## SPEC® CPU2017 Integer Rate Result

**Dell Inc.**  
PowerEdge C6420 (Intel Xeon Gold 6140, 2.30 GHz)

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

<table>
<thead>
<tr>
<th>Copy</th>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
<td>187</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

### Hardware

**CPU Name:** Intel Xeon Gold 6140  
**Max MHz.:** 3700  
**Nominal:** 2300  
**Enabled:** 36 cores, 2 chips, 2 threads/core  
**Orderable:** 1,2 chips  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**L2:** 1 MB I+D on chip per core  
**L3:** 24.75 MB I+D on chip per chip  
**Other:** None  
**Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)  
**Storage:** 480 GB SATA SSD  
**Other:** None

### Software

**OS:** CentOS Linux release 7.4.1708 (Core)  
**Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++  
**Compiler for Linux:**  
**Fortran:** Version 18.0.0.128 of Intel Fortran  
**Compiler for Linux:**  
**Parallel:** No  
**Firmware:** Version 1.0.8 released Jul-2017  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 32/64-bit  
**Other:** jemalloc: jemalloc memory allocator library V5.0.1;
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>72</td>
<td>765</td>
<td>150</td>
<td>755</td>
<td>152</td>
<td>759</td>
<td>151</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>72</td>
<td>633</td>
<td>161</td>
<td>630</td>
<td>162</td>
<td>632</td>
<td>161</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>72</td>
<td>513</td>
<td>227</td>
<td>521</td>
<td>223</td>
<td>524</td>
<td>222</td>
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<tr>
<td>520.omnetpp_r</td>
<td>72</td>
<td>814</td>
<td>116</td>
<td>858</td>
<td>110</td>
<td>871</td>
<td>108</td>
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<tr>
<td>523.xalancbmk_r</td>
<td>72</td>
<td>422</td>
<td>180</td>
<td>424</td>
<td>179</td>
<td>425</td>
<td>179</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>72</td>
<td>333</td>
<td>379</td>
<td>335</td>
<td>377</td>
<td>331</td>
<td>381</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>72</td>
<td>479</td>
<td>172</td>
<td>486</td>
<td>170</td>
<td>489</td>
<td>169</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>72</td>
<td>755</td>
<td>158</td>
<td>767</td>
<td>156</td>
<td>756</td>
<td>158</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>72</td>
<td>502</td>
<td>376</td>
<td>502</td>
<td>376</td>
<td>501</td>
<td>376</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>72</td>
<td>595</td>
<td>131</td>
<td>597</td>
<td>130</td>
<td>597</td>
<td>130</td>
</tr>
</tbody>
</table>

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

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:

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4
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
runcpu command invoked through numactl i.e.:
umactl --interleave=all runcpu <etc>

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;
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General Notes (Continued)

jemalloc: sources available via jemalloc.net

No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
No: 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.
No: 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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

Platform Notes

BIOS settings:
Virtualization Technology disabled
System Profile set to Custom
CPU Power Management set to Maximum Performance
Memory Frequency set to Maximum Performance
Turbo Boost enabled
C States disabled
Memory Patrol Scrub disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /root/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bce091c0f

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 6140 CPU @ 2.30GHz
  2 "physical id"s (chips)
  72 "processors"

(Continued on next page)
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</tbody>
</table>

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

## Platform Notes (Continued)

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 : 18  
siblings : 36  
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27  
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
```

From lscpu:

- **Architecture:** x86_64  
- **CPU op-mode(s):** 32-bit, 64-bit  
- **Byte Order:** Little Endian  
- **CPU(s):** 72  
- **On-line CPU(s) list:** 0-71  
- **Thread(s) per core:** 2  
- **Core(s) per socket:** 18  
- **Socket(s):** 2  
- **NUMA node(s):** 4  
- **Vendor ID:** GenuineIntel  
- **CPU family:** 6  
- **Model:** 85  
- **Model name:** Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz  
- **Stepping:** 4  
- **CPU MHz:** 2300.000  
- **BogoMIPS:** 4600.00  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 1024K  
- **L3 cache:** 25344K  
- **NUMA node0 CPU(s):** 0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68  
- **NUMA node1 CPU(s):** 1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69  
- **NUMA node2 CPU(s):** 2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70  
- **NUMA node3 CPU(s):** 3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63,67,71  
- **Flags:** fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtrunc lm constant_tsc arch_perfmon pebs bts rep_good nopl nonstop_tsc aperfmperf ept vpid fpgasave vsync fmaritmov rdtscp fma rdtsc rss Neal pdm vni fepsignext dtes64 monitoring tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xsaveopt xsaves xcrpt vmprev cqm_llc cqm_occctl cqm_park cqm_mbm_total cqm_mbm_local dtherm ida arat pni pts

```
/proc/cpuinfo cache data  
cache size : 25344 KB
```
### Platform Notes (Continued)

From `numactl --hardware` WARNING: a `numactl 'node'` might or might not correspond to a physical chip.

available: 4 nodes (0-3)

<table>
<thead>
<tr>
<th>Node</th>
<th>CPUs</th>
<th>Size (MB)</th>
<th>Free (MB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68</td>
<td>47813</td>
<td>46400</td>
</tr>
<tr>
<td>1</td>
<td>1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69</td>
<td>49152</td>
<td>47848</td>
</tr>
<tr>
<td>2</td>
<td>2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62 66 70</td>
<td>49152</td>
<td>47754</td>
</tr>
<tr>
<td>3</td>
<td>3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63 67 71</td>
<td>49152</td>
<td>47481</td>
</tr>
</tbody>
</table>

From `/proc/meminfo`

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MemTotal</td>
<td>196689516 kB</td>
</tr>
<tr>
<td>HugePages_Total</td>
<td>128</td>
</tr>
<tr>
<td>Hugepagesize</td>
<td>2048 kB</td>
</tr>
</tbody>
</table>

From `/etc/*release* /etc/*version*`

centos-release: CentOS Linux release 7.4.1708 (Core)
centos-release-upstream: Derived from Red Hat Enterprise Linux 7.4 (Source)
os-release:

```
NAME="CentOS Linux"
VERSION="7 (Core)"
ID="centos"
ID_LIKE="rhel fedora"
VERSION_ID="7"
PRETTY_NAME="CentOS Linux 7 (Core)"
ANSI_COLOR="0;31"
CPE_NAME=cpe:/o:centos:centos:7
```

redhat-release: CentOS Linux release 7.4.1708 (Core)
system-release: CentOS Linux release 7.4.1708 (Core)
system-release-cpe: cpe:/o:centos:centos:7

```
uname -a:
Linux localhost.localdomain 3.10.0-693.5.2.el7.x86_64 #1 SMP Fri Oct 20 20:32:50 UTC 2017 x86_64 x86_64 x86_64 GNU/Linux
```
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Platform Notes (Continued)

run-level 3 Nov 29 20:48

SPEC is set to: /root/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda2      xfs   433G  13G  421G   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. 1.0.8 07/12/2017
Memory:
3x 002C00B3002C 18ASF2G72PDZ-2G6D1 16 GB 2 rank 2666
9x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666
4x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

------------------------------------------------------------------
CC  500.perlbench_r(base)  502.gcc_r(base)  505.mcf_r(base)  525.x264_r(base)
     557.xz_r(base)
------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------
------------------------------------------------------------------
CXXC 520.omnetpp_r(base)  523.xalancbmk_r(base)  531.deepsjeng_r(base)
     541.leela_r(base)
------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------
------------------------------------------------------------------
FC  548.exchange2_r(base)
------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
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Base Compiler Invocation

C benchmarks:
  icc

C++ benchmarks:
  icpc

Fortran benchmarks:
  ifort

Base Portability Flags

500.perlbmk_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
- W1, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
- W1, -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:
- W1, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
- L/usr/local/je5.0.1-64/lib -ljemalloc
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Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

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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