Dell Inc. PowerEdge R540 (Intel Xeon Bronze 3104, 1.70 GHz)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>45.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak</td>
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</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

### Hardware
- **CPU Name:** Intel Xeon Bronze 3104
- **Max MHz.:** 1700
- **Nominal:** 1700
- **Enabled:** 12 cores, 2 chips
- **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 2133)
- **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:** None

### Benchmark Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>12</td>
<td>34.9</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>12</td>
<td>26.4</td>
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<tr>
<td>508.namd_r</td>
<td>12</td>
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<td>510.parest_r</td>
<td>12</td>
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<td>511.povray_r</td>
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<td>41.9</td>
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<td>519.lbm_r</td>
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<td>521.wrf_r</td>
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<td>526.blender_r</td>
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<td>527.cam4_r</td>
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<td>56.5</td>
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<tr>
<td>538.imagick_r</td>
<td>12</td>
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<tr>
<td>544.nab_r</td>
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<tr>
<td>554.roms_r</td>
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**SPECrate2017_fp_base (45.4)**
SPEC CPU2017 Floating Point Rate Result

Dell Inc.

PowerEdge R540 (Intel Xeon Bronze 3104, 1.70 GHz)

SPECrate2017_fp_base = 45.4
SPECrate2017_fp_peak = Not Run

Results Table

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<td>558</td>
<td>34.2</td>
</tr>
</tbody>
</table>

SPECrate2017_fp_base = 45.4
SPECrate2017_fp_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>
```
Dell Inc.

PowerEdge R540 (Intel Xeon Bronze 3104, 1.70 GHz)

SPECrate2017_fp_base = 45.4
SPECrate2017_fp_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:
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-oq9t Tue Oct 24 18:44:40 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) Bronze 3104 CPU @ 1.70GHz
  2 "physical id"s (chips)
  12 "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 : 6
siblings : 6
physical 0: cores 0 1 2 3 4 5
physical 1: cores 0 1 2 3 4 5

From lscpu:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                12
On-line CPU(s) list:   0-11
Thread(s) per core:    1
Core(s) per socket:    6
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Bronze 3104 CPU @ 1.70GHz
Stepping:              4
CPU MHz:               1695.999

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

Dell Inc.

PowerEdge R540 (Intel Xeon Bronze 3104, 1.70 GHz)

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CPU2017 License: 55
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### Platform Notes (Continued)

- **BogoMIPS:** 3391.99
- **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
- **NUMA node1 CPU(s):** 1,3,5,7,9,11
- **Flags:** fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dtls acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good ntop xtopology nonstop_tsc aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch arat epb pln pts dtherm intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512bw avx512vl xsaveopt xsavec 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
- node 0 size: 95341 MB
- node 0 free: 94881 MB
- node 1 cpus: 1 3 5 7 9 11
- node 1 size: 96736 MB
- node 1 free: 96307 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)
  - VERSION = 12

(Continued on next page)
Platform Notes (Continued)

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-oq9t 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 24 13:59 last=5

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>301G</td>
<td>51G</td>
<td>251G</td>
<td>17%</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. 1.2.10 10/16/2017
Memory:
  12x 00AD063200AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666, configured at 2133
  4x Not Specified Not Specified

(End of data from sysinfo program)
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PowerEdge R540 (Intel Xeon Bronze 3104, 1.70 GHz)

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Compiler Version Notes (Continued)

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<table>
<thead>
<tr>
<th>Compiler</th>
<th>Version</th>
<th>Date</th>
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<td>icpc</td>
<td>18.0.0</td>
<td>20170811</td>
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<tr>
<td>ifort</td>
<td>18.0.0</td>
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Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

(Continued on next page)
Dell Inc. PowerEdge R540 (Intel Xeon Bronze 3104, 1.70 GHz)

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Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only

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

Fortran benchmarks (continued):
-qopt-mem-layout-trans=3 -nstandard-realloc-lhs -align array32byte

Benches using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nstandard-realloc-lhs -align array32byte

Benches using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benches using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nstandard-realloc-lhs -align array32byte

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

Benches using both Fortran and C:
-m64 -std=c11

Benches using both C and C++:
-m64 -std=c11

Benches using Fortran, C, and C++:
-m64 -std=c11

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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