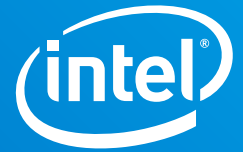


SOLUTION BRIEF

Intel® Builders
Enterprise Data Center Infrastructure
June 2018 v3



Intel® Select Solutions for Windows Server* Software Defined Storage

Intel Select Solutions simplify the selection of a Windows Server hyperconverged infrastructure solution with efficiency and performance.



Businesses are increasingly looking to replace costly, dedicated storage area network (SAN) and network-attached storage (NAS) solutions. Windows Server* Datacenter edition provides a software defined storage feature that enables highly available, highly scalable storage from industry-standard servers and locally attached drives. The feature, called Storage Spaces Direct*, can be used to create a complete, hyperconverged solution for the data center at a fraction of the cost of most other dedicated hardware solutions.

Intel® Select Solutions are verified hardware and software stacks optimized across compute, storage, and networking resources for specific workloads. Built on Intel® Xeon® Scalable processors, Intel Select Solutions help ensure enterprises get the performance, agility, and security they require.

Windows Server with Storage Spaces Direct

Many enterprise businesses are seeking a more scalable and less costly storage option than their current SAN or NAS solutions. Storage Spaces Direct offers an attractive alternative for these companies because the software is included with the Windows Server license they already have. At no additional cost, Storage Spaces Direct provides exceptional performance, fault tolerance, and scalability for scale-out storage. The solution also simplifies management because administrators can use the same familiar Microsoft tools they are already using for managing virtual machines (VMs). That means Storage Spaces Direct can reduce both capital expenditures (CapEx) and operational expenditures (OpEx) through efficient use of both hardware resources and IT personnel.

To simplify adoption of Storage Spaces Direct for hyperconverged infrastructure or software defined infrastructure (SDI) solutions, Microsoft has created the Windows Server Software Defined solutions program. This program is designed to ensure that customers have a seamless deployment and steady-state operational experience on validated hardware. Intel Select Solutions for Windows Server Software Defined Storage complement the Microsoft program by offering two configurations that conform to the program's requirements and are tuned to a performance threshold on Intel® hardware. Intel Select Solutions make it easier for businesses to evaluate and select the solution that best meets their needs from the pool of validated Windows Server Software Defined solutions. Multiple server vendors or solution providers will bring these Intel Select Solutions to market.

Intel Select Solutions for Windows Server Software Defined Storage

Intel Select Solutions for Windows Server Software Defined Storage provide optimized performance on a fully tested stack—from the servers, CPU, memory, and storage to the firmware and software. That enables businesses to migrate to a hyperconverged infrastructure solution without spending weeks on researching and testing. Intel Select Solutions for Windows Server Software Defined Storage are performance-optimized specifically for hyperconverged compute and storage with Windows Server running on trusted Intel architecture. As a result, Intel Select Solutions can help reduce the time required to evaluate, select, and purchase the most appropriate Windows Server Software Defined solution, based on current and future needs. In addition, Intel Select Solutions are verified by Intel, Microsoft, and the server partner to deliver optimum performance with improved security, reliability, and agility.

Inside Intel Select Solutions for Windows Server Software Defined Storage

Intel Select Solutions for Windows Server with Software Defined Storage are available in two configurations: “Base” and “Plus,” as shown in Table 1. The two configurations help ensure scalability across different environments and meet the needs of a wide range of applications and workloads. The Base configuration is designed to accommodate mainstream performance for standard enterprise applications, such as Microsoft SharePoint* team services or Microsoft Exchange*. The Plus configuration is intended for more bandwidth-intensive and latency-sensitive environments. For example, businesses using database applications, such as Microsoft SQL Server* software for online transaction processing (OLTP) or real-time analytics, can benefit from the Plus configuration.

Table 1. The Base and Plus configurations for Intel® Select Solutions for Windows Server* Software Defined Storage

INGREDIENT	INTEL® SELECT SOLUTIONS FOR WINDOWS SERVER* SOFTWARE DEFINED STORAGE BASE CONFIGURATION	INTEL SELECT SOLUTIONS FOR WINDOWS SERVER SOFTWARE DEFINED STORAGE PLUS CONFIGURATION
MASTER/HEAD NODES	4	4
PLATFORM	Intel® Server Board S2600WFT	Intel Server Board S2600WFT
PROCESSOR	2 x Intel® Xeon® Gold 6130 processor at 2.10 GHz, 16 cores/32 threads, or a higher number Intel Xeon Scalable processor	2 x Intel Xeon Gold 6152 processor at 2.10 GHz, 22 cores/44 threads, or a higher number Intel Xeon Scalable processor
MEMORY	256 GB (16 x 16 GB 2,666 MHz 288-pin DDR4 RDIMM)	384 GB (24 x 16 GB 2,666 MHz 288-pin DDR4 RDIMM)
BOOT DRIVE	2 x Intel® Solid-State Drive (SSD) DC S3520 Series, M.2 or 2.5" or 2 x Intel SSD DC S4500 Series, M.2 or 2.5"***	2 x Intel SSD DC S3520 Series, M.2 or 2.5" or 2 x Intel SSD DC S4500 Series, M.2 or 2.5"***
CACHE TIER	2 x Intel SSD DC P4600 Series, NVMe Express* (NVMe*)	2 x Intel® Optane™ SSD DC P4800X Series
CAPACITY TIER	8 x Intel SSD DC S4500 Series, Serial ATA (SATA)**	8 x Intel SSD DC P4500 Series with NVMe**
DATA NETWORK	10 gigabit Ethernet (GbE) Intel® Ethernet Gigabit Server Adapter X722, Intel® Ethernet Network Connection OCP X527-DA2**	10 GbE Intel Ethernet Gigabit Server Adapter X722, Intel Ethernet Network Connection OCP X527-DA4**
MANAGEMENT NETWORK	Integrated 1 GbE	Integrated 1 GbE
SOFTWARE	Windows Server 2016 Datacenter edition	Windows Server 2016 Datacenter edition
TRUSTED PLATFORM MODULE (TPM)	Trusted Platform Module (TPM) 2.0 or Intel® Platform Trust Technology (Intel® PTT)	TPM 2.0 or Intel PTT
FIRMWARE AND SOFTWARE OPTIMIZATIONS	Intel® Hyper-Threading Technology (Intel® HT Technology) enabled Intel® Turbo Boost Technology enabled Intel® Speed Shift technology, Hardware P-states (HWP) native Intel Turbo Boost Technology/HWP energy performance preference (EPP)/energy performance bias (EPB) settings balanced	Intel HT Technology enabled Intel Turbo Boost Technology enabled Intel Speed Shift technology, HWP native Intel Turbo Boost Technology/HWP EPP/EPB settings balanced

**Recommended, not required

What Are Intel® Select Solutions?

Intel Select Solutions are verified hardware and software stacks that are optimized for specific software workloads across compute, storage, and network. The solutions are developed from deep Intel experience with industry solution providers, in addition to extensive collaboration with the world’s leading data center and service providers.

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

1. Follow the software and hardware stack requirements outlined by Intel
2. Replicate or exceed Intel's reference benchmark-performance threshold
3. Publish a detailed implementation guide to facilitate customer deployment

Solution providers can develop their own optimizations to add further value to their solutions.

The Windows Server Hardware, Operating System, Firmware, and Technology Stack

Table 1 shows the hardware and software stacks for both the Base and Plus configurations of Intel Select Solutions for Windows Server Software Defined Storage. To refer to a solution as an Intel Select Solution, a server vendor or data center solution provider must use these or better configurations.


Hardware Selections for the Intel Select Solutions for Windows Server Software Defined Storage

Intel chose Intel Xeon Gold processors for the Plus and Base configurations because these processors provide an optimized balance of price and performance. However, certain workloads might benefit from the Plus configuration with an Intel Xeon Platinum processor. In addition, both Intel Select Solution configurations make use of SSD storage for maximum throughput and low latencies. The Base configuration features the SATA Intel® SSD DC S4500 Series for the capacity tier and the Intel SSD DC P4600 Series with NVMe Express* (NVMe*) for the cache tier. The Plus configuration makes use of NVMe with the Intel SSD DC P4500 Series in the capacity tier and the Intel® Optane™ SSD DC P4800X Series in the cache tier in order to deliver optimum performance.

Technology Selections for the Intel Select Solutions for Windows Server Software Defined Storage

In addition to the Intel Xeon processor-based hardware foundation, other technologies provide further performance and security gains:

- **Trusted Platform Module (TPM) 2.0:** Protects the system start-up process by ensuring the boot hardware is tamper-free before releasing system control to the operating system. TPM 2.0 also provides secured storage for sensitive data, such as security keys and passwords, and performs encryption and hash functions.
- **Internet Wide Area Remote Direct Memory Access (RDMA) Protocol (iWARP):** A host-offload, host-bypass technology that allows an application to make secured data transfers directly to and from another application's memory space. iWARP is based on TCP/IP with high data throughput and low latency, and it is ideal for traffic between nodes in software defined storage solutions. It is also highly scalable and has an effective congestion-management capability.
- **Intel® Hyper-Threading Technology (Intel® HT Technology):** Enables multiple threads to run on each core, which ensures that systems use processor resources more efficiently. Intel HT Technology also increases processor throughput, improving overall performance on threaded software.
- **Intel® Turbo Boost Technology:** Accelerates processor and graphics performance for peak loads, automatically allowing processor cores to run faster than the rated operating frequency when operating below power, current, and temperature specification limits.
- **Intel® Speed Shift Technology:** Allows the processor to quickly select its best operating frequency and voltage for optimal performance and power efficiency without intervention from the operating system.



Intel® Xeon® Scalable Processors

Intel Xeon Scalable processors:

- Offer high scalability for enterprise data centers
- Deliver performance gains for virtualized infrastructure compared to previous-generation processors
- Achieve exceptional resource utilization and agility
- Enable improved data and workload integrity and regulatory compliance for data center solutions

The family includes Intel Xeon Bronze processors, Intel Xeon Silver processors, Intel Xeon Gold processors, and Intel Xeon Platinum processors.

Optimize Performance, Scalability, and Agility for Hyperconverged Infrastructure Built with Intel Select Solutions for Windows Server Software Defined Storage

Intel Select Solutions for Windows Server Software Defined Storage are designed to deliver optimum performance for hyperconverged infrastructure built with Windows Server, and they can be ideal building blocks for businesses beginning their journey to a hybrid cloud infrastructure. As a step toward hybrid cloud, these pre-tuned and tested configurations can simplify the move from costly SAN and NAS solutions to virtualized compute and storage using Windows Server with Storage Spaces Direct. By deploying Storage Spaces Direct on a certified Windows Server Software Defined solution running an Intel Select Solution configuration, businesses can lower their hardware and IT personnel costs through simplified management and efficient scalability. Visit [intel.com/selectsolutions](https://www.intel.com/selectsolutions) for more information on Intel Select Solutions.

Learn More

Intel Select Solutions: intel.com/selectsolutions

Intel Xeon Scalable processors: intel.com/xeonscalable

Intel Select Solutions are supported by Intel Builders: <http://builders.intel.com>. Follow us on Twitter: #IntelBuilders

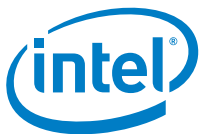
Windows Server 2016 with Storage Spaces Direct:

<https://docs.microsoft.com/en-us/windows-server/storage/storage-spaces/storage-spaces-direct-overview>

Where to buy:

intel.com/content/www/us/en/processors/xeon/scalable/xeon-scalable-platform-where-to-buy.html

Intel and Microsoft joint data center web site: intel.com/microsoftdatacenter



Tests document performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance. Consult other sources of information to evaluate performance as you consider your purchase. For more complete information about performance and benchmark results, visit intel.com/benchmarks.

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