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Press Release

SC19: RSC presents an updated RSC Tornado solution line for a wide range of demanding scientific research workloads and applied tasks

RSC demonstrated its new HPC solutions with efficient storage and data processing capabilities which should help create Machining Learning and Deep Learning (ML/DL) systems fat the leading global supercomputer exhibition.

Moscow, November 29th, 2019 — RSC Group, leading Russian and worldwide well-known developer and integrator of innovative ultrahigh-dense, scalable, energy efficient and hyper-converged solutions for HPC and data centers, has demonstrated an updated and unified RSC Tornado solution line at SC19, the largest global supercomputer exhibition that took place in Denver (Colorado, USA) on November 18th-21st. New RSC solutions are oriented on a wide range of demanding scientific research workloads and applied tasks. The updated portfolio of integrated software-defined and reconfigurable solutions targets classic HPC systems, efficient storage and data processing and should help create AI/ML/DL (Artificial Intelligence, Machine Learning, Deep Learning) systems.

RSC presented the following new solutions:

- Super powerful RSC Tornado AP computing node based on the best performing server processors — new Intel® Xeon® Platinum 9200 series (up to 56 cores per chip).
- RSC Tornado AFS high-performance storage systems for HPC and ML/DL. They asynchronous object storage systems with Intel® Optane™ DC Persistent Memory support.

RSC has also demonstrated broad functionality of updated RSC BasIS integrated software stack for management and monitoring of computing clusters (Cluster-on-Demand) and distributed storage systems (Storage-on-Demand).

Next generation of RSC Tornado line supports all advantages of RSC solutions at new level including maximum computing density and energy efficiency (with 100% "hot water" liquid cooling of all electronic components), horizontal scalability from small systems with a few servers to huge clusters or server farms containing many thousands of server nodes. The solutions provide additional cost optimization benefits through support of open standards, including new types of storage components:

- Intel Optane DC Persistent Memory,
- NVMe storage with EDSFF form-factor (so called "long/short ruler"),

and:

- server boards supporting a large volume of RAM,
- processors with maximum power consumption of 500W per socket,
- a broad range of accelerators with up to 700W power consumption.

The updated RSC Tornado solution line enables integration of systems with even higher computing and volume performance density, broad variety of components and numerous configurations for maximum efficiency of each end-customer solution.

Unified cabinet form-factor includes distributed power system with N+x redundancy, integrated computing/switching control and monitoring system. With this support customers can use RSC solutions with 100% liquid cooling in the same rack with third-party server and communication equipment of standart (19'') form factor (rack unit, RU)) equipped with air-based or combined cooling systems.

RSC Tornado AP computing node

New high-performance RSC Tornado AP computing node supports 56-core Intel® Xeon® Platinum 9200 processors (Intel® Xeon® Platinum 9282 processor) and direct liquid cooling in "hot water" mode. It provides the theoretical peak performance of 9.3 Teraflops and 24 channels of RAM and supports up to 1.5 TB of data storage. This node can include two solid-state drives (SSD) with NVMe technology in M.2 form factor, for example Intel® Optane™ SSD DC P4801X M.2 Series or Intel® SSD DC P4511 (NVMe, M.2), or two SSDs of E1.S (short ruler) format, for example Intel® SSD DC P4511 (NVMe, E1.S). The system can also be expanded with additional module of 6 NVMe-based SSDs in E1.L (long ruler) form factor, each having up to 15.36 TB data volume with hot swap support.

For example, configuration with Intel® SSD DC P4320/P4520 (NVMe, E1.L) enables storage of up to 100 TB per node with extremely fast access. The optimal combination of computing, networking and storage components provides the required balance to create horizontally scalable hyper-converged and distributed storage systems with requested high performance and storage volume/speed levels.

This approach enables creation of compact and high-performance systems with the leading industry parameters: 0.8 Petaflops of total peak performance and 8.4 Petabytes of storage in a single 42U rack.

RSC Tornado AFS storage systems

Considering growing customer demand for increased storage volume and data processing rate, RSC has developed a totally new RSC Tornado AFS solution for high capacity All-Flash systems based on high-speed NVMe technology with high density EDSFF.L form factor. New All-Flash storage with 100% "hot water" liquid cooling of all components supports up to 32 SSDs with NVMe technology in EDSFF.L form factor with currently declared capacity of 15.36 TB each and hot swap support. The capacity of NVMe/EDSFF.L SSDs will soon double storage volume to 1 PB (Petabyte) per 1 standart rack unit (19'') without any design alterations.

Broad use of NVMe-over-Fabric (NVMeOF) technology enables creation of high-performance distributed storage systems with data transfer rates of several TB/s and total storage volume up to 20.64 PB per cabinet with support of various parallel file systems such as Lustre, BGFS, etc.

Intel® Optane™ DC Persistent Memory technology and RDMA (remote direct memory access) technology enable a totally new approach to create high speed low latency storage systems of key-value store class using DAOS (Distributed Asynchronous Object Storage) software stack. These data storage systems are optimal for wide usage in machine learning and deep learning applications.

The base part of the solution also helps to achieve the optimal performance balance. It includes two high-performance 2nd generation of Intel® Xeon® Scalable

processors and supports up to 2 TB of high-speed RAM and up to four Intel® Optane™ DC Persistent Memory modules as L4/L5 data cache. A communication subsystem with two PCIe Gen3/4 x16 adapters based on Intel® Omni-Path, InfiniBand or Ethernet technologies and enables high-speed interconnect at up to 200 Gb/s rate (up to 25 Gb/s per array).

Addition of Intel® Optane™ DC Persistent Memory modules became a logical development of high-speed hyperconverged RSC Tornado HS storage system with 12 NVMe modules, enabling support of DAOS software stack. Upgraded supercomputer system named after N. N. Govorun in the Joint Institute for Nuclear Research in Dubna[1] with these solutions achieved the highest distributed storage performance of 300 GB/s.

Built-in orchestrator in the RSC BasIS software stack integrated into hyper-converged RSC Tornado solution enables on-the-fly definition of storage architecture after hardware installation and adaptation of the system to different workload types depending on user preferences and tasks. This approach enables creation of storage-on-demand systems with different characteristics (volume, file system type, access speed, reliability and security level, lifetime).

About RSC Group

RSC group is the leading Russian developer and integrator of "full cycle" innovative, high-density, scalable, energy-efficient and hyper-converged solutions for high-performance computing (HPC) segment and data centers based on Intel architectures, innovative liquid cooling technologies 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, member of Intel® Select Solution for Simulation and Modeling, Intel® Select Solution for Professional Visualization, Intel® Fabric Builders Program, has Intel® HPC Data Center Specialist status and Intel® Solutions for Lustre Reseller Elite status. Performance and scalability of solutions based on RSC Tornado architecture are Intel® Cluster Ready certified.

For more information see our corporate website www.rscgroup.ru.

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[1] Updated supercomputer named after N. N. Govorun is presented in Joint Institute for Nuclear Research (JINR) in Dubna (http://www.rscgroup.ru/ru/news/371-obnovlennyy-superkompyuter-imeni-nn-govoruna-predstavlen-v-obedinennom-institute-yadernyh)