

DDN

DDN Updates

Data DirectNetworks Japan, Inc
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DDN | A Broad Range of Technologies to Best Address Your Needs

Your
Use
Cases



DDN

Data-at-Scale Services
Scalable Storage Platforms

DDN HW PLATFORMS

DDN SOFTWARE CAPABILITIES

LEVERAGING

NVMe, Disk Drives,
Enclosures, CPU,
PCIe, RDMA Fabrics,
Networking, GPU

Protection

Security

Data Distribution and
Lifecycle Management

Open Monitoring

DATA
PERFORMANCE
& SCALE

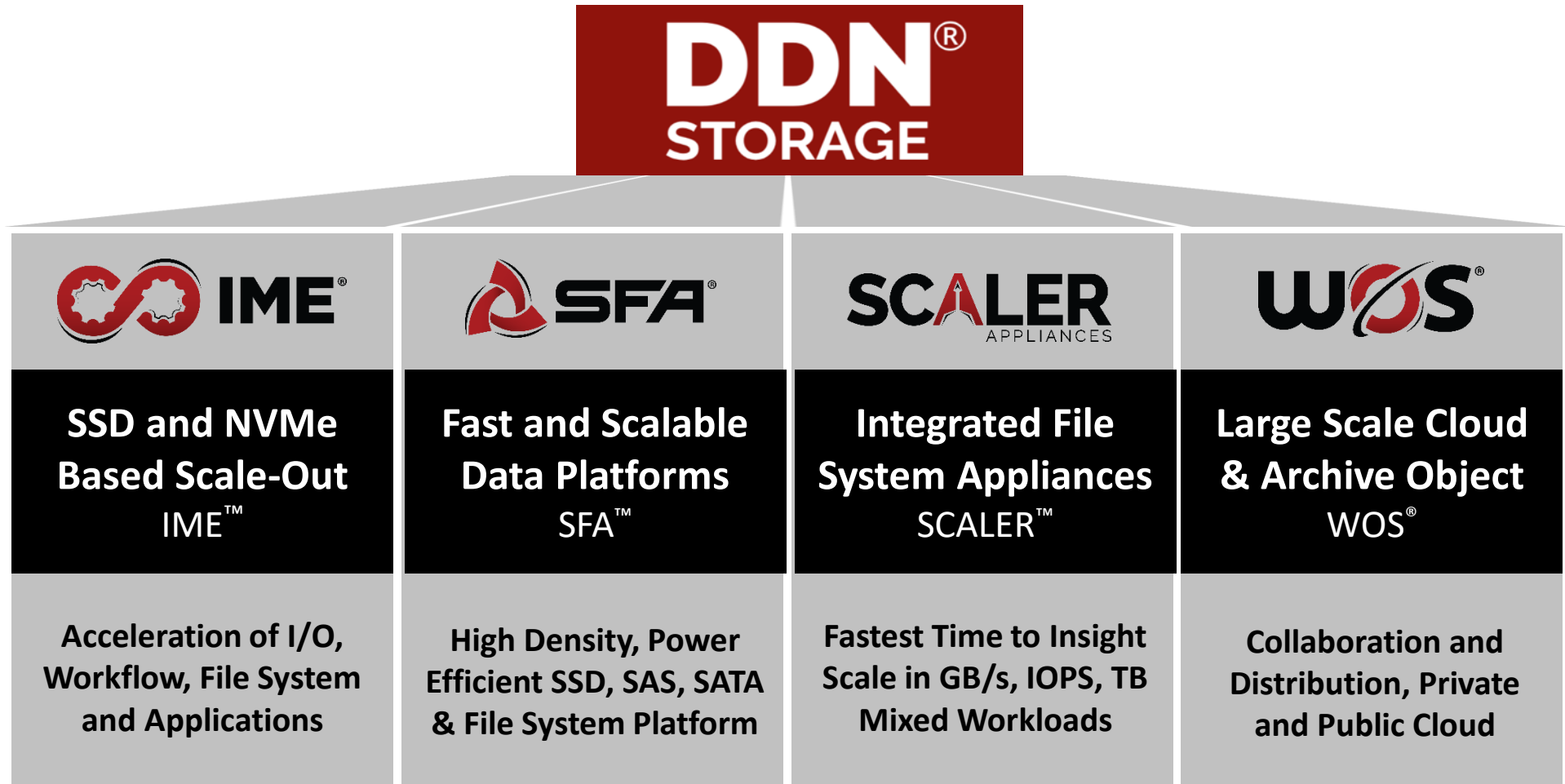
IOPs, GB/s
Latency, single
thread/client
Concurrency, RDMA
networks

CONTAINERS
& VM

orchestration and
management

DDN
Products
&
Solutions

DDN | Software Defined, Flash, Hybrid and Cloud Storage



DDN | Focused Storage Areas

▶ NVMe/SSD everywhere at scale

- IME(Infinite Memory Engine)
- All flash for Parallel filesystem
- Lustre Persistent Client Cache

▶ Understand and optimizations of I/O Workflow

- AI/Machine Learning
- Life Science Pipeline
- Data Archiving/Management



A Fully Scalable, **High Performance**
Easy to Deploy **NVMe Data Platform**
For Your Most Demanding **Workloads**

DDN | IME Solves Critical I/O problem

<https://www.vi4io.org/io500/start>

#	information				io500	ior			
	system	institution	filesystem	client nodes	bw	easy write	easy read	hard write	hard read
					GiB/s				
1	Oakforest-PACS	JCAHPC	IME	2048	471.25	742.38	427.41	600.28	258.93
2	Shaheen	Kaust	DataWarp	300	151.53	969.45	894.76	15.55	39.09
3	Shaheen	Kaust	Lustre	1000	54.17	333.03	220.62	1.44	81.38
4	Mistral	DKRZ	Lustre	100	22.77	158.19	163.62	1.53	6.79
5	JURON	JSC	BeeGFS	8	14.24	30.42	48.36	1.46	19.16
6	Seislab	Fraunhofer	BeeGFS	24	5.13	18.79	22.34	0.89	1.86
7	EMSL Cascade	PNNL	Lustre	126	4.88	17.81	30.19	0.39	2.72
8	Sonasad	IBM	Spectrum Scale	10	4.57	34.13	32.25	0.17	2.33
9	Serrano	SNL	Spectrum Scale	16	0.65	1.08	1.03	0.22	0.71

IOR Hard : A single shared file, 47008 byte I/O size and Stride I/O

IOR Easy : File Per Process, 2MB I/O size and Sequential I/O

IME | NVMe Flash Software Data Platform



***Truly Software-Defined • Commodity Hardware • Flash
Native • Linear Scaling • Low Power • High Density
Removes Filesystem Bottlenecks***



IME | NVMe Flash Software Data Platform

- Transparent, Scalable Cache Layer Delivering Unprecedented Performance for Your Workflows
 - Dramatically accelerate random read, random write, shared file, high concurrency and streaming workloads by up to 100X
- Reduces Footprint and Power by Up to 1/3
- Extend Flash SSD Life By Up to 500%
- Optimally Scale to Requirements At Any Scale
- Zero Application Modifications Needed
- Protects Data Against Device and Node Failures

APPLICATIONS

- more IOPs
- more throughput



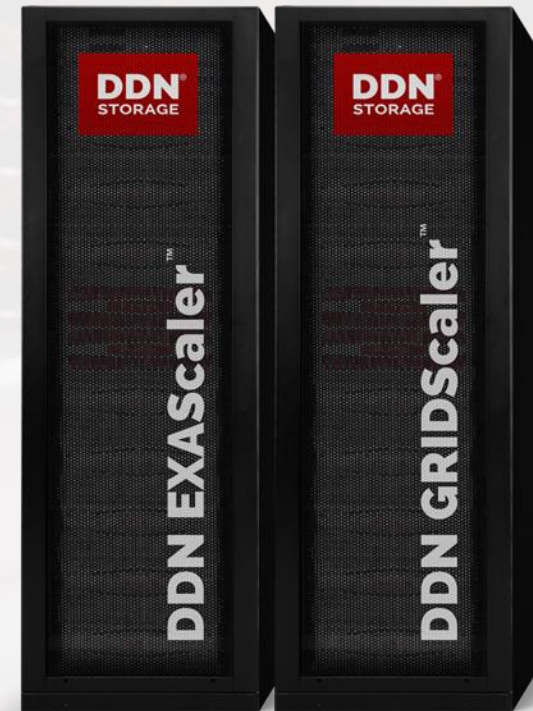
SCALER

APPLIANCES



Ultimate in **Performance & Capacity** for
both **Filesystems** and **Block** platforms
with Hybrid Flash and Disk Drives

Massively Scalable and Easy to Deploy



SFA | Fast and Scalable Data Storage Platforms for All Your Needs

- True Parallel File System Performance
- Extreme Real World Throughput & IOPs
- Optimal at Any Scale for Your Changing Needs
- Adaptable Flash & Disk Pools for Best Cost
- THE Best Global File System Technical Team



EXAScaler | GRIDScaler

SFA | Optimal Speed and Capacity with Hybrid Flash & Disk Drives

- **Filesystems that scale way beyond traditional NAS and Scale-Out NAS**
- **Built for simplicity at extreme performance**
- **Lustre and Spectrum Scale tightly integrated into DDN's SFA Architecture**
- **Broad spectrum capability for complex data workflows**
- **One Rack delivers**
 - 10 Petabytes of capacity with HDD
 - Up to 30M IOPs and 350GB/s per rack with Flash

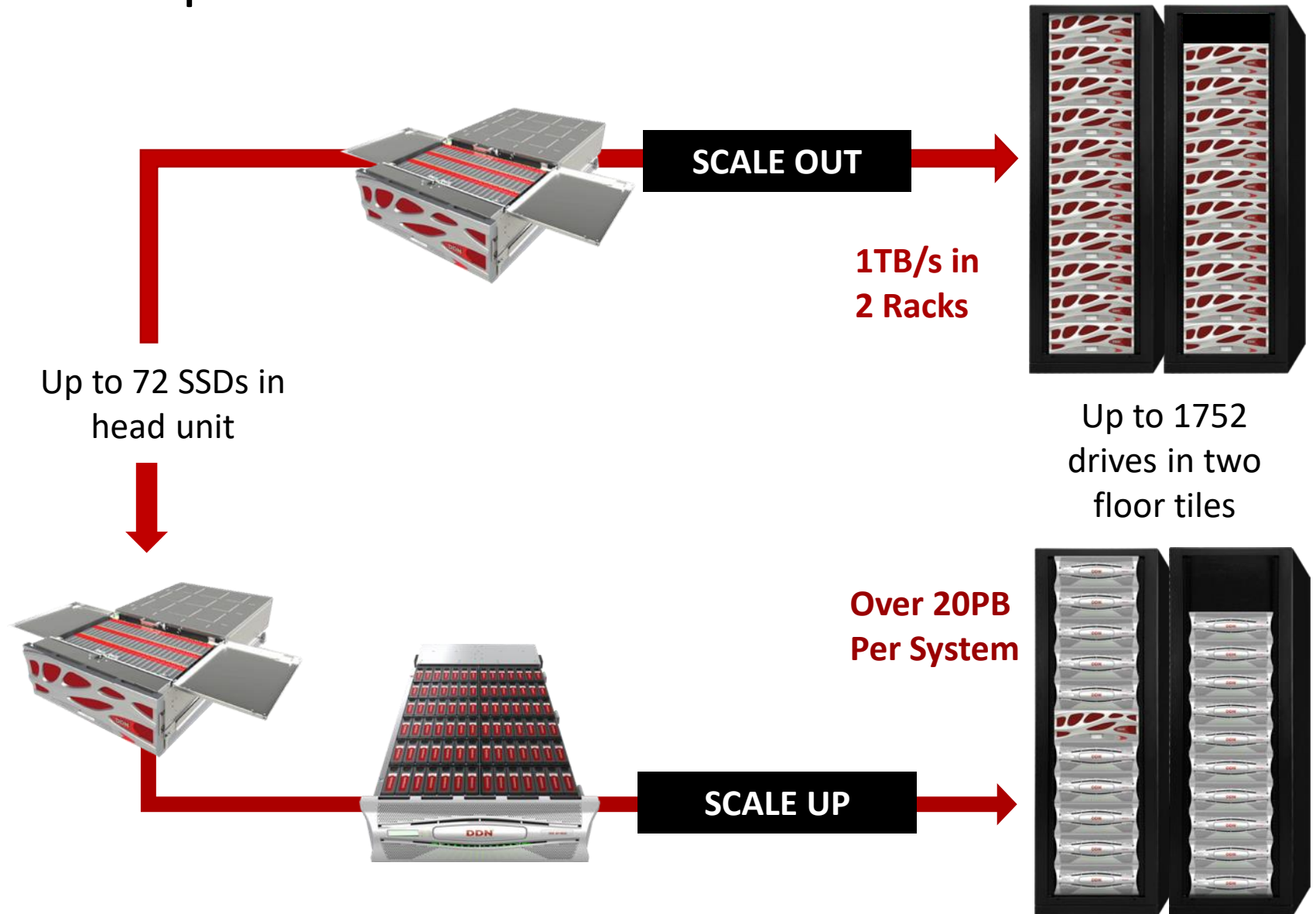


EXAScaler | GRIDScaler

SFA | Scale Appliances Up or Out

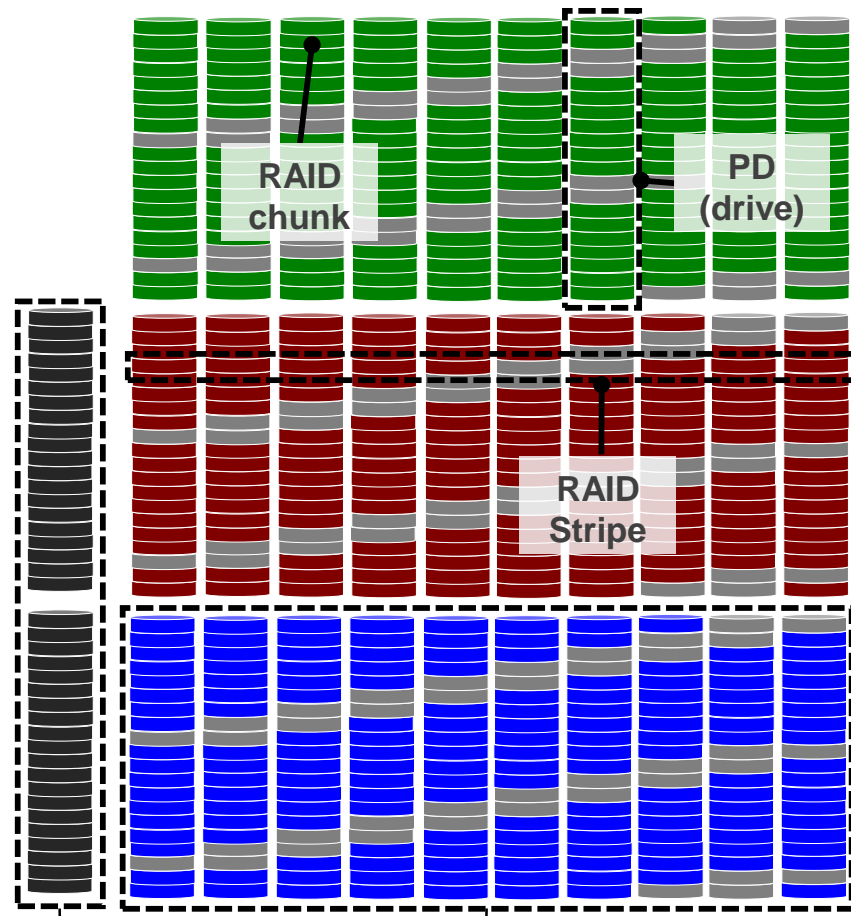
Ultimate Flexibility

- Any media type
- Any combination
- On demand



SFA | DDN DCR(DeClustering RAID)

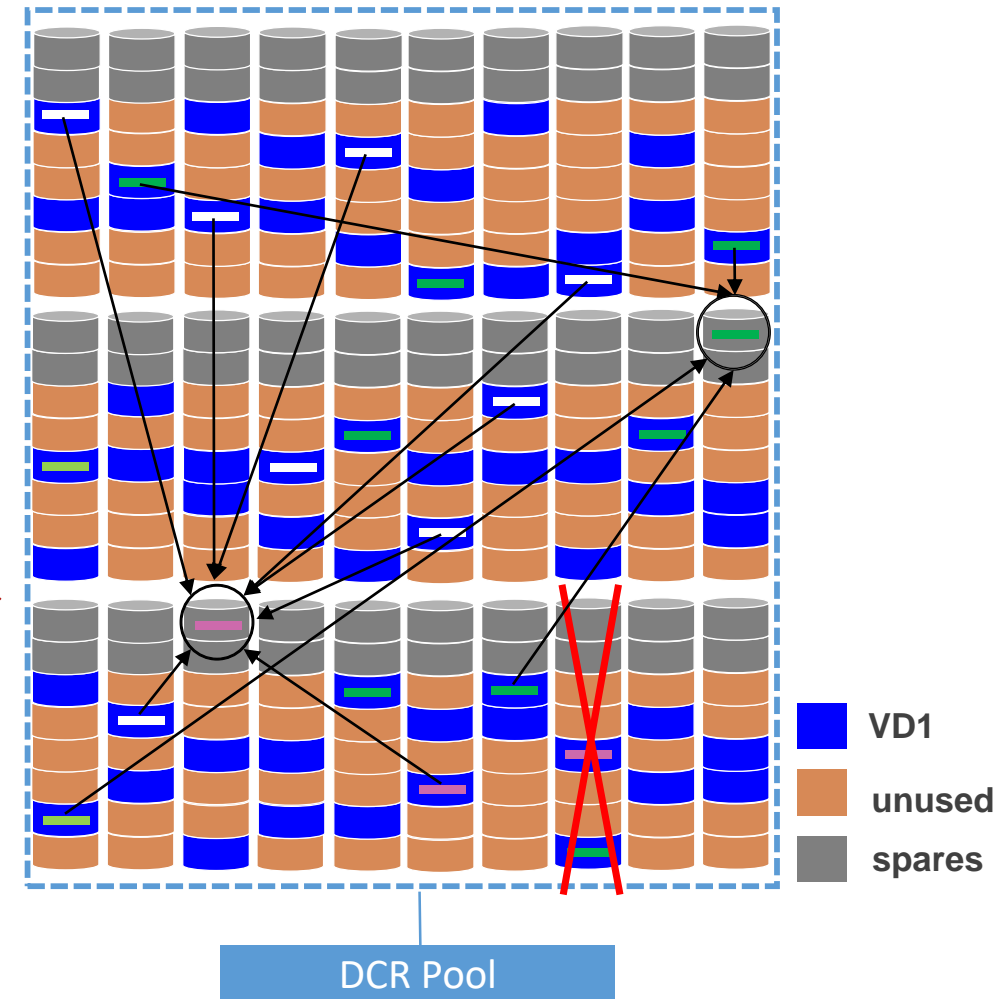
Traditional RAID



- Support Large LUN
- Single LUN's performance improvement
- Full PCIe/SAS Bandwidth
- Disk enclosure-aware DCR
- Reduce Rebuild Time



DDN DCR



SFA | Embedded Appliances

EXAScaler and GRIDScaler - Parallel Filesystems Simplified

Up to 40GB/s Throughput
Millions of IOPS
ReACT™ for Mixed-IO
Mirrored Cache for small IO

EXTREME PERFORMANCE



Custom Full-Fabric Architecture
768 PCIe Lanes
OPA/EDR/FDR
10/40/100GbE

SCALABLE FABRICS



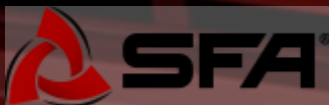
SFAOS Real-Time Parity Engine
DirectProtect
Real-time Integrity
Partial rebuilds

DATA PROTECTION

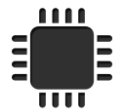


Up to 1752 Devices
Over 20PB in 2 floor tiles
Hybrid SSD/HDD Architecture

SCALE UP or OUT



DDN Exascaler | Our contribution for Lustre



Optimization for new HW platforms



Monitoring and orchestration



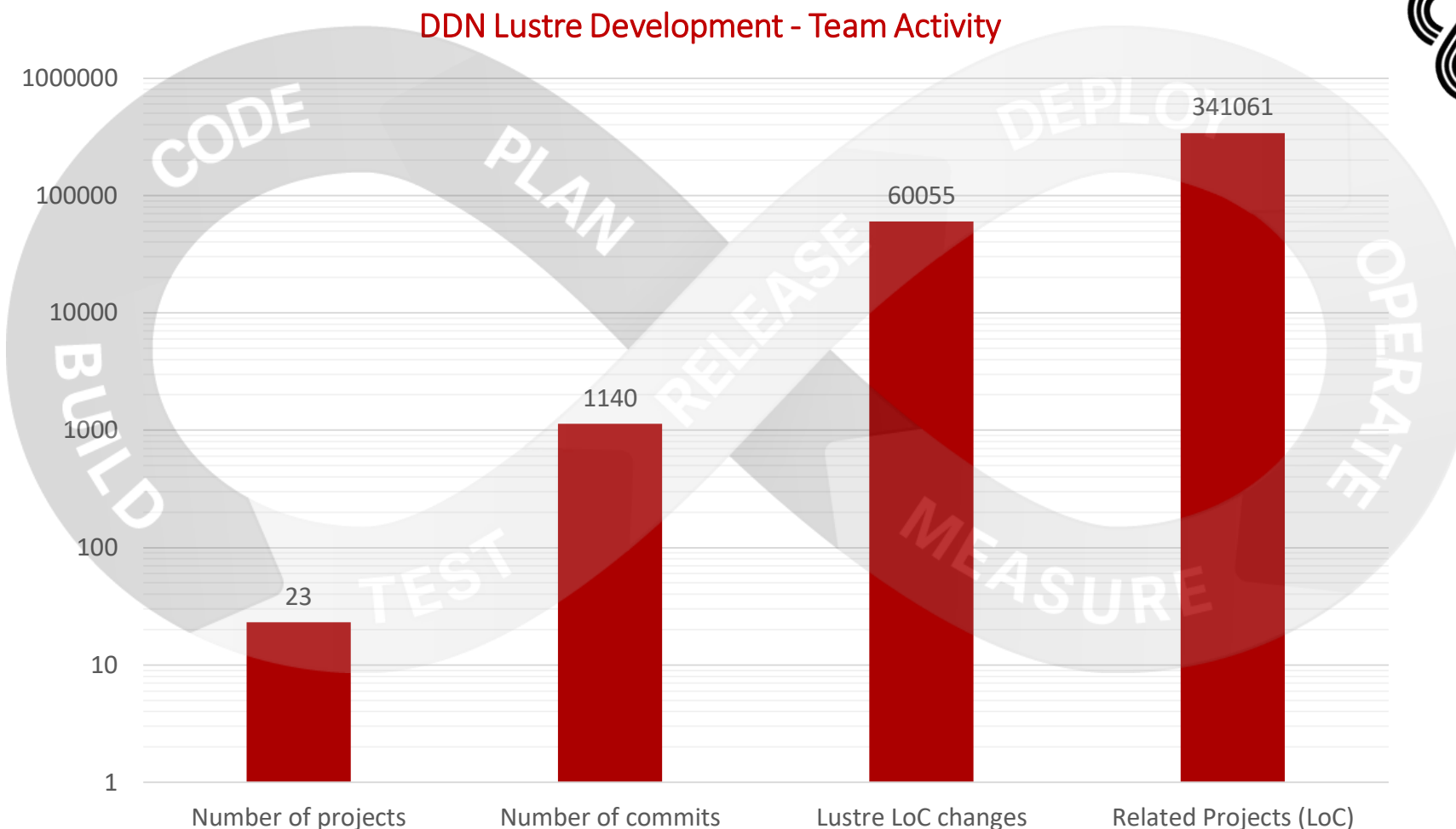
Capacity and Data Reliability



Data Management for Lustre



Enhanced Security



DDN | DDN for 2018

▶ Continue to investment in Highly Scalable Flash Storage Solution

- Enhancement and Performance Improvements of IME
- Price and Performance efficient All Flash Storage H/W and S/W
- Mixed HDD and SSD/NVMe configuration with Parallel Filesystem

▶ Data Management

- Data Security/Integrity and Multi tenancy
- Data locality and Archiving

Thank You!

Keep in touch with us.



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