SPEC CPU®2017 Integer Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.
PowerEdge R6515 (redacted)

SPEC has determined that this result does not comply with the SPEC OSG Guidelines for General Availability and the SPEC CPU 2017 run and reporting rules. Specifically, at this time, the submitter is not able to make a public statement of intent to ship this particular configuration.

<table>
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<tr>
<th>Copies</th>
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<tr>
<td>500.perlbench_r</td>
</tr>
<tr>
<td>502.gcc_r</td>
</tr>
<tr>
<td>505.mcf_r</td>
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<tr>
<td>520.omnetpp_r</td>
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<tr>
<td>523.xalancbmk_r</td>
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<td>525.x264_r</td>
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<tr>
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<tr>
<td>548.exchange2_r</td>
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<tr>
<td>557.xz_r</td>
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<table>
<thead>
<tr>
<th>Hardware</th>
</tr>
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<tbody>
<tr>
<td>CPU Name: redacted</td>
</tr>
<tr>
<td>Max MHz: 0</td>
</tr>
<tr>
<td>Nominal: 0</td>
</tr>
<tr>
<td>Enabled: 0 cores, 1 chip, 0 threads/core</td>
</tr>
<tr>
<td>Orderable: 1 chip</td>
</tr>
<tr>
<td>Cache L1: redacted</td>
</tr>
<tr>
<td>L2: redacted</td>
</tr>
<tr>
<td>L3: redacted</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
<tr>
<td>Memory: 128 GB (8 x 16 GB 2Rx8 PC4-3200AA-R, running at 3200)</td>
</tr>
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<table>
<thead>
<tr>
<th>Software</th>
</tr>
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<tbody>
<tr>
<td>OS: SUSE Linux Enterprise Server 15 SP1</td>
</tr>
<tr>
<td>Compiler: C/C++/Fortran: Version 2.0.0 of AOCC</td>
</tr>
<tr>
<td>Parallel: No</td>
</tr>
<tr>
<td>Firmware: Version 1.2.12 released Dec-2019</td>
</tr>
<tr>
<td>File System: xfs</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Other: jemalloc: jemalloc memory allocator library v5.2.0</td>
</tr>
<tr>
<td>Power Management: BIOS set to prefer performance at the cost of additional power usage.</td>
</tr>
</tbody>
</table>

(Continued on next page)
SPEClve®2017 Integer Rate Results

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.
PowerEdge R6515 (redacted)

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

SPEClve has determined that this result does not comply with the SPEClve OSG Guidelines for General Availability and the SPEClve CPU 2017 run and reporting rules. Specifically, at this time, the submitter is not able to make a public statement of intent to ship this particular configuration.

Hardware (Continued)
Storage: 1 x 960 GB SATA SSD
Other: None

Results Table

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</table>

Compiler Notes

The AMD64 AOCC Compiler Suite is available at http://developer.amd.com/amd-aocc/

Submit Notes

The config file option 'submit' was used.
'nnumactl' was used to bind copies to the cores.
See the configuration file for details.
SPEC has determined that this result does not comply with the SPEC OSG Guidelines for General Availability and the SPEC CPU 2017 run and reporting rules. Specifically, at this time, the submitter is not able to make a public statement of intent to ship this particular configuration.

### Operating System Notes

- 'ulimit -s unlimited' was used to set environment stack size
- 'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl...
numactl --interleave=all runcpu <etc>

- Set dirty_ratio=8 to limit dirty cache to 8% of memory
- Set swappiness=1 to swap only if necessary
- Set zone_reclaim_mode=1 to free local node memory and avoid remote memory sync then drop_caches=3 to reset caches before invoking runcpu

- dirty_ratio, swappiness, zone_reclaim_mode and drop_caches were all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).

- Transparent huge pages set to 'always' for this run (OS default)

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:

LD_LIBRARY_PATH =
"/root/cpu2017-1.1.0/amd_rate_aocc200_rome_C_lib/64;/root/cpu2017-1.1.0/amd_rate_aocc200_rome_C_lib/32;"

MAJORCONF = "retain:true"

### General Notes

Binaries were compiled on a system with 2x AMD EPYC 7601 CPU + 512GB Memory using Fedora 26

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)
SPEC has determined that this result does not comply with the SPEC OSG Guidelines for General Availability and the SPEC CPU 2017 run and reporting rules. Specifically, at this time, the submitter is not able to make a public statement of intent to ship this particular configuration.

General Notes (Continued)

is mitigated in the system as tested and documented.

jemalloc: configured and built with GCC v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto
jemalloc 5.2.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.2.0/jemalloc-5.2.0.tar.bz2

Platform Notes

BIOS settings:
NUMA Nodes Per Socket set to 4
CCX as NUMA Domain set to Enabled
System Profile set to Custom
CPU Power Management set to Maximum Performance
Memory Frequency set to Maximum Performance
Turbo Boost Enabled
Cstates set to Enabled
Memory Patrol Scrub Disabled
Memory Refresh Rate set to 1x
PCI ASPM L1 Link Power Management Disabled
Determinism Slider set to Power Determinism
Efficiency Optimized Mode Disabled
Memory Interleaving set to Disabled
Memory Freq set to 3200
Fan Speed = Maximum

Sysinfo program /root/cpu2017-1.1.0/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbe6e46a485a0011
running on linux-g3ob Sat Jan 11 15:25:30 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

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

**Dell Inc.**  
**PowerEdge R6515 (redacted)**

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### Platform Notes (Continued)

- From `lscpu`: redacted
- From `/proc/cpuinfo` cache data: redacted
- From `numactl --hardware`: WARNING: a numactl 'node' might or might not correspond to a physical chip.
  - redacted
- From `/proc/meminfo`
  - `MemTotal: 131479104 kB`
  - `HugePages_Total: 0`
  - `Hugepagesize: 2048 kB`
- From `/etc/*release` /`/etc/*version*`
  - `NAME="SLES"`
  - `VERSION="15-SP1"
  - `VERSION_ID="15.1"
  - `PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
  - `ID="sles"
  - `ID_LIKE="suse"
  - `ANSI_COLOR="0;32"
  - `CPE_NAME="cpe:/o:suse:sles:15:sp1"
- `uname -a`:
  - `Linux linux-g3ob 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516) x86_64 x86_64 x86_64 GNU/Linux`

**Kernel self-reported vulnerability status:**

- **CVE-2018-3620 (L1 Terminal Fault):** Not affected

(Continued on next page)
Dell Inc.  
PowerEdge R6515 (redacted)  

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Platform Notes (Continued)

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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

run-level 3 Nov 25 11:37 1 last=5

SPEC is set to: /root/cpu2017-1.1.0
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 440G 36G 405G 9% /

From /sys/devices/virtual/dmi/id
BIOS: Dell Inc. 1.2.12 12/12/2019
Vendor: Dell Inc.
Product: PowerEdge R6515
Product Family: PowerEdge

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:
8x 80AD80B380AD HMA82GR7CJR8N-XN 16 GB 2 rank 3200
8x Not Specified Not Specified

Compiler Version Notes

C | 502.gcc_r(peak)

(Continued on next page)
Dell Inc.  
PowerEdge R6515 (redacted)

SPECRate®2017_int_base =  
SPECRate®2017_int_peak =  

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

Compiler Version Notes (Continued)

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)  
Target: i386-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)  
Target: i386-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

Non-Compliant

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(Continued on next page)
SPECCPU®2017 Integer Rate Results

Dell Inc.
PowerEdge R6515 (redacted)

Copyright 2017-2020 Standard Performance Evaluation Corporation

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Compiler Version Notes (Continued)

Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

==============================================================================
C++     | 523.xalancbmk_r(peak)
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
   AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

==============================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
| 541.deepsjeng_r(base, peak) 541.leela_r(base, peak)
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
   AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

==============================================================================
C++     | 523.xalancbmk_r(peak)
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
   AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

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---

**Compiler Version Notes (Continued)**

```
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
```

---

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

---

Fortran | 548.exchange2_r(base, peak)

---

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

---

**Base Compiler Invocation**

C benchmarks:
```
clang
```

C++ benchmarks:
```
clang++
```

Fortran benchmarks:
```
flang
```
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### Base Optimization Flags (Continued)

C++ benchmarks (continued):

- `-ljemalloc -lflang`

Fortran benchmarks:

- `-flto -Wl,-ml LLVM -Wl,-function-specialize`
- `-Wl,-ml LLVM -Wl,-region-vectorize -Wl,ml LLVM -Wl,-vector-library=LIBMVEC`
- `-Wl,-ml LLVM -Wl,-reduce-array-computations=3 -ffast-math`
- `-Wl,-ml LLVM -Wl,-inline-recursion=3 -Wl,ml LLVM -Wl,-lsr-in-nested-loop`
- `-Wl,-ml LLVM -Wl,-enable-iv-split -O3 -march=znver2 -funroll-loops`
- `-Mrecursive -ml LLVM -vector-library=LIBMVEC -z muldefs`
- `-ml LLVM -disable-indvar-simplify -ml LLVM -unroll-aggressive`
- `-ml LLVM -unroll-threshold=150 -lm vec -lamdlibm -ljemalloc -lflang`

### Peak Compiler Invocation

C benchmarks:
- `clang`
- `clang++`

Fortran benchmarks:
- `flang`

### Peak Portability Flags

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`
505.mcf_r: `-DSPEC_LP64`

(Continued on next page)
Dell Inc.  
PowerEdge R6515 (redacted)  

CPU2017 License: 55  
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Peak Portability Flags (Continued)

520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LINUX -D_FILE_OFFSET_BITS=64
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

Peak Optimization Flags

C benchmarks:


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

502.gcc_r (continued):
-march=znver2 -mno-sse4a -fstruct-layout=5
-mlvm -vectorize-memory-aggressively
-mlvm -function-specialize -mlllvm -enable-gvn-hoist
-mlllvm -unroll-threshold=70 -fremap-arrays
-mlllvm -vector-library=LIBMVEC
-mlllvm -reduce-array-computations=3
-mlllvm -global-vectorize-slp=1 -inline-threshold=1000
-flv-function-specialization -fgnu89-inline -ljemalloc

505.mcf_r: -flto -Wl,-mlllvm -W1,-function-specialize
-W1,-mlllvm -W1,-region-vectorize
-W1,-mlllvm -W1,-vector-library=LIBMVEC
-W1,-mlllvm -W1,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mlllvm -vectorize-memory-aggressively
-mlllvm -function-specialize -mlllvm -enable-gvn-hoist
-mlllvm -unroll-threshold=50 -fremap-arrays
-mlllvm -vector-library=LIBMVEC
-mlllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mlllvm -inline-threshold=1000
-nv-function-specialization -lmvec -lamdlibm -ljemalloc
-llang

525.x264_r: Same as 500.perlbench_r

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r: -flto -W1,-mlllvm -W1,-function-specialize
-W1,-mlllvm -W1,-region-vectorize
-W1,-mlllvm -W1,-vector-library=LIBMVEC
-W1,-mlllvm -W1,-reduce-array-computations=3 -Ofast

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

**Dell Inc.**
PowerEdge R6515 (redacted)

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<th>SPECrate®2017_int_base =</th>
<th>SPECrate®2017_int_peak =</th>
</tr>
</thead>
</table>

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Jan-2020  
**Hardware Availability:** Apr-2020  
**Software Availability:** Aug-2019

**SPECHas determined that this result does not comply with the SPEC OSG Guidelines for General Availability and the SPEC CPU 2017 run and reporting rules. Specifically, at this time, the submitter is not able to make a public statement of intent to ship this particular configuration.**

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### Peak Optimization Flags (Continued)

520.omnetpp_r (continued):
- `march=znver2 -flv-function-specialization`  
- `mlivm -unroll-threshold=100`  
- `mlivm -enable-partial-unswitch`  
- `mlivm -loop-unswitch-threshold=200000`  
- `mlivm -vector-library=LIBMVEC`  
- `mlivm -inline-threshold=1000 -lmvec -lamdlibm -ljemalloc -lflang`

523.xalancbmk_r:  
- `-m32 -flto -Wl,-mllvm -Wl,-function-specialize`  
- `-Wl,-mllvm -Wl,-region-vectorize`  
- `-Wl,-mllvm -Wl,-vector-library=LIBMVEC`  
- `-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast`  
- `-march=znver2 -flv-function-specialization`  
- `mlivm -unroll-threshold=100`  
- `mlivm -enable-partial-unswitch`  
- `mlivm -loop-unswitch-threshold=200000`  
- `mlivm -vector-library=LIBMVEC`  
- `mlivm -inline-threshold=1000 -ljemalloc`

541.leela_r:  
- `basepeak = yes`

**Fortran benchmarks:**
548.exchange2_r:  
- `basepeak = yes`

---

### Peak Other Flags

**C benchmarks:**

(Continued on next page)
SPEC has determined that this result does not comply with the SPEC OSG Guidelines for General Availability and the SPEC CPU 2017 run and reporting rules. Specifically, at this time, the submitter is not able to make a public statement of intent to ship this particular configuration.

Peak Other Flags (Continued)

502.gcc_r: -L/sppo/dev/cpu2017/v110/amd_rate_aocc200_rome_C_lib/32

C++ benchmarks:

523.xalancbmk_r: -L/sppo/dev/cpu2017/v110/amd_rate_aocc200_rome_C_lib/32

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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