



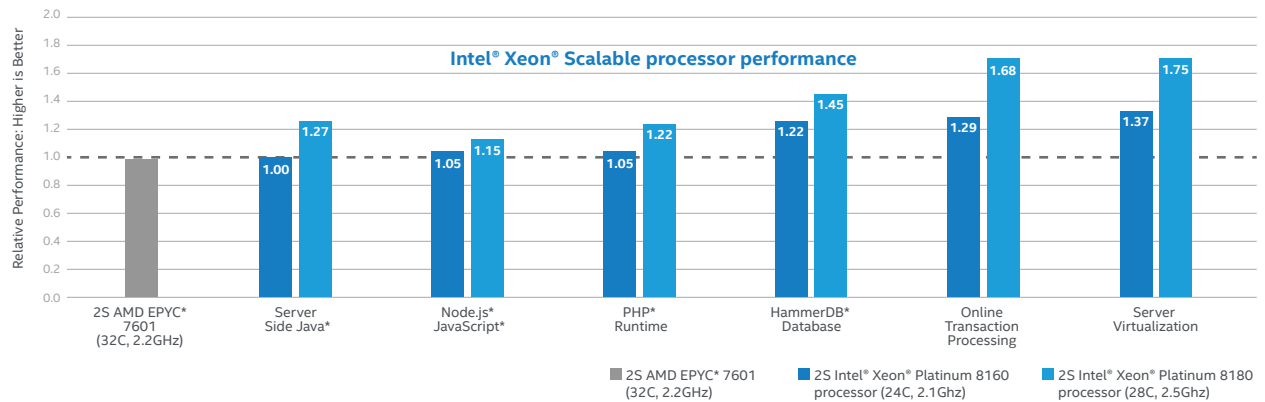
Technology
Provider

INTEL® XEON® SCALABLE PROCESSORS

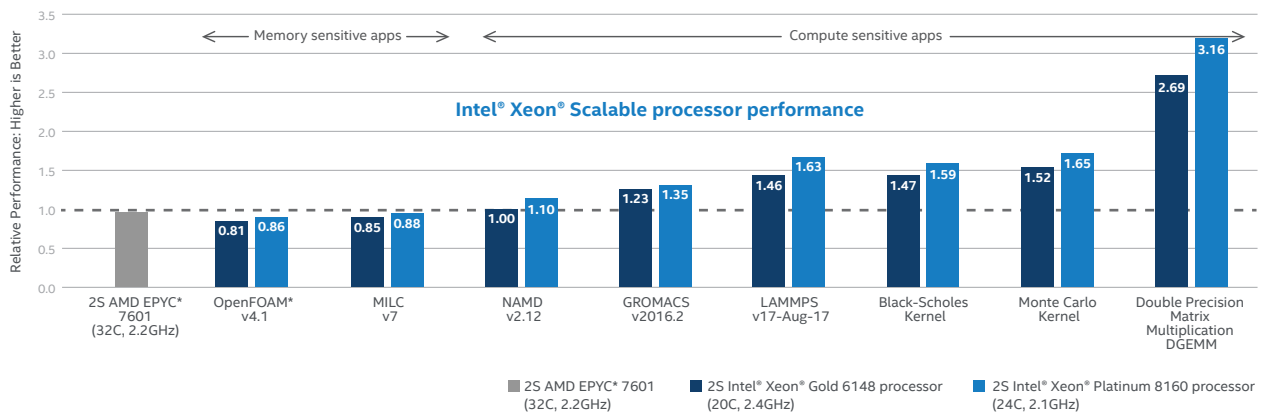


Performance Comparison

Enterprise and Cloud Workload Performance



Single Node High Performance Computing (HPC) Performance



Enterprise and Cloud Workload Performance:

Server Side Java* (higher is better)

AMD EPYC 7601, Supermicro AS-2023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 16x32GB DDR4-2666, 1 SSD, Ubuntu* 16.04 LTS, Oracle* JDK 8u131, SMT ON, Turbo ON, Score= 132012 requests/sec, TR#3861

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 12x32GB DDR4-2666, 1 SSD, Ubuntu 16.04 LTS, Oracle JDK 8u131, HT ON, Turbo ON, Score= 131526 requests/sec, TR#3861

Intel Xeon Scalable processor 8180, Intel Reference Platform, 2S Intel Xeon Scalable processor 8180 (2.5GHz, 28C), 12x32GB DDR4-2666, 1 SSD, Ubuntu 16.04 LTS, Oracle JDK 8u131, HT ON, Turbo ON, Score= 167696 requests/sec, TR#2513

Node.js* JavaScript* (higher is better)

AMD EPYC 7601, Supermicro AS-2023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 16x32GB DDR4-2666, 1 SSD, Ubuntu 16.04 LTS, Node-DC-EISv1.0 benchmark, node 6.9.2, python 2.7.12, mongo 2.6.10, glibc 2.23, SMT ON, Turbo ON, Score= 25455 requests/sec, TR#3866

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 12x32GB DDR4-2666, 1 SSD, Ubuntu 16.04 LTS, Node-DC-EISv1.0 benchmark, node 6.9.2, python 2.7.12, mongo 2.6.10, glibc 2.23, HT ON, Turbo ON, Score= 29493 requests/sec, TR#3889

Intel Xeon Scalable processor 8180, Intel Reference Platform, 2S Intel Xeon Scalable processor 8180 (2.5GHz, 28C), 12x32GB DDR4-2666, 1 SSD, Ubuntu 16.04 LTS, Node-DC-EISv1.0 benchmark, node 6.9.2, python 2.7.12, mongo 2.6.10, glibc 2.23, HT ON, Turbo ON, Score= 29493 requests/sec, TR#3866

PHP* runtime (higher is better)

AMD EPYC 7601, Supermicro AS-2023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 16x32GB DDR4-2666, 1 SSD, Ubuntu 16.04 LTS, WordPress HHVM benchmark, HHVM 3.18.1, MariaDB 10.2.8, Siege 2.78, Nginx 1.10.1, WordPress 4.2.0, SMT ON, Turbo ON, Score= 3621 requests/sec, TR#3865

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 12x32GB DDR4-2666, 1 SSD, Ubuntu 16.10, WordPress HHVM benchmark, HHVM 3.18.1, MariaDB 10.2.8, Siege 2.78, Nginx 1.10.1, WordPress 4.2.0, HT ON, Turbo ON, Score= 3816 requests/sec, TR#3890

Intel Xeon Scalable processor 8180, Intel Reference Platform, 2S Intel Xeon Scalable processor 8180 (2.5GHz, 28C), 12x32GB DDR4-2666, 1 SSD, Ubuntu 16.10, WordPress HHVM benchmark, HHVM 3.18.1, MariaDB 10.2.8, Siege 2.78, Nginx 1.10.1, WordPress 4.2.0, HT ON, Turbo ON, Score= 4431 requests/sec, TR#3865

HammerDB* Database (higher is better)

AMD EPYC 7601, Supermicro AS-2023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 32x32GB DDR4-2666 (running @ 2400), 1x PCIe P3700 SSD 2TB for DATA, 1x PCIe P3700 SSD for REDO, Open Source Linux Distribution, Enterprise Class Database, HammerDB 2.23, SMT ON, Turbo ON, Score= 5258526 tpm, TR#3892

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 24x32GB DDR4-2666, 1x PCIe P3700 SSD 2TB for DATA, 1x PCIe P3700 SSD for REDO, Open Source Linux Distribution, Enterprise Class Database, HammerDB 2.23, HT ON, Turbo ON, Score= 6429485 tpm, TR#3892

Intel Xeon Scalable processor 8180, Intel Reference Platform, 2S Intel Xeon Scalable processor 8180 (2.5GHz, 28C), 24x32GB DDR4-2666, 1x PCIe P3700 SSD 2TB for DATA, 1x PCIe P3700 SSD for REDO, Open Source Linux Distribution, Enterprise Class Database, HammerDB 2.23, HT ON, Turbo ON, Score= 7632554 tpm, TR#3892

Online Transaction Processing, OLTP (higher is better)

AMD EPYC 7601, Supermicro AS-2023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 32x32GB DDR4-2666 (running @ 2400), 1 SSD, Microsoft Windows Server 2016, SQL Server on-line transaction processing (OLTP) using a brokerage firm scenario benchmark, SMT ON, Turbo ON, Score= 3630 tps, TR#3871

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 24x32GB DDR4-2666, 1 SSD, 5 PCIe RAID Cards, Microsoft Windows Server 2016, SQL Server on-line transaction processing (OLTP) using a brokerage firm scenario benchmark, HT ON, Turbo ON, Score= 4700 tps, TR#3891

Intel Xeon Scalable processor 8180, Intel Reference Platform, 2S Intel Xeon Scalable processor 8180 (2.5GHz, 28C), 24x32GB DDR4-2666, 1 SSD, 5 PCIe RAID Cards, Microsoft Windows Server 2016, SQL Server on-line transaction processing (OLTP) using a brokerage firm scenario benchmark, HT ON, Turbo ON, Score= 6100 tps, TR#3871

Server Virtualization (higher is better)

AMD EPYC 7601, Supermicro AS-2023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 32x32GB DDR4-2666 (running @ 2400), 2 PCIe NVMe P3700 2.0TB, VMware* ESXi, 6.5.0, 5969303, SMT ON, Turbo ON, Score= 760 @ 8 tiles and 42 Virtual Machines TR#3902

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 24x32GB DDR4-2400, 2 PCIe NVMe* P3700 2.0TB, VMware ESXi, 6.5.0, 5969303, HT ON, Turbo ON, Score= 1045 @ 11 tiles and 58 Virtual Machines TR#3902

Intel Xeon Scalable processor 8180, Intel Reference Platform, 2S Intel Xeon Scalable processor 8180 (2.5GHz, 28C), 24x32GB DDR4-2666, 2 PCIe NVMe P3700 2.0TB, VMware ESXi, 6.5.0, 5969303, HT ON, Turbo ON, Score= 1332 @ 14 tiles and 74 Virtual Machines TR#3902

Single Node High Performance Computing (HPC) Performance:

OpenFOAM* (lower is better):

AMD EPYC 7601, Supermicro AS -1023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 16x8GB DDR4-2666, SMT ON (1 thread per core), Turbo ON, 1 SSD SATA, Fedora* Linux* 25, kernel 4.11.10-200.fc25.x86_64, OpenFOAM v4.1, motorbike 20M simpleFoam workload, compiled with GCC 7.2.0, with Intel MPI 2017.2.174 (Version 2017 Update 2), score=913.18

Intel Xeon Scalable processor 6148, Intel Reference Platform, 2S Intel Xeon Scalable processor 6148 (2.4GHz, 20C), 12x16GB DDR4-2666, HT ON (1 thread per core), Turbo ON, 1 SSD SATA, Red Hat* Enterprise Linux* 7.3, kernel 3.10.0-514.6.2.0.1.el7.x86_64, OpenFOAM v4.1, motorbike 20M simpleFoam workload, compiler with GCC 7.2.0, with Intel MPI 2017.2.174 (Version 2017 Update 2), score=1121.63

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 12x16GB DDR4-2666, HT ON (1 thread per core), Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux* 7.4, kernel 3.10.0-514.6.2.0.1.el7.x86_64.knl1, OpenFOAM v4.1, motorbike 20M simpleFoam workload, compile with GCC 7.2.0, with Intel MPI 2017.2.174 (Version 2017 Update 2), score=1059.85

MILC (higher is better):

AMD EPYC 7601, Supermicro AS -1023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 16x8GB DDR4-2666, SMT ON (1 thread per core), Turbo ON, 1 SSD SATA, Fedora 25 4.11.10-200.fc25.x86_64, MILC v7, su3_rhmd_hisq workload, 24^4 Lattice size, compiled with Intel Compiler v17.0.2.174 w/AVX2, Intel MPI 2017.2.174, score=69.23

Intel Xeon Scalable processor 6148, Intel Reference Platform, 2S Intel Xeon Scalable processor 6148 (2.4GHz, 20C), 12x16GB DDR4-2666, HT ON (1 thread per core), Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, MILC v7, su3_rhmd_hisq workload, 24^4 Lattice size, compiled with Intel Compiler v17.0.2.174 w/AVX512, Intel MPI 2017.2.174, score= 58.94

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 12x16GB DDR4-2666, HT ON (1 thread per core), Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, MILC v7, su3_rhmd_hisq workload, 24^4 Lattice size, compiled with Intel Compiler v17.0.2.174 w/AVX512, Intel MPI 2017, score= 61.39

NAMD (higher is better):

AMD EPYC 7601, Supermicro AS -1023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 16x32GB DDR4-2666, SMT ON, Turbo ON, 1 SSD SATA, Fedora 25 4.11.10-200.fc25.x86_64, NAMD v2.12, apoa1 original workload, compiled with LLVM5.0 compiler w/AVX2, FFTW 3.3.6-pl2, score=7.67

Intel Xeon Scalable processor 6148, Intel Reference Platform, 2S Intel Xeon Scalable processor 6148 (2.4GHz, 20C), 12x16GB DDR4-2666, HT ON (1 thread per core), Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, NAMD v2.12, apoa1 original workload, compiled with Intel Compiler v16 w/AVX512, FFTW 3.3.6-pl2, score=7.67

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 12x16GB DDR4-2666, HT ON, (1 thread per core) Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, NAMD v2.12, apoa1 original workload, compiled with Intel Compiler v16 w/AVX512, FFTW 3.3.6-pl2, score=8.49

GROMACS (higher is better):

AMD EPYC 7601, Supermicro AS -1023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 16x8GB DDR4-2666, SMT ON, Turbo ON, 1 SSD SATA, Fedora 25 4.11.10-200.fc25.x86_64, GROMACS v2016.2, water1.5M_pme workload, compiled GCC 6.3 w/AVX2 w/Intel MPI 2017, score=3.671

Intel Xeon Scalable processor 6148, Intel Reference Platform, 2S Intel Xeon Scalable processor 6148 (2.4GHz, 20C), 12x16GB DDR4-2666, HT ON, Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, GROMACS v2016.2, water1.5M_pme workload compiled with Intel Compiler v17 w/AVX512 with Intel MPI, score=4.526

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 12x16GB DDR4-2666, HT ON, Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, GROMACS v2016.2, water1.5M_pme workload compiled with Intel Compiler v17 w/AVX512 with Intel MPI, score=4.967

LAMMPS (higher is better):

AMD EPYC 7601, Supermicro AS -1023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 16x8GB DDR4-2666, SMT ON, Turbo ON, 1 SSD SATA, Fedora 25 4.11.10-200.fc25.x86_64, LAMMPS v17-Aug-17, Coarse Grain Water (512K Particles) workload, compiled with Intel Compiler v17 w/AVX2, Intel MPI 2017, score=76.07

Intel Xeon Scalable processor 6148, Intel Reference Platform, 2S Intel Xeon Scalable processor 6148 (2.4GHz, 20C), 12x16GB DDR4-2666, HT ON, Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, LAMMPS v17-Aug-17, Coarse Grain Water (512K Particles) workload , compiled with Intel Compiler v17 w/AVX512, with Intel MPI 2017, score=111.45

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 12x16GB DDR4-2666, HT ON, Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, LAMMPS v17-Aug-17, Coarse Grain Water (512K Particles) workload, compiled with Intel Compiler v17 w/AVX512, with Intel MPI 2017, score=124.04

Black-Scholes Kernel (higher is better):

AMD EPYC 7601, Supermicro AS-2023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 16x8GB DDR4-2666, SMT ON, Turbo ON, 1 SSD SATA, Fedora 25 4.11.10-200.fc25.x86_64, Black-Scholes workload with 2097152 options, compiled with Intel Compiler v18 w/AVX2, score=8.00

Intel Xeon Scalable processor 6148, Intel Reference Platform, 2S Intel Xeon Scalable processor 6148 (2.4GHz, 20C), 12x16GB DDR4-2666, HT ON, Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, Black-Scholes workload with 2097152 options, compiled with Intel Compiler v18 w/AVX512, score=11.81

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 12x16GB DDR4-2666, HT ON, Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, Black-Scholes workload with 2097152 options, compiled with Intel Compiler v18 w/AVX512, score=12.75

Monte Carlo Kernel (higher is better):

AMD EPYC 7601, Supermicro AS-1023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 16x8GB DDR4-2666, SMT ON, Turbo ON, 1 SSD SATA, Fedora 25 4.11.10-200.fc25.x86_64, Monte Carlo workload with 1344K options and 256K paths, compiled with Intel Compiler v18 w/AVX2, score=0.055

Intel Xeon Scalable processor 6148, Intel Reference Platform, 2S Intel Xeon Scalable processor 6148 (2.4GHz, 20C), 12x16GB DDR4-2666, HT ON, Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, Monte Carlo workload with 1344K options and 256K paths, compiled with Intel Compiler v18 w/AVX512, score=0.084

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 12x16GB DDR4-2666, HT ON, Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, Monte Carlo workload with 1344K options and 256K paths, compiled with Intel Compiler v18 w/AVX512, score=0.0912

DGEMM (higher is better):

AMD EPYC 7601, Supermicro AS-2023US-TR4, 2S AMD EPYC 7601 (2.2GHz, 32C), 16x8GB DDR4-2666, SMT ON (1 thread per core), Turbo ON, 1 SSD SATA, Fedora 25 4.11.10-200.fc25.x86_64, internally developed DGEMM test code, compiled with GCC compiler v6.3, AMD BLIS v0.9 from <https://github.com/amd/blis>, Score= 832.1784 GF (max GFs achieved at N=6000)

Intel Xeon Scalable processor 6148, Intel Reference Platform, 2S Intel Xeon Scalable processor 6148 (2.4GHz, 20C), 12x16GB DDR4-2666, HT ON (1 thread per core), Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, internally developed DGEMM test code, compiled with Intel Compiler v17, Intel MKL 2017u4, Score = 2240.301 GF (max GFs achieved at N=6000)

Intel Xeon Scalable processor 8160, Intel Reference Platform, 2S Intel Xeon Scalable processor 8160 (2.1GHz, 24C), 12x16GB DDR4-2666, HT ON (1 thread per core), Turbo ON, 1 SSD SATA, Red Hat Enterprise Linux 7.3 3.10.0-514.el7.x86_64, internally developed DGEMM test code, compiled with Intel Compiler v17, Intel MKL 2017u4, Score = 2636.902 GF (max GFs achieved at N=9000)

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