# SPEC CPU®2017 Integer Speed Result

## Dell Inc.

PowerEdge R7515 (AMD EPYC 7F72, 3.20 GHz)

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>Dell Inc.</th>
<th>Hardware Availability</th>
<th>Aug-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by</td>
<td>Dell Inc.</td>
<td>Software Availability</td>
<td>Aug-2019</td>
</tr>
</tbody>
</table>

### SPECspeed®2017_int_peak = 9.65

### SPECspeed®2017_int_base = 9.32

#### CPU2017 License: 55

### Test Date: Jan-2020

### Hardware

| Threads | 0.0 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 | 12.0 | 13.0 | 14.0 | 15.0 | 16.0 | 17.0 | 18.0 | 19.0 | 20.0 | 21.0 | 22.0 | SPECspeed®2017_int_peak (9.65) |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------------------|
| 600.perlbench_s | 24  | 5.01|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | SPECspeed®2017_int_base (9.32) |
| 602.gcc_s        | 24  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |                                           |
| 605.mcf_s        | 24  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |                                           |
| 620.omnetpp_s    | 24  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |                                           |
| 623.xalancbmk_s  | 24  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |                                           |
| 625.x264_s       | 24  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |                                           |
| 631.deepsjeng_s  | 24  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |                                           |
| 641.leela_s      | 24  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |                                           |
| 648.exchange2_s  | 24  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |                                           |
| 657.xz_s         | 24  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |                                           |

### Software

<table>
<thead>
<tr>
<th>OS</th>
<th>SUSE Linux Enterprise Server 15 SP1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler</td>
<td>C/C++/Fortran: Version 2.0.0 of AOCC</td>
</tr>
<tr>
<td>Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware</td>
<td>Version 1.3.0 released Jan-2020</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</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>32/64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>jemalloc: jemalloc memory allocator library v5.1.0</td>
</tr>
<tr>
<td>Power Management</td>
<td>BIOS set to prefer performance at the cost of additional power usage.</td>
</tr>
</tbody>
</table>

### CPU Name: AMD EPYC 7F72

Max MHz: 3700

Nominal: 3200

Enabled: 24 cores, 1 chip, 2 threads/core

Orderable: 1 chip

Cache L1: 32 KB I + 32 KB D on chip per core

L2: 512 KB I+D on chip per core

L3: 192 MB I+D on chip per chip, 16 MB shared / 2 cores

Other: None

Memory: 256 GB (8 x 32 GB 2Rx4 PC4-3200AA-R)

Storage: 1 x 960 GB SATA SSD

Other: None
**Dell Inc.**

PowerEdge R7515 (AMD EPYC 7F72, 3.20 GHz)

**SPEC CPU®2017 Integer Speed Result**

Copyright 2017-2020 Standard Performance Evaluation Corporation

**Test Sponsor:** Dell Inc.  
**Hardware Availability:** Apr-2020  
**Software Availability:** Aug-2019

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**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
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<td>24</td>
<td>355</td>
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<td>355</td>
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<td>5.54</td>
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<td>602.gcc_s</td>
<td>24</td>
<td>393</td>
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<td>392</td>
<td>10.1</td>
<td>392</td>
<td>10.2</td>
<td><strong>392</strong></td>
<td><strong>10.2</strong></td>
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<td>605.mcf_s</td>
<td>24</td>
<td>305</td>
<td>15.5</td>
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<td>306</td>
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<td><strong>16.7</strong></td>
<td>282</td>
<td>16.7</td>
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<tr>
<td>620.omnetpp_s</td>
<td>24</td>
<td>327</td>
<td><strong>4.99</strong></td>
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<td>5.05</td>
<td>343</td>
<td>4.75</td>
<td>24</td>
<td>327</td>
<td><strong>4.99</strong></td>
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<td>5.05</td>
<td>343</td>
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<td>623.xalanchmk_s</td>
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<td>138</td>
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<td>10.3</td>
<td>137</td>
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<td>11.0</td>
<td>129</td>
<td>11.0</td>
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<tr>
<td>625.x264_s</td>
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<td>129</td>
<td>13.7</td>
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<td>13.5</td>
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<td><strong>13.6</strong></td>
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<td>631.deepsjeng_s</td>
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<td><strong>5.29</strong></td>
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<td><strong>4.64</strong></td>
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<td>368</td>
<td>4.63</td>
<td><strong>368</strong></td>
<td><strong>4.64</strong></td>
<td>366</td>
<td>4.67</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>24</td>
<td>166</td>
<td>17.7</td>
<td><strong>166</strong></td>
<td><strong>17.7</strong></td>
<td>166</td>
<td>17.7</td>
<td>1</td>
<td>161</td>
<td>18.2</td>
<td><strong>161</strong></td>
<td><strong>18.3</strong></td>
<td>161</td>
<td>18.3</td>
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<tr>
<td>657.xz_s</td>
<td>24</td>
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<td>21.5</td>
<td>287</td>
<td>21.5</td>
<td><strong>288</strong></td>
<td><strong>21.5</strong></td>
<td>24</td>
<td>287</td>
<td>21.5</td>
<td><strong>287</strong></td>
<td><strong>21.5</strong></td>
<td>288</td>
<td>21.5</td>
</tr>
</tbody>
</table>

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**Compiler Notes**

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

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**Submit Notes**

The config file option 'submit' was used.  
'numactl' was used to bind copies to the cores.  
See the configuration file for details.

---

**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 i.e.:  
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:
GOMP_CPU_AFFINITY = "0-47"
LD_LIBRARY_PATH =
    "/root/cpu2017-1.1.0/amd_speed_aocc200_rome_C_lib/64;/root/cpu2017-1.1.0/amd_speed_aocc200_rome_C_lib/32:" 
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "48"

Environment variables set by runcpu during the 600.perlbench_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 602.gcc_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 605.mcf_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 623.xalancbmk_s peak run:
GOMP_CPU_AFFINITY = "0"
OMP_STACKSIZE = "128M"

Environment variables set by runcpu during the 625.x264_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 631.deepsjeng_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 648.exchange2_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 657.xz_s peak run:
GOMP_CPU_AFFINITY = "0-23"

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)

(Continued on next page)
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SPECspeed®2017_int_base = 9.32
SPECspeed®2017_int_peak = 9.65

Dell Inc.

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

Test Date: Jan-2020
Hardware Availability: Apr-2020
Software Availability: Aug-2019

General Notes (Continued)

is mitigated in the system as tested and documented.

cpuidle: configured and built with GCC v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2

Platform Notes

BIOS settings:
NUMA Nodes Per Socket set to 2
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 295195f888a3d7edbble6e646a485a0011
running on linux-g3ob Thu Jan 30 04:35:05 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
model name : AMD EPYC 7F72 24-Core Processor
1 "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 : 48
physical 0: cores 0 1 4 5 8 9 12 13 16 17 20 21 24 25 28 29 32 33 36 37 40 41 44 45

From lscpu:
Architecture: x86_64

(Continued on next page)
### Dell Inc. PowerEdge R7515 (AMD EPYC 7F72, 3.20 GHz)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>9.32</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>9.65</td>
</tr>
</tbody>
</table>

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

**CPU op-mode(s):** 32-bit, 64-bit  
**Byte Order:** Little Endian  
**Address sizes:** 43 bits physical, 48 bits virtual  
**CPU(s):** 48  
**On-line CPU(s) list:** 0-47  
**Thread(s) per core:** 2  
**Core(s) per socket:** 24  
**Socket(s):** 1  
**NUMA node(s):** 12  
**Vendor ID:** AuthenticAMD  
**CPU family:** 23  
**Model:** 49  
**Model name:** AMD EPYC 7F72 24-Core Processor  
**Stepping:** 0  
**CPU MHz:** 3194.196  
**BogoMIPS:** 6388.39  
**Virtualization:** AMD-V  
**L1d cache:** 32K  
**L1i cache:** 32K  
**L2 cache:** 512K  
**L3 cache:** 16384K  
**NUMA node0 CPU(s):** 0,1,24,25  
**NUMA node1 CPU(s):** 2,3,26,27  
**NUMA node2 CPU(s):** 4,5,28,29  
**NUMA node3 CPU(s):** 6,7,30,31  
**NUMA node4 CPU(s):** 8,9,32,33  
**NUMA node5 CPU(s):** 10,11,34,35  
**NUMA node6 CPU(s):** 12,13,36,37  
**NUMA node7 CPU(s):** 14,15,38,39  
**NUMA node8 CPU(s):** 16,17,40,41  
**NUMA node9 CPU(s):** 18,19,42,43  
**NUMA node10 CPU(s):** 20,21,44,45  
**NUMA node11 CPU(s):** 22,23,46,47  

**Flags:**  
```
    fpu vme de pse tsc msr pae mce cmov cx8 apic sep mtrr pge mca cmov pat
    pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb
    rdtscp lm constant_tsc rep_good nopl xtopology nonstop_tsc cpuid extd_apicid
    aperfmpref pni pclmulqdq monitor ssse3 fma cx16 sse4_1 l1ic movbe
    popcnt aes avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy
    abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext
    perfctr_core perfctr_nb bptext perfctr_l2 mwaitx cpb cat_l3 cdp_l3
    hw_pstate sme ssbd sev ibrs ibpb stibp vmmcall fsqsbos bml1 avx2
    smep bmi2 cqm rdt_a rdseed adx xsave cur xsaveopt xsaves cqm_llc
    cqm_occup_llc cqm_mbb_total cqm_mbb_local clzero irperf xsaveerptr
    arat npt lbrv svm_lock nrip_save tsc_scale vmbcb_clean
    flushbyasid decodeassists pausefilter pfthreshold avic
    v_vmsave_vmload vgf umip rdpid overflow_recov succor smca
```

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SPEC CPU®2017 Integer Speed Result

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SPECspeed®2017_int_base = 9.32
SPECspeed®2017_int_peak = 9.65

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

Platform Notes (Continued)

cache size : 512 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 12 nodes (0-11)
node 0 cpus: 0 1 24 25
node 0 size: 20924 MB
node 0 free: 20855 MB
node 1 cpus: 2 3 26 27
node 1 size: 21502 MB
node 1 free: 21457 MB
node 2 cpus: 4 5 28 29
node 2 size: 21503 MB
node 2 free: 21459 MB
node 3 cpus: 6 7 30 31
node 3 size: 21502 MB
node 3 free: 21449 MB
node 4 cpus: 8 9 32 33
node 4 size: 21502 MB
node 4 free: 21426 MB
node 5 cpus: 10 11 34 35
node 5 size: 21504 MB
node 5 free: 21459 MB
node 6 cpus: 12 13 36 37
node 6 size: 21502 MB
node 6 free: 21402 MB
node 7 cpus: 14 15 38 39
node 7 size: 21502 MB
node 7 free: 21433 MB
node 8 cpus: 16 17 40 41
node 8 size: 21474 MB
node 8 free: 21402 MB
node 9 cpus: 18 19 42 43
node 9 size: 21502 MB
node 9 free: 21304 MB
node 10 cpus: 20 21 44 45
node 10 size: 21502 MB
node 10 free: 21413 MB
node 11 cpus: 22 23 46 47
node 11 size: 21490 MB
node 11 free: 21413 MB
node distances:

node distances:
node 0 1 2 3 4 5 6 7 8 9 10 11
0: 10 11 11 11 11 11 12 12 12 12 12 12
1: 11 11 11 11 11 11 12 12 12 12 12 12
2: 11 11 11 11 11 11 12 12 12 12 12 12
3: 11 11 11 11 11 11 12 12 12 12 12 12

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

```
4: 11 11 11 11 11 10 11 12 12 12 12 12 12 12 12 12 12 12
5: 11 11 11 11 11 11 10 12 12 12 12 12 12 12 12 12 12 12 12
```

From /proc/meminfo

```
MemTotal:       263591340 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
- 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 retropoline, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

run-level 3 Jan 29 08:25 last=5

SPEC is set to: /root/cpu2017-1.1.0

```
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda2      xfs   440G  37G  404G   9% /
```

(Continued on next page)
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SPECspeed®2017_int_base = 9.32
SPECspeed®2017_int_peak = 9.65

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

Test Date: Jan-2020
Hardware Availability: Apr-2020
Software Availability: Aug-2019

Platform Notes (Continued)

From /sys/devices/virtual/dmi/id
BIOS: Dell Inc. 1.3.0 01/14/2020
Vendor: Dell Inc.
Product: PowerEdge R7515
Product Family: PowerEdge
Serial: SMGPH13

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:
8x 80AD80B380AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
8x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins</td>
<td></td>
</tr>
<tr>
<td>AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)</td>
<td></td>
</tr>
<tr>
<td>Target: x86_64-unknown-linux-gnu</td>
<td></td>
</tr>
<tr>
<td>Thread model: posix</td>
<td></td>
</tr>
<tr>
<td>InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>C++</td>
<td>623.xalancbmk_s(peak)</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins</td>
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<tr>
<td>AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)</td>
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<tr>
<td>Target: i386-unknown-linux-gnu</td>
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<tr>
<td>Thread model: posix</td>
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<tr>
<td>InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin</td>
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</tr>
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<td>C++</td>
<td>620.omnetpp_s(base, peak) 623.xalancbmk_s(base) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)</td>
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**Dell Inc.**

PowerEdge R7515 (AMD EPYC 7F72, 3.20 GHz)

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

### Compiler Version Notes (Continued)

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

---

#### C++

| 623.xalancbmk_s(peak) |

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
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#### C++

| 620.omnetpp_s(base, peak) 623.xalancbmk_s(base) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak) |

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
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**Target:** x86_64-unknown-linux-gnu  
**Thread model:** posix  
**InstalledDir:** /sppo/dev/compilers/aocc-compiler-2.0.0/bin

---

#### Fortran

| 648.exchange2_s(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
SPEC CPU®2017 Integer Speed Result

Dell Inc.

PowerEdge R7515 (AMD EPYC 7F72, 3.20 GHz)

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CPU2017 License: 55
Test Sponsor: Dell Inc.
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Test Date: Jan-2020
Hardware Availability: Apr-2020
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Base Portability Flags

600.perlbench_s: -DSPEC_LINUX_X64 -DSPEC_LP64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LINUX -DSPEC_LP64
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:
- flto -Wl,-mllvm -Wl,-function-specialize
- Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
- Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
- march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50
- fremap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist
- mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
- mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
- flv-function-specialization -z muldefs -DSPEC_OPENMP -fopenmp
- fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc
- lflang

C++ benchmarks:
- flto -Wl,-mllvm -Wl,-function-specialize
- Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
- Wl,-mllvm -Wl,-reduce-array-computations=3
- Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
- mllvm -loop-unswitch-threshold=200000 -mllvm -vector-library=LIBMVEC
- mllvm -unroll-threshold=100 -flv-function-specialization
- mllvm -enable-partial-unswitch -z muldefs -DSPEC_OPENMP -fopenmp
- fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc
- lflang

Fortran benchmarks:
- flto -Wl,-mllvm -Wl,-function-specialize
- Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
- Wl,-mllvm -Wl,-reduce-array-computations=3 -ffast-math
- Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
- Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver2 -funroll-loops
- Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
- mllvm -disable-indvar-simplify -mllvm -unroll-aggressive

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## Dell Inc.

**PowerEdge R7515 (AMD EPYC 7F72, 3.20 GHz)**

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**SPEC CPU®2017 Integer Speed Result**

- **CPU2017 License:** 55
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- **Tested by:** Dell Inc.
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### Base Optimization Flags (Continued)

Fortran benchmarks (continued):

```bash
-llvm -unroll-threshold=150 -DSPEC_OPENMP -fopenmp -fopenmp=libomp
-lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc -lflang
```

### Base Other Flags

- **C benchmarks:**
  - -Wno-return-type
- **C++ benchmarks:**
  - -Wno-return-type
- **Fortran benchmarks:**
  - -Wno-return-type

### Peak Compiler Invocation

- **C benchmarks:**
  - clang
- **C++ benchmarks:**
  - clang++
- **Fortran benchmarks:**
  - flang

### Peak Portability Flags

- `600.perlbench_s: -DSPEC_LINUX_X64 -DSPEC_LP64`
- `602.gcc_s: -DSPEC_LP64`
- `605.mcf_s: -DSPEC_LP64`
- `620.omnetpp_s: -DSPEC_LP64`
- `623.xalancbmk_s: -DSPEC_LINUX -D_FILE_OFFSET_BITS=64`
- `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`
**SPEC CPU®2017 Integer Speed Result**

**Dell Inc.**

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- **Software Availability:** Aug-2019

## Peak Optimization Flags

C benchmarks:

600.perlb_m: -flto -Wl,-mllvm -Wl,-function-specialize
- Wl,-mllvm -Wl,-region-vectorize
- Wl,-mllvm -Wl,-vector-library=LIBMVEC
- Wl,-mllvm -Wl,-reduce-array-computations=3
- fprofile-instr-generate(pass1)
- fprofile-instr-use(pass2) -Ofast -march=znver2
- mno-sse4a -fstruct-layout=5
- mllvm -vectorize-memory-aggressively
- mllvm -function-specialize -mllvm -enable-gvn-hoist
- mllvm -unroll-threshold=50 -fremap-arrays
- mllvm -vector-library=LIBMVEC
- mllvm -reduce-array-computations=3
- mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
- flv-function-specialization -DSPEC_OPENMP -fopenmp
- lmvec -lamdlibm -fopenmp=libomp -lomp -lpthread -ldl
- ljemalloc -lflang

602.gcc_s: -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 -mno-sse4a -fstruct-layout=5
- mllvm -vectorize-memory-aggressively
- mllvm -function-specialize -mllvm -enable-gvn-hoist
- mllvm -unroll-threshold=50 -fremap-arrays
- mllvm -vector-library=LIBMVEC
- mllvm -reduce-array-computations=3
- mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
- flv-function-specialization -z muldefs -DSPEC_OPENMP
- fopenmp -fgnu89-inline -fopenmp=libomp -lomp -lpthread -ldl
- ljemalloc

605.mcf_s: -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 -mno-sse4a -fstruct-layout=5
- mllvm -vectorize-memory-aggressively
- mllvm -function-specialize -mllvm -enable-gvn-hoist
- mllvm -unroll-threshold=50 -fremap-arrays
- mllvm -vector-library=LIBMVEC
- mllvm -reduce-array-computations=3
- mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
- flv-function-specialization -DSPEC_OPENMP -fopenmp

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Peak Optimization Flags (Continued)

605.mcf_s (continued):
- lmvec -lamdlibm -fopenmp=libomp -lomp -lpthread -ldl
- ljemalloc -lflag

625.x264_s: Same as 600.perlbench_s

657.xz_s: -flto -Wl,-mlllvm -Wl,-function-specialize
- Wl,-mlllvm -Wl,-region-vectorize
- Wl,-mlllvm -Wl,-vector-library=LIBMVEC
- Wl,-mlllvm -Wl,-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
- mlllvm -global-vectorize-slp -mlllvm -inline-threshold=1000
- flv-function-specialization -DSPEC_OPENMP -fopenmp
- fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
- ljemalloc -lflag

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalan_bmk_s: -m32 -flto -Wl,-mlllvm -Wl,-function-specialize
- Wl,-mlllvm -Wl,-region-vectorize
- Wl,-mlllvm -Wl,-vector-library=LIBMVEC
- Wl,-mlllvm -Wl,-reduce-array-computations=3 -Ofast
- march=znver2 -flv-function-specialization
- mlllvm -unroll-threshold=100
- mlllvm -enable-partial-unswitch
- mlllvm -loop-unswitch-threshold=200000
- mlllvm -vector-library=LIBMVEC
- mlllvm -inline-threshold=1000 -DSPEC_OPENMP -fopenmp
- fopenmp=libomp -lomp -lpthread -ldl -ljemalloc

631.deepsjeng_s: -flto -Wl,-mlllvm -Wl,-function-specialize
- Wl,-mlllvm -Wl,-region-vectorize
- Wl,-mlllvm -Wl,-vector-library=LIBMVEC
- Wl,-mlllvm -Wl,-reduce-array-computations=3 -Ofast
- march=znver2 -flv-function-specialization
- mlllvm -unroll-threshold=100
- mlllvm -enable-partial-unswitch
- mlllvm -loop-unswitch-threshold=200000
- mlllvm -vector-library=LIBMVEC

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**Peak Optimization Flags (Continued)**

631.deepsjeng_s (continued):
- mllvm -inline-threshold=1000 -DSPEC_OPENMP -fopenmp
- fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
- ljemalloc -lflang

641.leela_s: basepeak = yes

Fortran benchmarks:
- ftio -Wl,-mllvm -Wl,-function-specialize
- Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
- Wl,-mllvm -Wl,-reduce-array-computations=3 -ffast-math
- Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lslr-in-nested-loop
- Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver2 -funroll-loops
- Mrecursive -mllvm -vector-library=LIBMVEC
- mllvm -disable-indvar-simplify -mllvm -unroll-aggressive
- mllvm -unroll-threshold=150 -DSPEC_OPENMP -fopenmp -fopenmp=libomp
- lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc -lflang

---

**Peak Other Flags**

C benchmarks:
- Wno-return-type

C++ benchmarks (except as noted below):
- Wno-return-type

623.xalancbkmx_s: -Wno-return-type
- L/sppo/dev/cpu2017/v110/amd_speed_aocc200_rome_C_lib/32

Fortran benchmarks:
- Wno-return-type

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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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**Dell Inc.**

**PowerEdge R7515 (AMD EPYC 7F72, 3.20 GHz)**

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