# SPEC® CPU2017 Integer Rate Result

**Dell Inc.**

**PowerEdge R440 (Intel Xeon Silver 4110, 2.10 GHz)**

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>Dell Inc.</th>
<th>Tested by</th>
<th>Dell Inc.</th>
<th>Hardware Availability</th>
<th>Sep-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPC2017 License</td>
<td>55</td>
<td>Test Date:</td>
<td>Nov-2017</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Silver 4110</td>
<td>Software Availability</td>
<td>Sep-2017</td>
<td></td>
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</tr>
<tr>
<td>Max MHz.</td>
<td>3000</td>
<td>compiler</td>
<td>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</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enabled</td>
<td>16 cores, 2 chips, 2 threads/core</td>
<td>Parallel:</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orderable</td>
<td>1,2 chip</td>
<td>Firmware:</td>
<td>Version 1.3.1 released Sep-2017</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2:</td>
<td>1 MB I+D on chip per core</td>
<td>Memory:</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L3:</td>
<td>11 MB I+D on chip per chip</td>
<td>Storage:</td>
<td>480 GB SATA SSD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
<td>Other:</td>
<td>jemalloc: jemalloc memory allocator library V5.0.1; 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</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory:</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)</td>
<td>Other:</td>
<td>None</td>
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<tr>
<td>Storage:</td>
<td>480 GB SATA SSD</td>
<td>Other:</td>
<td>None</td>
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## SPECrate2017_int_base = 72.6

## SPECrate2017_int_peak = Not Run
# SPEC CPU2017 Integer Rate Result

## Dell Inc.

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**SPECrate2017_int_base** = 72.6  
**SPECrate2017_int_peak** = Not Run

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| Test Sponsor: | Dell Inc. |  
| Tested by: | Dell Inc. |  
| Test Date: | Nov-2017 |  
| Hardware Availability: | Sep-2017 |  
| Software Availability: | Sep-2017 |

### Results Table

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<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>
<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.perfbench_r</td>
<td>32</td>
<td>913</td>
<td>55.8</td>
<td>919</td>
<td>55.4</td>
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<td>505.mcf_r</td>
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<td>520.omnetpp_r</td>
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<td>862</td>
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<td>869</td>
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<td><strong>48.7</strong></td>
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<tr>
<td>523.xalancbmk_r</td>
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<td>75.9</td>
<td>444</td>
<td>76.1</td>
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<tr>
<td>531.deepsjeng_r</td>
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<td><strong>62.7</strong></td>
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<td>541.leela_r</td>
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<td>57.2</td>
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<td><strong>56.6</strong></td>
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<tr>
<td>548.exchange2_r</td>
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<tr>
<td>557.xz_r</td>
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<td>640</td>
<td>54.0</td>
<td><strong>698</strong></td>
<td><strong>49.5</strong></td>
<td>698</td>
<td>49.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
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**SPECrate2017_int_base** = 72.6  
**SPECrate2017_int_peak** = Not Run

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:

```bash
```

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.:  
numactl --interleave=all runcpu <etc>
```

### Platform Notes

BIOS settings:  
Logical Processor Enabled

(Continued on next page)
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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Nov-2017  
**Hardware Availability:** Sep-2017  
**Software Availability:** Sep-2017

**Platform Notes (Continued)**

- Virtualization Technology Disabled
- Sub NUMA Cluster Enabled
- System Profile set to Custom
- CPU Performance set to Maximum Performance
- C1E Disabled
- C States set to Autonomous
- Uncore Frequency set to Dynamic
- Memory Patrol Scrub Disabled
- Energy Efficiency Policy set to Performance
- 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-jlsy Thu Nov 2 14:32:15 2017
```

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) Silver 4110 CPU @ 2.10GHz  
  2 "physical id"s (chips)  
  32 "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 : 8  
    siblings : 16  
    physical 0: cores 0 1 2 3 4 5 6 7  
    physical 1: cores 0 1 2 3 4 5 6 7
```

```
From lscpu:  
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 32  
On-line CPU(s) list: 0-31  
Thread(s) per core: 2  
Core(s) per socket: 8  
Socket(s): 2  
NUMA node(s): 2  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Silver 4110 CPU @ 2.10GHz  
Stepping: 4  
CPU MHz: 2095.177  
BogoMIPS: 4190.35
```

(Continued on next page)
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Platform Notes (Continued)

Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31
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 rdtsdp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xapic ndx tsc ept est tm
mlnx aperf perf perf_event pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xtopr pdc md cda sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer
aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb pln pts dtherm intel_pt
tpr_shadow vmni flexpriority ept vpid fsgsbase tsc_adjust bml hle avx2 smep bmi2
erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsaveopt xsave xgetbv1 cqm_llc cqm_occup_llc

/platform/cpuinfo cache data
cache size: 11264 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
node 0 size: 95269 MB
node 0 free: 94821 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
node 1 size: 96615 MB
node 1 free: 96178 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 196489992 KB
HugePages_Total: 0
Hugepagesize: 2048 KB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2

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Platform Notes (Continued)

# 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-SP2"
  VERSION_ID="12.2"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
  Linux linux-jiswy 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)
  x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 2 14:29

SPEC is set to: /root/cpu2017
  Filesystem  Type  Size  Used  Avail Use% Mounted on
  /dev/sda2    xfs  371G  30G  342G   8% /

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. 1.2.11 10/20/2017
  Memory:
    12x 00AD063200AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666, configured at 2400
    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)
==============================================================================

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</table>

### Compiler Version Notes (Continued)

```plaintext
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.
------------------------------------------------------------------------------
```

### Base Compiler Invocation

- **C benchmarks:**
  - icc

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

- **Fortran benchmarks:**
  - ifort

### Base Portability Flags

```
500.perlbench_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

(Continued on next page)
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**Base Optimization Flags (Continued)**

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 -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

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.

Tested with SPEC CPU2017 v1.0.2 on 2017-11-02 02:32:14-0400.
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