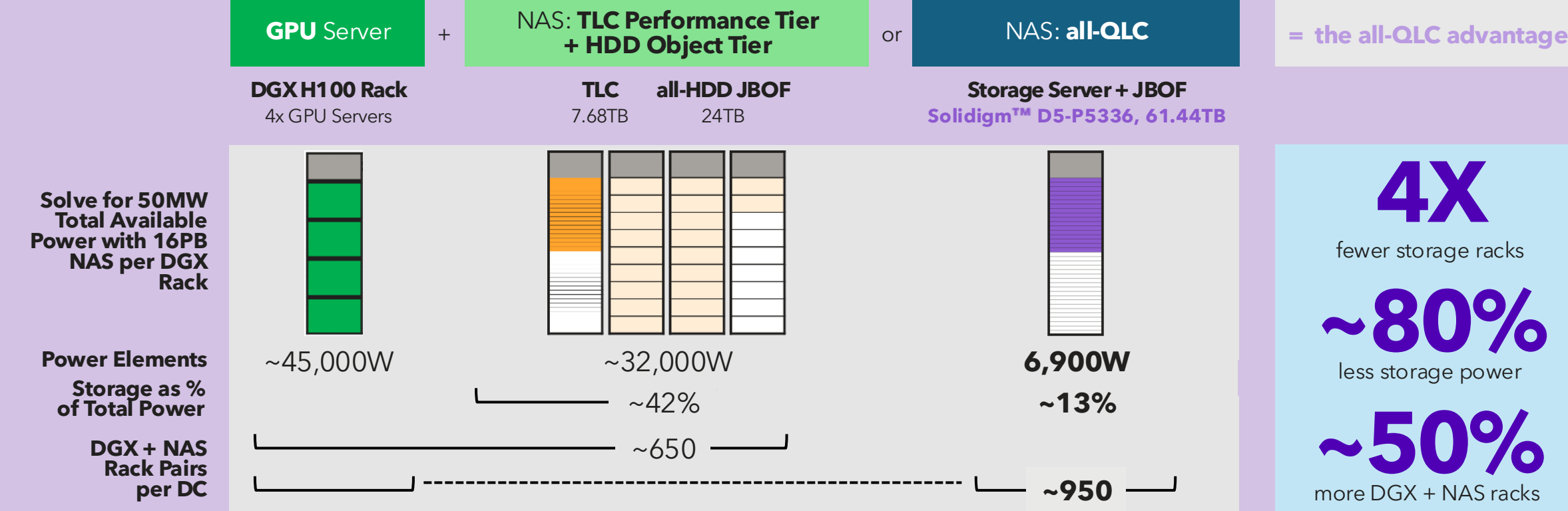
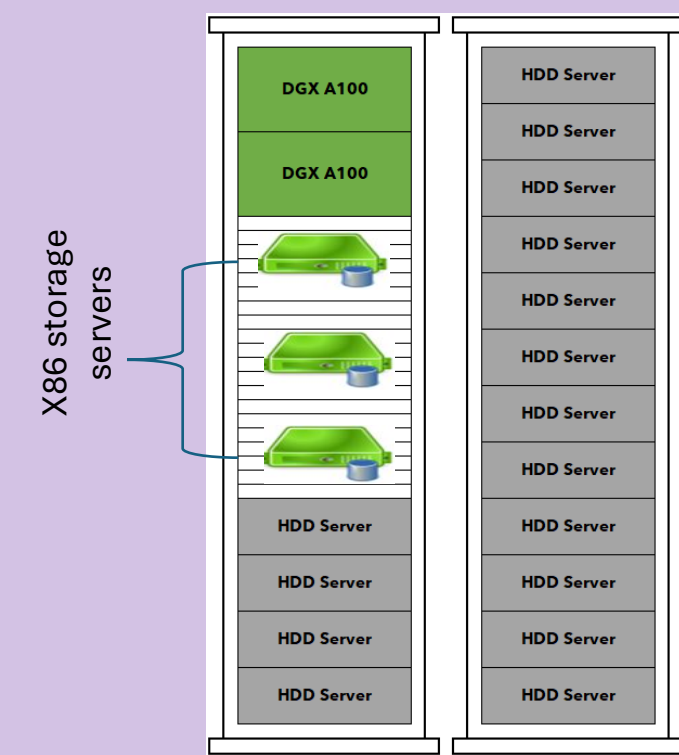
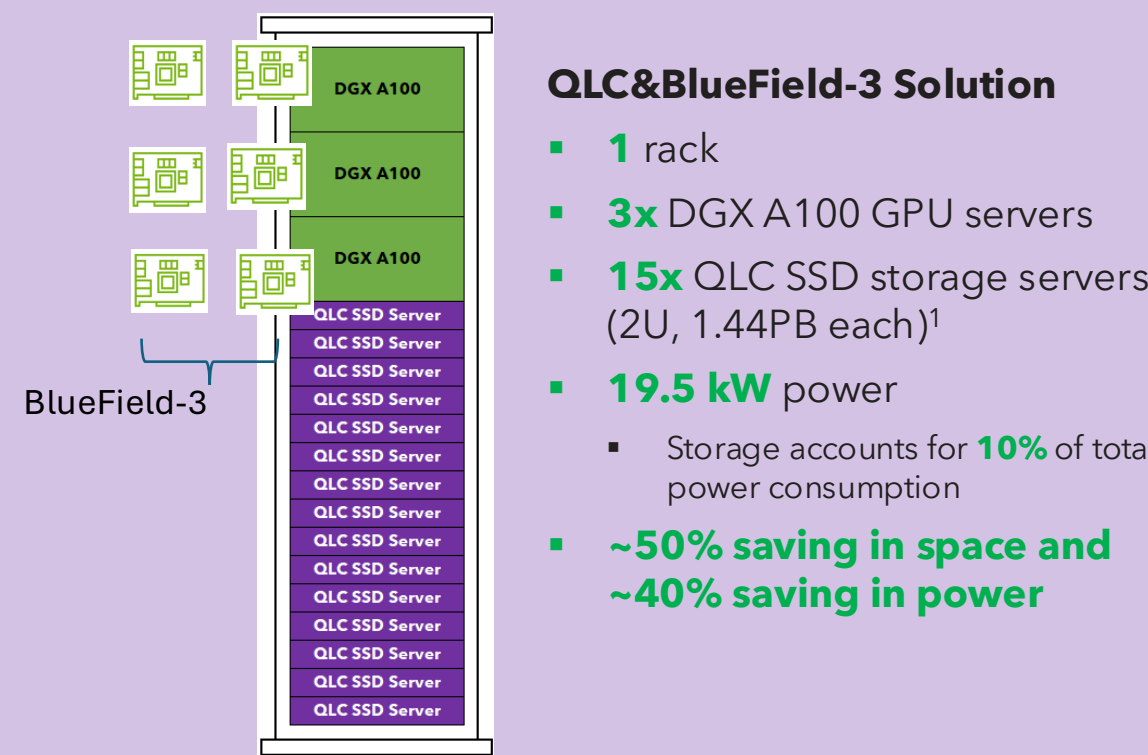




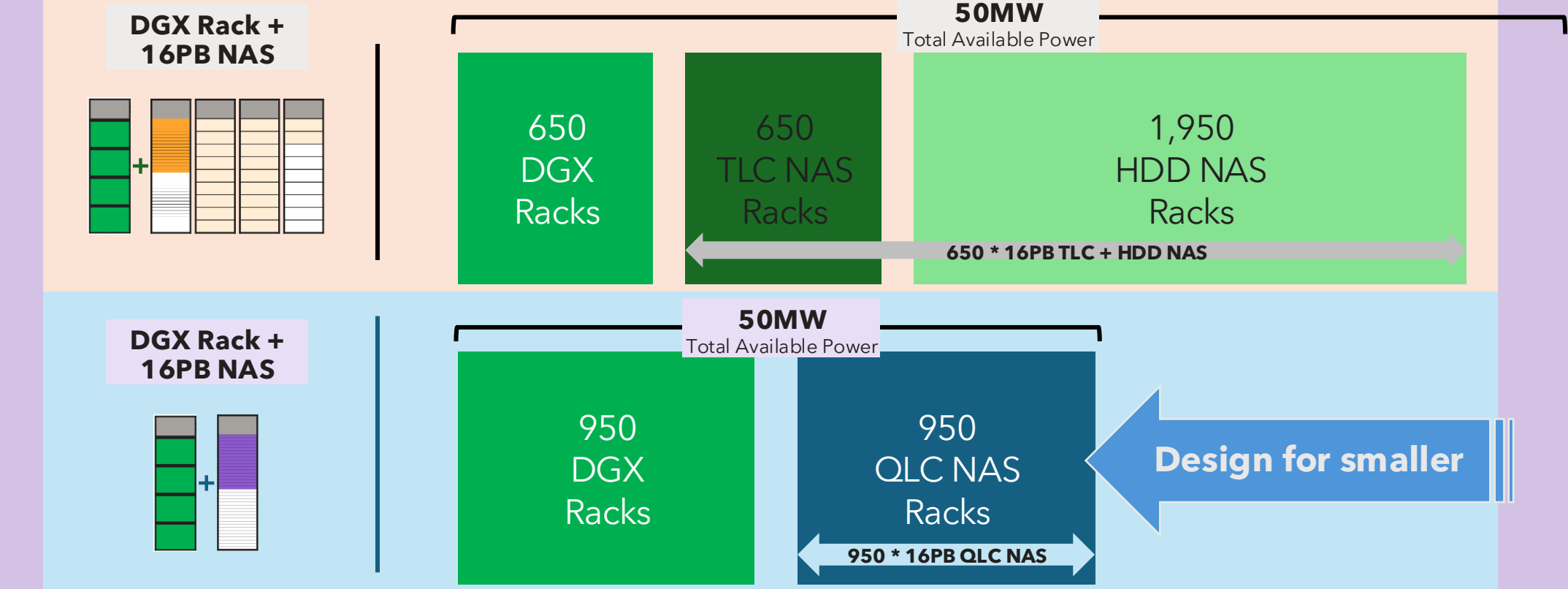
Solidigm CSAL solution brings advanced IO shaping, caching and data placement into NVIDIA BlueField-3 DPU and NVIDIA DOCA storage service for AI storage BeeGFS

QLC and BlueField-3 together Powered Solution Offers More Compute for Less Power in Less Space



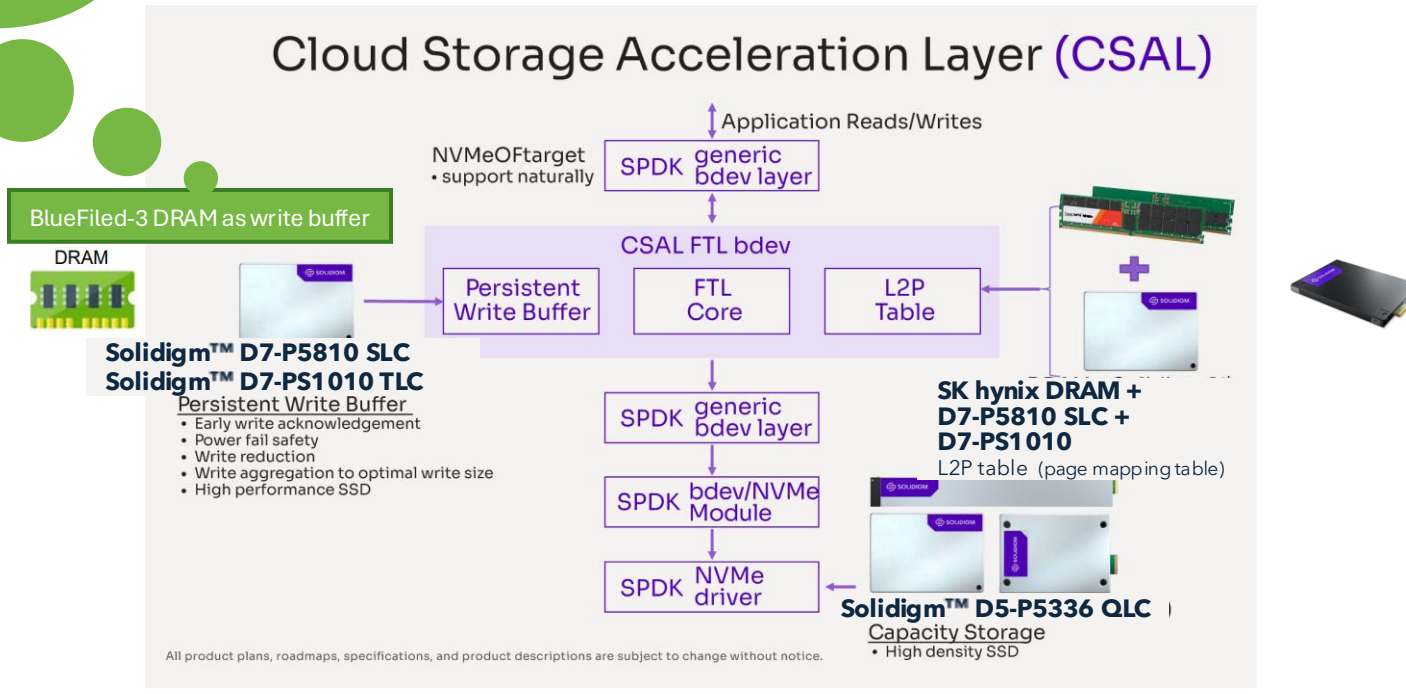
QLC Improves Power Efficiency for New AI DC Builds

QLC Enables More Compute in Less Space at Same Power



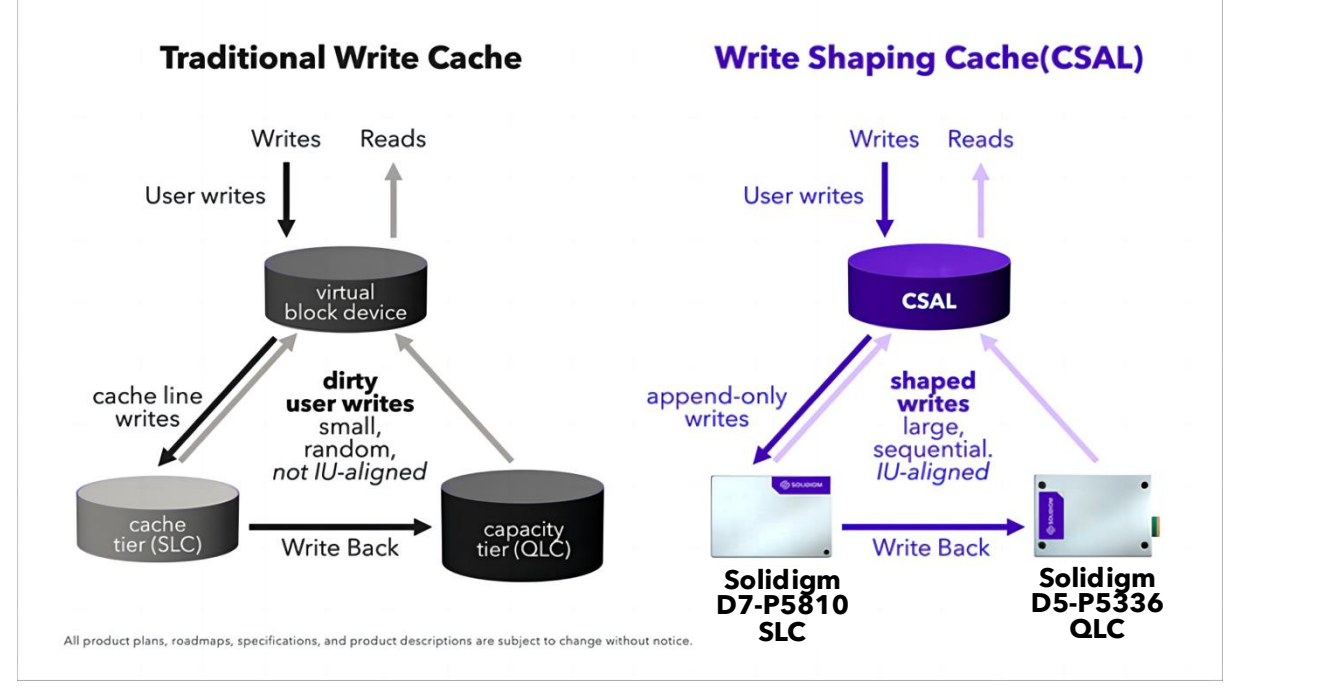
- BlueField-3 on board DRAM have separate power protection
- BlueField-3 DRAM have no limitation on endurance
- We can take it as NVDIMM with CSAL SW support
- CSAL new shaping and caching pool will add BlueField-3 free DRAM

CSAL can leverage BlueField-3 DRAM as persistent write buffer

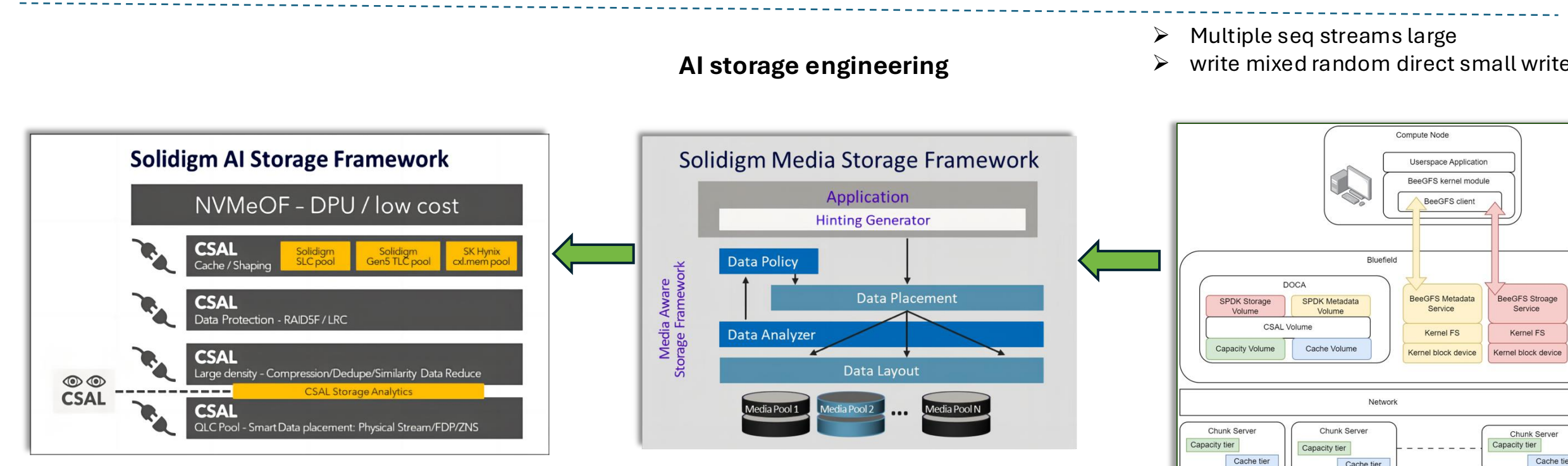
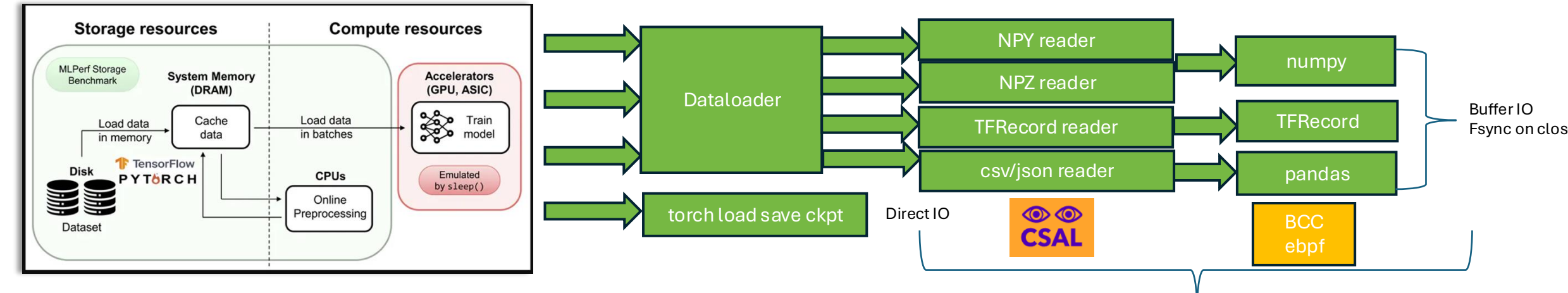


- What are newest features?**
- CSAL in NVIDIA BlueField-3 DPU, DPU DRAM as write buffer
 - CSAL runs L2P table using CXL (SK Hynix's CMM-DDRS, Gen1 CXL 2.0 Memory Module)
 - CSAL using new type of cache devices:
 - Solidigm D7-5810
 - Solidigm D7-P51010 (Gen5)
 - CSAL append-cache
 - CSAL using FDP device

- What is next?**
- CSAL full support for BeeGFS in NVIDIA BlueField-3 DPU
 - CSAL Compaction/GC improvement for BlueField-3 with NVMe copy offload
 - CSAL async malloc bdev with RDMA loopback in BlueField-3 that saving BlueField-3 CPU core
 - CSAL K8S CSI support
 - CSAL append-cache write back
 - Xinnor RAID solution partnership
 - PF LRC(Azure&VAST)



AI actually talk Dataloader not File system!

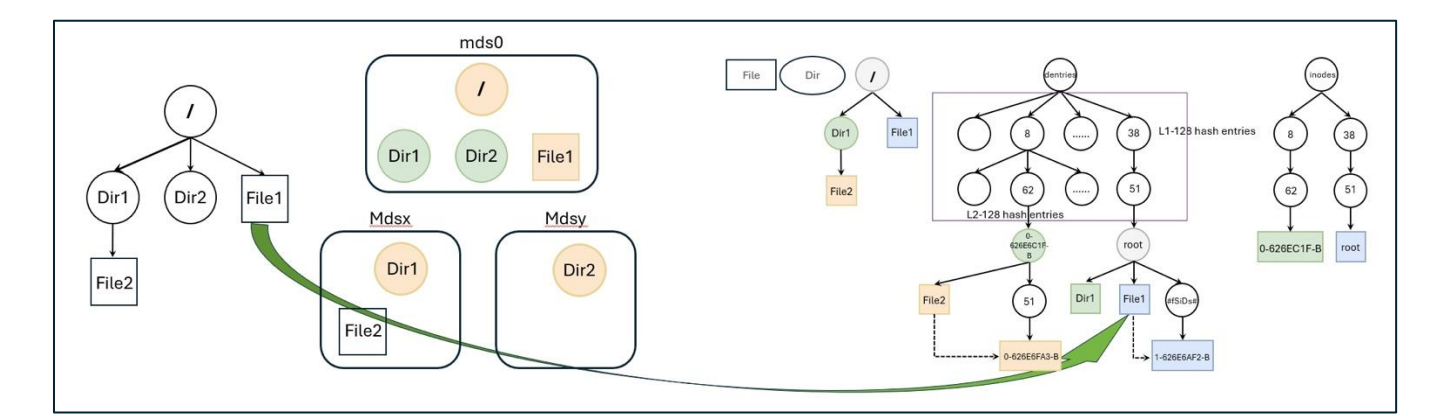


End to End AI storage stack from MLPerf.storage, BeeGFS to CSAL – from AI data engineer to storage developer

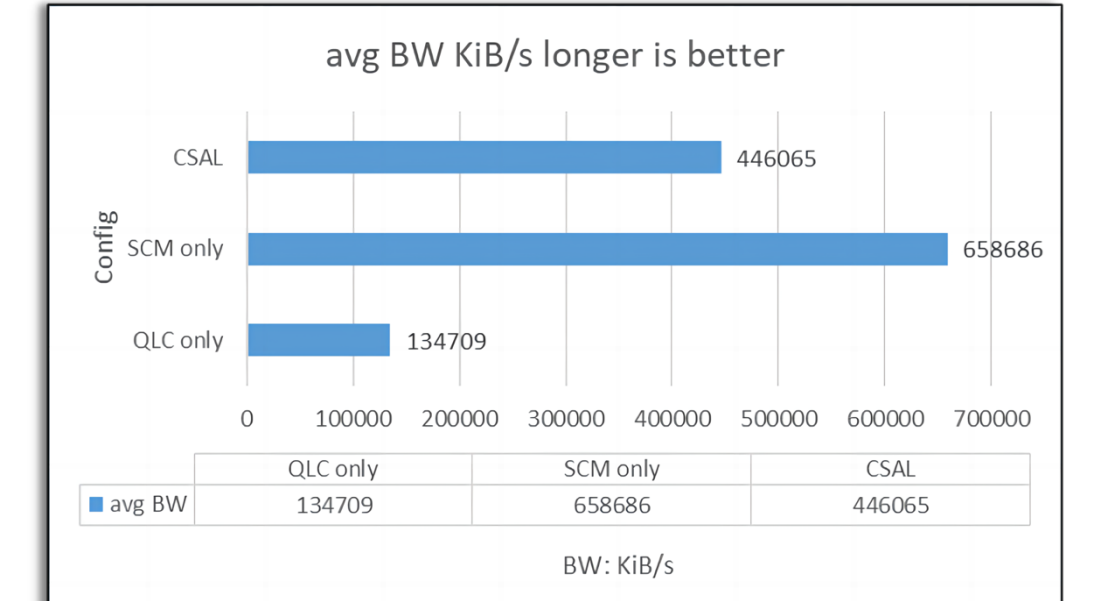
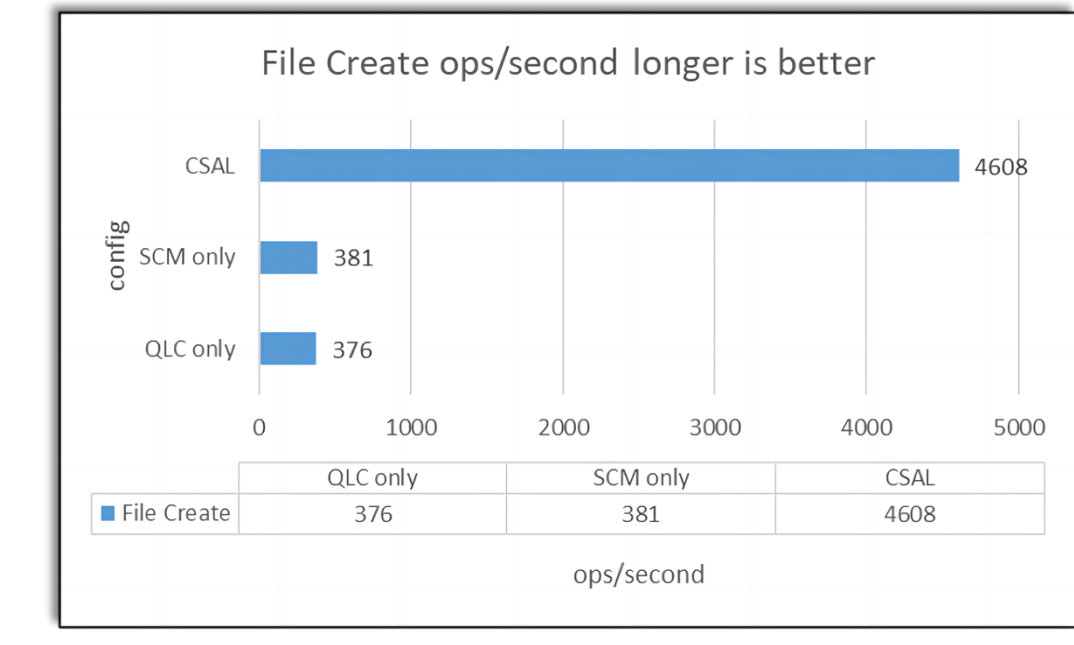
BeeGFS meta core

- Translate standard file directory tree via HASH into one distributed load balanced across nodes metadata tree that is 2 level each level is 128 entries, save path lookup overhead into hash computation

- Industry problems:**
- Metadata path lookup across metadata nodes
 - Hot directory billion files



Mdtest on BeeGFS meta server – small files



Storagebench on beeGFS storage server – 4K small files(imagenet)

