Press Release

RSC presents intelligent Data Storage-on-Demand with DAOS support at FMS 2020

Flash Memory Summit 2020, November 10 — RSC Group, the leading Russian and well-known worldwide developer and integrator of innovative ultrahigh-dense and energy efficient solutions for high-performance computing (HPC), data centers, cloud platforms and storage-on-demand systems, for the first time participates in global Flash Memory Summit 2020 Virtual Event with Bronze Sponsor status.

Since 2018, RSC develops, produces and deploys intelligent data storage-on-demand systems (RSC Data Storage-on-Demand). These systems have been deployed at the Joint Institute for Nuclear Research (JINR, Dubna, Moscow region), St. Petersburg State Polytechnic University named after Peter the Great (SPbPU) and the Joint Supercomputer Center of the Russian Academy of Sciences (JSCC RAS).

Russian systems in IO500 rating

Two RSC's deployments are currently the only Russian systems in IO500 list of the best performing HPC storage systems. Govorun supercomputer with RSC storage platform at JINR holds 17th place in the rating and Polytechnic RSC Tornado supercomputer in SPbPU got 22nd position. These excellent results were achieved by using unique technology platform for creating distributed composable RSC Storage-on-demand systems based on Intel® SSDs and Intel® Optane™ SSD drives with NVMe interface. When Govorun supercomputer was installed at JINR in June 2018, it immediately took high 9th place in the worldwide IO500 rating.

DAOS support in RSC Data Storage-on-Demand solutions

At FMS 2020 RSC Group announced that its RSC Data Storage-on-Demand solutions support DAOS (Distributed Asynchronous Object Storage), new open-source cluster file system developed by Intel. It enables multi-layered storage based on Lustre file system in Disaggregated Composable Infrastructure and flexible management of NVMe disk pools, and enhances these levels with high-performance components based on DAOS.

For many years, the increase of nominal storage performance was mostly achieved by boost of serial read/write operations speed. DAOS addresses restrictions of old approaches to high performance storage based on TCP/IP protocol, Linux core architecture and other bottlenecks when applications need high-speed random data access.

DAOS provides significant performance increase with a number of architectural principles:

- avoidance of CPU/OS kernel processing, interrupts, context switching on data path from storage device to the point of processing;
- use of Storage Class Memory devices with efficient support of Byte Level Access for meta-data and caches;

• the most transparent streaming of continuous and block-based R/W operations in NVMe-based devices.

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RSC BasIS Orchestration Platform for High-Performance Composable Storage Architectures

RSC uses its experience of building composable disaggregated solutions in DAOS management with RSC BasIS orchestration platform.

Existing DAOS-based solutions required strict hardware-set ratio between processor resources, Intel® Optane™ DC Persistent Memory (PMEM) and SSD drives with NVMe interface. RSC BasIS platform enables composable approach for DAOS management combining servers with PMEM and servers with NVMe devices in pools connected with fast network fabric. Use of high-performance adapters with RDMA support, disaggregation of servers with NVMe-based media and Intel® Optane™ DC Persistent Memory enables on-demand composability without loss of performance.

This approach removes the restriction of PMEM/NVMe ratio in storage servers. Also it significantly increases possible capacity of the storage system. DAOS currently requires allocating at least 6% of local storage with NVMe for PMEM, and this greatly restricts maximum effective number of disks per storage server. However, composable architecture enables connection of unused disks to another server based on DAOS or Lustre.

As well, disaggregation lifts physical server hardware restrictions, like restrictions of PCIe bus lanes that are necessary by both storage media and network adapters and those of server chassis that can hold a limited number of extra devices.

RSC will describe the solution in its presentation during DUG meeting (DAOS User Group) on November 19 at SC20, the largest worldwide virtual conference and exhibition on supercomputing technologies and solutions.

RSC Tornado AFS storage system

RSC presented at FMS 2020 their improved RSC Tornado AFS intelligent data storage-on-demand system with up to 1PB capacity per node enabled by 32x Intel® SSD drives with NVMe in EDSFF.L format (so-called “ruler” form factor). The node also includes two Intel® Xeon® Scalable 2nd Generation processors, Intel® Optane™ SSD drives and Intel® Optane™ DC Persistent Memory modules. RSC Tornado AFS nodes use 100% “hot water” liquid cooling with record low PUE level of 1.04.

RSC Tornado HS hyper-converged node

RSC Tornado HS hyper-converged node is another RSC storage-on-demand solution. It is based on two Intel® Xeon® Scalable 2nd Generation processors, Intel® Server Board S2600BP with two 10GbE ports and (optional) Intel® Quick Assist Support. This node supports up to 12x hot-swap Intel® SSD drives with NVMe, e.g.:

- Intel® SSD DC P4511 (NVMe, M.2), 1-2TB capacity, configured as disk;
- Intel® Optane™ SSD DC 4801X (M.2), 375GB capacity, configured as disk or memory with Intel® Memory Drive Technology (IMDT).

It provides up to 24TB of fast storage and up to 4.2TB RAM per 1 node with Intel® Memory Drive Technology (IMDT). RSC Tornado HS hyper-converged node uses 100% “hot water” liquid cooling.

Press contact:

Oleg Gorbachev
Senior Director,
Corporate Communications and Integrated Marketing,
RSC Group
Cell: +7 (967) 052-50-85
Email: oleg.gorbachov@rscgroup.ru

About RSC Group

RSC Group is the leading Russian and well-known worldwide developer and integrator of full cycle innovative, ulrahigh-dense, scalable, energy-efficient and hyper-converged solutions for high-performance computing (HPC), data centers, cloud platfroms and intelligent data storage on-demand systems based on Intel architecture, innovative RSC liquid cooling technology and a number of its own know-hows. Since 2018, RSC participates in 'National Champions' priority project implemented by the Ministry of Economic Development of Russian Federation.

RSC has the potential to create the most energy efficient solutions with record-breaking power usage effectiveness (PUE), the highest computing density in the industry with standard x86-based processors, to use fully green design, provide the highest solution reliability, noise-free operation of computing modules, 100% compatibility and guaranteed scalability with unmatched low cost of ownership and low power consumption. RSC specialists also have the experience of developing and implementing an integrated software stack of solutions to improve work efficiency and application of supercomputer systems from system software to vertically oriented platforms based on cloud computing technologies.

RSC is a Platinum member of Intel® Technology Provider Program, has Intel® Select Solution for Simulation and Modeling, Intel® Select Solution for Professional Visualization certifications, participates in Intel® Fabric Builders Program, has Intel® HPC Data Center Specialist status and Intel® Solutions for Lustre Reseller Elite status. Performance and scalability of RSC Tornado based solutions are proved by Intel® Cluster Ready certification.

For more information please visit RSC website www.rscgroup.ru.