Future-Ready Cloud

Hybrid Cloud Solutions for Business Transformation

Competitiveness Demands Innovation

Being left behind is not an option in business. With the hyper-digitalization of the business world, entire industries are finding this out the hard way. Companies need to innovate faster to stay relevant in this rapidly changing digital ecosystem, where well-established businesses can find it hard to compete with disruptive, web-based startups.

Data center technology is no longer only supporting internal business processes—it has become the engine for business growth. Business transformation starts with IT.

Enterprise IT Faces Many Challenges

While IT is now integral to new business innovations, its budget for infrastructure is flat to down. IT is challenged to become simultaneously more versatile and more efficient. Building agility and versatility into the infrastructure, combined with effectively utilizing resources, helps IT meet expectations of business leaders while lowering total cost of ownership (TCO) for the data center.

Another challenge for enterprise IT is the growing threat of cybercrime. As more businesses move their services to the web and look to enhance their offerings and customer experiences through digitization, malicious attackers are taking advantage. Cyber-attacks have become increasingly sophisticated and can disrupt even the most cautious or well-established business. For IT, this means significant focus and investment in enterprise-wide security in order to defend against attacks, monitor the environment, and protect all data across the business, its employees, and its customers.

Hybrid Cloud Strategy

40% Enterprise IT with hybrid cloud environments in place already.¹

60% Enterprise IT testing or planning to implement within two years.²
The Hybrid Cloud Solution

To meet these challenges, enterprises must continue to invest in data center computing; but they must do so differently to keep up with evolving demands and complexities. Intel believes that investing in the hybrid cloud allows enterprises to keep up with these challenges and continue to contend in the hyper-competitive and innovative business landscape. Hybrid clouds offer a more comprehensive, flexible, and cost-effective solution for modernizing the data center with control, security, and manageability. With a hybrid cloud strategy, IT can deploy workloads and application environments that make the most sense for them—either on premises or in a public cloud—depending on the business and technical requirements. IT specialists even have the versatility to mix and match cloud services when necessary, which can improve both agility and financial return.

Data Center Technology Matters in a Hybrid Cloud

To maximize your hybrid cloud investment, the underlying architecture matters. Hybrid cloud requires a powerful platform that can handle the widest range of enterprise workloads, that can efficiently scale to meet dynamic demands, and that supports increased security and reliability capabilities for the modern data center.

With the latest generation of Intel® Xeon® processors, Intel continues to improve and innovate with the needs of the enterprise top of mind, including supporting the hybrid cloud use case. The Intel® Xeon® processor Scalable family enables fast performance and scalability to support the diverse set of workloads, both on and off premises, running on your hybrid cloud. And that is the great thing about Intel® technology: it can support both cloud environments because the majority of the cloud runs on Intel. No matter what hybrid cloud vendor businesses choose to partner with, they can find solutions with Intel inside, and that compatibility of software and technology matters when bridging across clouds.

Intel® Xeon® Scalable Processors Deliver Agility and Scalability

Businesses that make use of a hybrid cloud to deploy new business capabilities with greater agility don't want their data center getting in the way. The new Intel Xeon processor Scalable family represents the ideal hybrid cloud foundation, merging and extending the best enterprise-class attributes from the Intel Xeon processor E5 and E7 families. As the name suggests, the result is a highly versatile platform, scaling from two-socket to eight-socket and beyond, all with the rich capabilities and software compatibility that enterprises expect from an Intel Xeon processor.

Hybrid clouds are inherently multi-application and multi-tenant, demanding a high degree of agility from the underlying infrastructure. Intel® Xeon® Scalable processors, with new microarchitecture features, increased core count, and greater memory bandwidth, provide a high performing environment for a wide range of applications and workloads. In fact, this new processor has delivered up to 1.6 times average generational gains across a dozen of the most common enterprise workloads.

Additionally, the Intel Xeon processor Scalable family delivers a strong performance boost in virtualization capabilities—also critical to hybrid cloud agility and efficiency. Servers based on Intel’s latest processor allow enterprises to run more virtual machines (VMs) per server than ever before. As a result, Intel Xeon Scalable processors can support up to 4.2 times more VMs per server compared to a four- or five-year-old system, allowing enterprises to run more workloads and applications to support their growing hybrid cloud strategies.

Run More Efficient Data Centers

Every enterprise strives to do more with less. While the technology and business drivers will vary from industry to industry, at some point in the life cycle of all data center infrastructure, it is more efficient to modernize the equipment than continue to invest in maintenance and patching of outdated gear.

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With the new Intel Xeon processor Scalable family, you can replace four four-to-five-year-old systems with one server, reducing data center footprint and allowing more of your limited IT budget to be allocated to directly growing your business. Additionally, with reduced software and operating system licensing fees and lower maintenance and infrastructure costs, you can reduce your four-year TCO by up to 65 percent when upgrading from a four-year-old.
server to one powered by the new Intel Xeon processor Scalable family. This reduction is made possible by Intel’s continued dedication to advancing its processor features and capabilities—for example, by including more cores with higher efficiency, improved cache hierarchy, and increased memory bandwidth.

**Experience Enhanced Security and Reliability**

When building out new infrastructures, such as hybrid clouds, enterprises want to build in highly responsive and multi-layered security, in addition to ensuring the underlying reliability of their new platforms. To protect data in flight and at rest, the Intel Xeon Scalable processor delivers enhanced processing of encryption algorithms, enabling you to broadly deploy more advanced security features and services into distributed environments without compromising performance. In addition, the Intel Xeon processor Scalable family integrates a new feature—Intel® Platform Trust Technology (Intel® PTT)—into the product, enabling an on-die trust module, further establishing the Intel Xeon processor product line as a hardware root-of-trust foundation for the cloud.

Lastly, in terms of platform reliability, availability, and serviceability (RAS) features, the new Intel Xeon Scalable processors inherit all the RAS features, including Intel® Run Sure technology, from the latest-generation, mission-critical Intel Xeon processor E7 family, but with their own additions. Offered with the Intel Xeon processor Scalable family are now two new Intel® Run Sure technologies; these, combined with 70+ proven RAS features, provide IT with additional peace of mind for the hybrid cloud infrastructure it relies upon.

Data and platform reliability and protection are mission-critical for enterprises dealing with increasing concerns and scrutiny regarding data security and privacy. As more data-rich workloads flow through the enterprise data center, the Intel Xeon processor Scalable family’s comprehensive suite of hardware-enhanced features brings better data and platform-level protection mechanisms for trusted service assurance in hybrid cloud environments.

**In Summary**

The transition to a hybrid cloud infrastructure is by no means a simple task. However, by choosing the right underlying foundation—versatile, efficient, scalable, and more secure—enterprise IT can reduce the headaches in building the cloud it needs to quickly roll out new services and apps. In this regard, the Intel Xeon processor Scalable family is the ideal platform for a hybrid cloud—increasing data center efficiency and security while simultaneously lowering TCO. With the Intel Xeon processor Scalable family, IT can be certain its data center is powered by Intel’s high performance and exceptionally scalable platform, a platform that is truly future-ready and can handle the complex and unexpected requirements of today’s data centers.

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1. Source: A commissioned study conducted by Forrester Consulting on behalf of Intel in May 2017.

2. Up to 1.6x geometric mean based on normalized generational performance across key industry benchmarks. Estimated based on Intel internal testing of: online transaction processing (OLTP) brokerage, SAP SD 2-Tier*, HammerDB*, server-side Java*, SPECint_rate_base2006, SPECfp_rate_base2006, server virtualization, STREAM* triad, LAMMPS*, DPDK L3 Packet Forwarding, Black-Scholes*, and the Intel® Distribution for LINPACK*. See below for individual benchmark configurations:

1. Up to 1.36x claim based on brokerage firm OLTP: one-node with 2 x Intel® Xeon® processor E5-2699 v4 and 512 GB total memory on Windows Server 2012 R2 Standard* using Microsoft SQL Server 2014*. Data source: request number: 1,640, benchmark: brokerage firm OLTP, score: 4,373 transactions per second (tps) for OLTP vs. one-node with 2 x Intel Xeon Platinum 8180 Processor and 764 GB total memory on Windows Server 2016 RTM Standard using SQL Server 2016 data, score: 5,979 tps for OLTP. Higher is better.
2. Up to 1.40x claim based on 2-Tier SAP SD*: one-node with 2 x Intel Xeon processor ES-2699 v4 and 512 GB total memory on SUSE Linux Enterprise Server* 10 SP4 using SAP EHP5.0* for ERP 6.0 and Sybase ASE 16.0. Data source: request number: 2,473, benchmark: SAP SD 2-Tier enhancement package 5 for SAP ERP 6.0, score: 19,721 vs. one-node with 2 x Intel Xeon processor ES-2699 v4 and 384 GB total memory on Red Hat Enterprise Linux* 7.3 using jdk1.8u121. Data source: request number: 2,513, benchmark: server-side Java workload—MultiJVM, score: 167,696. Higher is better.


5. Up to 1.55x claim based on server virtualization workload: one-node with 2 x Intel Xeon processor ES-2699 v4 and 512 GB total memory on VMware ESXi* 6.0 Update 1 using Guest VMs and RHEL 6 64-bit OS. Data source: request number: 1,637, benchmark: server virtualization workload, score: 1,034 at 58 vs. one-node with 2 x Intel Xeon Platinum 8180 processor and 768 GB total memory on VMware ESXi 6.0 U3 GA using Guest VMs and RHEL 6 64-bit OS. Data source: request number: 2,563, benchmark: server virtualization workload, score: 1,580 at 90 VMs. Higher is better.


9. Up to 1.73x claim based on LAMMPS: LAMMPS is a classical molecular dynamics code, and an acronym for Large-scale Atomic/Molecular Massively Parallel Simulator. It is used to simulate the movement of atoms to develop better therapeutic, improve alternative energy devices, develop new materials, and more. 2-socket Intel Xeon processor ES-2697 v4, 2.3 GHz, 36 cores, Intel® Turbo Boost Technology, and Intel® Hyper-Threading Technology on, BIOS B86D7181.R00, 8 x 16 GB 2.400 GHz DDR4, Red Hat Enterprise Linux* 7.2 kernel 3.10.0-327 vs. 2-socket Intel Xeon Gold 6148 processor, 2.4 GHz, 40 cores, Intel Turbo Boost Technology and Intel Hyper-Threading Technology on, BIOS B86D7181.R00, 8 x 16 GB 2.666 MHz DDR4, Red Hat Enterprise Linux 7.2 kernel 3.10.0-327. Higher is better.


11. Up to 1.87x claim based on Black-Scholes: A popular mathematical model used in finance for European option valuation. This is a double precision version, 2-socket Intel Xeon processor ES-2697 v4, 2.3 GHz, 36 cores, Intel Turbo Boost Technology and Intel Hyper-Threading Technology on, BIOS B86D7181.R00, 8 x 16 GB 2.400 MHz DDR4, Red Hat Enterprise Linux 7.2 kernel 3.10.0-327 vs. 2-socket Intel Xeon processor E5-2699 v4 at 90 VMs, Higher is better.

12. Up to 2.27x claim based on LINPACK*: One-node with 2 x Intel Xeon processor ES-2699 v4 and 64 GB total memory on Red Hat Enterprise Linux* 7.0 kernel 3.10.0-123 using MP_LINPACK 11.3.1 [Composer XE on Red Hat Enterprise 6 U1], Data source request number: 1,636, benchmark: Intel® Optimized MP LINPACK, score: 1,446.4 vs. one-node with 2 x Intel Xeon Platinum 8180 processor and 384 GB total memory on Red Hat Enterprise Linux* 7.3 using mp_linpack_2017.1.031. Data source: request number: 3,753, benchmark: Intel Optimized MP LINPACK, score: 3,295,57. Higher is better.

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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 does not control or audit third-party benchmark data or the web sites referenced in this document. You should visit the referenced web site and confirm whether referenced data are accurate.

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