## SPEC® CPU2017 Integer Speed Result

**Dell Inc.**  
PowerEdge R740xd2 (Intel Xeon Silver 4116, 2.10GHz)  

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>6.72</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak</td>
<td>6.94</td>
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<tr>
<th>CPU2017 License:</th>
<th>55</th>
</tr>
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<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Nov-2018</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Dec-2018</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Feb-2018</td>
</tr>
</tbody>
</table>

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>24</td>
<td>4.88</td>
<td>7.07</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>24</td>
<td>5.75</td>
<td>7.40</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>24</td>
<td>4.12</td>
<td>8.66</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>24</td>
<td>7.61</td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>24</td>
<td>8.24</td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>24</td>
<td>3.91</td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>24</td>
<td>3.49</td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>24</td>
<td>10.9</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Silver 4116</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz.:</td>
<td>3000</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2100</td>
</tr>
<tr>
<td>Enabled:</td>
<td>24 cores, 2 chips</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>16.5 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Memory:</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 250 GB M.2 SATA SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>SUSE Linux Enterprise Server 12 SP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 18.0.2.20180210 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.2.20180210 of Intel Fortran Compiler for Linux</td>
</tr>
<tr>
<td>Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 1.0.3 released Oct-2018</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>jemalloc memory allocator v5.0.1</td>
</tr>
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SPEC CPU2017 Integer Speed Result

Dell Inc.
PowerEdge R740xd2 (Intel Xeon Silver 4116, 2.10GHz)

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

RESULTS

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>24</td>
<td>363</td>
<td>4.89</td>
<td>364</td>
<td>4.88</td>
<td>365</td>
<td>4.86</td>
<td>24</td>
<td>309</td>
<td>5.75</td>
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<td>7.61</td>
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<td>366</td>
<td>3.92</td>
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<td>399</td>
<td>15.5</td>
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<td>15.7</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 6.72
SPECspeed2017_int_peak = 6.94

RESULTS

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"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
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.
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache syncd and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5
### 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
- C1E disabled
- Uncore Frequency set to Dynamic
- Energy Efficiency Policy set to Performance
- Memory Patrol Scrub disabled
- Logical Processor disabled
- CPU Interconnect Bus Link Power Management disabled
- PCI ASPM L1 Link Power Management disabled
- Sysinfo program `/home/cpu2017/bin/sysinfo`

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f964985e45859ea9
running on linux-m8ku Wed Nov 7 12:10:45 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

From `/proc/cpuinfo`
- `model name : Intel(R) Xeon(R) Silver 4116 CPU @ 2.10GHz`
- `2 "physical id"s (chips)
24 "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 : 12`
  - `physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13`
  - `physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13`

From `lscpu`:
- `Architecture: x86_64`
- `CPU op-mode(s): 32-bit, 64-bit`
- `Byte Order: Little Endian`
- `CPU(s): 24`
- `On-line CPU(s) list: 0-23`
- `Thread(s) per core: 1`
- `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) Silver 4116 CPU @ 2.10GHz`
- `Stepping: 4`
Dell Inc.

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**SPECspeed2017_int_base = 6.72**

**SPECspeed2017_int_peak = 6.94**

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

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**Platform Notes (Continued)**

- **CPU MHz:** 2095.090  
- **BogoMIPS:** 4190.18  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 1024K  
- **L3 cache:** 16896K  
- **NUMA node0 CPU(s):** 0,2,4,6,8,10,12,14,16,18,20,22  
- **NUMA node1 CPU(s):** 1,3,5,7,9,11,13,15,17,19,21,23  
- **Flags:** fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dtes acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperf perf mono pni pclmulqdq dtes64 monitor ss_ASSERT tm2 ssse3 sdbg fma cx16 xtpre pdcm pcid dca se4_1 ssse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpseq_single pln pts dtherm intel_pt rsb_cxsw spec_ctrl retpoline kaiser tpr_shadow vmci flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mp xav512f avx512dq rsxrdseed adx smap clflushopt clwb avx512cd avx512bw avx512v1 xsaveopt xsaveopt xsaves xgetbv1 cqm_llc cqm_occup_llc pku ospke

/proc/cpuinfo cache data  
  cache size : 16896 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  
  node 0 size: 95285 MB  
  node 0 free: 94910 MB  
  node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23  
  node 1 size: 96749 MB  
  node 1 free: 96368 MB  
  node distances:  
    node  0  1  
    0: 10 21  
    1: 21 10

From /proc/meminfo  
  MemTotal: 196643524 kB  
  HugePages_Total: 0  
  Hugepagesize: 2048 kB

/usr/bin/lsb_release -d  
  SUSE Linux Enterprise Server 12 SP3

From /etc/*release* /etc/*version*  
  SuSE-release:

(Continued on next page)
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Test Date: Nov-2018
Hardware Availability: Dec-2018
Software Availability: Feb-2018

Platform Notes (Continued)

SUSE Linux Enterprise Server 12 (x86_64)
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-m8ku 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

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: Barriers
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Nov 7 12:06 last=5

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sdz4 xfs 182G 4.0G 178G 3% /home

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. 1.0.3 10/25/2018
Memory:
12x 002C04B3002C 18ASF2G72PDZ-2G6E1 16 GB 2 rank 2666, configured at 2400
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)
657.xz_s(base)
==============================================================================

(Continued on next page)
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Compiler Version Notes (Continued)

==============================================================================
icc (ICC) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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

icc (ICC) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)  
641.leela_s(base)

icpc (ICC) 18.0.2 20180210  
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==============================================================================
CXXC 620.omnetpp_s(peak) 623.xalancbmk_s(peak) 631.deepsjeng_s(peak)  
641.leela_s(peak)

icpc (ICC) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC 648.exchange2_s(base)

ifort (IFORT) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC 648.exchange2_s(peak)

ifort (IFORT) 18.0.2 20180210  
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| Test Date: | Nov-2018 |
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### Base Compiler Invocation

- **C benchmarks:**
  - icc -m64 -std=c11

- **C++ benchmarks:**
  - icpc -m64

- **Fortran benchmarks:**
  - ifort -m64

### Base Portability Flags

- **C benchmarks:**
  - 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: -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-AVX2 -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-AVX2 -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-AVX2 -ipo -O3 -no-prec-div
  - -qopt-mem-layout-trans=3 -nostandard-realloc-lhs
  - -L/usr/local/je5.0.1-64/lib -ljemalloc
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Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks (except as noted below):
icpc -m64

623.xalancbmk_s: icpc -m32 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64

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-AVX2 -qopt-prefetch -ipo -O3
-qopt-mem-layout-trans=3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -gopenmp -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-AVX2 -qopt-prefetch -ipo -O3
-qopt-mem-layout-trans=3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

(Continued on next page)
Peak Optimization Flags (Continued)

605.mcf_s: basepeak = yes
625.x264_s: basepeak = yes
657.xz_s: Same as 602.gcc_s

C++ benchmarks:

620.omnetpp_s: basepeak = yes
623.xalancbmk_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -03 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-32/lib -ljemalloc

631.deepsjeng_s: basepeak = yes
641.leela_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -03 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:

648.exchange2_s: basepeak = yes

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:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml