### SPEC® CPU2017 Integer Speed Result

**Dell Inc.**  
PowerEdge C6420 (Intel Xeon Gold 6146, 3.20 GHz)

| Test Sponsor | Dell Inc. | Hardware Availability | Sep-2017 |
| Test Date | Feb-2018 | Software Availability | Sep-2017 |
| SPECspeed2017_int_base | 9.74 | SPECspeed2017_int_peak | 10.0 |

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### Hardware

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 6146</td>
</tr>
<tr>
<td>Max MHz</td>
<td>4200</td>
</tr>
<tr>
<td>Nominal</td>
<td>3200</td>
</tr>
<tr>
<td>Enabled</td>
<td>24 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>24.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Memory</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 TB SATA SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 12 SP3 (x86_64) 4.4.114-94.11-default</td>
</tr>
</tbody>
</table>
| Compiler | C/C++: Version 18.0.0.128 of Intel C/C++  
Fortran: Version 18.0.0.128 of Intel Fortran |
| Parallel | Yes |
| Firmware | Version 1.3.7 released Feb-2018 |
| File System | xfs |
| System State | Run level 3 (multi-user) |
| Base Pointers | 64-bit |
| Peak Pointers | 32/64-bit |
| Other | jemalloc memory allocator library V5.0.1 |

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### Test Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>48</td>
<td>6.95</td>
<td>8.27</td>
</tr>
<tr>
<td>gcc_s</td>
<td>48</td>
<td>9.74</td>
<td>10.4</td>
</tr>
<tr>
<td>mcf_s</td>
<td>48</td>
<td>6.52</td>
<td>11.9</td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>48</td>
<td>6.81</td>
<td>11.9</td>
</tr>
<tr>
<td>xalancbmk_s</td>
<td>48</td>
<td>10.5</td>
<td>11.3</td>
</tr>
<tr>
<td>x264_s</td>
<td>48</td>
<td>5.58</td>
<td>6.52</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>48</td>
<td>8.56</td>
<td>4.91</td>
</tr>
<tr>
<td>leela_s</td>
<td>48</td>
<td>4.93</td>
<td>4.93</td>
</tr>
<tr>
<td>exchange2_s</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xz_s</td>
<td>48</td>
<td>13.1</td>
<td>13.1</td>
</tr>
</tbody>
</table>

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**Notes:**
- **CPU2017 License:** 55
- **Test Date:** Feb-2018
- **Hardware Availability:** Sep-2017
- **Software Availability:** Sep-2017
SPEC CPU2017 Integer Speed Result

Dell Inc.
PowerEdge C6420 (Intel Xeon Gold 6146, 3.20 GHz)

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Dell Inc.

3.20 GHz)

PowerEdge C6420 (Intel Xeon Gold 6146,

SPECspeed2017_int_base = 9.74
SPECspeed2017_int_peak = 10.0

Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Results Table

Benchmark | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio
---|---|---|---|---|---|---|---|---|---|---|---|---|---|---
600.perlbench_s | 48 | 255 | 6.97 | 255 | 6.98 | 257 | 6.91 | 48 | 216 | 8.22 | 214 | 8.29 | 215 | 8.27
602.gcc_s | 48 | 385 | 10.4 | 383 | 10.4 | 392 | 10.2 | 48 | 383 | 10.4 | 379 | 10.5 | 375 | 10.6
605.mcf_s | 48 | 252 | 6.47 | 246 | 6.64 | 250 | 6.52 | 48 | 238 | 6.86 | 249 | 6.55 | 239 | 6.81
620.omnetpp_s | 48 | 134 | 10.5 | 133 | 10.6 | 135 | 10.5 | 48 | 125 | 11.3 | 124 | 11.4 | 126 | 11.3
625.x264_s | 48 | 257 | 15.2 | 257 | 15.2 | 257 | 15.2 | 48 | 257 | 15.1 | 194 | 15.1 | 193 | 15.2
641.leela_s | 48 | 194 | 15.2 | 194 | 15.2 | 193 | 15.2 | 48 | 194 | 15.1 | 194 | 15.2 | 193 | 15.2
657.xz_s | 48 | 260 | 23.8 | 259 | 23.9 | 259 | 23.9 | 48 | 259 | 23.9 | 257 | 24.1 | 256 | 24.2

SPECspeed2017_int_base = 9.74
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.
jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;
jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;
jemalloc: sources available via jemalloc.net
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches
Dell Inc.
PowerEdge C6420 (Intel Xeon Gold 6146, 3.20 GHz)

| SPECspeed2017_int_base | 9.74 |
| SPECspeed2017_int_peak | 10.0 |

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Feb-2018
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Platform Notes

BIOS settings:
Sub NUMA Cluster disabled
Virtualization Technology disabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to Autonomous
C1EE disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
Logical Processor enabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /root/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-5j67 Mon Feb 19 18:51:57 2018

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) Gold 6146 CPU @ 3.20GHz
  2 "physical id"s (chips)
  48 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 12
siblings : 24
physical 0: cores 0 3 4 5 6 7 16 18 19 20 21 22
physical 1: cores 0 1 2 3 9 10 16 18 19 24 26 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 2
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6146 CPU @ 3.20GHz
Stepping: 4

(Continued on next page)
Dell Inc.                                           SPECspeed2017_int_base = 9.74
PowerEdge C6420 (Intel Xeon Gold 6146,             SPECspeed2017_int_peak = 10.0
3.20 GHz)                                           

CPU2017 License: 55                                 Test Date: Feb-2018
Test Sponsor: Dell Inc.                             Hardware Availability: Sep-2017
Tested by: Dell Inc.                                Software Availability: Sep-2017

## SPEC CPU2017 Integer Speed Result

<table>
<thead>
<tr>
<th>Performance Metric</th>
<th>Value</th>
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<tr>
<td>SPECspeed2017_int_base</td>
<td>9.74</td>
</tr>
<tr>
<td>SPECspeed2017_int_peak</td>
<td>10.0</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

- CPU MHz: 3192.649
- BogoMIPS: 6385.29
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 25344K
- NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46
- NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47
- Flavors: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xptr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat ptable psè fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 irdq vpopcnt vpd vptq vplpmovvmx vptpin vptamovtm xsaveopt xsavec xgetbv1 cqm_1lc cqm_occup_llc pku ospke

/proc/cpuinfo cache data
- cache size : 25344 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
- available: 2 nodes (0-1)
- node 0 cpus: 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
- node 0 size: 95352 MB
- node 0 free: 94952 MB
- node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
- node 1 size: 96747 MB
- node 1 free: 96400 MB
- node distances:
  - node 0 1
  - 0: 10 21
  - 1: 21 10

From /proc/meminfo
- MemTotal: 196711104 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
- SuSE-release: SUSE Linux Enterprise Server 12 (x86_64)

(Continued on next page)
SPEC CPU2017 Integer Speed Result

Dell Inc. PowerEdge C6420 (Intel Xeon Gold 6146, 3.20 GHz)  SPECspeed2017_int_base = 9.74
SPECspeed2017_int_peak = 10.0

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Platform Notes (Continued)

VERSION = 12
PATCHLEVEL = 3
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.
os-release:
  NAME="SLES"
  VERSION="12-SP3"
  VERSION_ID="12.3"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
  Linux linux-5j67 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Feb 19 18:32

SPEC is set to: /root/cpu2017
  Filesystem  Type  Size  Used Avail Use% Mounted on
  /dev/sda2    xfs   928G   25G  903G   3% /

Additional information from dmidecode follows. WARNING: Use caution when you interpret
this section. The 'dmidecode' program reads system data which is "intended to allow
hardware to be accurately determined", but the intent may not be met, as there are
frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
  BIOS Dell Inc. 1.3.7 02/09/2018
  Memory:
    12x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666
    4x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base,
  peak) 657.xz_s(base)
==============================================================================

icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================

CC  600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)

(Continued on next page)
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CPU2017 License: 55
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Test Date: Feb-2018
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Compiler Version Notes (Continued)

------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
CXXC 620.omnetpp_s(peak) 623.xalancbmk_s(peak) 631.deepsjeng_s(peak) 641.leela_s(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
FC 648.exchange2_s(base, peak)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks: icc
C++ benchmarks: icpc
Fortran benchmarks: ifort

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64

(Continued on next page)
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Base Portability Flags (Continued)

605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

Peak Compiler Invocation

C benchmarks:
icc

(Continued on next page)
Peek Compiler Invocation (Continued)

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Peak Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-mem-layout-trans=3 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/je5.0.1-64/lib -ljemalloc

602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-mem-layout-trans=3 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

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**Peak Optimization Flags (Continued)**

625.x264_s: -Wl, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

657.xz_s: Same as 602.gcc_s

C++ benchmarks:

620.omnetpp_s: -Wl, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc


631.deepsjeng_s: Same as 620.omnetpp_s

641.leela_s: Same as 620.omnetpp_s

Fortran benchmarks:

-std=c11

C++ benchmarks (except as noted below):

-std=c++1y

623.xalancbmk_s: -m32

Fortran benchmarks:

-std=f90
### SPEC CPU2017 Integer Speed Result

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</table>

The flags files that were used to format this result can be browsed at:


You can also download the XML flags sources by saving the following links:


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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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