Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6240R, 2.40 GHz)

**SPEC CPU®2017 Integer Speed Result**

CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.  
Test Date: Apr-2020  
Hardware Availability: Feb-2020  
Software Availability: Nov-2019

**Threads**

<table>
<thead>
<tr>
<th>Test</th>
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<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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<td>9.02</td>
<td>9.07</td>
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<td>omnetpp_s</td>
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<td>10.7</td>
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<td>xalancbmk_s</td>
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<td>x264_s</td>
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<td>deepsjeng_s</td>
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<td>leela_s</td>
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<tr>
<td>exchange2_s</td>
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<tr>
<td>xz_s</td>
<td>48</td>
<td>23.3</td>
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</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6240R  
- **Max MHz:** 4000  
- **Nominal:** 2400  
- **Enabled:** 24 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:** 384 GB (12 x 32 GB 2Rx8 PC4-2933V-R, running at 2933)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux release 8.1  
  4.18.0-147.el8.x86_64  
- **Compiler:** C/C++: Version 19.0.5.281 of Intel C/C++ Compiler for Linux; Fortran: Version 19.0.5.281 of Intel Fortran Compiler for Linux  
- **Parallel:** Yes  
- **Firmware:** Version 2.7.3 released Mar-2020  
- **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 set to prefer performance at the cost of additional power usage
SPEC CPU®2017 Integer Speed Result

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PowerEdge C6420 (Intel Xeon Gold 6240R, 2.40 GHz)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
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<td>48</td>
<td>264</td>
<td>23.4</td>
<td>265</td>
<td>23.3</td>
</tr>
</tbody>
</table>

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:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/dev/shm/cpu2017/lib/intel64:/dev/shm/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

General Notes

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.
**SPEC CPU®2017 Integer Speed Result**

**Dell Inc.**

PowerEdge C6420 (Intel Xeon Gold 6240R, 2.40 GHz)

| SPECspeed®2017_int_base = 10.1 |
| SPECspeed®2017_int_peak = 10.3 |

| CPU2017 License: 55 | Test Date: Apr-2020 |
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**General Notes (Continued)**

Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
```bash
sync; echo 3 > /proc/sys/vm/drop_caches
```
runcpu command invoked through numactl i.e.:
```bash
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:
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
Memory Patrol Scrub set to standard
Logical Processor enabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled

Sysinfo program /dev/shm/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed6b1e6e46a485a0011
running on localhost.localdomain Mon Apr 20 10:04:43 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

From /proc/cpuinfo
```bash
model name : Intel(R) Xeon(R) Gold 6240R CPU @ 2.40GHz
  2 "physical id"s (chips)
  48 "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 : 24
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:

(Continued on next page)
Dell Inc.

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Platform Notes (Continued)

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 1
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6240R CPU @ 2.40GHz
Stepping: 7
CPU MHz: 2721.301
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): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46
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
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 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 xtrm 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 cdp_l3
invpcid_single intel_ppnin ssbd mba ibpb stibp ibrs Enhanced tpr_shadow vmm flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaveopt xsaves xsavec xgetbv1 xsavec qmmi cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d arch_capabilities

/proc/cpuinfo cache data
cache size : 36608 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

(Continued on next page)
Dell Inc. PowerEdge C6420 (Intel Xeon Gold 6240R, 2.40 GHz)

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SPECspeed®2017_int_base = 10.1
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Test Date: Apr-2020
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Platform Notes (Continued)

node 0 size: 192046 MB
node 0 free: 190830 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
node 1 size: 193530 MB
node 1 free: 177465 MB
node distances:
node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo
MemTotal: 394831408 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"
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 localhost.localdomain 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019
x86_64 x86_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 sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Apr 20 10:00

(Continued on next page)
Dell Inc. PowerEdge C6420 (Intel Xeon Gold 6240R, 2.40 GHz)

SPEC is set to: /dev/shm/cpu2017
Filesystem       Type     Size  Used  Avail Use% Mounted on
tmpfs           tmpfs     189G   7.6G  181G   5%  /dev/shm

From /sys/devices/virtual/dmi/id
BIOS:  Dell Inc. 2.7.3 03/25/2020
Vendor:  Dell Inc.
Product: PowerEdge C6420
Product Family: PowerEdge

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:
6x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
1x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
2x 00AD063200AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
3x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
4x Not Specified Not Specified

(End of data from sysinfo program)
**Dell Inc.**

PowerEdge C6420 (Intel Xeon Gold 6240R, 2.40 GHz)

<table>
<thead>
<tr>
<th>Overview</th>
<th>Value</th>
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<tr>
<td>CPU2017 License:</td>
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<td>Test Sponsor:</td>
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<td>Dell Inc.</td>
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<td>SPECspeed®2017_int_base =</td>
<td>10.1</td>
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<tr>
<td>Software Availability:</td>
<td>Nov-2019</td>
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**Compiler Version Notes (Continued)**

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.5.281 Build 20190815

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Base Compiler Invocation

- C benchmarks: `icc`
- C++ benchmarks: `icpc`
- 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:
  - `m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
  - `qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP`
  - `-L/usr/local/je5.0.1-64/lib -ljemalloc`

- C++ benchmarks:
  - `m64 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
  - `qopt-mem-layout-trans=4`
  - `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin -lqkmalloc`

(Continued on next page)
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**SPECspec®2017_int_base = 10.1**

**SPECspec®2017_int_peak = 10.3**

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### Base Optimization Flags (Continued)

Fortran benchmarks:
- `m64 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4 -nostandard-realloc-lhs`

### Peak Compiler Invocation

**C benchmarks:**
- `icc`

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

**Fortran benchmarks:**
- `ifort`

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

**C benchmarks:**

- `600.perlbench_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -gopenmp -DSPEC_OPENMP -fno-strict-overflow -L/usr/local/je5.0.1-64/lib -ljemalloc`

- `602.gcc_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc`

- `605.mcf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div`

(Continued on next page)
Dell Inc. PowerEdge C6420 (Intel Xeon Gold 6240R, 2.40 GHz)

**SPECspeed®2017_int_base = 10.1**

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---

### Peak Optimization Flags (Continued)

605.mcf_s (continued):
- -qopt-mem-layout-trans=4  
- -DSPEC_SUPPRESS_OPENMP -qopenmp  
- -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

625.x264_s: basepeak = yes

657.xz_s: -m64 -std=c11 -W1,-z,muldefs -prof-gen(pass 1)
- -prof-use(pass 2) -O2 -xCORE-AVX512
- -qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div
- -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
- -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:

620.omnetpp_s: -m64 -W1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
- -ipo -xCORE-AVX512 -O3 -no-prec-div
- -qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
- -lqkmalloc

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

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