SPEC CPU®2017 Floating Point Speed Result

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

Tyrone Camarero DS400TG-48R
(2.60 GHz,Intel Xeon Gold 6142)

$SPECspeed®2017\_fp\_base = 117$
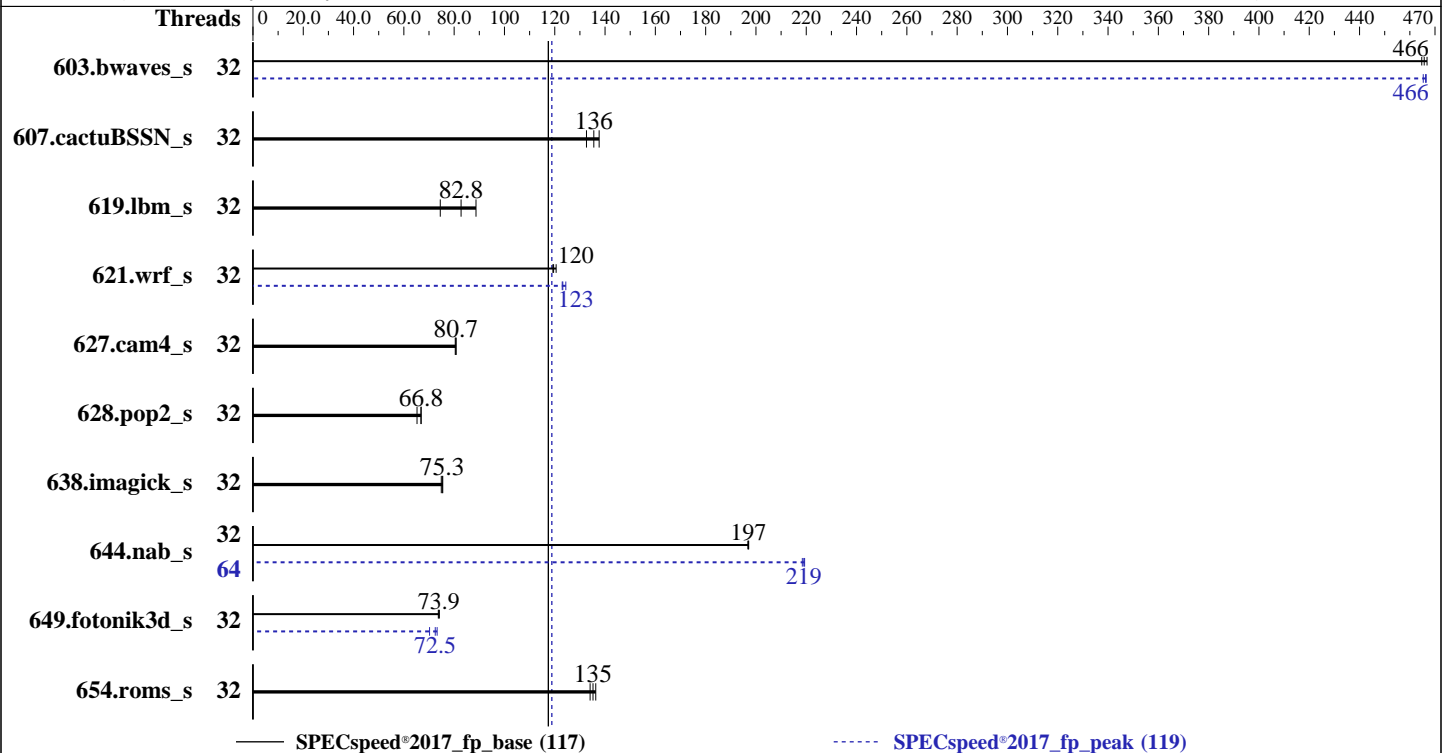
$SPECspeed®2017\_fp\_peak = 119$

CPU2017 License: 006042

Test Sponsor: Netweb Pte Ltd

Tested by: Tyrone Systems

Test Date: Feb-2021

Hardware Availability: Aug-2020

Software Availability: Dec-2020

Threads scale: 0 20.0 40.0 60.0 80.0 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 470

Benchmark	Threads	Base	Peak
603.bwaves_s	32	466	466
607.cactuBSSN_s	32	136	
619.lbm_s	32	82.8	
621.wrf_s	32	120	123
627.cam4_s	32	80.7	
628.pop2_s	32	66.8	
638.imagick_s	32	75.3	
644.nab_s	32 / 64	197	219
649.fotonik3d_s	32	73.9	72.5
654.roms_s	32	135	

—— **SPECspeed®2017_fp_base (117)**   ----- **SPECspeed®2017_fp_peak (119)**

Hardware

CPU Name: Intel Xeon Gold 6142
 Max MHz: 3700
 Nominal: 2600
Enabled: 32 cores, 2 chips, 2 threads/core
Orderable: 1,2 (chip)s
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 22 MB I+D on chip per chip
 Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)
Storage: 1 x 480 GB SATA SSD
Other: None

Software

OS: CentOS Linux release 8.3.2011
 Kernel 4.18.0-240.el8.x86_64
 4.18.0-240.el8.x86_64
Compiler: C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux Build 20200306;
 Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux Build 20200306;
Parallel: Yes
Firmware: Version 3.3 released Feb-2020
File System: xfs
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.

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	32	126	467	**127**	**466**	127	465	32	**127**	**466**	127	465	126	467
607.cactuBSSN_s	32	126	133	**123**	**136**	121	138	32	126	133	**123**	**136**	121	138
619.lbm_s	32	59.1	88.7	70.3	74.5	**63.3**	**82.8**	32	59.1	88.7	70.3	74.5	**63.3**	**82.8**
621.wrf_s	32	**111**	**120**	111	119	110	121	32	108	123	**107**	**123**	106	124
627.cam4_s	32	**110**	**80.7**	110	80.4	110	80.7	32	**110**	**80.7**	110	80.4	110	80.7
628.pop2_s	32	178	66.9	**178**	**66.8**	182	65.2	32	178	66.9	**178**	**66.8**	182	65.2
638.imagick_s	32	193	74.9	**192**	**75.3**	191	75.5	32	193	74.9	**192**	**75.3**	191	75.5
644.nab_s	32	**88.7**	**197**	88.6	197	88.8	197	64	79.7	219	80.0	218	**79.8**	**219**
649.fotonik3d_s	32	123	74.1	**123**	**73.9**	124	73.7	32	130	70.2	**126**	**72.5**	124	73.2
654.roms_s	32	116	136	117	134	**116**	**135**	32	116	136	117	134	**116**	**135**
SPECspeed®2017_fp_base =	**117**													
SPECspeed®2017_fp_peak =	**119**													

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,1,0"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

General Notes

```
  Binaries compiled on a system with 2x Intel Cascade Lake CPU 4214R + 384GB RAM
  memory using Centos 8.2 x86_64
  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>
  Yes: 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.
```

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CPU2017 License: 006042		**Test Date:**	Feb-2021
Test Sponsor:	Netweb Pte Ltd	**Hardware Availability:**	Aug-2020
Tested by:	Tyrone Systems	**Software Availability:**	Dec-2020

General Notes (Continued)

```
  jemalloc, a general purpose malloc implementation
  built with the Centos 8.2 x86_64, and the system compiler gcc 4.8.5
  sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Platform Notes

```
BIOS Settings:
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Maximum Performance
SNC = Enable
Stale AtoS = Disable
IMC Interleaving = 1-way Interleave
Patrol Scrub = Disable

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
 running on localhost.localdomain Mon Feb 22 14:43:05 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 6142 CPU @ 2.60GHz
       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
```

(Continued on next page)

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CPU2017 License: 006042

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Tested by: Tyrone Systems

Test Date: Feb-2021

Hardware Availability: Aug-2020

Software Availability: Dec-2020

Platform Notes (Continued)

```
        Model:                  85
        Model name:             Intel(R) Xeon(R) Gold 6142 CPU @ 2.60GHz
        Stepping:               4
        CPU MHz:                1427.364
        CPU max MHz:            3700.0000
        CPU min MHz:            1000.0000
        BogoMIPS:               5200.00
        Virtualization:         VT-x
        L1d cache:              32K
        L1i cache:              32K
        L2 cache:               1024K
        L3 cache:               22528K
        NUMA node0 CPU(s):      0-3,8-11,32-35,40-43
        NUMA node1 CPU(s):      4-7,12-15,36-39,44-47
        NUMA node2 CPU(s):      16-19,24-27,48-51,56-59
        NUMA node3 CPU(s):      20-23,28-31,52-55,60-63
        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
    aperfmperf 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 cpuid_fault epb cat_l3 cdp_l3
    invpcid_single pti intel_ppin ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority
    ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx
    rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw
    avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
    cqm_mbm_local dtherm ida arat pln pts pku ospke md_clear flush_l1d

 /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 1 2 3 8 9 10 11 32 33 34 35 40 41 42 43
   node 0 size: 91721 MB
   node 0 free: 77255 MB
   node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 39 44 45 46 47
   node 1 size: 92308 MB
   node 1 free: 86071 MB
   node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59
   node 2 size: 93706 MB
   node 2 free: 86002 MB
   node 3 cpus: 20 21 22 23 28 29 30 31 52 53 54 55 60 61 62 63
   node 3 size: 93549 MB
   node 3 free: 86099 MB
   node distances:
```

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SPECspeed®2017_fp_peak = 119

CPU2017 License: 006042
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Test Date: Feb-2021
Hardware Availability: Aug-2020
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Platform Notes (Continued)

```
   node   0   1   2   3
     0:  10  11  21  21
     1:  11  10  21  21
     2:  21  21  10  11
     3:  21  21  11  10

 From /proc/meminfo
    MemTotal:       394847488 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

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

 /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
    performance

 From /etc/*release* /etc/*version*
    centos-release: CentOS Linux release 8.3.2011
    centos-release-upstream: Derived from Red Hat Enterprise Linux 8.3
    os-release:
       NAME="CentOS Linux"
       VERSION="8"
       ID="centos"
       ID_LIKE="rhel fedora"
       VERSION_ID="8"
       PLATFORM_ID="platform:el8"
       PRETTY_NAME="CentOS Linux 8"
       ANSI_COLOR="0;31"
    redhat-release: CentOS Linux release 8.3.2011
    system-release: CentOS Linux release 8.3.2011
    system-release-cpe: cpe:/o:centos:centos:8

 uname -a:
    Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Fri Sep 25 19:48:47 UTC 2020
    x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2018-12207 (iTLB Multihit):           KVM: Mitigation: Split huge pages
 CVE-2018-3620 (L1 Terminal Fault):           Mitigation: PTE Inversion; VMX:
                                              conditional cache flushes, SMT
                                              vulnerable
 Microarchitectural Data Sampling:         Mitigation: Clear CPU buffers; SMT
                                              vulnerable
 CVE-2017-5754 (Meltdown):                    Mitigation: PTI
 CVE-2018-3639 (Speculative Store Bypass):    Mitigation: Speculative Store
```

(Continued on next page)

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Platform Notes (Continued)

```
                                              Bypass disabled via prctl and
                                              seccomp
 CVE-2017-5753 (Spectre variant 1):           Mitigation: usercopy/swapgs
                                              barriers and __user pointer
                                              sanitization
 CVE-2017-5715 (Spectre variant 2):           Mitigation: Full generic
                                              retpoline, IBPB: conditional,
                                              IBRS_FW, STIBP: conditional, RSB
                                              filling
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):             Mitigation: Clear CPU buffers; SMT
                                              vulnerable


 run-level 3 Feb 20 16:27

 SPEC is set to: /home/cpu2017
    Filesystem          Type  Size  Used Avail Use% Mounted on
    /dev/mapper/cl-home xfs   372G   85G  288G  23% /home

 From /sys/devices/virtual/dmi/id
     Vendor:          Tyrone Systems
     Product:         Tyrone Camarero DS400TG-48R
     Serial:          0123456789

 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:
     4x NO DIMM NO DIMM
     12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2666

 BIOS:
    BIOS Vendor:      American Megatrends Inc.
    BIOS Version:     3.3
    BIOS Date:        02/21/2020
    BIOS Revision:    5.14

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
 C            | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
              | 644.nab_s(base, peak)
------------------------------------------------------------------------------
```

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SPECspeed®2017_fp_base = 117

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Compiler Version Notes (Continued)

```
Intel(R) C 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.
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ 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 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) 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         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
                | 654.roms_s(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      | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
                | 628.pop2_s(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 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.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
icc
```

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Base Compiler Invocation (Continued)

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`

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/je5.0.1-64/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/je5.0.1-64/lib -ljemalloc`

(Continued on next page)

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Base Optimization Flags (Continued)

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/je5.0.1-64/lib -ljemalloc
```

Peak 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
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

638.imagick_s: basepeak = yes

644.nab_s: `-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`
`-L/usr/local/je5.0.1-64/lib -ljemalloc`

Fortran benchmarks:

(Continued on next page)

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Peak Optimization Flags (Continued)

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/je5.0.1-64/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/je5.0.1-64/lib -ljemalloc`

627.cam4_s: `basepeak = yes`

628.pop2_s: `basepeak = yes`

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
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-CLX-revB.html

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
http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-CLX-revB.xml

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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