DAOS & DATA SERVICES BOF

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INTEL ESAD & MYSELF

**Extreme Storage Architecture & Development (ESAD)**

- Part of **Extreme Computing Organization** (ECO)
- Formerly called **High Performance Data Division** (HPDD)
- New storage semantics for Exascale HPC, Big Data & AI
- Open-source userspace I/O
  - Distributed Asynchronous Object Storage (DAOS)
  - I/O Forwarding (IOF)

Johann Lombardi

- Lead ESAD architect
- Previously worked on Lustre (CFS, Sun, Oracle, Whamcloud & Intel)
NEXTGEN STORAGE SYSTEMS

Data streaming from Instruments

Traditional HPC
Modeling & Simulation

Data Science Analytics
Analysis, Search & Compare

Artificial Intelligence
Decision making

SSD vs HDD Pricing (per-GB ratio)
Source: Hyperion Resources, IDC, Stifel 2018
DAOS PROJECT HISTORY

- 2012: Fast Forward Storage & I/O
- 2013: Extreme Scale Storage & I/O
- 2014: Stabilization & new features for Exascale
- 2015: Dual tier prototype based on Lustre* & PLFS
- 2016: Standalone DAOS prototype
- 2017: DAOS productization for Exascale deployment

*Other names and brands may be claimed as the property of others.
**Distributed Asynchronous Object Storage**

**Benefits**
- Built natively over **new userspace** PMEM/NVMe software stack
- **Rich** storage semantics
- **Non-blocking**
- High **throughput/IOPS @arbitrary alignment/size**
- **Ultra-fine grained** I/O
- **Scalable** communications & I/Os
- **Software**-managed **redundancy**
- **Open source**
DAOS MICROSERVICE ARCHITECTURE

Collection of Microservices

- Control Plane
- Pool
- Container
- Object
- Self-healing
- Concurrency Control
- ...

Infrastructure

- RPC
  - Mercury & OFI
- Collectives
  - CaRT
- Persistent Storage
  - PMDK & SPDK
- Thread Model
  - Argobots
- Common Data Structures
- Security
- Logging/Debugging
- Offload/Accelerator