

Cray Sponsor Presentation

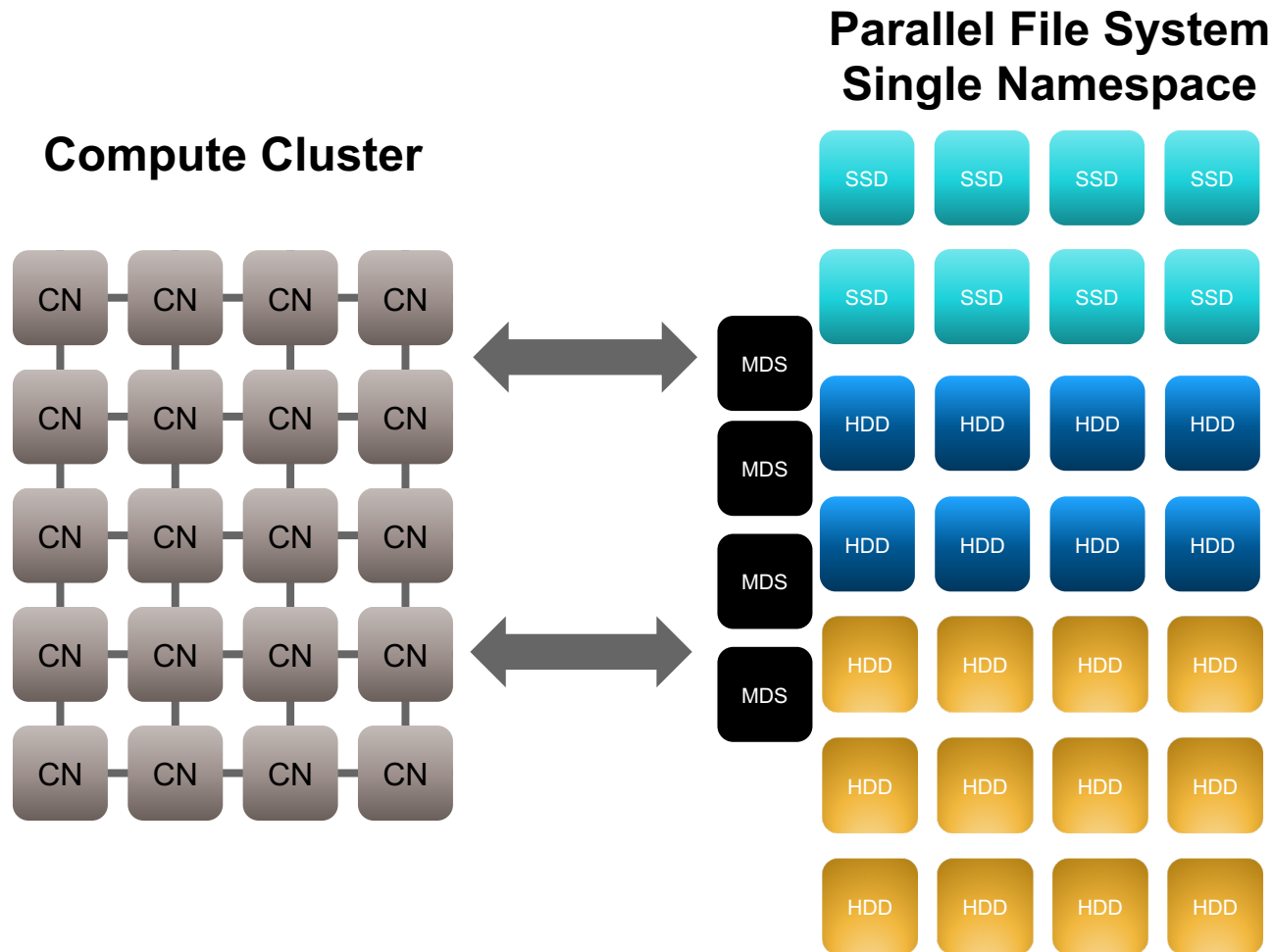
LUG 2019



CRAY[®]



Today's ClusterStor Hybrid Architecture



Scalable MDS Flash Tier :

- Large number of Inode Support per FS
- Improved Metadata Operations
- Improved Small I/O Latency

Flash Tier :

- Optimize for throughput and IOPs - \$/GB/sec.
- Improved Performance for Intermediate Results
- Small/random I/O performance improved

High Performance HDD Tier:

- Optimize Throughput/Capacity - \$/GB/Sec
- Optional Flash/Cache to accelerate small block IO within the HDD Tier

Capacity HDD Tier:

- Optimize cost - \$/GB
- Lower performance, longer term data retention

ENGINEERED RACK-SCALE HPC STORAGE



CLUSTERSTOR™

Management Network Switches
Data Network Switches (IB, OPA, GbE)
System Management Unit (SMU)
Metadata Management Unit (MMU)

Scalable Storage Units (SSU)
with embedded HA OSS*:

L300

5U84

All HDD:
Large,
streaming
I/O

L300N

5U84

Hybrid
(SSD/HDD):
Mixed I/O

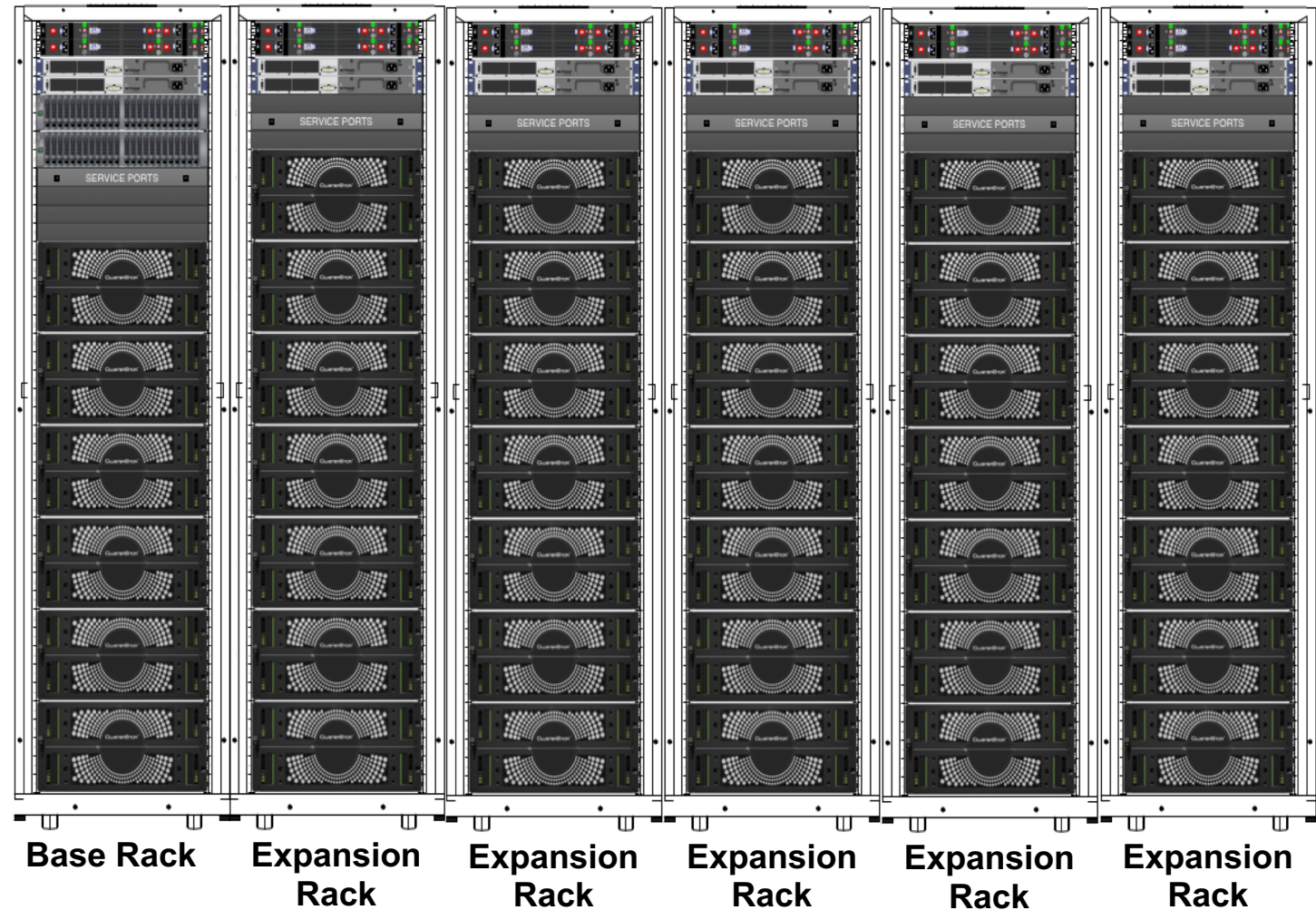
L300F

2U24

All Flash:
Small,
random,
I/O

Mix & Match

*Object Storage Servers



Today's Flash Use Case with ClusterStor:



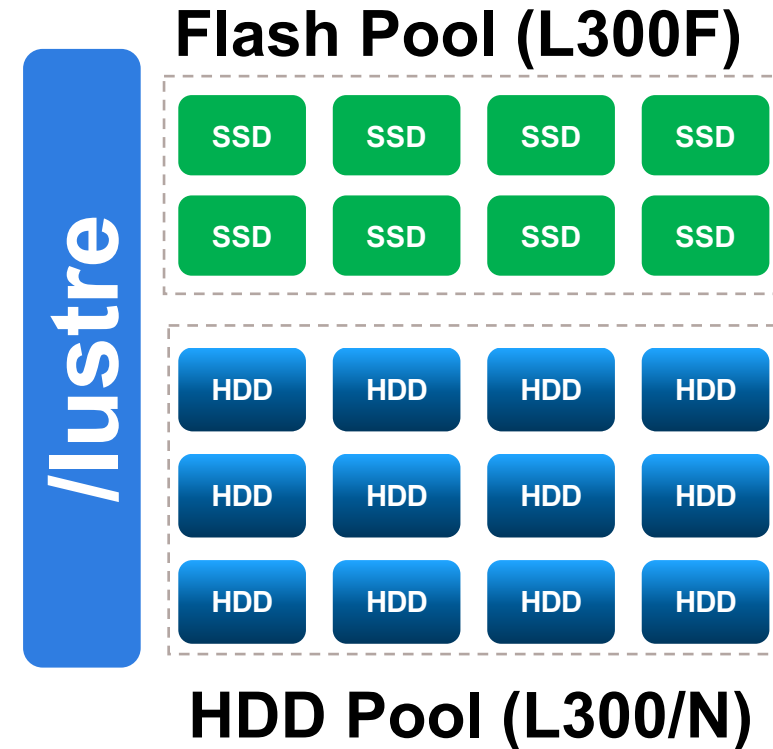
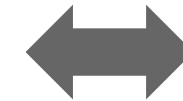
Flash Pool Complementing An HDD Pool

Workload Manager Script

```
#!/bin/bash
#SBATCH -n 3200 -t 2000

IN=/lustre/hdd/user/input
JOBDIR=/lustre/ssd/user/scratch
OUT=/lustre/hdd/user/output

srun -n 3200 a.out -in $IN -out $OUT $JOBDIR
```



User Experience:

- **Single file system**, two directories
- ClusterStor Flash used for superfast scratch storage

Cray is taking Lustre to the Exascale Era

- Lustre is the world-leading, high-performance file system that Cray delivers with its supercomputers
- Cray will advance Lustre to support Exascale system requirements
 - Cray intends to push Lustre to extreme scale and performance
 - Tackling and fusing diverse workloads
- With simple yet powerful data placement, data movement, and data management



THANK YOU

QUESTIONS?



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