**SPEC CPU®2017 Integer Rate Result**

**Dell Inc.**
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Bronze 3206R, 1.90 GHz)

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<td>35.8</td>
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<tr>
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<td>115</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>31.2</td>
</tr>
</tbody>
</table>

**Software**

- OS: Red Hat Enterprise Linux 8.2
- 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 2.8.1 released Jun-2020
- File System: XFS
- System State: Run level 3 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: 32/64-bit
- Other: jemalloc memory allocator V5.0.1
- Power Management: BIOS set to prefer performance at the cost of additional power usage

**Hardware**

- CPU Name: Intel Xeon Bronze 3206R
- Max MHz: 1900
- Nominal: 1900
- Enabled: 16 cores, 2 chips
- Orderable: 1.2 chips
- 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: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2133)
- Storage: 1 x 480 GB SATA SSD
- Other: None

**Test Sponsor:** Dell Inc

**Hardware Availability:** Jul-2020

**Software Availability:** Apr-2020

**Test Date:** Sep-2020

**CPU2017 License:** 55

**Tested by:** Dell Inc.

**Software**

- OS: Red Hat Enterprise Linux 8.2
- Compiler: C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux;
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**Max MHz:** 1900

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**Enabled:** 16 cores, 2 chips

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**Cache L1:** 32 KB I + 32 KB D on chip per core

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**Other:** None

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**Storage:** 1 x 480 GB SATA SSD

**Other:** None

**Test Sponsor:** Dell Inc

**Hardware Availability:** Jul-2020

**Software Availability:** Apr-2020

**Test Date:** Sep-2020

**CPU2017 License:** 55

**Tested by:** Dell Inc. **Software**

- OS: Red Hat Enterprise Linux 8.2
  kernel 4.18.0-193.el8.x86_64
- 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 2.8.1 released Jun-2020
- File System: XFS
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**Test Sponsor:** Dell Inc

**Hardware Availability:** Jul-2020

**Software Availability:** Apr-2020

**Test Date:** Sep-2020

**CPU2017 License:** 55

**Tested by:** Dell Inc.
SPEC CPU®2017 Integer Rate Result

Dell Inc.
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Bronze 3206R, 1.90 GHz)

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.
PowerEdge R540 (Intel Xeon Bronze 3206R, 1.90 GHz)

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

SPECrate®2017_int_base = 59.5
SPECrate®2017_int_peak = 61.0

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</tbody>
</table>

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

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
The correct version of Fortran 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 = 
"/home/cpu2017-ic19.1u1/lib/intel64:/home/cpu2017-ic19.1u1/lib/ia32:/home/cpu2017-ic19.1u1/je5.0.1-32" 
MALLOC_CONF = "retain:true"
Dell Inc.  
(Test Sponsor: Dell Inc) 

PowerEdge R540 (Intel Xeon Bronze 3206R, 1.90 GHz) 

<table>
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**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0

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:

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

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 /home/cpu2017-ic19.1u1/bin/sysinfo

Rev: r6365 of 2019-08-21 295195f888a3d7e67e6e46a485a0011

running on RHEL-8-2-SUT Fri Sep 11 04:38:52 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

From /proc/cpuinfo

```
 model name : Intel(R) Xeon(R) Bronze 3206R CPU @ 1.90GHz
```

(Continued on next page)
Dell Inc.
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Bronze 3206R, 1.90 GHz)

<table>
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<td>Test Date: Sep-2020</td>
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<tr>
<td>Hardware Availability: Jul-2020</td>
</tr>
<tr>
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</tr>
</tbody>
</table>

### Platform Notes (Continued)

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 3206R CPU @ 1.90GHz
- Stepping:               7
- CPU MHz:                1863.602
- CPU max MHz:            1900.0000
- CPU min MHz:            1000.0000
- BogoMIPS:               3800.00
- 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 cmovpat 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 cpuid aperfmpref 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 abcd lm 3nowprefetch cpuid_fault epb cat _l3 cdp _l3 invpcid_single intel_patin ssbd mba ibrs ibpb ibrs _enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bni lhe 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 arat pln pts pk u ospke avx512_vnni md _clear flush_lld arch_capabilities

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

Dell Inc.  
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Bronze 3206R, 1.90 GHz)

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</table>

**SPECrate®2017_int_base** = 59.5
**SPECrate®2017_int_peak** = 61.0

Platform Notes (Continued)

```
/proccpusinfo 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: 192075 MB
  node 0 free: 191274 MB
  node 1 cpus: 1 3 5 7 9 11 13 15
  node 1 size: 193505 MB
  node 1 free: 192867 MB
  node distances:
    node 0 1
    0:  10  21
    1:  21  10

From /proc/meminfo
  MemTotal:       394835732 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.2 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.2"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
    ANSI_COLOR="0;31"
  redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
  system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:
  Linux RHEL-8-2-SUT 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020 x86_64
  x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

itlb_multihit: KVM: Vulnerable
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
```

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

Dell Inc.  
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Bronze 3206R, 1.90 GHz)

SPECRate®2017_int_base = 59.5
SPECRate®2017_int_peak = 61.0

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

Platform Notes (Continued)

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 sanitization
CVE-2017-5715 (Spectre variant 2):  Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
tsx_async_abort:  Mitigation: Clear CPU buffers; SMT disabled

run-level 3 Sep 11 04:37 last=5

SPEC is set to: /home/cpu2017-ic19.1u1
Filesystem            Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 392G 7.1G 385G 2% /home

From /sys/devices/virtual/dmi/id
BIOS: Dell Inc. 2.8.1 06/30/2020
Vendor: Dell Inc.
Product: PowerEdge R540
Product Family: PowerEdge

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:
  1x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
  6x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
  5x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
  4x Not Specified Not Specified

(End of data from sysinfo program)
Memory running at 2133

Compiler Version Notes

==============================================================================
C       | 502.gcc_r(peak)
==============================================================================
Intel(R) C Compiler for applications running on IA-32, Version 2021.1 NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base)
(Continued on next page)
SPEC CPU®2017 Integer Rate Result

Dell Inc.
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Bronze 3206R, 1.90 GHz)

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

SPECrater®2017_int_base = 59.5
SPECrater®2017_int_peak = 61.0

Test Date: Sep-2020
Hardware Availability: Jul-2020
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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------
C  | 500.perlbench_r(peak) 557.xz_r(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.

------------------------------------------------------------------------
C  | 502.gcc_r(peak)
------------------------------------------------------------------------
Intel(R) C Compiler for applications running on IA-32, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------
C  | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
      | 525.x264_r(base, peak) 557.xz_r(base)
------------------------------------------------------------------------
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.

------------------------------------------------------------------------
C  | 500.perlbench_r(peak) 557.xz_r(peak)
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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C  | 502.gcc_r(peak)
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(Continued on next page)
Dell Inc.  
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PowerEdge R540 (Intel Xeon Bronze 3206R, 1.90 GHz)  

| CPU2017 License: | 55 | Test Date: | Sep-2020 |  
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| Tested by: | Dell Inc. | Software Availability: | Apr-2020 |  

### SPEC CPU®2017 Integer Rate Result

**SPECrate®2017_int_base = 59.5**

**SPECrate®2017_int_peak = 61.0**

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**Compiler Version Notes (Continued)**

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<td>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.</td>
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<td>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.</td>
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**Base Compiler Invocation**

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<td>C++</td>
<td>icpc</td>
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<tr>
<td>Fortran</td>
<td>ifort</td>
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### Dell Inc.
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Bronze 3206R, 1.90 GHz)

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</table>

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

---

### Base Portability Flags

- 500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
- 502.gcc_r: -DSPEC_LP64
- 505.mcf_r: -DSPEC_LP64
- 520.omnetpp_r: -DSPEC_LP64
- 523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
- 525.x264_r: -DSPEC_LP64
- 531.deepsjeng_r: -DSPEC_LP64
- 541.leelaw_r: -DSPEC_LP64
- 548.exchange2_r: -DSPEC_LP64
- 557.xz_r: -DSPEC_LP64

---

### Base Optimization Flags

**C benchmarks:**
- -m64 -qnextgen -std=c11
- -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
- -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
- -fuse-ld=gold -qopt-mem-layout-trans=4
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
- -lqkmalloc

**C++ benchmarks:**
- -m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
- -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
- -funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
- -lqkmalloc

**Fortran benchmarks:**
- -m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
- -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
- -nostandard-realloc-lhs -align array32byte -auto
- -mbranches-within-32B-boundaries
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
- -lqkmalloc

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### Peak Compiler Invocation

**C benchmarks:**
- icc

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(Continued on next page)
## Peak Compiler Invocation (Continued)

C++ benchmarks:
- icpc

Fortran benchmarks:
- ifort

## Peak Portability Flags

- 500.perlbanch_r: -DSPEC_LP64 -DSPEC_LINUX_X64
- 502.gcc_r: -D_FILE_OFFSET_BITS=64
- 505.mcf_r: -DSPEC_LP64
- 520.omnetpp_r: -DSPEC_LP64
- 523.xalanchbmk_r: -DSPEC_LP64 -DSPEC_LINUX
- 525.x264_r: -DSPEC_LP64
- 531.deepsjeng_r: -DSPEC_LP64
- 541.leela_r: -DSPEC_LP64
- 548.exchange2_r: -DSPEC_LP64
- 557.xz_r: -DSPEC_LP64

## Peak Optimization Flags

C benchmarks:

- 500.perlbanch_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4 -fno-strict-overflow -mbranches-within-32B-boundaries 
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin 
  -ljemalloc

- 502.gcc_r: -m32 
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/ia32_lin 
  -std=gnu89 
  -Wl,-plugin-opt=-x86-branches-within-32B-boundaries 
  -Wl,-z,muldefs -fprofile-generate(pass 1) 
  -fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto -Ofast(pass 1) 
  -O3 -ffast-math -qnextgen -fuse-ld=gold 
  -qopt-mem-layout-trans=4 
  -L/usr/local/jemalloc32-5.0.1/lib 
  -ljemalloc

- 505.mcf_r: basepeak = yes
SPEC CPU®2017 Integer Rate Result

Dell Inc.
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Bronze 3206R, 1.90 GHz)

SPECrate®2017_int_base = 59.5
SPECrate®2017_int_peak = 61.0

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

Test Date: Sep-2020
Hardware Availability: Jul-2020
Software Availability: Apr-2020

Peak Optimization Flags (Continued)

525.x264_r: -m64 -qnextgen -std=c11
-W1,-plugin-opt=-x86-branches-within-32B-boundaries
-W1,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math
-fuse-ld=gold -qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: -W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
520.omnetpp_r: basepeak = yes
523.xalancbmk_r: basepeak = yes
531.deepsjeng_r: basepeak = yes
541.leela_r: basepeak = yes

Fortran benchmarks:
548.exchange2_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

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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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