# SPEC® CPU2017 Integer Rate Result

## Dell Inc.

**PowerEdge R440 (Intel Xeon Silver 4112, 2.60 GHz)**

<table>
<thead>
<tr>
<th>Speciation</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPECrate2017_int_base</strong></td>
<td>43.7</td>
</tr>
<tr>
<td><strong>SPECrate2017_int_peak</strong></td>
<td>Not Run</td>
</tr>
</tbody>
</table>

### CPU2017 License:
55

### Test Sponsor:
Dell Inc.

### Tested by:
Dell Inc.

### Test Date:
Oct-2017

### Hardware Availability:
Sep-2017

### Software Availability:
Sep-2017

### Copies

<table>
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<td>16</td>
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<tr>
<td>502.gcc_r</td>
<td>16</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>16</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>16</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>16</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>16</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>16</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>16</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>16</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>16</td>
</tr>
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</table>

### SPECrate2017_int_base (43.7)

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<tr>
<td>500.perlbench_r</td>
<td>32.4</td>
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<tr>
<td>502.gcc_r</td>
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<td>505.mcf_r</td>
<td>54.6</td>
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<td>520.omnetpp_r</td>
<td>27.4</td>
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<tr>
<td>523.xalancbmk_r</td>
<td>47.0</td>
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<tr>
<td>525.x264_r</td>
<td>84.3</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>38.2</td>
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<td>541.leela_r</td>
<td>34.4</td>
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<tr>
<td>548.exchange2_r</td>
<td>81.4</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>31.4</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Silver 4112
- **Max MHz.:** 3000
- **Nominal:** 2600
- **Enabled:** 8 cores, 2 chips, 2 threads/core
- **Orderable:** 1,2 chip
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 8.25 MB I+D on chip per chip
- **Other:** None
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
- **Storage:** 480 GB SATA SSD
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 12 SP2
  4.4.21-69-default
- **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 1.3.1 released Sep-2017
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** 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
SPEC CPU2017 Integer Rate Result

Dell Inc.

PowerEdge R440 (Intel Xeon Silver 4112, 2.60 GHz)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>16</td>
<td>776</td>
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<td><strong>33.0</strong></td>
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<td>541.leela_r</td>
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<tr>
<td>557.xz_r</td>
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<td>31.5</td>
<td>550</td>
<td><strong>31.4</strong></td>
</tr>
</tbody>
</table>

**SPECrate2017_int_base = 43.7**

**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:

```
```

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>
```
SPEC CPU2017 Integer Rate Result

Dell Inc.

PowerEdge R440 (Intel Xeon SIIver 4112, 2.60 GHz)

SPECrater2017_int_base = 43.7
SPECrater2017_int_peak = Not Run

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

Test Date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Platform Notes

BIOS settings:
Logical Processor Enabled
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
Sysinfo program /root/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-jlsey Thu Oct 19 14:11:31 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 4112 CPU @ 2.60GHz
   2 "physical id"s (chips)
   16 "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 : 4
siblings : 8
physical 0: cores 1 2 4 5
physical 1: cores 1 2 4 5

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4112 CPU @ 2.60GHz
Stepping: 4

(Continued on next page)
## Dell Inc.

**PowerEdge R440 (Intel Xeon Silver 4112, 2.60 GHz)**

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<td>55</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU MHz</td>
<td>2594.029</td>
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<td></td>
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<td>BogoMIPS</td>
<td>5188.05</td>
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<td>Virtualization</td>
<td>VT-x</td>
<td></td>
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</tr>
<tr>
<td>L1d cache</td>
<td>32K</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>L1i cache</td>
<td>32K</td>
<td></td>
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<tr>
<td>L2 cache</td>
<td>1024K</td>
<td></td>
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<tr>
<td>L3 cache</td>
<td>8448K</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>NUMA node0 CPU(s)</td>
<td>0,2,4,6,8,10,12,14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>NUMA node1 CPU(s)</td>
<td>1,3,5,7,9,11,13,15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flags:</td>
<td>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 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 xtpmr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx fl64 rdrand lahf_lm abm 3dnowprefetch ida arat epb pln pts dtherm intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1 cqm_llc cqm_occup_llc</td>
<td></td>
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<tr>
<td>/proc/cpuinfo cache data</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>cache size</td>
<td>8448 KB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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
node 0 size: 95269 MB
node 0 free: 94810 MB
node 1 cpus: 1 3 5 7 9 11 13 15
node 1 size: 96615 MB
node 1 free: 96158 MB
node distances:
  node 0 1
  0: 10 21
  1: 21 10
```

From `/proc/meminfo`

```
MemTotal:       196489992 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

From `/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)
```

(Continued on next page)
## Dell Inc.

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### Platform Notes (Continued)

```bash
VERSION = 12
PATCHLEVEL = 2
# 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-j1sy 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 Oct 19 14:00

SPEC is set to: /root/cpu2017
```

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda2</td>
<td>xfs</td>
<td>371G</td>
<td>29G</td>
<td>343G</td>
<td>8%</td>
<td>/</td>
</tr>
</tbody>
</table>

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. 1.2.9 10/06/2017
- 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

```bash
==============================================================================
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.
```

```bash
==============================================================================
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
```

(Continued on next page)
Dell Inc.

PowerEdge R440 (Intel Xeon Silver 4112, 2.60 GHz)  

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| SPECrate2017_int_peak = Not Run |

Compiler Version Notes (Continued)

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.

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:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div

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

C benchmarks (continued):
-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

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 2017-10-19 02:11:31-0400.
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