# Dell Inc.

PowerEdge R7515 (AMD EPYC 7642, 2.30 GHz)

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Jan-2020</th>
</tr>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Aug-2019</td>
</tr>
</tbody>
</table>

## SPEC CPU®2017 Integer Speed Result

**SPECspeed®2017_int_base** = 8.44  
**SPECspeed®2017_int_peak** = 8.70

### Hardware

- **CPU Name:** AMD EPYC 7642  
- **Max MHz:** 3300  
- **Nominal:** 2300  
- **Enabled:** 48 cores, 1 chip, 2 threads/core  
- **Orderable:** 1 chip  
- **Cache L1:** 32 KB I+ 32 KB D on chip per core  
- **Cache L2:** 512 KB I+D on chip per core  
- **Cache L3:** 256 MB I+D on chip per chip, 16 MB shared / 3 cores  
- **Other:** None  
- **Memory:** 256 GB (8 x 32 GB 2Rx4 PC4-3200AA-R)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 15 SP1  
- **Compiler:** C/C++/Fortran: Version 2.0.0 of AOCC  
- **Parallel:** Yes  
- **Firmware:** Version 1.3.0 released Jan-2020  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 32/64-bit  
- **Other:** jemalloc: jemalloc memory allocator library v5.1.0  
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage.

### Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>48</td>
<td>4.47</td>
<td>8.70</td>
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<tr>
<td>gcc_s</td>
<td>48</td>
<td>9.26</td>
<td>14.2</td>
</tr>
<tr>
<td>mcf_s</td>
<td>48</td>
<td>4.71</td>
<td>15.1</td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>48</td>
<td>4.74</td>
<td>9.08</td>
</tr>
<tr>
<td>xalancbmk_s</td>
<td>48</td>
<td>4.75</td>
<td>9.74</td>
</tr>
<tr>
<td>x264_s</td>
<td>48</td>
<td>4.64</td>
<td>12.1</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>48</td>
<td>4.75</td>
<td>15.5</td>
</tr>
<tr>
<td>leela_s</td>
<td>48</td>
<td>4.13</td>
<td>16.2</td>
</tr>
<tr>
<td>exchange2_s</td>
<td>48</td>
<td>4.13</td>
<td>20.1</td>
</tr>
<tr>
<td>xz_s</td>
<td>48</td>
<td>20.1</td>
<td>20.1</td>
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### Results Table

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<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>
<th>Thread</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>48</td>
<td>395</td>
<td>4.49</td>
<td>399</td>
<td>4.45</td>
<td>397</td>
<td>4.47</td>
<td>1</td>
<td>360</td>
<td>4.93</td>
<td>360</td>
<td>4.93</td>
<td>361</td>
<td>4.92</td>
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<tr>
<td>605.mcf_s</td>
<td>48</td>
<td>336</td>
<td>14.1</td>
<td>333</td>
<td>14.2</td>
<td>332</td>
<td>14.2</td>
<td>1</td>
<td>312</td>
<td>15.1</td>
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<td>15.1</td>
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<tr>
<td>620.omnetpp_s</td>
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<td>345</td>
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<td>4.68</td>
<td>1</td>
<td>344</td>
<td>4.75</td>
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<td>4.74</td>
<td>347</td>
<td>4.70</td>
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<tr>
<td>625.x264_s</td>
<td>48</td>
<td>145</td>
<td>12.2</td>
<td>145</td>
<td>12.1</td>
<td>147</td>
<td>12.0</td>
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<td>145</td>
<td>12.2</td>
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<td>631.deepsjeng_s</td>
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<td>4.66</td>
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<td>4.64</td>
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<td>4.75</td>
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<td>641.leela_s</td>
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<td>4.13</td>
<td>416</td>
<td>4.10</td>
<td>48</td>
<td>413</td>
<td>4.13</td>
<td>413</td>
<td>4.13</td>
<td>416</td>
<td>4.10</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>48</td>
<td>189</td>
<td>15.5</td>
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<td>189</td>
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<td>657.xz_s</td>
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<td>48</td>
<td>306</td>
<td>20.2</td>
<td>307</td>
<td>20.1</td>
<td>307</td>
<td>20.1</td>
</tr>
</tbody>
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### 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. '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 = "0-95"
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:"
MALLOCONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "96"

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 620.omnetpp_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 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 = "0-47"

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 CPU®2017 Integer Speed Result

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SPECspeed®2017_int_base = 8.44
SPECspeed®2017_int_peak = 8.70

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

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 5.1.0 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 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 295195f888a3d7edbble6e46a485a0011
running on linux-g3ob Wed Jan 22 02:56:42 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 7642 48-Core Processor
  1 "physical id"s (chips)
    96 "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 : 48
siblings : 96
  physical 0: cores 0 1 2 4 5 6 8 9 10 12 13 14 16 17 18 20 21 22 24 25 26 28 29 30
                       32 33 34 36 37 38 40 41 42 44 45 46 48 49 50 52 53 54 56 57 58 60 61 62

From lscpu:
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**Architecture:** x86_64  
**CPU op-mode(s):** 32-bit, 64-bit  
**Byte Order:** Little Endian  
**Address sizes:** 43 bits physical, 48 bits virtual  
**CPU(s):** 96  
**On-line CPU(s) list:** 0-95  
**Thread(s) per core:** 2  
**Core(s) per socket:** 48  
**Socket(s):** 1  
**NUMA node(s):** 16  
**Vendor ID:** AuthenticAMD  
**CPU family:** 23  
**Model:** 49  
**Model name:** AMD EPYC 7642 48-Core Processor  
**Stepping:** 0  
**CPU MHz:** 2295.859  
**BogoMIPS:** 4591.71  
**Virtualization:** AMD-V  
**L1d cache:** 32K  
**L1i cache:** 32K  
**L2 cache:** 512K  
**L3 cache:** 16384K  
**NUMA node0 CPU(s):** 0-2,48-50  
**NUMA node1 CPU(s):** 3-5,51-53  
**NUMA node2 CPU(s):** 6-8,54-56  
**NUMA node3 CPU(s):** 9-11,57-59  
**NUMA node4 CPU(s):** 12-14,60-62  
**NUMA node5 CPU(s):** 15-17,63-65  
**NUMA node6 CPU(s):** 18-20,66-68  
**NUMA node7 CPU(s):** 21-23,69-71  
**NUMA node8 CPU(s):** 24-26,72-74  
**NUMA node9 CPU(s):** 27-29,75-77  
**NUMA node10 CPU(s):** 30-32,78-80  
**NUMA node11 CPU(s):** 33-35,81-83  
**NUMA node12 CPU(s):** 36-38,84-86  
**NUMA node13 CPU(s):** 39-41,87-89  
**NUMA node14 CPU(s):** 42-44,90-92  
**NUMA node15 CPU(s):** 45-47,93-95  
**Flags:** fpu vme de pse tsc msr pae mce 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 aperfmperf pni pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw lfskinit wdt tce topoext perfctr_core perfctr_nb bpxext perfctr_l2 mwaitx cpb cat_l3 cdpl_l3 hw_pstate sme sbd dev ibs ibpb stibp vmmcall fsgsbase bni1 mcm rdt_a rdseed adx smap clflushopt clwb sha ni xsaveopt xsave xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local

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

```
clzero irperf xsaveerptr arat npt lbv svmlock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pfthreshold avic v_vmsave_vmload vgif umip rdpid overflow_recov succor smca
```

/proc/cpuinfo cache data
```
cache size : 512 KB
```

From `numactl --hardware` WARNING: a numactl 'node' might or might not correspond to a physical chip.
```
available: 16 nodes (0-15)
node 0 cpus: 0 1 2 48 49 50
node 0 size: 15548 MB
node 0 free: 15390 MB
node 1 cpus: 3 4 5 51 52 53
node 1 size: 16126 MB
node 1 free: 16021 MB
node 2 cpus: 6 7 8 54 55 56
node 2 size: 16126 MB
node 2 free: 16001 MB
node 3 cpus: 9 10 11 57 58 59
node 3 size: 16125 MB
node 3 free: 15948 MB
node 4 cpus: 12 13 14 60 61 62
node 4 size: 16126 MB
node 4 free: 16038 MB
node 5 cpus: 15 16 17 63 64 65
node 5 size: 16126 MB
node 5 free: 16044 MB
node 6 cpus: 18 19 20 66 67 68
node 6 size: 16126 MB
node 6 free: 15942 MB
node 7 cpus: 21 22 23 69 70 71
node 7 size: 16125 MB
node 7 free: 16039 MB
node 8 cpus: 24 25 26 72 73 74
node 8 size: 16126 MB
node 8 free: 16041 MB
node 9 cpus: 27 28 29 75 76 77
node 9 size: 16126 MB
node 9 free: 16047 MB
node 10 cpus: 30 31 32 78 79 80
node 10 size: 16126 MB
node 10 free: 16048 MB
node 11 cpus: 33 34 35 81 82 83
node 11 size: 16125 MB
node 11 free: 16022 MB
node 12 cpus: 36 37 38 84 85 86
```

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#### Platform Notes (Continued)

```
node 12 size: 16097 MB
node 12 free: 16014 MB
node 13 cpus: 39 40 41 87 88 89
node 13 size: 16126 MB
node 13 free: 16048 MB
node 14 cpus: 42 43 44 90 91 92
node 14 size: 16126 MB
node 14 free: 16049 MB
node 15 cpus: 45 46 47 93 94 95
node 15 size: 16112 MB
node 15 free: 16035 MB
node distances:
node  0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
0:  10  11  11  11  12  12  12  12  12  12  12  12  12  12  12  12
1:  11  10  11  11  12  12  12  12  12  12  12  12  12  12  12  12
2:  11  11  10  11  12  12  12  12  12  12  12  12  12  12  12  12
3:  11  11  11  10  12  12  12  12  12  12  12  12  12  12  12  12
4:  12  12  12  12  10  11  11  12  12  12  12  12  12  12  12  12
5:  12  12  12  12  11  10  11  11  12  12  12  12  12  12  12  12
6:  12  12  12  12  11  10  11  11  12  12  12  12  12  12  12  12
7:  12  12  12  12  11  11  11  10  12  12  12  12  12  12  12  12
8:  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12
9:  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12
10:  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12
11:  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12
12:  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12
13:  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12
14:  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12
15:  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12
```

From /proc/meminfo
MemTotal: 263580124 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
```
os-release:
  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:

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

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 retpoline, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

run-level 3 Jan 21 06:01 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. 1.3.0 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 HMA84GR77C4R4N-XN 32 GB 2 rank 3200  
8x Not Specified Not Specified

(End of data from sysinfo program)

### Compiler Version Notes

```
C       | 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)
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)
```

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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++ | 623.xalancbmk_s(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++ | 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
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++ | 623.xalancbmk_s(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++ | 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
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
```

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

**Dell Inc.**

PowerEdge R7515 (AMD EPYC 7642, 2.30 GHz)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Dell Inc.</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_int_base = 8.44**

**SPECspeed®2017_int_peak = 8.70**

---

**Compiler Version Notes (Continued)**

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

---

**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:
-f1to -Wl,-mlllvm -Wl,-function-specialize
-Wl,-mlllvm -Wl,-region-vectorize -Wl,-mlllvm -Wl,-vector-library=LIBMVEC
-Wl,-mlllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mlllvm -unroll-threshold=50

(Continued on next page)
Dell Inc.
PowerEdge R7515 (AMD EPYC 7642, 2.30 GHz)

SPECspeed®2017_int_base = 8.44
SPECspeed®2017_int_peak = 8.70

Base Optimization Flags (Continued)

C benchmarks (continued):
- 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-lv-split -O3 -march=znver2 -funroll-loops
- Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
- mllvm -disable-indvar-simplify -mllvm -unroll-aggressive
- mllvm -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
Dell Inc.

PowerEdge R7515 (AMD EPYC 7642, 2.30 GHz)

SPECspeed®2017_int_base = 8.44
SPECspeed®2017_int_peak = 8.70

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

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

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

Peak Optimization Flags

C benchmarks:

600.perlbench_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
-fprofile-instr-generate(pass 1)
-fprofile-instr-use(pass 2) -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
-lvvec -lamdlibm -fopenmp=libomp -lomp -lpthread -ldl
-ljemalloc -lflang

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

602.gcc_s:
- flto -Wl,-mllvm -Wl,-function-specialize
- Wl,-mllvm -Wl,-region-vectorize
- Wl,-mllvm -Wl,-vector-library=LIBMVEC
- Wl,-mllvm -Wl,-reduce-arraycomputations=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 -z muldefs -DSPEC_OPENMP
- lmvec -lamdlibm -fopenmp=libomp -lomp -lpthread -ldl
- ljemalloc -lflang

625.x264_s:
- basepeak = yes

657.xz_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

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

657.xz_s (continued):
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang

C++ benchmarks:

620.omnetpp_s -flto -Wl,-mllvm -W1,-function-specialize
-foopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang

623.xalancbmk_s -m32 -flto -Wl,-mllvm -W1,-function-specialize
-foopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang

631.deepsjeng_s: Same as 620.omnetpp_s

641.leela_s: basepeak = yes

Fortran benchmarks:

-flto -Wl,-mllvm -W1,-function-specialize
-foopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang

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Dell Inc.

PowerEdge R7515 (AMD EPYC 7642, 2.30 GHz)

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Test Sponsor: Dell Inc.
Tested by: Dell Inc.

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

Peak Other Flags

C benchmarks:
- Wno-return-type

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

623.xalancbmk_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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