**SPEC® CPU2017 Integer Rate Result**

**Dell Inc.**

**PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
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<tr>
<td>SPECrate2017_int_peak</td>
<td>187</td>
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</table>

**CPU2017 License:** 55  
**Test Date:** Mar-2019  
**Test Sponsor:** Dell Inc.  
**Hardware Availability:** Apr-2019  
**Tested by:** Dell Inc.  
**Software Availability:** Feb-2019

<table>
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<tr>
<th>Software Test</th>
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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>137</td>
</tr>
<tr>
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<td>149</td>
</tr>
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**Hardware**

<table>
<thead>
<tr>
<th>CPU Name</th>
<th>Intel Xeon Gold 6246</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz.:</td>
<td>4200</td>
</tr>
<tr>
<td>Nominal</td>
<td>3300</td>
</tr>
<tr>
<td>Enabled:</td>
<td>24 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>24.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 480 GB SATA SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

| OS | Ubuntu 18.04.2 LTS |
| Compiler | C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux; Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux |
| Parallel | No |
| Firmware | Version 2.1.6 released Mar-2019 |
| File System | ext4 |
| System State | Run level 5 (multi-user) |
| Base Pointers | 64-bit |
| Peak Pointers | 32/64-bit |
| Other | jemalloc memory allocator V5.0.1 |
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Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)

SPECr2017_int_base = 181
SPECr2017_int_peak = 187

Results Table

<table>
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<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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SPECr2017_int_base = 181
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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"

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i9−7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

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.
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.:

(Continued on next page)
Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)

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</table>

General Notes (Continued)

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:
ADDDC setting disabled
Sub NUMA Cluster enabled
Virtualization Technology disabled
DCU Streamer Prefetcher enabled
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 disabled
Logical Processor enabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on intel-sut Tue Apr 23 19:27:10 2019

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 6246 CPU @ 3.30GHz
        2 "physical id"s (chips)
        48 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpt from /proc/cpuinfo might not be reliable. Use with caution.)
    cpu cores : 12
    siblings : 24
    physical 0: cores 0 2 4 8 9 10 17 18 19 20 25 27
    physical 1: cores 0 2 4 8 9 10 11 17 18 19 25 27

From lscpu:
    Architecture: x86_64
    CPU op-mode(s): 32-bit, 64-bit
    Byte Order: Little Endian
    CPU(s): 48

(Continued on next page)
Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)

**SPECrate2017_int_base = 181**

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**Platform Notes (Continued)**

- **On-line CPU(s) list:** 0-47
- **Thread(s) per core:** 2
- **Core(s) per socket:** 12
- **Socket(s):** 2
- **NUMA node(s):** 4
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Gold 6246 CPU @ 3.30GHz
- **Stepping:** 7
- **CPU MHz:** 1200.641
- **BogoMIPS:** 6600.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 25344K
- **NUMA node0 CPU(s):** 0,4,8,10,12,20,24,28,32,34,36,44
- **NUMA node1 CPU(s):** 1,5,9,13,17,21,25,29,33,37,41,45
- **NUMA node2 CPU(s):** 2,6,14,16,18,22,26,30,38,40,42,46
- **NUMA node3 CPU(s):** 3,7,11,15,19,23,27,31,35,39,43,47
- **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 aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ertsm invpcid rtm cqm mpx rd vt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_p t avx512cd avx512bw avx512vl xsaveopt xsaveprec xturbv1 xsaves cqm_llc cqm_occup_llc cqm_mmb_total cqm_mmb_local dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

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 10 12 20 24 28 32 34 36 44
  - node 0 size: 46785 MB
  - node 0 free: 46486 MB
  - node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45
  - node 1 size: 48381 MB
  - node 1 free: 48213 MB
  - node 2 cpus: 2 6 14 16 18 22 26 30 38 40 42 46
  - node 2 size: 48381 MB

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**SPEC CPU2017 Integer Rate Result**

Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)

![SPEC Logo]

**SPECrate2017_int_base = 181**

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---

**Platform Notes (Continued)**

- node 2 free: 48152 MB
- node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47
- node 3 size: 48359 MB
- node 3 free: 48163 MB
- node distances:
  - node 0: 10 21 11 21
  - node 1: 21 10 21 11
  - node 2: 11 21 10 21
  - node 3: 21 11 21 10

From /proc/meminfo
- MemTotal: 196513984 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

```
From /bin/lsb_release -d
Ubuntu 18.04.2 LTS
```

From /etc/*release* /etc/*version*
- debian_version: buster/sid
- os-release:
  - NAME="Ubuntu"
  - VERSION="18.04.2 LTS (Bionic Beaver)"
  - ID=ubuntu
  - ID_LIKE=debian
  - PRETTY_NAME="Ubuntu 18.04.2 LTS"
  - VERSION_ID="18.04"
  - HOME_URL="https://www.ubuntu.com/"
  - SUPPORT_URL="https://help.ubuntu.com/"

```
uname -a:
Linux intel-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019 x86_64
x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:
- CVE-2017-5754 (Meltdown): Not affected
- CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB

run-level 5 Apr 23 19:20

SPEC is set to: /home/cpu2017

```
Filesystem Type  Size Used Avail Use% Mounted on
/dev/sda2 ext4 439G 19G 398G 5% /
```

(Continued on next page)
### Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)

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**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test Date:** Mar-2019

**Hardware Availability:** Apr-2019

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**Platform Notes (Continued)**

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.

BIOS Dell Inc. 2.1.6 03/04/2019

Memory:
- 11x 002C069D002C 18ASF2G72PDZ-2G9E1 16 GB 2 rank 2933
- 1x 00AD00B300AD HMA82GR7CJR8N-WM 16 GB 2 rank 2933
- 4x Not Specified Not Specified

(End of data from sysinfo program)

---

**Compiler Version Notes**

```
CC   502.gcc_r(peak)
Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
557.xz_r(base, peak)
```

```
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
CC   500.perlbench_r(peak)
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
CXXC 523.xalancbmk_r(peak)
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

(Continued on next page)
## Compiler Version Notes (Continued)

CXXC 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)

---

**Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018**
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---

**Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018**
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---

## Base Compiler Invocation

**C benchmarks:**
```
icc -m64 -std=c11
```

**C++ benchmarks:**
```
icpc -m64
```

**Fortran benchmarks:**
```
ifort -m64
```

## 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
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548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
```
Dell Inc. PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz) SPECrate2017_int_base = 181
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
cc -m64 -std=c11


C++ benchmarks (except as noted below):
icpc -m64

523.xalancbmk_r: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64

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: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64

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Copyright 2017-2019 Standard Performance Evaluation Corporation

Peak Portability Flags (Continued)

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| 541.leela_r      | \
| 548.exchange2_r  | \
| 557.xz_r         | \

Peak Optimization Flags

C benchmarks:

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Peak Optimization Flags (Continued)

541.leela_r: Same as 520.omnetpp_r

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

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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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.5 on 2019-04-23 15:27:09-0400.
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