SOLUTION BRIEF

Intel® Builders
Enterprise Data Center Infrastructure

Intel® Select Solutions for VMware vSAN*

Intel Select Solutions provide proven performance on verified infrastructure.

Picture two deployments of VMware vSAN*. The first is on a VMware vSAN ReadyNode*. The second is an Intel® Select Solution for VMware vSAN. With the first deployment, an IT team can spend days or weeks researching options within the diverse range of VMware vSAN ReadyNode solutions available from different vendors. Once the hardware and software are procured and installed, the IT team must spend additional time tuning the solution to work optimally for its workloads. By narrowing down the pool of VMware vSAN ReadyNodes to the Intel Select Solutions for VMware vSAN, the IT team can rest assured that the solutions are already verified for balanced and optimized performance—from the hardware up through the firmware stack to the VMware vSAN software. The IT team can get right to work providing VMware vSAN services to its customers rather than doing research and testing.

Proven configurations are within reach with Intel Select Solutions for VMware vSAN, available from a wide variety of data center solution providers. Intel Select Solutions for VMware vSAN:

- Are performance-optimized specifically for VMware vSAN
- Reduce the time required to evaluate, select, and purchase the necessary hardware components
- Minimize the time required to deploy new infrastructure
- Deliver performance optimized to a specific threshold across compute, storage, and network on trusted Intel® architecture

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 the solutions.

Intel Select Solutions for VMware vSAN

VMware vSAN is an enterprise-class, software-defined storage (SDS) solution that powers highly scalable and high-performance hyper-converged infrastructure. Native to the VMware vSphere* hypervisor, VMware vSAN uses solid-state drives (SSDs) for high capacity input/output (I/O) and low latency. Seamless integration with vSphere and the VMware ecosystem makes it an ideal storage platform for business-critical applications, cloud-native applications, remote office and branch office implementations, test and development environments, management clusters, security zones, and virtual desktop infrastructure (VDI).

Intel Select Solutions for VMware vSAN are available in two configurations, "Base" and "Plus," as shown in Table 1. The configurations are designed to provide optimized balance and price performance for VMware vSAN across compute, storage, and networking components. The Plus configuration offers greater performance than the Base configuration, as measured by VMmark* 3.0 benchmark scores.[1]

Compute: Intel Select Solutions for VMware vSAN utilize features and capabilities of the Intel® Xeon® Scalable processors. The Intel® Xeon® Gold 6138 processor provides an optimized balance of price and performance in a mainstream configuration. The Intel Xeon Platinum 8164 processor powers the Plus configuration, which is designed for high-density deployments or more demanding, latency-sensitive environments.

Storage: VMware vSAN performs best when its hot-data tier—the cache tier—is on fast SSDs. Organizations that value performance can benefit from empowering the cache tier with the highest-performing SSDs rather than mainstream Serial ATA (SATA) SSDs. The Intel® SSD Data Center (DC) Family with Non-Volatile Memory Express* (NVMe*) is used to power the cache tier in Intel Select Solutions. These SSDs with NVMe outperform SATA SSDs, offering high I/O operations per second (IOPS) per dollar, and they are ideal for read- and write-heavy cache functions. The capacity tier is also served by the Intel SSD DC Family and delivers a combination of data integrity, performance consistency, and drive reliability.

Networking: VMware vSAN requires 10 gigabit Ethernet (GbE), which is provided in the Base configuration by an Intel® Ethernet Network Adapter X722, an Intel® Ethernet Converged Network Adapter X710, or an Intel® Ethernet Network Connection OCP X527-DA2/DA4. In the Plus

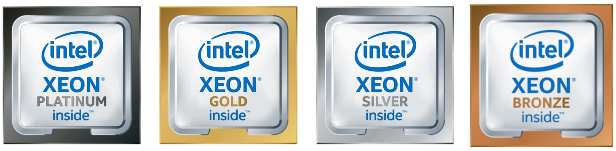
Table 1. Proposed hardware and firmware components for the Intel® Select Solutions for VMware vSAN Plus and Base configurations

INGREDIENT	INTEL® SELECT SOLUTION FOR VMWARE VSAN PLUS CONFIGURATION	INTEL® SELECT SOLUTION FOR VMWARE VSAN BASE CONFIGURATION
PLATFORM	Intel® Server Board S2600WFT	Intel Server Board S2600WFT
PROCESSOR	2 x Intel® Xeon® Platinum 8164 processor, 2.00 GHz, 26 cores, or a higher number Intel Xeon Platinum processor SKU	2 x Intel® Xeon® Gold 6138 processor, 2.60 GHz, 20 cores, or a higher number Intel Xeon Gold processor SKU
MEMORY	768 GB (24 x 32 GB 2,666 MHz DDR4 DIMM)	384 GB (12 x 32 GB 2,666 MHz DDR4 DIMM)
STORAGE	**Cache tier:** 2 x 375 GB Intel® Optane™ SSD DC P4800X Series with NVMe* **Capacity tier:** 4 x 2 TB Intel SSD DC P4500 Series with NVMe	**Cache tier:** 1 x 1.6 TB Intel SSD DC P4600 Series with NVMe **Capacity tier:** 3 x 2 TB Intel SSD DC P4500 Series with NVMe
RAID CONTROLLER	Intel® RAID Controller RS3UC080J	Intel RAID Controller RS3UC080J
DATA NETWORK	10/40 GbE Intel® Ethernet Converged Network Adapter XL710 **Management network:** Integrated 1 GbE or better	10 GbE Intel® Ethernet Gigabit Server Adapter X722, Intel Ethernet Network Connection OCP X527-DA2/DA4 or 10/40 GbE Intel Ethernet Converged Network Adapter X710 **Management network:** Integrated 1 GbE or better
TRUSTED PLATFORM MODULE (TPM)	TPM 1.2	TPM 1.2
FIRMWARE AND SOFTWARE OPTIMIZATIONS	Intel® Trusted Execution Technology (Intel® TXT) enabled Intel® Hyper-Threading Technology (Intel® HT Technology) enabled Intel® Turbo Boost Technology enabled Intel® Speed Shift Technology, Hardware P-states (HWP) native Intel® Volume Management Device (Intel® VMD) C-states disabled Power management settings optimized for performance	Intel TXT enabled Intel HT Technology enabled Intel Turbo Boost Technology enabled Intel Speed Shift Technology, HWP native Intel VMD C-states disabled Power management settings optimized for performance

Intel® Xeon® Scalable Processors

Intel Xeon Scalable processors are the future-forward platform for cloud and software-defined infrastructure technologies, such as VMware vSAN. This processor family offers:

- High scalability to support a wide range of existing and emerging workloads for a modern hybrid cloud business strategy
- The efficiency and density required to deliver strong virtualized infrastructure performance gains
- Intelligence to deliver exceptional resource utilization and agility
- A foundation for more secure data center solutions, enabling improved data and workload integrity and supporting regulatory compliance



configuration, an Intel Ethernet Converged Network Adapter XL710 addresses the needs of VMware vSAN by providing rich features for virtualization, flexibility for LAN and storage area network (SAN) networking, and proven performance.

Fundamental Intel® Technologies

In addition to the Intel hardware foundation, related Intel technologies play a fundamental role in Intel Select Solutions. The following technologies help enhance security and performance in Intel Select Solutions for VMware vSAN:

- **Intel® Trusted Execution Technology (Intel® TXT)**: Provides the foundation for highly scalable platform security in physical and virtual infrastructures. It helps harden servers at the lowest level against threats of hypervisor, BIOS, or other firmware attacks, malicious rootkit installations, and other types of attacks or misconfiguration to firmware and operating systems.
- **Trusted Platform Module (TPM) 1.2**: Protects the system start-up process by ensuring it is tamper-free before releasing system control to the operating system. TPM 1.2 also provides secured storage for sensitive data, such as security keys and passwords, and performs encryption and hash functions. Intel TXT utilizes this technology.
- **Intel® Turbo Boost Technology**: Accelerates processor and graphics performance for peak loads, automatically allowing processor cores to run faster than the rated operating frequency if they're operating below power, current, and temperature specification limits.
- **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® 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® Volume Management Device (Intel® VMD):** Enables hot swap replacement of NVMe SSDs from the Peripheral Component Interconnect Express* (PCIe*) bus without shutting down the system, while standardized LED management helps provide much faster identification of SSD status. This standardization brings enterprise reliability, availability, and serviceability (RAS) features to NVMe SSDs, enabling you to deploy next-generation storage with confidence. IT professionals can now service these drives online without an outage, which minimizes interruptions and improves uptime and serviceability. The unique value of Intel VMD is that Intel is sharing this technology across the ecosystem for broad enablement.

A Verified Foundation for Hyper-Converged Infrastructure with Intel Select Solutions for VMware vSAN

Intel Select Solutions are a fast path to data center transformation with workload-optimized configurations verified for Intel Xeon Scalable processors. When organizations choose Intel Select Solutions for VMware vSAN, they get the optimized performance that hyper-converged infrastructures need and demand—without the time and hassle required to tune the stack. Visit intel.com/selectsolutions for more information on Intel Select Solutions.

Learn More

Intel Select Solutions web page: **intel.com/selectsolutions**

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

Intel Select Solutions are supported by Intel Builders: **builders.intel.com**. Follow us on Twitter: **#IntelBuilders**

VMware vSAN: **vmware.com/vsan**

[1] VMmark 3.0 generates a realistic measure of platform performance by incorporating a variety of platform-level workloads such as shared-nothing migration, virtual machine migration, clone and deploy, snapshotting, and storage migration operations, in addition to traditional application-level workloads. To learn more about the benchmark, visit vmware.com/products/vmmark.html.

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.

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.

Intel technologies' features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer or learn more at intel.com.

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