

# **SANGFOR EDS works with Intel to achieve high performance at low cost**



In the field of storage, it seems that high performance and low cost conflict with each other and cannot be achieved both ways. Today, the cooperation between SANGFOR EDS and Intel SPDK makes it possible to achieve both at the same time.

As one of the Intel SPDK's partners in China, SANGFOR EDS(Enterprise Distributed Storage) designs a brand new storage engine using Intel SPDK as the programming framework. With the joint efforts of both sides, the ideal of "high performance at low cost" has been turned into reality.

The storage engine designed by SANGFOR EDS based on Intel SPDK not only gives full play to the performance of Intel hardware, but also builds a high-performance, low-cost storage architecture, which is attributed to the EDS R&D team's extensive experience and software development capabilities in the field of software-defined storage(SDS). We are looking forward to further cooperation in the future to build a storage foundation for the digital transformation of users.

## **SANGFOR EDS and Intel SPDK achieve "high performance at low cost"**

Through the optimization and improvement of software capabilities, the deep cooperation between SANGFOR EDS and Intel SPDK makes full use of the hardware strengths and stimulates the potential of hardware, and ultimately achieves the two-way acceleration of the overall performance improvement and cost reduction.

### **1. Unleash the hardware potential with up to a million IOPS in standard 3 nodes**

When each physical CPU is running at 100% to provide a higher IOPS, EDS can achieve millions of IOPS in a 3-node standard configuration, representing a significant improvement in performance compared to traditional all-flash storage.

## **2. Reduce construction costs with same performance**

The technological innovation of EDS based on the SPDK framework improves the synergistic efficiency of the NVMe and RDMA protocols so that actions like transferring data from memory to SSD and RDMA memory copy can be completed in the same process, making it easy to break through system performance of IO bottlenecks across nodes, and reduce CPU consumption with the use of RDMA.

Therefore, when the architecture remains unchanged, EDS can meet the same performance requirements with fewer storage nodes, greatly reducing the construction cost. (The above data come from the test results of the EDS R&D team.)

The HD video is a case in point. A blending of EDS and Intel DPDK uses a code rate of 500mb/s and 6 layers of editing in 4K non-linear editing scenarios. Each node can support three 4K workstations.

### **Why do we use Intel SPDK framework?**

With the improvement of technology and the reduction of cost and power consumption, SSD (Solid State Drive) has developed rapidly as storage media in recent years. However, the general NVMe protocol requires frequent data exchange between user mode and kernel mode by “interrupts” when processing each IO. The entire process involves multiple CPU context switches and memory data copies. This method is too outdated and inefficient to give full play to the SSD hardware performance, resulting in waste of storage resources.

In order to make better use of SSD performance, Intel has developed a high-performance storage kit SPDK, using the network, computing processing capability, and storage technology of its hardware platform to realize the full potential of solid-state storage. SPDK provides a set of tools and libraries and the design concepts are as follows:

- IO processing is completed in “user space” without multiple system calls, and enables zero-copy access to memory, thereby reducing protocol overhead and access latency.
- A new asynchronous programming model is adopted, which can take full advantage of NVMe queue width and depth to maximize the potential of SSD and improve the performance.

### **Innovations and breakthroughs in EDS**

Based on the Intel SPDK framework, SANGFOR has invested a lot of research and development resources to build a new PhxStore storage engine, and has made the following technological innovations:

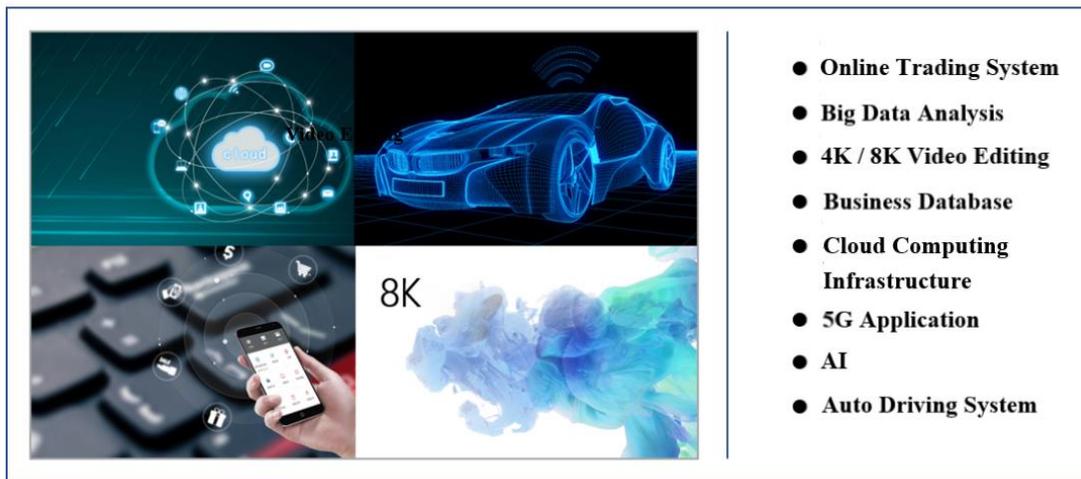
- **Low CPU consumption for high performance**

The EDS storage engine PhxStore improves the efficiency of storage resources through a lot of software optimization. It is proved that only one core of the CPU is needed to achieve the full performance of more than two SAS interface SSDs, which greatly reduces the storage consumption of the CPU and improves efficiency.

- **Lower latency with zero cost increase**

The EDS storage engine PhxStore has developed a new network communication module and distributed consistency protocol that fully embraces the RDMA network. According to the experiments, the transmission delay of 4K data across the hosts can be dramatically reduced without changing the user's existing network architecture.

With more powerful performance and lower costs, EDS will bring users much more advanced storage experience in the fields of HD video, big data analysis, online trading systems, business databases, etc.



SANGFOR provides users with agile, intelligent and secure IT infrastructure based on software-defined reinvention of IT architecture, including aDesk(VDI), AD (application delivery), SD-WAN and EDS. SANGFOR's new IT infrastructure solves the problems of inefficiency, high cost and poor security that traditional infrastructure faces, and accelerates the digital transformation process of users.