



# Intel® Select Solutions for EasyStack\* Private Cloud and HCI



Enterprises are shifting the services they need or provide to cloud servers to save investing on hardware. A big task now facing enterprises is to assess the cloud-readiness of their on-premises application portfolios, and discover how best to make their data centers more efficient and agile engines of digital transformation by deployed solutions. In this context, the delivery of enterprise cloud platform through software and hardware integration is becoming a new trend in private cloud, hybrid cloud and multi-cloud market. Through the implementation of hyper-converged infrastructure (HCI), enterprises can centrally deploy and manage computing, storage, network, management resources, etc., thereby simplifying management and significantly shortening the cloud deployment cycle while achieving high performance, high reliability, flexible expansion, and low cost.

With more than 500 large- and medium-sized enterprises engaged in supporting the production practices, EasyStack\* has released an evolutionary new generation Private Cloud - EasyStack ECS Enterprise Cloud\*, which helps customers quickly build data-centric private clouds and manage the multi-cloud platform of multiple public clouds. Through the innovative distributed micro-service engine and platform integration design, EasyStack ECS Enterprise Cloud can help enterprise customers realize the smooth evolution of service capabilities, product forms and supported scenarios, that is, upgrading without influencing business, migrating data or interrupting services.

As the most convenient way to implement a new generation of evolvable private cloud, EasyStack ECS Stack HCI\* adopts software and hardware integrated modular design, which features support for multi-cloud, micro-service granularity upgrade, application-orientation and so on. It not only provides software and hardware integrated standard delivery capability through Infrastructure as a Service (IaaS), but also supports the coordinated adaptation and integrated delivery of industrial application software and cloud platform, and can smoothly evolve to private cloud based on the changing user needs.

Intel® Select Solutions for EasyStack Private Cloud and HCI provide hardware combination verified and optimized through benchmark testing, including Intel® Xeon® 5118 Processor/Silver 4110 Processor, Intel® SSD D3-S4510 Series, and Intel® Ethernet Adapter X710-DA2. The solutions help users accelerate platform deployment, simplify verification testing, ensure system performance, security and availability, and drive business cloudification.

## EasyStack Drives Business Cloudification

While an enterprise is transforming to private cloud, hybrid cloud or multi-cloud, how to integrate infrastructure and applications and provide cross-cloud management capabilities has become one of the key factors for the success of cloud strategy. In order to meet the above needs of the enterprises, EasyStack ECS Enterprise Cloud and ECS Stack HCI have made targeted innovation from the perspectives of software management and software/hardware integration respectively.

An integrated hardware and software modular design for EasyStack ECS Stack HCI, with the first fully symmetric distributed micro-service architecture in the industry, provides software-defined evolvable computing, storage and network infrastructure. At the same time, the cloud platform's self-service process system, unified intelligent scheduling and intelligent management capabilities for resources and applications effectively promote the development of traditional services and a new generation of cloud-based services. Specifically, the ECS Stack HCI has the following advantages:

- It supports multi-cloud forms. In addition to dual-engine computing services of cloud host + container, it supports self-service access to IT resources to meet the needs of application as required and agile delivery.
- It provides a variety of OpenStack® core functional modules including computing, storage, networking, etc., enabling users to take full advantage of the OpenStack open source cloud computing ecosystem.
- A number of custom functions have been developed to manage and monitor infrastructure resources to make cloud operation and maintenance more efficient.

## Intel® Select Solutions for EasyStack Private Cloud and HCI

Intel® Select Solutions for EasyStack Private Cloud and HCI are based on the critical hardware components, including Intel® Xeon® Gold 5118 processor/Silver 4110 processor, Intel® SSD D3-S4510 Series, and Intel® Ethernet Adapter X710-DA2, and integrates with multiple Intel® chip-level advanced technology features. These components, verified and optimized under actual workloads, can help enterprise users improve the experience, comprehensive performance and cost performance of EasyStack ECS Enterprise Cloud and ECS Stack HCI, significantly reducing the time required for assessment, testing and configuration of infrastructure.

For users in the finance, telecommunications, government, energy, manufacturing and other industries, Intel® Select Solutions for EasyStack Private Cloud and HCI can deliver the following values:

- IaaS + PaaS integrated solutions for industry users, helping users save the cost of business cloudification while accelerating the transformation to hybrid cloud and multi-cloud architecture.
- Verified solutions for component deployment infrastructure for industry users, helping simplify infrastructure deployment and reduce operation & maintenance pressure.
- Higher performance based on the superior performance of the Intel® architecture to support higher cloud loads.

### Hardware Selections

The Intel® Select Solutions provide Base and Plus configuration options based on different performance demands of users of EasyStack Private Cloud and HCI. The Base configuration uses the Intel® Xeon® Silver 4110 processor which is of excellent cost

## 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.

performance advantage. The Plus configuration uses the Intel® Xeon® Gold 5118 processor which can meet more stringent performance requirements (a list of configurations is shown in Appendix 1).

### Intel® Xeon® Scalable processor

The performance and functions of the EasyStack ECS Enterprise Cloud and ECS Stack HCI are driven by the Intel® Xeon® Scalable processor-based computing resource pool. In the Mesh Architecture within the Intel® processor, all cores share the Last Level Cache (LLC), six memory channels and 48 PCIe\* channels, allowing for access to a large number of resources on the entire chip, and provide dynamic scalability without compromising the performance of various deployment scenarios such as virtualization.

### Intel® SSD DC P4510 Series

The enterprise's IaaS and PaaS layers often support critical business applications and require strong IOPS capabilities to ensure fast and agile delivery of the business. The Intel® SSD D3-S4510 uses 64-layer Intel® 3D NAND TLC media to provide higher IOPS throughput performance and flexible cost-compatibility compared to traditional hard disks used in earlier similar solutions, enabling it to cover more cloud-based business scenarios and bring flexible capacity, durability and energy efficiency.

### Intel® Ethernet Adapter X710-DA2

This solution uses the Intel® Ethernet 710 Series with 10-gigabit Ethernet (GbE). The 710 Series, with professional 10/25GbE performance, supports 1/10/25GbE single- or dual-port connections,

## Intel® Xeon® Scalable processors

2<sup>nd</sup> 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 EasyStack Private Cloud and HCI feature Intel® Xeon® Gold processors.



functions well in PCI Express v3.0 x8 slot, and supports advanced features such as Virtual Machine Device queues (VMDq), Single Root I/O Virtualization (SR-IOV), etc. In addition, compared with 40G network card, 710 Series can also effectively reduce costs while meeting the needs of bandwidth, highlighting economy and applicability.

## Performance verified by benchmark performance test

An important value of the Intel® Select Solutions for EasyStack Private Cloud and HCI is that its performance, compatibility and availability have been verified by the benchmark testing to reduce the time required to evaluate, test and configure the infrastructure, thereby accelerating the deployment of EasyStack ECS Enterprise Cloud and ECS Stack HCI.

In benchmark test, Intel chose Sysbench\* to validate its online transaction processing (OLTP) capability, and used FIO\* tool to measure its random literacy to verify its performance. Sysbench is a modular, cross-platform, multi-threaded benchmark testing tool designed to evaluate and test the database loads under various system parameters. FIO is an open source I/O stress testing tool used to test the IO performance of components such as disks, processors and network adapters.

The testing data are shown in Table 1. The Base and Plus configurations of the Intel® Select Solutions for EasyStack Private Cloud and HCI have achieved targeted performance. In the OLTP testing, the performance of the Plus configuration is about 40% higher than that of the Base configuration; in the random read-write capability testing, the performance of the Plus configuration is about 80% higher than that of the Base configuration. The above testings demonstrate that the two configurations provide an optimized solution to meet the operational needs of users with different load levels for the EasyStack ECS Enterprise Cloud and ECS Stack HCI. <sup>1</sup>

**Table 1:** Comparison of Base configuration and Plus configuration testing

EasyStack	Sysbench/OLTP R/W TPS	Sysbench/OLTP R/W QPS	FIO/Storage 4K Rand Read (IOPS)	FIO/Storage 4K Rand Write (IOPS)
Base	3200	63500	44700	17200
Plus	4500	90400	84300	31600

## Technology Selections for Intel® Select Solution for EasyStack Private Cloud and HCI

In addition to the basic hardware recommended by Intel® Select Solutions, the Intel® technologies integrated into Intel® Xeon® scalable processors can help users further improve performance, reliability and security:

- **Intel® QuickAssist Technology (Intel® QAT):** Intel® QAT may allow hardware acceleration for encryption and data compression and release the host processor performance, thereby enabling it to focus on other important workloads.
- **Intel® Volume Management Device (Intel® VMD):** Intel® VMD is a technology used on the root port of Intel® Xeon® Scalable processor to redirect the insertion and removal of PCIe bus events in and from NVMe\* SSD to storage of perception drive programs.
- **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 application in the system.
- **Intel® Hyper-Threading (HT) Technology:** Ensures that the systems use processor resources more efficiently and increases processor throughput to improve the overall performance on threaded software.
- **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 EasyStack Private Cloud and HCI Accelerate Enterprises Access to Cloud-based Services

In virtue of the Intel® Select Solutions for EasyStack Private Cloud and HCI, enterprises can quickly acquire fully-verified and optimized hardware infrastructure for IaaS software and hardware integrated standard delivery. This will help enterprises further optimize the deployment speed, performance and availability of infrastructure,

and realize the continuous evolution of service capabilities, product forms, and supported scenarios to meet the new demands of new business forms and cloud environments, enabling digital transformation and business innovation.

### Learn More

Intel® Select Solutions: [intel.com/selectsolutions](http://intel.com/selectsolutions)

Intel® Xeon® Scalable processors: [intel.com/xeonscalable](http://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 Solution for EasyStack Private Cloud and HCI

EasyStack/4 Nodes	Base	Plus
Processor	2 x Intel® Xeon® Silver 4110 @ 2.10GHz 8C or Intel® Xeon® Silver 4210 @ 2.2GHz 10C or higher	2 x Intel® Xeon® Gold 5118 @ 2.30GHz 12C or Intel® Xeon® Gold 5218 @ 2.30GHz 16C or higher
Memory	192 GB or higher (6 x 32 GB DDR4-2666)	192 GB or higher (6 x 32 GB DDR4-2666 or higher)
Boot Drive	2 x 480 GB or larger Intel® SSD DC S4510	2 x 480 GB or larger Intel® SSD DC S4510
Storage Cache	2 x 960 GB Intel® SSD D3-S4510 Series or larger	2 x 960 GB Intel® SSD D3-S4510 Series or higher
Storage Drive	≥4 x 2 TB or larger SATA HDD	≥8 x 2 TB or larger SATA HDD
Data Network	≥2 x 10 GB Dual-Port Intel® Ethernet Converged Network Adapter X710-DA2 SFP+ or better	≥2 x 10 GB Dual-Port Intel® Ethernet Converged Network Adapter X710-DA2 SFP+
Mgmt Network	Integrated 1 GbE or better	Integrated 1 GbE



<sup>1</sup> CONFIG1 - Base: Test by Intel and EasyStack as of 5/30/2019. 4-node, 2x Intel® Xeon® Silver 4110 Processor, 8 cores HT On Turbo ON Total Memory 192 GB (12 slots/ 16GB/ 2400 MHz), 2x 480 GB Intel® SSD DC S4510, 2x 960 GB Intel® SSD DC S4510, 4x 2TB SATA 7200RPM HDD, Microcode:0x200005e, Centos 6.5, Sysbench 1.0.14, FIO 3.1, EasyStack ECS 5.0.1, MySQL 5.7.

CONFIG2 - Plus: Test by Intel and EasyStack as of 5/30/2019. 4-node, 2x Intel® Xeon® Gold 5118 Processor, 12 cores HT On Turbo ON Total Memory 192 GB (12 slots/ 16GB/ 2400 MHz), 2x 480 GB Intel® SSD DC S4510, 2x 960 GB Intel® SSD DC S4510, 8x 2TB SATA 7200RPM HDD, Microcode:0x200005e, Centos 6.5, Sysbench 1.0.14, FIO 3.1, EasyStack ECS 5.0.1, MySQL 5.7.

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](http://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](http://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](http://intel.com)

Intel disclaims all express and implied warranties, including without limitation, the implied warranties of merchantability, fitness for a particular purpose, and non-infringement, as well as any warranty arising from course of performance, course of dealing, or usage in trade.

Intel, the Intel logo, and Xeon are trademarks of Intel Corporation or its subsidiaries in the U.S. and/or other countries.

\*Other names and brands may be claimed as the property of others.

Copyright © 2019 Intel Corporation. All rights reserved.