### SPEC CPU®2017 Integer Rate Result

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

**PowerEdge R740xd (Intel Xeon Gold 6240R, 2.40 GHz)**

| Copies | 0  | 30.0 | 60.0 | 90.0 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 | 390 | 420 | 450 | 480 | 510 | 540 | 570 | 600 | 630 | 660 | 690 | 720 | 750 |
|--------|----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 500.perlbench_r | 96 |      |      |      | 251 | 241 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 502.gcc_r | 96 |      |      |      |      | 286 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 505.mcf_r | 96 |      |      |      | 512 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 520.omnetpp_r | 96 |      |      |      | 197 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 523.xalancbmk_r | 96 |      |      |      |      |      |      | 399 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 525.x264_r | 96 |      |      |      |      |      |      |      | 630 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 531.deepsjeng_r | 96 |      |      |      |      |      |      |      |      | 250 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 541.leela_r | 96 |      |      |      |      |      |      |      |      |      | 238 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 548.exchange2_r | 96 |      |      |      |      |      |      |      |      |      |      | 601 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 557.xz_r | 96 |      |      |      |      |      |      |      |      |      |      |      | 190 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc  
**Test Date:** July-2020  
**Hardware Availability:** Feb-2020

**Software Availability:** Apr-2020

**SPECrate®2017_int_base = 311**  
**SPECrate®2017_int_peak = 326**

### Hardware
- **CPU Name:** Intel Xeon Gold 6240R  
- **Max MHz:** 4000  
- **Nominal:** 2400  
- **Enabled:** 48 cores, 2 chips, 2 threads/core  
- **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:** 35.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)  
- **Storage:** 1 x 1.92 TB SATA SSD  
- **Other:** None

### Software
- **OS:** Red Hat Enterprise Linux 8.1  
  - kernel 4.18.0-147.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
- **Compiler:**  
- **Firmware:** Version 2.8.1 released Jun-2020  
- **File System:** tmpfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 32/64-bit  
- **Other:** None  
  - jemalloc memory allocator V5.0.1  
  - Power Management: BIOS set to prefer performance at the cost of additional power usage
Dell Inc. (Test Sponsor: Dell Inc)

PowerEdge R740xd (Intel Xeon Gold 6240R, 2.40 GHz)

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

SPECrater®2017_int_base = 311
SPECrater®2017_int_peak = 326

Results Table

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SPECrater®2017_int_base = 311
SPECrater®2017_int_peak = 326

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 = "/mnt/ramdisk/cpu2017-ic19.1u1/lib/intel64:/mnt/ramdisk/cpu2017-ic19.1u1
/lib/ia32:/mnt/ramdisk/cpu2017-ic19.1u1/je5.0.1-32"
MALLOCONF = "retain:true"
**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>

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


**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
  - 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 /mnt/ramdisk/cpu2017-ic19.1u1/bin/sysinfo
  - Rev: r6365 of 2019-08-21 295195f888a3d7edeb1e6e46a485a0011 running on user-pc.spa.lab Wed Jul 29 05:03:03 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 Integer Rate Result

Dell Inc.
(Test Sponsor: Dell Inc)

PowerEdge R740xd (Intel Xeon Gold 6240R, 2.40 GHz)

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<td>Tested by:</td>
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<td>326</td>
</tr>
</tbody>
</table>

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

Platform Notes (Continued)

From /proc/cpuinfo

- model name: Intel(R) Xeon(R) Gold 6240R CPU @ 2.40GHz
- 2 "physical id"s (chips)
- 96 "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: 24
  - siblings: 48
  - physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
  - physical 1: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:

- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 96
- On-line CPU(s) list: 0-95
- Thread(s) per core: 2
- Core(s) per socket: 24
- Socket(s): 2
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6240R CPU @ 2.40GHz
- Stepping: 7
- CPU MHz: 1762.388
- CPU max MHz: 4000.0000
- CPU min MHz: 1000.0000
- BogoMIPS: 4800.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 36608K
- NUMA node0 CPU(s):
  - 0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92
- NUMA node1 CPU(s):
  - 1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93
- NUMA node2 CPU(s):
  - 2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94
- NUMA node3 CPU(s):
- 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

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

Dell Inc.
(Test Sponsor: Dell Inc)

PowerEdge R740xd (Intel Xeon Gold 6240R, 2.40 GHz)

SPECrate®2017_int_base = 311
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CPU2017 License: 55
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Software Availability: Apr-2020

Platform Notes (Continued)

aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 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 vmi
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmqm mxat a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves xsavec xgetbv1 xsave cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pkul ospke avx512_vnni md_clear flush_l1d
arch_capabilities

/cache data

cache size : 36608 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 64 68 72 76 80 84 88 92
node 0 size: 192046 MB
node 0 free: 191537 MB
node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77 81 85 89 93
node 1 size: 193531 MB
node 1 free: 192433 MB
node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62 66 70 74 78 82 86 90 94
node 2 size: 193531 MB
node 2 free: 193317 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63 67 71 75 79 83 87 91 95
node 3 size: 193530 MB
node 3 free: 184212 MB
node distances:
node 0 1 2 3
 0: 10 21 11 21
 1: 21 10 21 11
 2: 11 21 10 21
 3: 21 11 21 10

From /proc/meminfo
MemTotal: 791182276 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"

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

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(Test Sponsor: Dell Inc)

PowerEdge R740xd (Intel Xeon Gold 6240R, 2.40 GHz)

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Test Date: Jul-2020
Hardware Availability: Feb-2020
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Platform Notes (Continued)

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

uname -a:
Linux user-pc.spa.lab 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019 x86_64
ox86_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 Jul 29 05:00 last=5

SPEC is set to: /mnt/ramdisk/cpu2017-ic19.1u1
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 225G 4.4G 221G 2% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
BIOS: Dell Inc. 2.8.1 06/26/2020
Vendor: Dell Inc.
Product: PowerEdge R740xd
Product Family: PowerEdge
Serial: F5BMCS2

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:
19x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
1x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
4x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933

(End of data from sysinfo program)
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler.

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

Dell Inc.  
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PowerEdge R740xd (Intel Xeon Gold 6240R, 2.40 GHz)

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

Platform Notes (Continued)

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

Compiler Version Notes

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==============================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak)  
| 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)                 
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NextGen Build 20200304
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------------------------------------------------------------------------------

==============================================================================
Fortran | 548.exchange2_r(base, peak)                                           
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
(Continued on next page)
Dell Inc.  
(Test Sponsor: Dell Inc)

PowerEdge R740xd (Intel Xeon Gold 6240R, 2.40 GHz)

Dell Inc.

CPU2017 License: 55  
Test Date: Jul-2020  
Tested by: Dell Inc.

Test Sponsor: Dell Inc  
Hardware Availability: Feb-2020  
Software Availability: Apr-2020

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Compiler Version Notes (Continued)

64, Version 19.1.1.217 Build 20200306
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Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

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.leela_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

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

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

**PowerEdge R740xd (Intel Xeon Gold 6240R, 2.40 GHz)**

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

**Test Date:** Jul-2020  
**Hardware Availability:** Feb-2020  
**Software Availability:** Apr-2020

### Base Optimization Flags (Continued)

C++ benchmarks (continued):
- `-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`

### Peak Compiler Invocation

**C benchmarks:**  
`icc`

**C++ benchmarks:**  
`icpc`

**Fortran benchmarks:**  
`ifort`

### Peak Portability Flags

```
500.perlbench_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.xalancbmk_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
```
## SPEC CPU®2017 Integer Rate Result

**Dell Inc.**  
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### PowerEdge R740xd (Intel Xeon Gold 6240R, 2.40 GHz)

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### Peak Optimization Flags

#### C benchmarks:

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<tr>
<td>500.perlbench_r</td>
<td><code>-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)</code></td>
</tr>
<tr>
<td></td>
<td><code>-xCORE-AVX512 -ipo -o3 -no-prec-div</code></td>
</tr>
<tr>
<td></td>
<td><code>-qopt-mem-layout-trans=4 -fno-strict-overflow</code></td>
</tr>
<tr>
<td></td>
<td><code>-mbranches-within-32B-boundaries</code></td>
</tr>
<tr>
<td></td>
<td><code>-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin</code></td>
</tr>
<tr>
<td></td>
<td><code>-lqkmalloc</code></td>
</tr>
<tr>
<td>502.gcc_r</td>
<td><code>-m32</code></td>
</tr>
<tr>
<td></td>
<td><code>-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/ia32_lin</code></td>
</tr>
<tr>
<td></td>
<td><code>-std=gnu89</code></td>
</tr>
<tr>
<td></td>
<td><code>-Wl,-plugin-opt=-x86-branches-within-32B-boundaries</code></td>
</tr>
<tr>
<td></td>
<td><code>-Wl,-z,muldefs -fprofile-generate(pass 1)</code></td>
</tr>
<tr>
<td></td>
<td><code>-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto</code></td>
</tr>
<tr>
<td></td>
<td><code>-Ofast(pass 1) -O3 -ffast-math -qnextgen -fuse-ld=gold</code></td>
</tr>
<tr>
<td></td>
<td><code>-qopt-mem-layout-trans=4 -L/usr/local/jemalloc32-5.0.1/lib</code></td>
</tr>
<tr>
<td></td>
<td><code>-ljemalloc</code></td>
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<tr>
<td>505.mcf_r</td>
<td><code>basepeak = yes</code></td>
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<td>525.x264_r</td>
<td><code>-m64</code></td>
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<td><code>-qnextgen -std=c11</code></td>
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<td><code>-Wl,-plugin-opt=-x86-branches-within-32B-boundaries</code></td>
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<td><code>-Wl,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math</code></td>
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<tr>
<td></td>
<td><code>-fuse-ld=gold -qopt-mem-layout-trans=4 -fno-alias</code></td>
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<td><code>-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin</code></td>
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<td><code>-lqkmalloc</code></td>
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<td>557.xz_r</td>
<td><code>-Wl,-z,muldefs -xCORE-AVX512 -ipo -o3 -no-prec-div</code></td>
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<td><code>-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries</code></td>
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<td><code>basepeak = yes</code></td>
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CPU2017 License: 55
Test Sponsor: Dell Inc
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Peak Optimization Flags (Continued)

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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