Dell Inc.

PowerEdge R750 (Intel Xeon Gold 5320, 2.20 GHz)

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

Dell Inc.

SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECspeed®2017_int_base = 11.5
SPECspeed®2017_int_peek = 11.8

Dell Inc.
PowerEdge R750 (Intel Xeon Gold 5320, 2.20 GHz)

CPU2017 License: 55
Test Date: Jun-2021
Test Sponsor: Dell Inc.
Hardware Availability: May-2021
Tested by: Dell Inc.
Software Availability: Feb-2021

Threads

| 600.perlbench_s | 52 | 8.06 |
| 602.gcc_s | 52 | 10.5 |
| 605.mcf_s | 52 | 10.9 |
| 620.omnetpp_s | 52 | 11.3 |
| 623.xalancbmk_s | 52 | 13.1 |
| 625.x264_s | 52 | 16.6 |
| 631.deepsjeng_s | 52 | 17.3 |
| 641.leela_s | 52 | 4.71 |
| 648.exchange2_s | 52 | 18.8 |
| 657.xz_s | 52 | 23.0 |

SPECSpeed®2017_int_base (11.5) SPECSpeed®2017_int_peak (11.8)

Hardware

CPU Name: Intel Xeon Gold 5320
Max MHz: 3400
Nominal: 2200
Enabled: 52 cores, 2 chips
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: 39 MB I+D on chip per chip
Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)
Storage: 225 GB on tmpfs
Other: None

Software

OS: Red Hat Enterprise Linux 8.3 (Ootpa) 4.18.0-240.15.1.el8_3.x86_64
Compiler: 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
Parallel: Yes
Firmware: Version 1.2.1 released May-2021
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 and OS set to prefer performance at the cost of additional power usage.
Dell Inc.  
PowerEdge R750 (Intel Xeon Gold 5320, 2.20 GHz)  

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Seconds</th>
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<th>Ratio</th>
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<tbody>
<tr>
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<td>52</td>
<td>254</td>
<td>7.00</td>
<td>253</td>
<td>7.03</td>
<td>252</td>
<td>7.05</td>
<td>52</td>
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<tr>
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<td>52</td>
<td>380</td>
<td>10.5</td>
<td>376</td>
<td>10.6</td>
<td>378</td>
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<td>10.9</td>
<td>365</td>
<td>10.9</td>
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<td></td>
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<tr>
<td>605.mcf_s</td>
<td>52</td>
<td>248</td>
<td>19.1</td>
<td>244</td>
<td>19.4</td>
<td>247</td>
<td>19.1</td>
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<td>248</td>
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<td>19.4</td>
<td>247</td>
<td>19.1</td>
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<tr>
<td>620.omnetpp_s</td>
<td>52</td>
<td>142</td>
<td>11.4</td>
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<td>145</td>
<td>11.2</td>
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<td>11.4</td>
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<td>11.3</td>
<td>145</td>
<td>11.2</td>
<td></td>
<td></td>
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<tr>
<td>625.x264_s</td>
<td>52</td>
<td>106</td>
<td>16.6</td>
<td>106</td>
<td>16.6</td>
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<td>16.6</td>
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<td>17.3</td>
<td>102</td>
<td>17.3</td>
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<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>52</td>
<td>249</td>
<td>5.75</td>
<td>249</td>
<td>5.76</td>
<td>250</td>
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<td>5.76</td>
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<tr>
<td>641.leela_s</td>
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<td>362</td>
<td>4.71</td>
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<td>4.71</td>
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<td>4.72</td>
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<td>4.71</td>
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<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>52</td>
<td>157</td>
<td>18.8</td>
<td>156</td>
<td>18.8</td>
<td>157</td>
<td>18.8</td>
<td>52</td>
<td>157</td>
<td>18.8</td>
<td>156</td>
<td>18.8</td>
<td>157</td>
<td>18.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>52</td>
<td>271</td>
<td>22.9</td>
<td>269</td>
<td>23.0</td>
<td>269</td>
<td>23.0</td>
<td>52</td>
<td>271</td>
<td>22.9</td>
<td>269</td>
<td>23.0</td>
<td>269</td>
<td>23.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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,scatter"
LD_LIBRARY_PATH = "/mnt/ramdisk2/cpu2017-1.1.5-ic2021.1/lib/intel64:/mnt/ramdisk2/cpu2017-1.1.5-ic2021.1/je5.0.1-64"
MALLOCONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes

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

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

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| SPECspeed®2017_int_base = 11.5 |
| SPECspeed®2017_int_peak = 11.8 |

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

Test Date: Jun-2021
Hardware Availability: May-2021
Software Availability: Feb-2021

General Notes (Continued)

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 225 GB ramdisk created with the cmd: "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk"

Platform Notes

BIOS Settings:
Logical Processor : Disabled
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

Sysinfo program /mnt/ramdisk2/cpu2017-1.1.5-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Tue Jun 1 12:07:53 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 5320 CPU @ 2.20GHz
  2 "physical id"s (chips)
  52 "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 : 26
  siblings : 26
  physical 0: cores 0 1 2 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
  physical 1: cores 0 1 2 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian

(Continued on next page)
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Platform Notes (Continued)

CPU(s): 52
On-line CPU(s) list: 0-51
Thread(s) per core: 1
Core(s) per socket: 26
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5320 CPU @ 2.20GHz
Stepping: 6
CPU MHz: 3103.685
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 39936K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51
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 invpcid_single intel_puin ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cmq rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_hni avx512bw avx512vl xsaveopt xsave xsaveopt xgetbv1 xsaves cmq_llc cmq_occopus_llc cmq_mbb_total cmq_mbb_local split_lock_detect wnbinvd dtherm ida arat pln pts avx512vbmi umip pkpu ospke avx512_vbmi2 gfnl vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512 vpoptcndq 1a57 rdpid md_clear pconfig flush_l1d
arch_capabilities

/proc/cpuinfo cache data
cache size : 39936 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 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
node 0 size: 246127 MB
node 0 free: 241391 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
node 1 size: 248207 MB

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

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<th>SPECspeed®2017_int_base = 11.5</th>
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</tbody>
</table>

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

### Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Free memory: 256815 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distances:</td>
</tr>
<tr>
<td>node 0 1</td>
</tr>
<tr>
<td>0: 10 20</td>
</tr>
<tr>
<td>1: 20 10</td>
</tr>
</tbody>
</table>

From `/proc/meminfo` |
MemTotal: 527811240 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

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

From `/etc/*release* /etc/*version*` |
NAME="Red Hat Enterprise Linux"  
VERSION="8.3 (Ootpa)"  
ID="rhel"  
ID_LIKE="fedora"  
VERSION_ID="8.3"  
PLATFORM_ID="platform:el8"  
PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"  
ANSI_COLOR="0;31"  
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)  
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)  
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:  
Linux localhost.localdomain 4.18.0-240.15.1.el8_3.x86_64 #1 SMP Wed Feb 3 03:12:15 EST 2021 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

<table>
<thead>
<tr>
<th>CVE-2018-12207 (ITLB Multihit):</th>
<th>Not affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVE-2018-3620 (L1 Terminal Fault):</td>
<td>Not affected</td>
</tr>
<tr>
<td>Microarchitectural Data Sampling:</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2017-5754 (Meltdown):</td>
<td>Mitigation: Speculative Store Bypass disabled via prctl and seccomp</td>
</tr>
<tr>
<td>CVE-2018-3639 (Speculative Store Bypass):</td>
<td>Mitigation: usercopy/swapsgs barriers and __user pointer sanitization</td>
</tr>
<tr>
<td>CVE-2017-5753 (Spectre variant 1):</td>
<td>Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling</td>
</tr>
<tr>
<td>CVE-2017-5715 (Spectre variant 2):</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2020-0543 (Special Register Buffer Data Sampling):</td>
<td>Not affected</td>
</tr>
</tbody>
</table>

(Continued on next page)
Dell Inc.

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SPECspeed®2017_int_base = 11.5
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Platform Notes (Continued)

CVE-2019-11135 (TSX Asynchronous Abort): Not affected

SPEC is set to: /mnt/ramdisk2/cpu2017-1.1.5-ic2021.1
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 225G 6.9G 219G 4% /mnt/ramdisk2

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R750
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:
12x 002C069D002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200, configured at 2933
4x 00AD063200AD HMAA4GR7AJR8N-XN 32 GB 2 rank 3200, configured at 2933
16x Not Specified Not Specified

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 1.2.1
BIOS Date: 05/06/2021
BIOS Revision: 1.2

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C | 600.perlbench_s(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 | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
   625.x264_s(base, peak) 657.xz_s(base, peak)
==============================================================================
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
(Continued on next page)
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### Compiler Version Notes (Continued)

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---

```markdown
| C  | 600.perlbench_s(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.

---

```markdown
| C          | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak) |
---|-------------------------------------------------------------|
```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113

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---

```markdown
| C++ | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak) |
---|----------------------------------------------------------------------------------------------------------------|
```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113

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---

```markdown
| Fortran | 648.exchange2_s(base, peak) |
---|-------------------------------|
```

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000

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---

## Base Compiler Invocation

C benchmarks:
- icx

C++ benchmarks:
- icpx

(Continued on next page)
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Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX512
-O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-DSPEC_OPENMP -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:
-m64 -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries

Peak Compiler Invocation

C benchmarks (except as noted below):
icx

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

600.perlbench_s: icc
C++ benchmarks:
icpx
Fortran benchmarks:
ifort

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -ipo -O3 -no-prec-div
-qqopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

602.gcc_s: -m64 -std=c11 -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/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -DSPEC_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs
-xCORE-AVX512 -flto -O3 -ffast-math
-qqopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes
C++ benchmarks:

(Continued on next page)
## Dell Inc.

**PowerEdge R750 (Intel Xeon Gold 5320, 2.20 GHz)**

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<tr>
<th>SPECspeed®2017_int_base = 11.5</th>
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<tbody>
<tr>
<td>SPECspeed®2017_int_peak = 11.8</td>
</tr>
</tbody>
</table>

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### Peak Optimization Flags (Continued)

- 620.omnetpp_s: basepeak = yes
- 623.xalancbmk_s: basepeak = yes
- 631.deepsjeng_s: basepeak = yes
- 641.leela_s: basepeak = yes

**Fortran benchmarks:**

- 648.exchange2_s: 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:


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