**SPEC® CPU2017 Floating Point Rate Result**

**Dell Inc.**

PowerEdge R440 (Intel Xeon Bronze 3106, 1.70 GHz)

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<tr>
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<th>55</th>
</tr>
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</tr>
<tr>
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<tr>
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<td>16</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>16</td>
</tr>
</tbody>
</table>

**Hardware**

- CPU Name: Intel Xeon Bronze 3106
- Max MHz.: 1700
- Nominal: 1700
- Enabled: 16 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: 11 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 1.3.1 released Sep-2017
- File System: xfs
- System State: Run level 3 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: Not Applicable
- Other: None
## Results Table

<table>
<thead>
<tr>
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<th>Ratio</th>
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</table>

**SPECrate2017_fp_base = 59.8**

**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>
```
**SPEC CPU2017 Floating Point Rate Result**

Dell Inc.  

**PowerEdge R440 (Intel Xeon Bronze 3106, 1.70 GHz)**

**SPECrate2017_fp_base = 59.8**

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---

**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-j1sy Mon Oct 30 18:49:40 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 3106 CPU @ 1.70GHz
    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 : 8
siblings : 8
    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):           16
On−line CPU(s) list: 0−15
Thread(s) per core: 1
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) Bronze 3106 CPU @ 1.70GHz
Stepping:         4
CPU MHz:          1696.007
```

(Continued on next page)
Dell Inc.

PowerEdge R440 (Intel Xeon Bronze 3106, 1.70 GHz)

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

SPECrate2017_fp_base = 59.8
SPECrate2017_fp_peak = Not Run

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

Platform Notes (Continued)

BogoMIPS: 3392.01
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
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15
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 rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfperf 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
erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512v1 xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc

/proc/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
node 0 size: 95269 MB
node 0 free: 94805 MB
node 1 cpus: 1 3 5 7 9 11 13 15
node 1 size: 96615 MB
node 1 free: 96188 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

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

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Software Availability: Sep-2017

---

**Platform Notes (Continued)**

```plaintext
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 30 14:02

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. 1.2.10 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)

---

**Compiler Version Notes**

```plaintext
==============================================================================  
CC  519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)  
==============================================================================
```

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

```
CXXC 508.namd_r(base) 510.parest_r(base)  
```

```
icpc (ICC) 18.0.0 20170811  
```

(Continued on next page)
## Dell Inc.

### PowerEdge R440 (Intel Xeon Bronze 3106, 1.70 GHz)

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### Compiler Version Notes (Continued)

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

---

**CC** 511.povray_r(base) 526.blender_r(base)

---

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

---

**FC** 507.cactuBSSN_r(base)

---

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

---

**CC** 521.wrf_r(base) 527.cam4_r(base)

---

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

---

**Base Compiler Invocation**

C benchmarks:
- icc

C++ benchmarks:
- icpc

(Continued on next page)
Dell Inc. PowerEdge R440 (Intel Xeon Bronze 3106, 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

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Base Optimization Flags (Continued)

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

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

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

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

Base Other Flags

C benchmarks:
-`-m64 -std=c11`

C++ benchmarks:
-`-m64`

Fortran benchmarks:
-`-m64`

Benchmarks using both Fortran and C:
-`-m64 -std=c11`

Benchmarks using both C and C++:
-`-m64 -std=c11`

Benchmarks 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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Tested with SPEC CPU2017 v1.0.2 on 2017-10-30 06:49:38-0400.  
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