Dell Inc.

PowerEdge R440 (Intel Xeon Silver 4112, 2.60 GHz)

SPECrate2017_int_base = 43.7

SPECrate2017_int_peak = Not Run

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

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 1.3.0 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
Dell Inc.

PowerEdge R440 (Intel Xeon Silver 4112, 2.60 GHz)

SPECrate2017_int_base = 43.7
SPECrate2017_int_peak = Not Run

Results Table

<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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<tr>
<td>500.perlbench_r</td>
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<td>771</td>
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<td>33.1</td>
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<td>505.mcf_r</td>
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<td>47.1</td>
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<td>525.x264_r</td>
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<td>338</td>
<td>82.9</td>
<td>335</td>
<td>83.5</td>
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<tr>
<td>531.deepsjeng_r</td>
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<td>480</td>
<td>38.2</td>
<td>481</td>
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<tr>
<td>541.leela_r</td>
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<td>767</td>
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<tr>
<td>548.exchange2_r</td>
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<td>509</td>
<td>82.4</td>
<td>516</td>
<td>81.2</td>
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<tr>
<td>557.xz_r</td>
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<td>31.5</td>
<td>549</td>
<td>31.5</td>
<td>549</td>
<td>31.5</td>
</tr>
</tbody>
</table>

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 Silver 4112, 2.60 GHz)

<table>
<thead>
<tr>
<th>SPECrate2017_int_peak</th>
<th>Not Run</th>
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<td>43.7</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

**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-hy8w Fri Oct 20 10:32:10 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)*
**SPEC CPU2017 Integer Rate Result**

**Dell Inc.**

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

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---

**SPECrate2017_int_base =** 43.7

**SPECrate2017_int_peak =** Not Run

---

### Platform Notes (Continued)

**CPU MHz:** 2594.022

**BogoMIPS:** 5188.04

**Virtualization:** VT-x

**L1d cache:** 32K

**L1i cache:** 32K

**L2 cache:** 1024K

**L3 cache:** 8448K

**NUMA node0 CPU(s):** 0,2,4,6,8,10,12,14

**NUMA node1 CPU(s):** 1,3,5,7,9,11,13,15

**Flags:** fpu vme de pse tsc msr pae mce 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 xtrunc 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 pni pt dtherm intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnow invpcid rtm lm clflushopt clwb intel_pt cmptm clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaveopt xsaveopt xgetbv1 cqm llc cqm_occup_llc

/proc/cpuinfo cache data

**cache size :** 8448 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`

`node 0 size: 95341 MB`

`node 0 free: 94901 MB`

`node 1 cpus: 1 3 5 7 9 11 13 15`

`node 1 size: 96736 MB`

`node 1 free: 96295 MB`

node distances:

`node 0 1`

`0: 10 21`

`1: 21 10`

From `/proc/meminfo`

MemTotal: 196687624 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)

(Continued on next page)
## Platform Notes (Continued)

```
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-hy8w 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 20 10:30 last=5
```

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:
  8x 002C04B3002C 18ASF2G72PDZ-2G6D1 16 GB 2 rank 2666, configured at 2400
  4x 002C0632002C 18ASF2G72PDZ-2G6D1 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.
```

(Continued on next page)
### Dell Inc.

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

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**SPEC CPU2017 Integer Rate Result**

| SPECrate2017_int_base = 43.7 |
| SPECrate2017_int_peak = Not Run |

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**Compiler Version Notes (Continued)**

```plaintext
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
```

```plaintext
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```plaintext
FC 548.exchange2_r(base)
```

```plaintext
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.xalanchmk_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
Dell Inc.  
PowerEdge R440 (Intel Xeon Silver 4112, 2.60 GHz)  

SPECrate2017_int_base = 43.7  
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Base Optimization Flags

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

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.

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