# SPEC CPU®2017 Integer Speed Result

## Dell Inc.

**PowerEdge R750xs** (Intel Xeon Gold 5320, 2.20 GHz)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base = 11.4</th>
<th>SPECspeed®2017_int_peak = 11.7</th>
</tr>
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<tbody>
<tr>
<td>Dell Inc.</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td><strong>CPU2017 License:</strong> 55</td>
<td><strong>Test Date:</strong> Sep-2021</td>
</tr>
<tr>
<td><strong>Test Sponsor:</strong> Dell Inc.</td>
<td><strong>Hardware Availability:</strong> Jul-2021</td>
</tr>
<tr>
<td><strong>Tested by:</strong> Dell Inc.</td>
<td><strong>Software Availability:</strong> Jun-2021</td>
</tr>
</tbody>
</table>

---

### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 5320</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz:</td>
<td>3400</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2200</td>
</tr>
<tr>
<td>Enabled:</td>
<td>52 cores, 2 chips</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>39 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>512 GB (12 x 32 GB 2Rx8 PC4-3200AA-R; 4 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)</td>
</tr>
<tr>
<td>Storage:</td>
<td>225 GB on tmpfs</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>Red Hat Enterprise Linux 8.4 (Ootpa) 4.18-0-305.7.1.el8_4.x86_64</th>
</tr>
</thead>
<tbody>
<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>Yes</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 1.2.1 released May-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>64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>jemalloc memory allocator V5.0.1 Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.</td>
</tr>
</tbody>
</table>

---

**Threads**

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base (11.4)</th>
<th>SPECspeed®2017_int_peak (11.7)</th>
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<tbody>
<tr>
<td>600.perlbench_s 52</td>
<td>6.96</td>
</tr>
<tr>
<td>602.gcc_s 52</td>
<td>10.4</td>
</tr>
<tr>
<td>605.mcf_s 52</td>
<td>11.0</td>
</tr>
<tr>
<td>620.omnetpp_s 52</td>
<td>11.1</td>
</tr>
<tr>
<td>623.xalancbmk_s 52</td>
<td>13.1</td>
</tr>
<tr>
<td>625.x264_s 52</td>
<td>16.5</td>
</tr>
<tr>
<td>631.deepsjeng_s 52</td>
<td>5.71</td>
</tr>
<tr>
<td>641.leela_s 52</td>
<td>4.71</td>
</tr>
<tr>
<td>648.exchange2_s 52</td>
<td>18.7</td>
</tr>
<tr>
<td>657.xz_s 52</td>
<td>22.9</td>
</tr>
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## SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

PowerEdge R750xs (Intel Xeon Gold 5320, 2.20 GHz)

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<td>Sept-2021</td>
<td>Dell Inc.</td>
<td>Jul-2021</td>
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**SPECspeed®2017_int_base = 11.4**

| SPECspeed®2017_int_peak = 11.7 |

### Results Table

<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>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlibench_s</td>
<td>52</td>
<td>255</td>
<td>6.96</td>
<td>254</td>
<td>6.99</td>
<td>254</td>
<td>6.99</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>52</td>
<td>382</td>
<td>10.4</td>
<td>383</td>
<td>10.4</td>
<td>383</td>
<td>10.4</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>52</td>
<td>243</td>
<td>19.4</td>
<td>243</td>
<td>19.4</td>
<td>243</td>
<td>19.4</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>52</td>
<td>147</td>
<td>11.1</td>
<td>145</td>
<td>11.2</td>
<td>145</td>
<td>11.2</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>52</td>
<td>107</td>
<td>16.5</td>
<td>107</td>
<td>16.5</td>
<td>107</td>
<td>16.5</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>52</td>
<td>251</td>
<td>5.71</td>
<td>250</td>
<td>5.73</td>
<td>250</td>
<td>5.73</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>52</td>
<td>362</td>
<td>4.71</td>
<td>362</td>
<td>4.71</td>
<td>362</td>
<td>4.71</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>52</td>
<td>157</td>
<td>18.8</td>
<td>157</td>
<td>18.7</td>
<td>157</td>
<td>18.7</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>52</td>
<td>270</td>
<td>22.9</td>
<td>270</td>
<td>22.9</td>
<td>270</td>
<td>22.9</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_int_base = 11.4**

**SPECspeed®2017_int_peak = 11.7**

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/ramdisk/cpu2017-1.1.8-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/je5.0.1-64"
- MALLOC_CONF = "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
```


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)
Dell Inc. PowerEdge R750xs (Intel Xeon Gold 5320, 2.20 GHz)

**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
- 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 982a61ec0915b55891ef0e16aca85915
running on R750xs.9xbzd3.inside.dell.com Wed Sep 8 10:11:54 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 from util-linux 2.32.1:
  - Architecture: x86_64
Dell Inc.

PowerEdge R750xs (Intel Xeon Gold 5320, 2.20 GHz)  

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Tested by: Dell Inc.  
Test Date: Sep-2021  
Hardware Availability: Jul-2021  
Software Availability: Jun-2021

Platform Notes (Continued)

CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
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
BIOS Vendor ID: Intel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5320 CPU @ 2.20GHz
BIOS Model name: Intel(R) Xeon(R) Gold 5320 CPU @ 2.20GHz
Stepping: 6
CPU MHz: 800.143
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_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmi flexpriority ept vpid ept_ad fsgsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdtd_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsavesopt xsaveopt xsave xstate avx cqm cqm_llc cqm_occbuf cqm_on协调发展 cqm_mbb_total cqm_mbb_local split_lock_detect wbench dtherm ida arat pin pts avx512vbm avx512pm mpmi avx512bitalg tme avx512_vpopcntdq la57 rdpid fsrm md_clear pconfig flush_l1d arch_capabilities

/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

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

node 0 size: 257143 MB  
node 0 free: 256400 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: 258039 MB  
node 1 free: 248232 MB  
node distances:  
  node 0 1  
  0: 10 20  
  1: 20 10  

From /proc/meminfo  
  MemTotal: 527547344 kB  
  HugePages_Total: 0  
  Hugepagesize: 2048 kB  

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

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 R750xs.9xbztd3.inside.dell.com 4.18.0-305.7.1.el8_4.x86_64 #1 SMP Mon Jun 14 17:25:42 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):**  
  Mitigation: Speculative Store Bypass disabled via prctl and seccomp  
**CVE-2018-3639 (Speculative Store Bypass):**  
  Mitigation: usercopy/swaps barriers and __user pointer  
**CVE-2017-5753 (Spectre variant 1):**

(Continued on next page)
Dell Inc.

PowerEdge R750xs (Intel Xeon Gold 5320, 2.20 GHz)

SPEC CPU®2017 Integer Speed Result

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Dell Inc.

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</tbody>
</table>

**Platform Notes (Continued)**

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 Sep 8 09:27

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2021.1

Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 225G 4.4G 221G 2% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R750xs
Product Family: PowerEdge
Serial: 9XBZTD3

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:
12x 002C069D002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200, configured at 2933
4x 00AD063200AD HMA84GR7DJR4N-XN 32 GB 2 rank 3200, configured at 2933

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 1.2.1
BIOS Date: 05/28/2021
BIOS Revision: 1.2

(End of data from sysinfo program)

**Compiler Version Notes**

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>600.perlbench_s(peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)</td>
<td></td>
</tr>
<tr>
<td>64, Version 2021.1 Build 20201112_000000</td>
<td></td>
</tr>
<tr>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>C</td>
<td>600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)</td>
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SPECspeed®2017_int_base = 11.4
SPECspeed®2017_int_peak = 11.7

Compiler Version Notes (Continued)

| 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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
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

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

**C++ benchmarks:**
- icpx

**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 -fopenmp -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
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Peak Compiler Invocation

C benchmarks (except as noted below):

icx

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
-qopt-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
-qopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

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

Dell Inc.

PowerEdge R750xs (Intel Xeon Gold 5320, 2.20 GHz)

<table>
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<tr>
<th>SPECspeed®2017_int_base = 11.4</th>
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<td>Hardware Availability: Jul-2021</td>
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<td>Tested by: Dell Inc.</td>
<td>Software Availability: Jun-2021</td>
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Peak Optimization Flags (Continued)

C++ benchmarks:

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:
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.

Tested with SPEC CPU®2017 v1.1.8 on 2021-09-08 11:11:53-0400.
Originally published on 2021-11-09.