SOLUTION BRIEF

Intel® Builders
Enterprise Data Center Infrastructure
June 2018 v3

Intel® Select Solutions for Microsoft SQL Server* Enterprise Data Warehouse

Extract powerful insights from big data using validated data warehouse solutions.

The need to digitally transform is a given in today's business world. What isn't always so obvious is that digital transformation requires organizations to grow and make use of their data assets. This requirement, in turn, necessitates an infrastructure that can handle exponential growth in datasets and that can make data available for analysis within seconds of creation. Ideally, organizations need an infrastructure that can scale and grow with their data volumes and their ongoing needs. Companies that meet these requirements are ready to digitally transform, uncover new ways to create and capture value, and expand into new customer segments.

A key to unlocking the value of company data more quickly and easily is found in Intel® Select Solutions for Microsoft SQL Server* Enterprise Data Warehouse (run on Windows Server*), optimized for hybrid transactional/analytical processing (HTAP). Microsoft SQL Server, running on Windows Server 2016 Datacenter edition, offers outstanding performance for data warehouse solutions, both for small to mid-sized businesses (SMBs) and for enterprise organizations. And Intel Select Solutions for SQL Server ensure that a company has validated hardware and software stacks that provide a fast path for taking advantage of big data—both structured and unstructured—massive data volumes, and rapid data analysis.

Intel Select Solutions for SQL Server Enterprise Data Warehouse (Run on Windows Server*)

Organizations of all sizes, and across all vertical industries, are awash in data. Data warehousing capabilities in SQL Server allow these organizations to take advantage of big data assets. SQL Server offers support for a range of business needs, from small data marts to large enterprise data warehouses, while reducing storage needs with enhanced data compression. It can scale easily for enterprise-grade relational data warehousing—and it can integrate with non-relational sources. By using SQL Server for data warehousing, organizations can gain fast, actionable insights and predictions from structured and unstructured data while protecting their data with layers of security.

Intel Select Solutions for SQL Server Enterprise Data Warehouse running on Windows Server are approved under the Microsoft Data Warehouse Fast Track* for SQL Server program. The Data Warehouse Fast Track program is a joint effort between Microsoft and hardware partners. Its goal is to help enterprise customers deploy data warehouse solutions with a recommended hardware configuration appropriate for the requirements of the workload with reduced risk, cost, and complexity.

Intel Select Solutions for SQL Server can help reduce the amount of time IT organizations spend evaluating, selecting, and purchasing optimized combinations of hardware components. They can also minimize the time required to deploy new infrastructure and deliver data warehousing performance that is optimized to a specific threshold across compute, storage, and networking resources on trusted Intel® technologies. Intel Select Solutions for SQL Server are optimized by Intel, Microsoft, and the server vendor, so IT organizations can deploy them with confidence.

Inside Intel Select Solutions for SQL Server Enterprise Data Warehouse

Intel Select Solutions for SQL Server are available in two configurations: "Base" and "Plus," as shown in Table 1. The two configurations help ensure a right-sized data warehouse solution across different environments and meet the needs of a wide range of businesses. The Base configuration is designed to accommodate mainstream businesses' data warehouse needs, whereas the Plus configuration is designed for larger data sets. Both configurations are tuned for optimal performance in latency-sensitive data warehouse environments.

Table 1 shows the hardware and software stacks for both the Base and Plus configurations of Intel Select Solutions for SQL Server Enterprise Data Warehouse, optimized for HTAP. To refer to a solution as an Intel Select Solution, a server vendor or data center solution provider must use these or better configurations, and they must meet or exceed reference benchmarks performed by Intel as part of the solution development process.

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.

Table 1. The Base and Plus configurations for Intel® Select Solutions for Microsoft SQL Server* Enterprise Data Warehouse (run on Windows Server*), optimized for HTAP

INGREDIENT	INTEL® SELECT SOLUTIONS FOR MICROSOFT SQL SERVER* ENTERPRISE DATA WAREHOUSE (RUN ON WINDOWS SERVER*) BASE CONFIGURATION FOR DATABASES UP TO 25 TB	INTEL SELECT SOLUTIONS FOR MICROSOFT SQL SERVER ENTERPRISE DATA WAREHOUSE (RUN ON WINDOWS SERVER) PLUS CONFIGURATION FOR DATABASES UP TO 70 TB
PROCESSOR	2 x Intel® Xeon® Gold 6132 processor at 2.60 GHz, 14 cores/28 threads, or a higher number Intel Xeon Scalable processor	2 x Intel Xeon Gold 6150 processor at 2.70 GHz, 18 cores/36 threads, or a higher number Intel Xeon Scalable processor
MEMORY	384 GB (24 x 16 GB 2,666 MHz DDR4 RDIMM)	768 GB (24 x 32 GB 2,666 MHz DDR4 RDIMM)
BOOT DRIVE	1 x Intel® Solid State Drive (SSD) DC S3520 Series, greater than or equal to 240 GB M.2 or 2.5-inch**	2 x Intel SSD DC S3520 Series, greater than or equal to 240 GB M.2 or 2.5-inch RAID 1**
LOG DRIVE	2 x Intel SSD DC P4600 Series, 1.6 TB, NVM Express* (NVMe*), or 2 x Intel SSD DC S4600 Series, Serial ATA (SATA)	2 x Intel® Optane™ SSD DC P4800X Series, 375 GB, NVMe
DATA DRIVE	4 x Intel SSD DC P4500 Series, 2.0 TB, NVMe	6 x Intel SSD DC P4500 Series, 4.0 TB, NVMe
DATA NETWORK	Intel® C620 Series Chipset Ethernet Connection X722, or 10 gigabit Ethernet (GbE) Intel® Ethernet Converged Network Adapter X710, or Intel® Ethernet Converged Network Connection OCP X527-DA2/DA4, or 40 GbE Intel Ethernet Converged Network Adapter XL710	Intel C620 Series Chipset Ethernet Connection X722, or 10 GbE Intel Ethernet Converged Network Adapter X710, or Intel Ethernet Converged Network Connection OCP X527-DA2/DA4, or 40 GbE Intel Ethernet Converged Network Adapter XL710
MANAGEMENT NETWORK	Integrated 1 GbE	Integrated 1 GbE
SOFTWARE	Windows Server 2016 Datacenter edition SQL Server 2017 Enterprise edition	Windows Server 2016 Datacenter edition SQL Server 2017 Enterprise edition
TRUSTED PLATFORM MODULE (TPM)	Trusted Platform Module (TPM) 2.0 discrete or FW TPM (Intel® Platform Trust Technology [Intel® PTT])	TPM 2.0 discrete 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 NVMe drivers C-states disabled Operating system power management and plan set for performance	Intel HT Technology enabled Intel Turbo Boost Technology enabled Intel Speed Shift technology, HWP native Intel® Rapid Storage Technology (Intel® RST) for SATA** Intel NVMe drivers C-states disabled Operating system power management and plan set for performance

**Recommended, not required

Technology Selections for Intel Select Solutions for SQL Server Enterprise Data Warehouse

Intel chose Intel® Xeon® Gold processors for the Base and Plus configurations because they provide an optimized balance of price and performance.

Extremely low latency is paramount in a data warehouse solution; for this reason, both configurations use all-flash drives. The Base configuration features the Intel® SSD DC P4500 Series for the data drive and the Intel SSD DC P4600 Series with NVM Express* (NVMe*) or the Intel SSD DC S4600 Series (SATA) for the log drive. The Plus configuration features all-NVMe drives with the Intel SSD DC P4500 Series for the data drive and the Intel® Optane™ SSD DC P4800X Series for the log drive.

In addition to the Intel hardware foundation, additional technologies provide further performance and security gains:

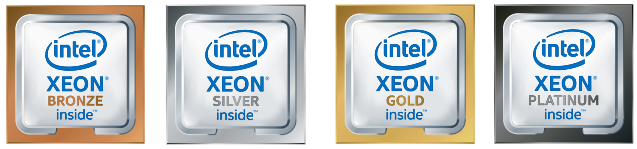
- **Intel® Platform Trust Technology or a discrete TPM 2.0**: Protects the system start-up process by ensuring the boot hardware is tamper-free before releasing system control to the operating system. TPM 2.0 also provides secured storage for sensitive data, such as security keys and passwords, and performs encryption and hash functions.
- **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.
- **Power-management settings**: Operating system power-management settings are tuned for performance in Intel Select Solutions for SQL Server Enterprise Data Warehouse.

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.



Fast Track Your Data Warehouse with Intel Select Solutions for SQL Server Enterprise Data Warehouse

Intel Select Solutions for SQL Server Enterprise Data Warehouse, optimized for HTAP, are designed to simplify and accelerate the extraction of value from corporate data by using a modern data warehouse. Proven to scale with Intel Xeon Scalable processors, these pre-tuned and tested configurations are workload-optimized and let organizations deploy the optimum data warehouse infrastructure quickly and with less tuning.

Visit **intel.com/selectsolutions** to learn more, and ask your infrastructure vendor for Intel Select Solutions.

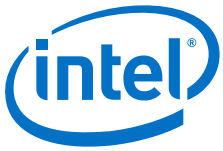
Learn More

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**

Data warehousing with SQL Server: **microsoft.com/en-us/sql-server/data-warehousing**



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 information go to intel.com/benchmarks.

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