

# Usage experience of INTEL DAOS

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on behalf of the

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Dubna

«**Govorun**» is a computing system for fast processing of big data, including the «**NICA**» project. One of the main tasks of the group in this direction is the introduction of new technologies to increase the efficiency of data processing.

One of the priority areas for the development of the supercomputer «**Govorun**» is to increase the volume of data storage and improve access parameters. **DAOS** (Distributed Asynchronous Object Storage) storage system is being implemented, which allows the use of NVMe non-volatile memory and also supports Optane DC Persistent Memory.

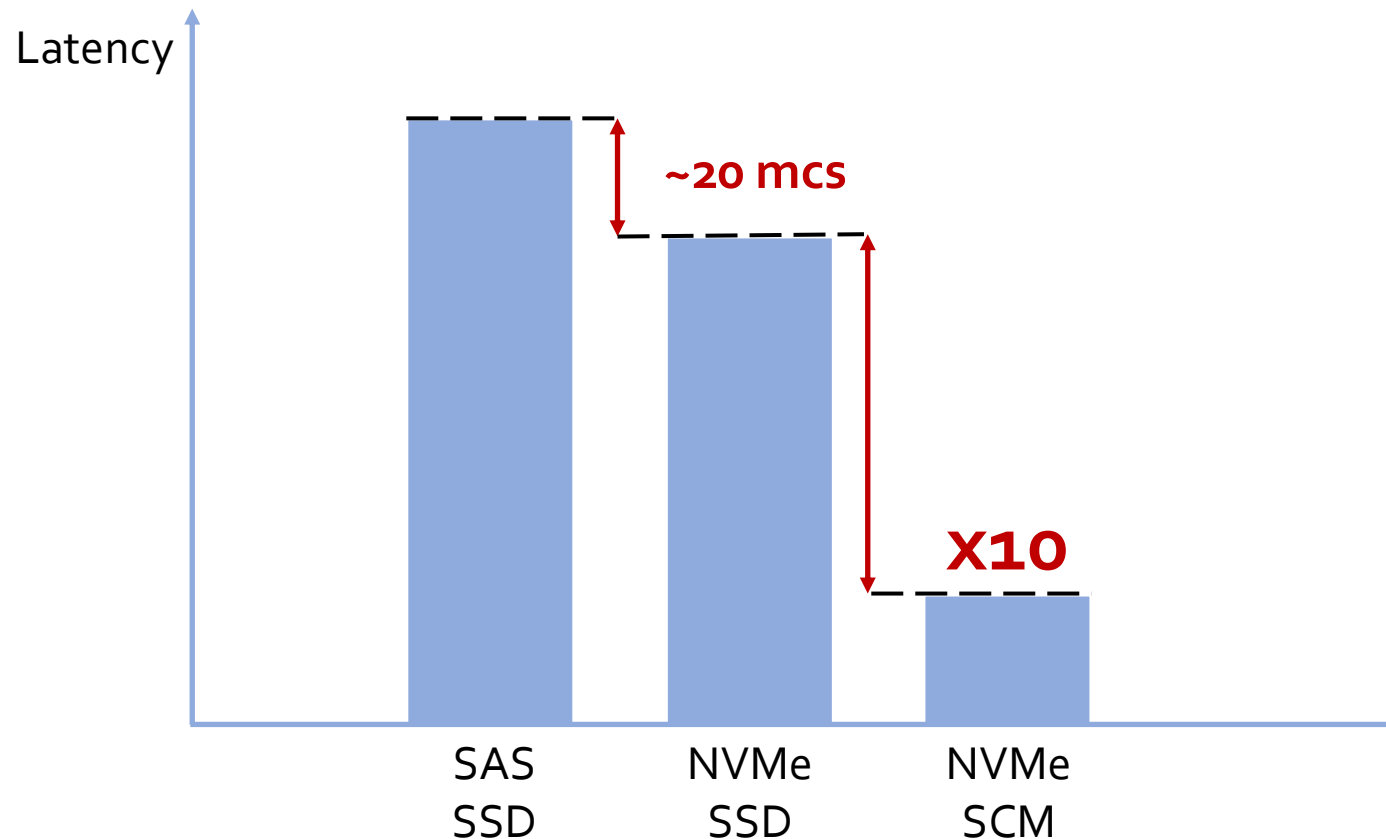
# PLANS

## Storage system for «NICA» project

#	information								io500		
	list id	institution	system	storage vendor	filesystem type	client nodes	client total procs	data	score	bw	md
										GiB/s	kIOP/s
1	sc20	Pengcheng Laboratory	Pengcheng Cloudbrain-II on Atlas 900	Pengcheng Laboratory	MadFS	255	18360	zip	7043.99	1475.75	33622.19
2	isc20	Intel	Wolf	Intel	DAOS	52	1664	zip	1792.98	371.67	8649.57
3	sc19	WekaIO	WekaIO on AWS	WekaIO	WekaIO Matrix	345	8625	zip	938.95	174.74	5045.33
4	isc20	TACC	Frontera	Intel	DAOS	60	1440	zip	763.80	78.31	7449.56
5	isc20	Argonne National Laboratory	Presque	Argonne National Laboratory	DAOS	16	544	zip	537.31	108.19	2668.57
22	isc20	JINR	Govorun	RSC Group	Lustre	50	800	zip	90.87	35.61	231.88

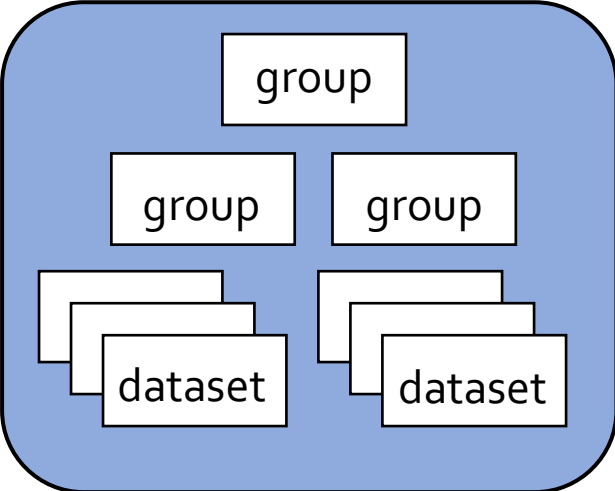
# DATA STORAGE BY DAOS

Distributed Asynchronous Object Storage - designed for massively distributed Non Volatile Memory (NVM). DAOS takes advantage of next-generation NVM technology, like Storage Class Memory (SCM) and NVM express (NVMe) and NVM express (NVMe)

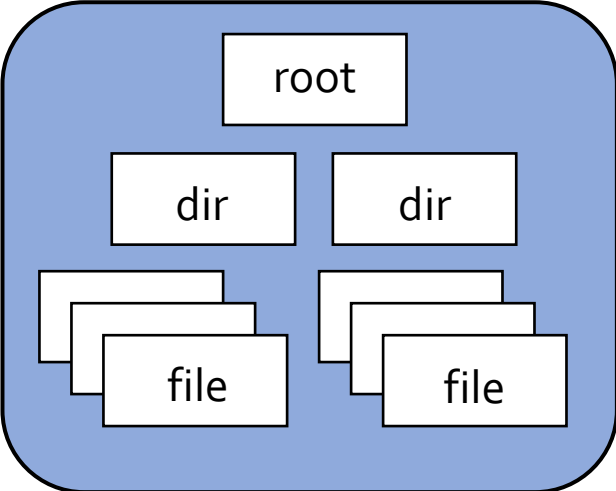


# DAOS MODES

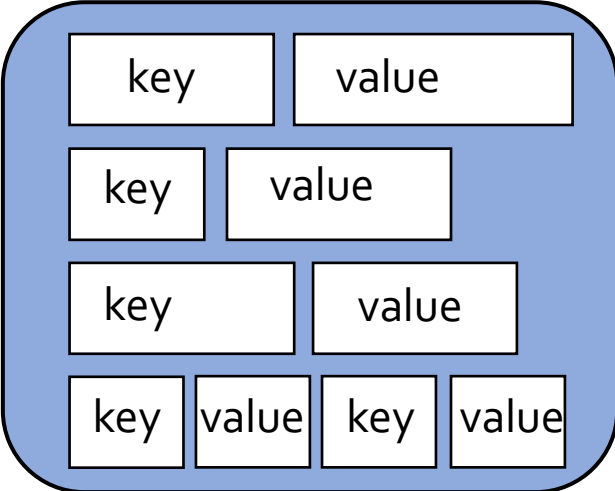
HDF5



POSIX



Key-value



# BASIC TERMS

DAOS System - system of the DAOS servers

DAOS Server – server with SCM or PMEM

DAOS Target – virtual storage for data and metadata

DAOS Pool – pool of the virtual storages for data and metadata

DAOS Container - pool DAOS object for data management

DAOS Objects - container DAOS objects

# DAOS REQUIREMENTS

## HARDWARE

Processors

Intel 64 bit

ARM 64 bit

Network

Ethernet

InfiniBand

Intel OPA

Storage

SSD NVMe

Optane DC Persistent Memory

## SOFTWARE

Compilers

C99, Go

Build tool

scons

Channel for administration

gRPC

Persistent memory programming

PMDK

NVMe device access

SPDK

Discovering devices

hwloc

Detecting fabric interfaces

libfabric

# HYBRILIT SPECS

8 servers for storage with

**2x** Intel Optane 512 Gb

**2x** Intel NVMe 2 Tb

RAM 192 Gb

Intel OPA 100 Gbit/s



# BUILDING DAOS

Create Node-pool

Create data storage object with DAOS type

Create cluster. When creating, you must specify a group of nodes and a network provider

Create DAOS server with local storage, when creating, you must specify:

- number of targets per disk (2 targets per 1 disk for best performance)
- local or remote disks
- disc groups
- RAM size (if use RAM)

Run distribute resources

Run DAOS instances

**THANK YOU FOR YOUR ATTENTION!**