



Intel® Select Solutions for XSKY* Software-Defined Storage System



As an important trend for enterprise storage, Software-Defined Storage (SDS) has grown rapidly in recent years. It realizes the management of storage resources based on intelligent software by abstracting and pooling storage physical resources, and builds on-demand storage architecture for users to effectively meet the needs for on-demand storage. Ceph* distributed storage platform is a distributed unified storage framework designed for high performance, high reliability and high scalability. It is open, transparent, efficient and compatible, and can fully support storage requirements of different enterprise application scenarios such as cloud data centers, transactions systems, analysis systems and disaster recovery systems. It has become one of the preferred choices for storage vendors to develop SDS solutions, and the ecosystem is expanding.

As a founder-member of the Ceph Foundation, XSKY* (XSKY (Beijing) Data Technology Co., Ltd.*) provides users with software-defined enterprise storage solution product. Aimed at cloud computing, innovative applications and other scenarios, the solution can help users avoid vendor lock-in, significantly reduce the total cost of ownership, and improve horizontal scalability and availability. In terms of the infrastructure level, the Intel® Select Solutions for XSKY Software-Defined Storage System cover the Intel® Xeon® Gold 5118 Processor/Silver 4110 Processor, Intel® SSD DC S4510/DC P4510 series, and Intel® Ethernet Adapter X710-DA2, providing users with proven and optimized performance and stability.

XSKY Software-Defined Storage Solutions Help Users Transform Data Center Infrastructure

Traditional storage architecture always has such problems as data silos and hardware vendor lock-in. With the rapid growth of data, there are more and more storage devices inside the enterprise, and resource management is becoming more and more complex. Traditional storage architecture with low system integration capabilities and low horizontal scalability cannot meet the requirements of enterprises for storage capacity. To address these problems, Software-Defined Storage, which is more flexible and easier to manage, becomes the trend for enterprise storage.

In the field of Software-Defined Storage, XSKY has accumulated rich experience and success stories. It provides multi-level and comprehensive data resource pools and "storage cloud" solutions for customers in the government, finance, telecommunications, broadcasting, education, transportation, etc. From the technical innovation perspective, XSKY's Software-Defined Storage solution offers the following outstanding features:

- Rich interfaces and technologies comparable to traditional storage area networks (SANs) such as Fibre Channel, iSCSI, storage multipathing, etc.
- Software and hardware fully decoupled and adaptable to common hardware; online expansion, full redundancy architecture, and Internet based operation and maintenance;
- Unified graphical management, which is intuitive, simple and easy to use;

- Outstanding performance optimized for NVMe* new storage protocols and high-speed networks.

Intel® Select Solutions for XSKY Software-Defined Storage System

While Software-Defined Storage emphasizes software and hardware decoupling, innovation and optimization at the hardware level, such as processors and storage, remain the basis for SDS systems to maximize performance, availability and other advantages. Enterprises could accelerate the deployment of SDS systems through hardware that is verified and optimized by actual workloads, thus significantly improving performance.

The Intel® Select Solutions for XSKY Software-Defined Storage System are based on the critical hardware, such as Intel® Xeon® Gold 5118 processor/Silver 4110 processor, Intel® SSD DC S4510/DC P4510 series, and Intel® Ethernet Adapter X710-DA2, and integrate with Intel® chip-level advanced technical features. They can help users optimize performance and cost while speeding up the deployment. In particular, Intel® Select Solutions for XSKY Software-Defined Storage System can provide the following values:

- Proven and optimized performance and the combination of high-speed data throughput and rapid deployment capabilities based on Intel® architecture;
- Reduction in cost and operating expenses compared to traditional storage devices;
- Support for block/file/object storage on the same node, and a unified data storage resource pool;
- Wide compatibility with multiple virtualization platforms, ease of deployment and maintenance.

Hardware Selections

Intel® Select Solutions offer "Base" and "Plus" configuration options for the different performance needs of XSKY Software-Defined Storage System users. For the "Base" configuration, the Intel® Xeon® Silver 4110 Processor and the Intel® SSD DC S4510 provide an optimized balance of price and performance. The Intel® Xeon® Gold 5118 Processor and Intel® SSD DC P4510 power the "Plus" configuration, which is designed for more demanding performance requirements (a list of configurations is shown in Appendix 1).

Intel® Xeon® Scalable processor

Intel® Xeon® Scalable processor provides a solid foundation for designing powerful Software-Defined Storage solutions, with a significant leap in agility and scalability. This innovative processor features a disruptive design that sets new standards in platform convergence and computing, storage, memory, networking and business continuity. The superior performance and low cost of Intel® Xeon® Silver processor make it the ideal processor platform of Software-Defined Storage solution.

What Are Intel® Select Solutions?

Intel Select Solutions are pre-defined, workload-optimized solutions designed to minimize the challenges of infrastructure evaluation and deployment. Solutions are validated by OEMs/ODMs, certified by ISVs, and verified by Intel. Intel develops these solutions in extensive collaboration with hardware, software and operating system vendor partners and with the world's leading data center and service providers. Every Intel Select Solution is a tailored combination of Intel® data center compute, memory, storage, and network technologies that delivers predictable, trusted, and compelling performance.

To qualify as an Intel® Select Solution, solution providers must:

1. Meet the software and hardware stack requirements outlined by the solution's reference-design specifications.
2. Replicate or exceed established reference-benchmark test results.
3. Publish a solution brief and a detailed implementation guide to facilitate customer deployment.

Solution providers can develop their own optimizations in order to give end customers a simpler, more consistent deployment experience.

Intel® SSD DC P4510

In a data-intensive application scenario, users can use the "Plus" configuration with the Intel® SSD DC P4510. The Intel® SSD DC P4510 features higher density Intel 64-Layer 3D NAND and enhanced firmware capabilities, enabling it to handle tasks such as read-intensive workloads.

Intel® SSD DC S4510

Intel® SSD DC S4510 features a new SSD form that is long and slim and completely different from the 2.5-inch, 3.5-inch specifications of traditional hard drives, enabling non-volatile storage beyond the shape and size constraint. It has been optimized for read-intensive workloads and delivers high performance and low cost, allowing it to dramatically increase server energy efficiency and data reliability.

Intel® Ethernet Adapter X710-DA2

The Intel® Ethernet Adapter XXV710-DA2 supports single or dual 1/10/25GbE port connections, provides outstanding performance in PCI Express v3.0 x8 slots. It also supports various advanced features such as virtual machine devices queue (VMDq) and simple root I/O virtualization (SR-IOV) and accelerates the delivery of new services and features through intelligent offloading, sophisticated packet processing and high quality open source driver, thus improving the performance of Intel® Select Solutions for the XSKY Software-Defined Storage System. Also, the adapter is extremely cost effective and can significantly reduce the total cost of the solution.

Intel® Xeon® Scalable processors

2nd Generation Intel® Xeon® Scalable processors:

- Offer high scalability that is cost-efficient and flexible, from the multi-cloud to the intelligent edge
- Establish a seamless performance foundation to help accelerate data's transformative impact
- Support breakthrough Intel® Optane™ DC persistent memory technology
- Accelerate artificial-intelligence (AI) performance and help deliver AI readiness across the data center
- Provide hardware-enhanced platform protection and threat monitoring

Intel® Select Solutions for XSKY Software-Defined Storage System feature Intel® Xeon® Gold processors.



Verified Performance through Benchmark Testing

To ensure full compatibility of hardware and software and fully optimize the performance of the solution, Intel® Select Solutions for XSKY Software-Defined Storage System has been rigorously tested. This allows them to significantly reduce the time and cost needed for XSKY Software-Defined Storage solution deployment and dramatically improve the performance.

In the benchmark performance test, XSKY and Intel® chose FIO* as the benchmark performance test tool. FIO is an I/O tool that is widely used for benchmark test and stress/hardware verification of block devices and file systems. The test data of the "Base" and "Plus" configurations are shown in Table 1. In terms of the 8k random read/write (75R/25W) IO model scenario, the PLUS and bandwidth performance of the "Plus" configuration is more than 70% higher than "Base". In terms of sequential read/write (50R/50W) model scenarios, the performance of "Plus" has increased by 250%. Users can choose a configuration that better fits their needs based on the cost budget and the actual requirements for data throughput.¹

Table 1: Comparison of Base configuration and Plus configuration testing

XSKY	Rand 8KB 75R25W			SEQ 256KB 50R/50W		
	IOPS	BW (MB)	Lat (ms)	IOPS	BW (MB)	Lat (ms)
Base	36700/12200	290/90	2.2/2.9	1810/1810	450/450	9.0/56.0
Plus	65300/21700	510/160	1.2/2.1	6590/6590	1650/1650	4.0/14.0

Technological Selections for Intel® Select Solutions for XSKY Software-Defined Storage System

The Intel® Xeon® Scalable processor also integrates innovative Intel® technologies to help users further enhance the performance, reliability and security of XSKY's Software-Defined Storage solutions:

- **Intel® QuickAssist Technology (Intel® QAT):** Accelerates key workloads such as bulk encryption, public key exchange, and data compression based on Intel® architecture platforms. The technology delivers strong performance with up to 100 gigabits (Gbps) per second encryption, 100 Gbps compression, and 100,000 decryptions per second using 2,048-bit RSA keys.
- **Intel® Volume Management Device (Intel® VMD):** The standardized design supported by Intel® VMD brings enterprise-level reliability, availability, and serviceability (RAS) to NVMe* SSDs, helping to improve user confidence for deploying the next generation of storage systems.
- **Intel® Trusted Execution Technology (Intel® TET):** Intel® TET is a set of general purpose hardware extensions for Intel® processors and chipsets, and can significantly enhance the security of digital office platforms. When this technology is enabled, applications can run in their own space without being affected by any other applications in the system.
- **Intel® Hyper-threading (HT) Technology:** It enables more efficient use of processor resources and supports multiple threads running in each core. As a feature, it also increases processor throughput and the overall performance of threaded software and keeps system responsiveness while running multiple demanding applications.
- **Intel® Turbo Boost Technology:** For peak demand, Intel® Turbo Boost Technology enables the processor to run beyond the basic operating frequency, accelerates processor and graphics performance, and easily handles peak loads.

Intel® Select Solutions for XSKY Software-Defined Storage System Provide Innovative Storage Capacity for Enterprises

Intel® Select Solutions for XSKY Software-Defined Storage System can help enterprise users reduce the time cost for hardware selection, and provide verified and optimized hardware selection, so as to speed up their deployment of XSKY Software-Defined Storage solution, and give full play to the key supporting value of the storage solution in server virtualization, desktop virtualization,

database, high performance computing, etc. With the help of Intel® Select Solutions for XSKY Software-Defined Storage System, enterprise users can not only solve the problem of data storage and management with lower costs, but also reshape data value, taking a lead in digital transformation.

Learn More

Intel® Select Solutions: intel.com/selectsolutions

Intel® Xeon® Scalable processors: intel.com/xeonscalable

Intel® Select Solutions are supported by Intel® Builder: <http://builders.intel.com>

Appendix 1: The Base and Plus Configurations for Intel® Select Solutions for XSKY Software-Defined Storage System

XSKY/3 Nodes	Base	Plus
Processor	2 x Intel® Xeon® Silver 4110 @ 2.10GHz 8C or Intel® Xeon® Silver 4210 @ 2.2GHz 10C or higher	2x Intel® Xeon® Gold 5118 @ 2.30 GHz 12C or Intel® Xeon® Gold 5218 @ 2.30 GHz 16C or higher
Memory	96GB or higher (6 x 16 GB DDR4-2666)	96GB or higher (6 x 16 GB DDR4-2666)
Boot Drive	2 x 240 GB Intel® SSD DC S4510	2 x 240 GB Intel® SSD DC S4510
Storage Cache	2 x 480 GB Intel® SSD DC S4510	2 x 1 TB Intel® SSD DC P4510
Data Drive	10 x 4 TB or larger 7200rpm SATA HDD	10 x 4 TB or larger 7200rpm SATA HDD
Data Network	2 x Intel® 82599 Dual-Port 10GbE or better	2 x Intel® 82599 Dual-Port 10GbE or better
Mgmt Network	Intel® I350 Dual-Port 1GbE or better	Intel® I350 Dual-Port 1GbE or better

Note: The specific product for the implementation of Intel® Select Solutions can be selected from the XSKY XSCALER Software-Defined Storage appliances.



¹ CONFIG1 - Base: Test by Intel & XSKY as of 5/30/2019. 3-node, 2x Intel® Xeon® Silver 4110 Processor, 8 cores HT On Turbo ON Total Memory 96 GB (6 slots/ 16GB/ 2400 MHz), 2x 240 GB Intel® SSD DC S4500, 2x 480GB Intel® SSD DC D3-S4500, 10x 4TB 7200RPM HDD, Microcode:0x2000050, Centos 7.6, 3.10.0-957.12.2.el7.x86_64, FIO 2.2.8, XSKY EBS 4.1.

CONFIG2 - Plus: Test by Intel & XSKY as of 5/30/2019. 3-node, 2x Intel® Xeon® Gold 6140 Processor, 18 cores HT On Turbo ON Total Memory 192 GB (12 slots/ 16GB/ 2400 MHz), 2x 240 GB Intel® SSD DC S4500, 2x 1TB Intel® SSD DC P4510, 10x 4TB 7200RPM HDD, Microcode:0x2000050, Centos 7.4, 3.10.0-957.12.2.el7.x86_64, FIO 2.2.8, XSKY EBS 4.1.

Component performance tests are measured using specific computer systems. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, visit intel.com/benchmarks

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark® and MobileMark®, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information visit intel.com/benchmarks

Cost reduction scenarios described are intended as examples of how a given Intel- based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

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