Dell Inc.

PowerEdge C6525 (AMD EPYC 7F72, 3.20 GHz)

SPECspeed®2017_int_base = 9.41  
SPECspeed®2017_int_peak = 9.75  

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

Threads

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base (9.41)</th>
<th>SPECspeed®2017_int_peak (9.75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threads</td>
<td>Threads</td>
</tr>
<tr>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>600.perlbench_s</td>
<td>6.23</td>
</tr>
<tr>
<td>620.gcc_s</td>
<td>5.51</td>
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<tr>
<td>605.mcf_s</td>
<td>4.41</td>
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<td>620.omnetpp_s</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>10.3</td>
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<tr>
<td>625.x264_s</td>
<td>13.6</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>13.3</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>4.66</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>18.3</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>23.1</td>
</tr>
<tr>
<td></td>
<td>23.2</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: AMD EPYC 7F72  
Max MHz: 3700  
Nominal: 3200  
Enabled: 48 cores, 2 chips  
Orderable: 1.2 chips  
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: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R, running at 3200)  
Storage: 1 x 480 GB SATA SSD  
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP1 kernel 4.12.14-197.7-default  
Compiler: C/C++/Fortran: Version 2.0.0 of AOCC  
Parallel: Yes  
Firmware: Version 1.2.5 released Dec-2019  
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 v5.2.0  
Power Management: BIOS set to prefer performance at the cost of additional power usage.
Dell Inc.
PowerEdge C6525 (AMD EPYC 7F72, 3.20 GHz)

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

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>Seconds</th>
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<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
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<td>335</td>
<td>5.30</td>
<td>342</td>
<td>5.19</td>
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<td>322</td>
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<td>392</td>
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<td>605.mcf_s</td>
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<td>10.3</td>
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<td>129</td>
<td>11.0</td>
<td>127</td>
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<tr>
<td>625.x264_s</td>
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<td>127</td>
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<tr>
<td>631.deepsjeng_s</td>
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<td>272</td>
<td>5.26</td>
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<td>5.25</td>
<td>273</td>
<td>5.26</td>
<td>1</td>
<td>274</td>
<td>5.24</td>
<td>268</td>
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<tr>
<td>648.exchange2_s</td>
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<td>18.3</td>
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<td>18.3</td>
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<td>18.3</td>
<td>48</td>
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<td>18.3</td>
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<tr>
<td>657.xz_s</td>
<td>48</td>
<td>268</td>
<td>23.1</td>
<td>267</td>
<td>23.1</td>
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<td>23.1</td>
<td>48</td>
<td>267</td>
<td>23.2</td>
<td>267</td>
</tr>
</tbody>
</table>

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:"
MALLOC_CONF = "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 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 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 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) 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
Dell Inc.

PowerEdge C6525 (AMD EPYC 7F72, 3.20 GHz)

**General Notes (Continued)**

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 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
- Logical Processor Disabled

Sysinfo program /root/cpu2017-1.1.0/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbb1e6e46a485a0011
running on suse15-sp1 Wed Feb 5 04:58:26 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
  2 "physical id"s (chips)
  48 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
eexcerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 24
siblings : 24
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
physical 1: 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
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 43 bits physical, 48 bits virtual
```

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

Dell Inc.

PowerEdge C6525 (AMD EPYC 7F72, 3.20 GHz)

SPECspeed®2017_int_base = 9.41
SPECspeed®2017_int_peak = 9.75

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)

- 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): 24
- 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
- NUMA node1 CPU(s): 2,3
- NUMA node2 CPU(s): 4,5
- NUMA node3 CPU(s): 6,7
- NUMA node4 CPU(s): 8,9
- NUMA node5 CPU(s): 10,11
- NUMA node6 CPU(s): 12,13
- NUMA node7 CPU(s): 14,15
- NUMA node8 CPU(s): 16,17
- NUMA node9 CPU(s): 18,19
- NUMA node10 CPU(s): 20,21
- NUMA node11 CPU(s): 22,23
- NUMA node12 CPU(s): 24,25
- NUMA node13 CPU(s): 26,27
- NUMA node14 CPU(s): 28,29
- NUMA node15 CPU(s): 30,31
- NUMA node16 CPU(s): 32,33
- NUMA node17 CPU(s): 34,35
- NUMA node18 CPU(s): 36,37
- NUMA node19 CPU(s): 38,39
- NUMA node20 CPU(s): 40,41
- NUMA node21 CPU(s): 42,43
- NUMA node22 CPU(s): 44,45
- NUMA node23 CPU(s): 46,47

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 rdtsscp lm constant_tsc rep_good nopl 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

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

Dell Inc.
PowerEdge C6525 (AMD EPYC 7F72, 3.20 GHz)

**SPECspeed®2017_int_base = 9.41**

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<td>Tested by:</td>
<td>Dell Inc.</td>
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<td>Test Date:</td>
<td>Jan-2020</td>
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<td>Hardware Availability:</td>
<td>Apr-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Aug-2019</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_l2 mwaitx cpb
cat_l3 cdp_l3 hw_pstate sme ssbd sev ibrs ibpb stibp vmmcall fsqgsbase bmi1 avx2 smep
bmi2 cmq rdt_a rdseed adx smap clflushopt clwb sha_ni xsaveopt xsavec xgetbv1 xsavees
cmq_llc cmq_occup_llc cmq_mbm_total cmq_mbm_local clzero irperf xsaveerptr arat npt
lbiv svm_lock nrpl_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
pfthreshold avic v_vmsave_vmload vgff 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: 24 nodes (0-23)
node 0 cpus: 0 1
node 0 size: 21023 MB
node 0 free: 20971 MB
node 1 cpus: 2 3
node 1 size: 21502 MB
node 1 free: 21473 MB
node 2 cpus: 4 5
node 2 size: 21504 MB
node 2 free: 21436 MB
node 3 cpus: 6 7
node 3 size: 21502 MB
node 3 free: 21458 MB
node 4 cpus: 8 9
node 4 size: 21502 MB
node 4 free: 21418 MB
node 5 cpus: 10 11
node 5 size: 21503 MB
node 5 free: 21460 MB
node 6 cpus: 12 13
node 6 size: 21502 MB
node 6 free: 21426 MB
node 7 cpus: 14 15
node 7 size: 21502 MB
node 7 free: 21437 MB
node 8 cpus: 16 17
node 8 size: 21504 MB
node 8 free: 21464 MB
node 9 cpus: 18 19
node 9 size: 21502 MB
node 9 free: 21475 MB
node 10 cpus: 20 21
node 10 size: 21502 MB
node 10 free: 21464 MB
node 11 cpus: 22 23

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

Dell Inc.

PowerEdge C6525 (AMD EPYC 7F72, 3.20 GHz)

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Platform Notes (Continued)

node 11 size: 21491 MB
dnode 11 free: 21470 MB
dnode 12 cpus: 24 25
dnode 12 size: 21502 MB
dnode 12 free: 21484 MB
dnode 13 cpus: 26 27
dnode 13 size: 21502 MB
dnode 13 free: 21480 MB
dnode 14 cpus: 28 29
dnode 14 size: 21504 MB
dnode 14 free: 21487 MB
dnode 15 cpus: 30 31
dnode 15 size: 21502 MB
dnode 15 free: 21485 MB
dnode 16 cpus: 32 33
dnode 16 size: 21502 MB
dnode 16 free: 21485 MB
dnode 17 cpus: 34 35
dnode 17 size: 21503 MB
dnode 17 free: 21484 MB
dnode 18 cpus: 36 37
dnode 18 size: 21502 MB
dnode 18 free: 21485 MB
dnode 19 cpus: 38 39
dnode 19 size: 21502 MB
dnode 19 free: 21482 MB
dnode 20 cpus: 40 41
dnode 20 size: 21504 MB
dnode 20 free: 21487 MB
dnode 21 cpus: 42 43
dnode 21 size: 21502 MB
dnode 21 free: 21485 MB
dnode 22 cpus: 44 45
dnode 22 size: 21502 MB
dnode 22 free: 21484 MB
dnode 23 cpus: 46 47
dnode 23 size: 21502 MB
dnode 23 free: 21482 MB

dnode distances:

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

**PowerEdge C6525 (AMD EPYC 7F72, 3.20 GHz)**

---

**SPECspeed® 2017 int_base = 9.41**

**SPECspeed® 2017 int_peak = 9.75**

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

---

### Platform Notes (Continued)

|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|

From `/proc/meminfo`

- **MemTotal:** 527958416 kB
- **HugePages_Total:** 0
- **Hugepagesize:** 2048 kB

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

Dell Inc.
PowerEdge C6525 (AMD EPYC 7F72, 3.20 GHz)

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Platform Notes (Continued)

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:
    Linux suse15-sp1 4.12.14-197.7-default #1 SMP Mon Jun 24 08:33:54 UTC 2019 (650fd32)
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: disabled, RSB filling

run-level 3 Feb 5 04:35

SPEC is set to: /root/cpu2017-1.1.0
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda2 xfs 444G 13G 432G 3% /

From /sys/devices/virtual/dmi/id
  BIOS: Dell Inc. 1.2.5 12/11/2019
  Vendor: Dell Inc.
  Product: PowerEdge C6525
  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:
    16x 802C869D802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200

(Continued on next page)
Dell Inc.

PowerEdge C6525 (AMD EPYC 7F72, 3.20 GHz)

SPEC CPU®2017 Integer Speed Result

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Platform Notes (Continued)

(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)
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
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==============================================================================
| C++     | 623.xalancbmk_s(peak) |
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(Continued on next page)
Dell Inc.

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Compiler Version Notes (Continued)

==============================================================================
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
------------------------------------------------------------------------------
==============================================================================
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

(Continued on next page)
Dell Inc.

PowerEdge C6525 (AMD EPYC 7F72, 3.20 GHz)

SPECspeed®2017_int_base = 9.41
SPECspeed®2017_int_peak = 9.75

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

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

Base Portability Flags (Continued)

657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
- -flto -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
- -fremap-arrays -mlllvm -function-specialize -mlllvm -enable-gvn-hoist
- -mlllvm -reduce-array-computations=3 -mlllvm -global-vectorize-slp
- -mlllvm -vector-library=LIBMVEC -mlllvm -inline-threshold=1000
- -flv-function-specialization -z muldefs -DSPEC_OPENMP -fopenmp
- -fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamlbimb -ljemalloc
- -lflang

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

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

Base Other Flags

C benchmarks:
- -Wno-return-type -DUSE_OPENMP

(Continued on next page)
### Base Other Flags (Continued)

C++ benchmarks:
- `-Wno-return-type -DUSE_OPENMP`

Fortran benchmarks:
- `-DUSE_OPENMP -Wno-return-type`

### Peak Compiler Invocation

C benchmarks:
- `clang`

C++ benchmarks:
- `clang++`

Fortran benchmarks:
- `flang`

### Peak Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td><code>-DSPEC_LINUX_X64 -DSPEC_LP64</code></td>
</tr>
<tr>
<td>602.gcc_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td><code>-DSPEC_LINUX -D_FILE_OFFSET_BITS=64</code></td>
</tr>
<tr>
<td>625.x264_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>641.leela_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>657.xz_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
</tbody>
</table>

### Peak Optimization Flags

C benchmarks:

600.perlbench_s: `-flto -Wl,--llvm -Wl,--function-specialize
- Wl,--llvm -Wl,--region-vectorize
- Wl,--llvm -Wl,--vector-library=LIBMVEC
- Wl,--llvm -Wl,--reduce-array-computations=3

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

600.perlbench_s (continued):
- fprofile-instr-generate(pass 1)
- fprofile-instr-use(pass 2) -Ofast -march=znver2
- mno-sse4a -fstruct-layout=5
- llvm -vectorize-memory-aggressively
- llvm -function-specialize -llvm -enable-gvn-hoist
- llvm -unroll-threshold=50 -fremap-arrays
- llvm -vector-library=LIBMVEC
- llvm -reduce-array-computations=3
- llvm -global-vectorize-slp -llvm -inline-threshold=1000
- llvm -function-specialization -DSPEC_OPENMP -fopenmp
- lmvec -lamdlibm -fopenmp -lomp -lpthread -ldl
- ljemalloc -lflang

602.gcc_s: basepeak = yes

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
- llvm -vectorize-memory-aggressively
- llvm -function-specialize -llvm -enable-gvn-hoist
- llvm -unroll-threshold=50 -fremap-arrays
- llvm -vector-library=LIBMVEC
- llvm -reduce-array-computations=3
- llvm -global-vectorize-slp -llvm -inline-threshold=1000
- llvm -function-specialization -DSPEC_OPENMP -fopenmp
- lmvec -lamdlibm -fopenmp -libomp -lomp -lpthread -ldl
- ljemalloc -lflang

625.x264_s: Same as 600.perlbench_s

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
- llvm -vectorize-memory-aggressively
- llvm -function-specialize -llvm -enable-gvn-hoist
- llvm -unroll-threshold=50 -fremap-arrays
- llvm -vector-library=LIBMVEC
- llvm -reduce-array-computations=3
- llvm -global-vectorize-slp -llvm -inline-threshold=1000
- llvm -function-specialization -DSPEC_OPENMP -fopenmp
- fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm

(Continued on next page)
Dell Inc.  
PowerEdge C6525 (AMD EPYC 7F72, 3.20 GHz)  

SPEC®2017_int_base = 9.41  
SPECspeed®2017_int_peak = 9.75

Peak Optimization Flags (Continued)

657.xz_s (continued):
-ljemalloc -lflang

C++ benchmarks:

620.omnetpp_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 -flv-function-specialization
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=10000 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang

623.xalancbmk_s: -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
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=10000 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lpthread -ldl -ljemalloc

631.deepsjeng_s: Same as 620.omnetpp_s

641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s basepeak = yes

Peak Other Flags

C benchmarks:
- Wno-return-type -DUSE_OPENMP

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

Dell Inc.

PowerEdge C6525 (AMD EPYC 7F72, 3.20 GHz)

<table>
<thead>
<tr>
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<td>Tested by: Dell Inc.</td>
<td>Software Availability: Aug-2019</td>
</tr>
</tbody>
</table>

Peak Other Flags (Continued)

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

623.xalancbmk_s: `-Wno-return-type -DUSE_OPENMP`
- `-L/sppo/dev/cpu2017/v110/amd_speed_aocc200_rome_C_lib/32`

Fortran benchmarks:
- `-DUSE_OPENMP -Wno-return-type`

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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