**SPEC CPU®2017 Floating Point Speed Result**

**Dell Inc. PowerEdge R750 (Intel Xeon Gold 6330, 2.00 GHz)**

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Apr-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>May-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Feb-2021</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Tested by:** Dell Inc.

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base = 175</th>
<th>SPECspeed®2017_fp_peak = 178</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>56</td>
<td>615</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>56</td>
<td>615</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>56</td>
<td>124</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>56</td>
<td>141</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>56</td>
<td>130</td>
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<tr>
<td>628.pop2_s</td>
<td>56</td>
<td>71.0</td>
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<tr>
<td>638.imagick_s</td>
<td>56</td>
<td>164</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>56</td>
<td>105</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>56</td>
<td>105</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>56</td>
<td>212</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 6330
- **Max MHz:** 3100
- **Nominal:** 2000
- **Enabled:** 56 cores, 2 chips
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 1.25 MB I+D on chip per core
- **L3:** 42 MB I+D on chip per chip
- **Other:** None
- **Memory:** 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)

### Software

- **OS:** Red Hat Enterprise Linux 8.3 (Ootpa) 4.18.0-240.15.1.el8_3.x86_64
- **Compiler:**
  - C/C++: Version 2021.1 of Intel oneAPI DPC++/C++
  - Fortran: Version 2021.1 of Intel Fortran Compiler
- **Parallel:** Yes
- **Firmware:** Version 1.1.2 released Apr-2021
- **File System:** tmpfs
- **System State:** Run level 5 (graphical multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **jemalloc memory allocator V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.
Dell Inc.

PowerEdge R750 (Intel Xeon Gold 6330, 2.00 GHz)

Specspeed®2017_fp_base = 175
Specspeed®2017_fp_peak = 178

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tr>
<td>603.bwaves_s</td>
<td>56</td>
<td>96.1</td>
<td>614</td>
<td>95.9</td>
<td>615</td>
<td>95.5</td>
<td>618</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>56</td>
<td>71.5</td>
<td>233</td>
<td>73.1</td>
<td>228</td>
<td>72.6</td>
<td>230</td>
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<tr>
<td>619.lbm_s</td>
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<td>43.8</td>
<td>120</td>
<td>42.3</td>
<td>124</td>
<td>41.7</td>
<td>126</td>
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<tr>
<td>621.wrf_s</td>
<td>56</td>
<td>93.6</td>
<td>141</td>
<td>92.7</td>
<td>143</td>
<td>93.6</td>
<td>141</td>
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<td>68.0</td>
<td>130</td>
<td>68.2</td>
<td>130</td>
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<tr>
<td>628.pop2_s</td>
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<td>70.3</td>
<td>164</td>
<td>72.3</td>
<td>167</td>
<td>71.0</td>
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<tr>
<td>638.imagick_s</td>
<td>56</td>
<td>87.4</td>
<td>164</td>
<td>87.9</td>
<td>164</td>
<td>87.9</td>
<td>164</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>56</td>
<td>54.4</td>
<td>321</td>
<td>54.4</td>
<td>321</td>
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<td>106</td>
<td>86.7</td>
<td>105</td>
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<td>654.roms_s</td>
<td>56</td>
<td>73.6</td>
<td>214</td>
<td>74.4</td>
<td>212</td>
<td>74.2</td>
<td>212</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/mnt/ramdisk2/cpu2017-1.1.5-ic2021.1/lib/intel64:/mnt/ramdisk2/cpu2017-1.1.5-ic2021.1/je5.0.1-64"
MALLOCONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0
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
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

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

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

Benchmark run from a 225 GB ramdisk created with the cmd: "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk"

### Platform Notes

#### BIOS Settings:
- Logical Processor: Disabled
- Virtualization Technology: Disabled
- System Profile: Custom
- CPU Power Management: Maximum Performance
  - C1E: Disabled
  - C States: Autonomous
- Memory Patrol Scrub: Disabled
- Energy Efficiency Policy: Performance
- CPU Interconnect Bus Link
  - Power Management: Disabled

Sysinfo program: /mnt/ramdisk2/cpu2017-1.1.5-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeac89d4b38e2f1c
running on localhost.localdomain Thu Apr 29 20:15:46 2021

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) Gold 6330 CPU @ 2.00GHz
- 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: 28
  - siblings: 28
  - physical 0: cores 0 1 2 3 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
  - physical 1: cores 0 1 2 3 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian

(Continued on next page)
## Dell Inc. PowerEdge R750 (Intel Xeon Gold 6330, 2.00 GHz)

### SPEC CPU®2017 Floating Point Speed Result

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

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<th>SPECspeed®2017_fp_peak</th>
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<tbody>
<tr>
<td>175</td>
<td>178</td>
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### Platform Notes (Continued)

- CPU(s): 56
- On-line CPU(s) list: 0-55
- Thread(s) per core: 1
- Core(s) per socket: 28
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 106
- Model name: Intel(R) Xeon(R) Gold 6330 CPU @ 2.00GHz
- Stepping: 6
- CPU MHz: 1243.451
- BogoMIPS: 4000.00
- Virtualization: VT-x
- L1d cache: 48K
- L1i cache: 32K
- L2 cache: 1280K
- L3 cache: 43008K

NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54

NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55

Flags: 
- fpu 
- vme 
- de 
- pse 
- tsc 
- msr 
- pae 
- mce 
- cx8 
- apic 
- sep 
- mtrr 
- pge 
- mca 
- cmov 
- pat 
- pse36 
- clflush 
- dts 
- acpi 
- fxsr 
- sse 
- sse2 
- ss 
- ht 
- tm 
- pbe 
- syscall 
- nx 
- pdpe1gb 
- rep_good 
- xtopology 
- nonstop_tsc 
- cpuid

From numactl --hardware  
WARNING: a numactl 'node' might or might not correspond to a physical chip.

```bash
available: 2 nodes (0-1)
node 0 cpus: 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54
node 0 size: 245982 MB
node 0 free: 239711 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
```
SPEC CPU®2017 Floating Point Speed Result

Dell Inc.
PowerEdge R750 (Intel Xeon Gold 6330, 2.00 GHz)

SPECspeed®2017_fp_base = 175
SPECspeed®2017_fp_peak = 178

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

Test Date: Apr-2021
Hardware Availability: May-2021
Software Availability: Feb-2021

Platform Notes (Continued)

53 55
node 1 size: 246787 MB
node 1 free: 252047 MB
node distances:
node 0 1
0: 10 20
1: 20 10

From /proc/meminfo
MemTotal: 527810380 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.3 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.3"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
    ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
Linux localhost.localdomain 4.18.0-240.15.1.el8_3.x86_64 #1 SMP Wed Feb 3 03:12:15 EST 2021 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB:
CVE-2017-5715 (Spectre variant 2):
**SPEC CPU®2017 Floating Point Speed Result**

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PowerEdge R750 (Intel Xeon Gold 6330, 2.00 GHz)

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---

### Platform Notes (Continued)

- CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected  
- CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 5 Apr 29 15:46

** SPEC is set to: /mnt/ramdisk2/cpu2017-1.1.5-ic2021.1**

<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>tmpfs</td>
<td>tmpfs</td>
<td>225G</td>
<td>13G</td>
<td>213G</td>
<td>6%</td>
<td>/mnt/ramdisk2</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id  
- **Vendor**: Dell Inc.  
- **Product**: PowerEdge R750  
- **Product Family**: PowerEdge  
- **Serial**: 1234567

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.

**Memory:**
- 12x 002C069D002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200, configured at 2933  
- 4x 00AD063200AD HMAA4GR7AJR8N-XN 32 GB 2 rank 3200, configured at 2933  
- 16x Not Specified Not Specified

**BIOS:**
- **BIOS Vendor**: Dell Inc.  
- **BIOS Version**: 1.1.2  
- **BIOS Date**: 04/09/2021  
- **BIOS Revision**: 1.1

(End of data from sysinfo program)

---

### Compiler Version Notes

```
C                  | 619.libm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base)  
```

**Intel(R) C** Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

```
C                     | 644.nab_s(peak)  
```

(Continued on next page)
Dell Inc.

PowerEdge R750 (Intel Xeon Gold 6330, 2.00 GHz)

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

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Tested by: Dell Inc.
Hardware Availability: May-2021
Software Availability: Feb-2021

Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

-----------------------------------------------------------------------------
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
                | 644.nab_s(base)
-----------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

-----------------------------------------------------------------------------
C               | 644.nab_s(peak)
-----------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

-----------------------------------------------------------------------------
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
-----------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

-----------------------------------------------------------------------------
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
                | 654.roms_s(base, peak)
-----------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
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Compiler Version Notes (Continued)

Fortran, C

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Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64
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Base Optimization Flags

C benchmarks:
-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-mbranches-within-32B-boundaries

Fortran benchmarks:
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
-mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib
-ljemalloc

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc

644.nab_s: icx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort
### Dell Inc.

**PowerEdge R750 (Intel Xeon Gold 6330, 2.00 GHz)**

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</table>

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

**C benchmarks:**

619.lbm_s: basepeak = yes

638.imagick_s: basepeak = yes


**Fortran benchmarks:**

603.bwaves_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: basepeak = yes

**Benchmarks using both Fortran and C:**

621.wrf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

627.cam4_s: basepeak = yes

628.pop2_s: basepeak = yes

(Continued on next page)
Dell Inc.
PowerEdge R750 (Intel Xeon Gold 6330, 2.00 GHz)

<table>
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: April 2021
Hardware Availability: May 2021
Software Availability: February 2021

Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

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:

http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml

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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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