## SPEC CPU®2017 Integer Rate Result

### Dell Inc.

**PowerEdge T550 (Intel Xeon Platinum 8352M, 2.30 GHz)**

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>408</td>
<td>423</td>
</tr>
</tbody>
</table>

---

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Nov-2021  
**Hardware Availability:** Oct-2021  
**Software Availability:** May-2021

### Hardware

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate®2017_int_base (408)</th>
<th>SPECrate®2017_int_peak (423)</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_r</td>
<td>128</td>
<td>331</td>
<td>423</td>
</tr>
<tr>
<td>gcc_r</td>
<td>128</td>
<td>321</td>
<td>380</td>
</tr>
<tr>
<td>mcf_r</td>
<td>128</td>
<td>653</td>
<td>500</td>
</tr>
<tr>
<td>omnetpp_r</td>
<td>128</td>
<td>243</td>
<td>480</td>
</tr>
<tr>
<td>xalancbmk_r</td>
<td>128</td>
<td>500</td>
<td>243</td>
</tr>
<tr>
<td>x264_r</td>
<td>128</td>
<td>853</td>
<td>891</td>
</tr>
<tr>
<td>deepsjeng_r</td>
<td>128</td>
<td>317</td>
<td>321</td>
</tr>
<tr>
<td>leela_r</td>
<td>128</td>
<td>653</td>
<td>880</td>
</tr>
<tr>
<td>exchange2_r</td>
<td>128</td>
<td>231</td>
<td>380</td>
</tr>
</tbody>
</table>

---

**CPU Name:** Intel Xeon Platinum 8352M  
**Max MHz:** 3500  
**Nominal:** 2300  
**Enabled:** 64 cores, 2 chips, 2 threads/core  
**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:** 48 MB I+D on chip per chip  
**Other:** None  
**Memory:** 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R)  
**Storage:** 125 GB on tmpfs  
**Other:** None

---

**Software**

<table>
<thead>
<tr>
<th>OS:</th>
<th>Red Hat Enterprise Linux 8.4 (Ootpa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version:</td>
<td>4.18.0-305.el8.x86_64</td>
</tr>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux; Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux; C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux</td>
</tr>
<tr>
<td>Parallel:</td>
<td>No</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 1.3.7 released Jul-2021</td>
</tr>
<tr>
<td>File System:</td>
<td>tmpfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
</tbody>
</table>

**Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.
# Dell Inc.

PowerEdge T550 (Intel Xeon Platinum 8352M, 2.30 GHz)

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## Results Table

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<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>128</td>
<td>710</td>
<td>287</td>
<td>711</td>
<td>287</td>
<td>710</td>
<td>287</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>128</td>
<td>565</td>
<td>321</td>
<td>564</td>
<td>321</td>
<td>565</td>
<td>321</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>128</td>
<td>316</td>
<td>655</td>
<td>317</td>
<td>653</td>
<td>316</td>
<td>655</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>128</td>
<td>690</td>
<td>243</td>
<td>687</td>
<td>245</td>
<td>690</td>
<td>243</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>128</td>
<td>270</td>
<td>501</td>
<td>270</td>
<td>500</td>
<td>270</td>
<td>500</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>128</td>
<td>263</td>
<td>853</td>
<td>262</td>
<td>856</td>
<td>263</td>
<td>853</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>128</td>
<td>458</td>
<td>321</td>
<td>463</td>
<td>317</td>
<td>458</td>
<td>321</td>
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<tr>
<td>541.leetcode_r</td>
<td>128</td>
<td>658</td>
<td>322</td>
<td>659</td>
<td>321</td>
<td>658</td>
<td>322</td>
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<td>548.exchange2_r</td>
<td>128</td>
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<td>882</td>
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<td>128</td>
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<td>231</td>
<td>597</td>
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</tr>
</tbody>
</table>

**SPECrate®2017_int_base = 408**

**SPECrate®2017_int_peak = 423**

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

## 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/cpu2017-1.1.8-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/lib/ia32:/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/je5.0.1-32"
MALLOC_CONF = "retain:true"
```

## General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1

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
```

(Continued on next page)
General Notes (Continued)

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

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.

Benchmark run from a 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"

Platform Notes

BIOS settings:
  Sub NUMA Cluster : 2-Way Clustering
  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
  PCI ASPM L1 Link
    Power Management : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-ic2021.1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on localhost.localdomain Fri Nov 12 13:59:59 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) Platinum 8352M CPU @ 2.30GHz
  2 "physical id"s (chips)
  128 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following

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

Dell Inc.
PowerEdge T550 (Intel Xeon Platinum 8352M, 2.30 GHz)

SPECrate®2017_int_base = 408
SPECrate®2017_int_peak = 423

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

Test Date: Nov-2021
Hardware Availability: Oct-2021
Software Availability: May-2021

Platform Notes (Continued)

  excerpts from /proc/cpuinfo might not be reliable. Use with caution.
  
  cpu cores : 32
  siblings : 64
  physical 0: cores 0 1 2 3 4 5 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
               28 29 30 31
  physical 1: cores 0 1 2 3 4 5 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
               28 29 30 31

  From lscpu from util-linux 2.32.1:
  Architecture:        x86_64
  CPU op-mode(s):      32-bit, 64-bit
  Byte Order:          Little Endian
  CPU(s):              128
  On-line CPU(s) list: 0-127
  Thread(s) per core:  2
  Core(s) per socket:  32
  NUMA node(s):        4
  Vendor ID:           GenuineIntel
  BIOS Vendor ID:      Intel
  CPU family:          6
  Model:               106
  Model name:          Intel(R) Xeon(R) Platinum 8352M CPU @ 2.30GHz
  BIOS Model name:     Intel(R) Xeon(R) Platinum 8352M CPU @ 2.30GHz
  Stepping:            6
  CPU MHz:             2490.424
  BogoMIPS:            4600.00
  Virtualization:      VT-x
  L1d cache:           48K
  L1i cache:           32K
  L2 cache:            1280K
  L3 cache:            49152K
  NUMA node0 CPU(s):
  0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,96,100,104,108,
  112,116,120,124
  NUMA node1 CPU(s):
  2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94,98,102,106,110
  ,114,118,122,126
  NUMA node2 CPU(s):
  1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93,97,101,105,109
  ,113,117,121,125
  NUMA node3 CPU(s):
  ,115,119,123,127
  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 rdtsscp
                       lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid

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

```plaintext
APERFMPERF pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrpr pdcm pcd dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 invpcid_single
intelpin ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2
smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
clfussoft clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaveopt xsave
xsave cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect wbnoinvd
dtherm ida arat pln pts avx512vbm umip pku ospke avx512_vbmi2 gfn vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpdpbld tdc avx512_vpopcntdq la57 rdpid fsrmd
md_clear pconfig flush_l1d arch_capabilities
```

```plaintext
From /proc/cpuinfo cache data
  cache size : 49152 KB
```

**WARNING:** a numactl 'node' might or might not correspond to a physical chip.

available: 4 nodes (0-3)

```plaintext
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 96
100 104 108 112 116 120 124
node 0 size: 128118 MB
node 0 free: 127665 MB

node 1 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 98
102 106 110 114 118 122 126
node 1 size: 129017 MB
node 1 free: 128647 MB
```

From /proc/meminfo

```plaintext
MemTotal:       527531036kB
HugePages_Total:       0
Hugepagesize:       2048kB
```

/sbin/tuned-adm active

Current active profile: throughput-performance

---

(Continued on next page)
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Platform Notes (Continued)

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.4 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.4"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"
    ANSI_COLOR="0;31"
  redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
  system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:8.4:ga

uname -a:
  Linux localhost.localdomain 4.18.0-305.el8.x86_64 #1 SMP Thu Apr 29 08:54:30 EDT 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): 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/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Nov 12 13:57

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2021.1
  Filesystem     Type   Size  Used Avail Use% Mounted on
  tmpfs          tmpfs  125G  4.1G  121G   4% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
  Vendor: Dell Inc.
  Product: PowerEdge T550
  Product Family: PowerEdge
  Serial: 3LM1509

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

Additional information from dmidecode 3.2 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:**

- 16x 002C00B3002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200

**BIOS:**

- BIOS Vendor: Dell Inc.
- BIOS Version: 1.3.7
- BIOS Date: 07/30/2021
- BIOS Revision: 1.3

(End of data from sysinfo program)

## Compiler Version Notes

```
| C | 500.perlbench_r(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.

---

```
| C | 502.gcc_r(peak) |
```

---

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113
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, 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 | 500.perlbench_r(peak) |
```

(Continued on next page)
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113
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https://www.spec.org/
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Compiler Version Notes (Continued)  
==============================================================================
C++ | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak)  
    | 531.deepsjeng_r(base, peak) 541.leela_r(base, 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.  
==============================================================================
Fortran | 548.exchange2_r(base, peak)  
==============================================================================
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.  
==============================================================================

Base Compiler Invocation  
C benchmarks:  
icx  
C++ benchmarks:  
icpx  
Fortran benchmarks:  
ifort

Base Portability Flags  
500.perlbmch_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
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Base Optimization Flags

C benchmarks:
- -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
- -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- -mbranches-within-32B-boundaries
- -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
  -lqkmalloc

C++ benchmarks:
- -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
- -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- -mbranches-within-32B-boundaries
- -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
  -lqkmalloc

Fortran benchmarks:
- -w -m64 -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/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
  -lqkmalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icx

500.perlbench_r: icc

C++ benchmarks:
icpx

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

(Continued on next page)
Peak Portability Flags (Continued)

525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leet_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

500.perlbench_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/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

(Continued on next page)
Dell Inc.
PowerEdge T550 (Intel Xeon Platinum 8352M, 2.30 GHz)

SPECrate®2017_int_base = 408
SPECrate®2017_int_peak = 423

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

Test Date: Nov-2021
Hardware Availability: Oct-2021
Software Availability: May-2021

Peak Optimization Flags (Continued)

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-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.4.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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