## SPEC CPU®2017 Floating Point Rate Result

### Dell Inc.

**PowerEdge MX740c (Intel Xeon Gold 6242, 2.80GHz)**

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>Dell Inc.</th>
</tr>
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<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
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- **CPU2017 License:** 55
- **Test Sponsor:** Dell Inc.
- **Tested by:** Dell Inc.
- **Test Date:** Jun-2020
- **Hardware Availability:** Apr-2019
- **Software Availability:** Apr-2020

### Hardware

**CPU Name:** Intel Xeon Gold 6242  
**Max MHz:** 3900  
**Nominal:** 2800  
**Enabled:** 32 cores, 2 chips, 2 threads/core  
**Orderable:** 1,2 chips  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**Cache L2:** 1 MB I+D on chip per core  
**Cache L3:** 22 MB I+D on chip per core  
**Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)  
**Storage:** 1 x 960 GB SATA SSD

### Software

**OS:** Red Hat Enterprise Linux 8.1  
**Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux; Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux  
**Parallel:** No  
**Firmware:** Version 2.7.1 released Feb-2020  
**File System:** tmpfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** jemalloc memory allocator V5.0.1  
**Power Management:** BIOS set to prefer performance at the cost of additional power usage

### Specifications

<table>
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<tbody>
<tr>
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</table>

### Benchmark Scores

- 503.bwaves_r: 32 copies, 283 scores
- 507.cactuBSSN_r: 64 copies, 493 scores
- 508.namd_r: 64 copies, 160 scores
- 510.parest_r: 64 copies, 114 scores
- 511.povray_r: 64 copies, 233 scores
- 519.lbm_r: 64 copies, 114 scores
- 521.wrf_r: 32 copies, 221 scores
- 526.blender_r: 64 copies, 205 scores
- 527.cam4_r: 64 copies, 214 scores
- 538.imagick_r: 64 copies
- 544.nab_r: 64 copies
- 549.fotonik3d_r: 64 copies, 152 scores
- 554.roms_r: 32 copies, 93.7 scores

---

**Copyright 2017-2020 Standard Performance Evaluation Corporation**
**SPEC CPU®2017 Floating Point Rate Result**

**Dell Inc.**

PowerEdge MX740c (Intel Xeon Gold 6242, 2.80GHz)

<table>
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</table>

**Compiler Notes**

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

**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"

**Environment Variables Notes**

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH = 
"/dev/shm/cpu2017-ic19.1u1/lib/intel64:/dev/shm/cpu2017-ic19.1u1/je5.0.1-64"
MALLOCV_CONF = "retain:true"
```
Dell Inc.

PowerEdge MX740c (Intel Xeon Gold 6242, 2.80GHz)  

SPEC CPU®2017 Floating Point Rate Result

SPECrater®2017_fp_base = 211
SPECrater®2017_fp_peak = 222

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

Test Date: Jun-2020
Hardware Availability: Apr-2019
Software Availability: Apr-2020

General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM 
memory using Redhat Enterprise Linux 7.5
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) 
is mitigated in the system as tested and documented.
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.
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>
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS settings:
Sub NUMA Cluster enabled
Virtualization Technology disabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to Autonomous
C1E disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub set to standard
Logical Processor enabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
UPI Prefetch enabled
LLC Prefetch disabled
Dead Line LLC Alloc enabled
Directory AtoS disabled
Sysinfo program /dev/shm/cpu2017-ic19.1u1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edeb1e6e46a485a0011
running on localhost.localdomain Fri Jun  5 16:07:02 2020

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

(Continued on next page)
**SPEC CPU®2017 Floating Point Rate Result**

**Dell Inc.**

PowerEdge MX740c (Intel Xeon Gold 6242, 2.80GHz)

<table>
<thead>
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<th>SPECrate®2017_fp_base</th>
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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.

**Test Date:** Jun-2020  
**Hardware Availability:** Apr-2019  
**Software Availability:** Apr-2020

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**Platform Notes (Continued)**

From `/proc/cpuinfo`

```
model name : Intel(R) Xeon(R) Gold 6242 CPU @ 2.80GHz
  2 "physical id"s (chips)
  64 "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 : 16
  siblings : 32

physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

From `lscpu`:

```
Architecture:        x86_64
CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
CPU(s):              64
On-line CPU(s) list: 0-63
Thread(s) per core:  2
Core(s) per socket:  16
Socket(s):           2
NUMA node(s):        4
Vendor ID:           GenuineIntel
CPU family:          6
Model:               85
Model name:          Intel(R) Xeon(R) Gold 6242 CPU @ 2.80GHz
Stepping:            6
CPU MHz:             3564.535
CPU max MHz:         3900.0000
CPU min MHz:         1200.0000
BogoMIPS:            5600.00
Virtualization:      VT-x
L1d cache:           32K
L1i cache:           32K
L2 cache:            1024K
L3 cache:            22528K
NUMA node0 CPU(s):   0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60
NUMA node1 CPU(s):   1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61
NUMA node2 CPU(s):   2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62
NUMA node3 CPU(s):   3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63
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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg fma cx16
xtr或许 pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_pni ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi
flexpriority ept vpid fsgsbase tsc_adjust bni hle avx2 smep bmi2 erms invpcid rtm
```

(Continued on next page)
Dell Inc.  
PowerEdge MX740c (Intel Xeon Gold 6242, 2.80GHz)  

<table>
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<th>CPU2017 License:</th>
<th>55</th>
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**SPEC CPU®2017 Floating Point Rate Result**

**SPECrate®2017_fp_peak = 222**  
**SPECrate®2017_fp_base = 211**

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**Platform Notes (Continued)**

cqm mpx rdt_a avx512f avx512dq rdseed adx smap clfushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsavc xgetbv1 xsaves cqm_llc cqm_occum_llc cqm_mbm_total
cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d
arch_capabilities

/proc/cpuinfo cache data

cache size : 22528 KB

From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60
node 0 size: 192048 MB
node 0 free: 182593 MB
node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61
node 1 size: 193532 MB
node 1 free: 193189 MB
node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62
node 2 size: 193532 MB
node 2 free: 192488 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63
node 3 size: 193532 MB
node 3 free: 193227 MB
node distances:

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<tr>
<td>3</td>
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From /proc/meminfo

MemTotal: 791188960 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*

os-release:

NAME="Red Hat Enterprise Linux"
VERSION="8.1 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.1"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.1 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
Dell Inc.
PowerEdge MX740c (Intel Xeon Gold 6242, 2.80GHz)

SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

spec

SPECrate®2017_fp_base = 211
SPECrate®2017_fp_peak = 222

Platform Notes (Continued)

    system-release-cpe: cpe:/o:redhat:enterprise_linux:8.1:ga

    uname -a:
    Linux localhost.localdomain 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019
    x86_64 x86_64 x86_64 GNU/Linux

    Kernel self-reported vulnerability status:

    CVE-2018-3620 (L1 Terminal Fault): Not affected
    Microarchitectural Data Sampling: Not affected
    CVE-2017-5754 (Meltdown): Not affected
    CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
    via prctl and seccomp
    CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user
    pointer sanitation
    CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional,
    RSB filling

    run-level 3 Jun 5 10:50
    SPEC is set to: /dev/shm/cpu2017-ic19.1u1
    Filesystem     Type   Size  Used Avail Use% Mounted on
    tmpfs          tmpfs  378G  4.2G  374G   2% /dev/shm

    From /sys/devices/virtual/dmi/id
    BIOS:    Dell Inc. 2.7.1 02/14/2020
    Vendor:  Dell Inc.
    Product: PowerEdge MX740c
    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:
    21x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
    1x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
    2x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933

    (End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C             | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
(Continued on next page)
Dell Inc.  
PowerEdge MX740c (Intel Xeon Gold 6242, 2.80GHz)  

| SPECrate®2017_fp_base = 211 |
| SPECrate®2017_fp_peak = 222 |

| CPU2017 License: | 55 |
| Test Sponsor: | Dell Inc. |
| Tested by: | Dell Inc. |
| Test Date: | Jun-2020 |
| Hardware Availability: | Apr-2019 |
| Software Availability: | Apr-2020 |

Compiler Version Notes (Continued)

---

| Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1  
| NextGen Build 20200304  
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---

| Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1  
| NextGen Build 20200304  
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---

| Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1  
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| Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1  
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| Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1  
| NextGen Build 20200304  
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |
---

| Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1  
| NextGen Build 20200304  
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| Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1  
| NextGen Build 20200304  
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Dell Inc.

PowerEdge MX740c (Intel Xeon Gold 6242, 2.80GHz)

SPECrater®2017_fp_base = 211
SPECrater®2017_fp_peak = 222

Compiler Version Notes (Continued)

C++, C | 511.povray_r(peak)

Intel(R) C++ Compiler for applications running on Intel(R) 64,
  Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Compiler for applications running on Intel(R) 64,
  Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

C++, C, Fortran | 507.cactuBSSN_r(base, peak)

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
  NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.
  NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Fortran | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
         | 554.roms_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Fortran, C | 521.wrf_r(base) 527.cam4_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
  NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

(Continued on next page)
Dell Inc.

PowerEdge MX740c (Intel Xeon Gold 6242, 2.80GHz)

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

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

**Test Date:** Jun-2020  
**Hardware Availability:** Apr-2019  
**Software Availability:** Apr-2020

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**Compiler Version Notes (Continued)**

- **Fortran, C**  
  521.wrf_r(peak)

- **Base Compiler Invocation**

  C benchmarks:
  
  icc

  C++ benchmarks:
  
  icpc

  Fortran benchmarks:
  
  ifort

  Benchmarks using both Fortran and C:
  
  ifort icc

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Base Compiler Invocation (Continued)

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: 
-m64 -qnextgen -std=c11
-Wl, -plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks: 
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks: 
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- auto -mbranches-within-32B-boundaries
- L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:
- -m64 -qnextgen -std=c11
- -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -WI,-z,muldefs
- -fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
- -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo -no-prec-div
- -qopt-prefetch -ftime-math-only
- -qopt-multiple-gather-scatter-by-shuffles -nostandard-realloc-lhs
- -align array32byte -auto -mbranches-within-32B-boundaries
- -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both C and C++:
- -m64 -qnextgen -std=c11
- -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -WI,-z,muldefs
- -fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
- -funroll-loops -qopt-mem-layout-trans=4
- -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
- -m64 -qnextgen -std=c11
- -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -WI,-z,muldefs
- -fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
- -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo -no-prec-div
- -qopt-prefetch -ftime-math-only
- -qopt-multiple-gather-scatter-by-shuffles -nostandard-realloc-lhs
- -align array32byte -auto -mbranches-within-32B-boundaries
- -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

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Dell Inc.
PowerEdge MX740c (Intel Xeon Gold 6242, 2.80GHz)

Peak Compiler Invocation (Continued)

Benchmarks using both C and C++:
  icpc icc

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

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes
538.imagick_r: basepeak = yes
544.nab_r: basepeak = yes

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: -m64 -qnextgen
  -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
  -Wl,-z,muldefs -fuse-ld=gold -xCORE-AVX512 -Ofast
  -ffast-math -floth -mfpmath=sse -funroll-loops
  -qopt-mem-layout-trans=4 -L/usr/local/jemalloc64-5.0.1/lib
  -ljemalloc

Fortran benchmarks:

503.bwaves_r: -m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
  -Wl,-z,muldefs -fuse-ld=gold -xCORE-AVX512 -O3 -ipo
  -no-prec-div -qopt-prefetch -ffinite-math-only
  -qopt-multiple-gather-scatter-by-shuffles
  -qopt-mem-layout-trans=4 -nostandard-realloc-lhs
  -align array32byte -auto -mbranches-within-32B-boundaries
  -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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Peak Optimization Flags (Continued)

549.fotonik3d_r: basepeak = yes

554.roms_r: Same as 503.bwaves_r

Benchmarks using both Fortran and C:


527.cam4_r: basepeak = yes

Benchmarks using both C and C++:


526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: 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-ic19.1u1-official-linux64_revA.xml