 360VR content.

Building the World's Fastest SSD

- PCI-Express v3 in 4x and 8x Lane Speeds. 3GB/sec - 6.8GB/sec. Faster than thunderbolt 3 for longevity
- Powerloss feature known as Pfail built into each card with capacitors. Saving unforeseen costs.
- Connection agnostic PCIe allowing current and future Producers to determine the best connection for a given project. Permitting companies to apply cost's to the storage, not a connection premium as technology advances.
- Selectable 256bit AES hardware encryption surpassing MPAA 128bit security specs.
- OS Independent system for MacOSX, Windows 10, and Linux OS systems
- Power Efficient 35w Max power consumption
- 5 year Warranty - Orange County Technical Support

HDD vs SSD vs NVMe

1. Single 7200rpm HDD ie. Lacie Rugged ->**115MB/s**
2. Dual HDD i.e OWC Elite Dual or GRAID ->**360MB/s**
3. Quad HDD 12TB RAID 0 i.e GSpeedES ->**600MB/s**
4. Single 2TB SSD i.e Samsung EVO -> **470MB/s**
5. Dual SSD 4TB RAID 0 i.e Glyph RAID ->**700MB/s**
6. 8 Bay HDD 48TB RAID 5 i.e Areca 8 bay ->**1100 MB/s**
7. Single 3.8TB U.2 NVMe SSD DC -> **2300 MB/s**

One Copy On-set

1. 2TB of Footage = 4.6hrs
2. 2TB of Footage = 1.8hr
3. 2TB of Footage = 48min
4. 2TB of Footage = 65 min
5. 2TB of Footage = 45min
6. 2TB of Footage = 21min
7. 2TB of Footage = 12min

Compared to Dual HDD is a 1000% more efficiecent with encryption protocols. A 12-15 hrs perweek of labor savings in overtime across multi departments. *Evaluated on a 2018 Apple i9 MacMini using USB3.1/TB2/TB3/PCIe Connections.*

From Set to DI : Cases Studies

Amazon Studios **"Making the Cut"** Docu-Series : 7x Alexa Mini + Amira 3.2K Prores444. Average weekly consumption of 120TB for 5 weeks. 50-100 Cfast Mags shot per day. ingested 4 Cfast Mags at a time via 2013 MacPro + 2018 MacMini in Silverstack XT. Deployed 3x 15.4TB NVMe RAIDs, 2x 19.2TB SSD RAID5, and 2x 98TB Flex. *Saved 70min per offload due to the sustained read speeds needed for the verification process. In order to read back 4x 100GB Prores444 files using CIntegral NVMe and SSD RAIDs. Total savings of 22hours per week in offload/checksum duration compared to HDD RAIDs. Project saved 88hours in Lost Productivity due to HDD Storage. August- September 2020.*

Netflix *"**The Kominsky Method**"* Season 2 WBTV : 3x Sony Venice 4K 16:9. Average weekly consumption of 16TB. Implemented 5x DCP 1000 NVMe Media Shuttles from Set to The Picture Shop for duration of Principal. *A Decrease of media offload duration onset, average offload duration at wrap to 20 minutes compared to 45-60 min with HDD. Picture Shop saw a reduction of SAN ingestion time by 500% compared to 4 disk HDD RAIDs. Jan-April 2019*

Netflix *"**Trial of Chicago 7**" Feature*: 3x Alexa LF +MinLF. Average weekly consumption of 32TB. Implemented LQD-3000 NVMe Encrypted Media Shuttles from Set to Technicolor for Principal. Photography. *The most significant decrease in offload times due to a optimized onset data pipeline from Codex Readers to Software to Lab ingestion averaging 1.2GB/sec on 2019 MacMini hardware. Optimized for Silverstack checksum read back verification. Technicolor saw a 500% increase of ingest compared to 2 Disk SSD RAID using TB3. Oct-Dec 2019*

Paramount Pictures "***Sponge Bob, A Wonderful Sponge***" Feature Live-Action Photography: 3 x 8K FF 5:1 VV Red Monsto. 3x Redmag readers via USB3.1-to 5x 3.8TB Cintegral NVMe Shuttles between DIT and Technicolor SGS. *Averaging 16minutes to offload 3x 480GB Red Mags with XXHASH checksum to three destinations (Shuttle, internal RAID, Master RAID). Apple TB3 Connection. 500% Increase in Lab Ingestion speed compared to HDD RAIDs.* January 2019 - February 2019.

Marvel Studios **"Wandavision"** Stunt/VFX Unit Los Angeles: 3 x Arri AlexaLF 4.5K Opengate Arriraw, X35 DJI, Red HeliumS35, and Phantom Flex4K. Averaging 8TB/day of Camera RAW per day. Offloaded via SXR TB3 Codex Reader via 2018 MacMini TB3 system utilizing a XXHash64BE checksum in Silverstack XT. Deployed 6x 7.68TB Cintegral Lidid NVMe Shuttles with a 38.4TB Onset Master encrypted SSD RAID5, *1.1GB/sec sustained throughput of Codex 2TB SXR Mags from Codex TD2. Consistant 17min total offload @wrap. Reduced on-set offload duration compared to spinning disks by 1500% Covid Production reducing Fall 2020*

Apple + **"Defending Jacob"** Mini-Series: 5x Red Monstro 8K 3:1 VV REDRAW. 2018 Mac mini via USB-C Hash64 checksum and offload @1.5 GB/s to 3.8TB PCIe NVMe and SSD RAIDs across 3 units. Delivered to Technicolor, Read @2.5GB/sec via TB3 to Deployment SAN and vaulted then quarentine then released for re-use. Erasure between Shooting Phases. *Password Protected FIPS compliant, Averaging 12min offload of 3x 480GB REDMAG Media with USBC 3.1 Reader's.* 600% *data transfer efficiency over 4 Bay HDD RAID. Winter 2018 - Fall 2019.*

Production, Lab, Post, and Studio approved

Conclusion

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I hope this has been informative about how Cintegrals Enterprise NVME and SSDs systems are ideal for lowering resource intense 4K+Production. These rentable NVMe Media Shuttle and RAID packages allow for Producers to optimize their costs from Set to Post without latency. While lowering additional overtime at wrap and decreasing wasted productivity in workflow bottlencks on Studio Features, Network Television or Streaming 4K, Multi-Cam and Raw Camera workflows. Our continued mission is to create a fast storage standard that the industry adopts and certifies based on the unique budgetary needs in Production to Post Production. Thank you for your consideration.

For any further information or a evaluation please contact.

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