# SPEC CPU®2017 Integer Speed Result

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## Dell Inc.

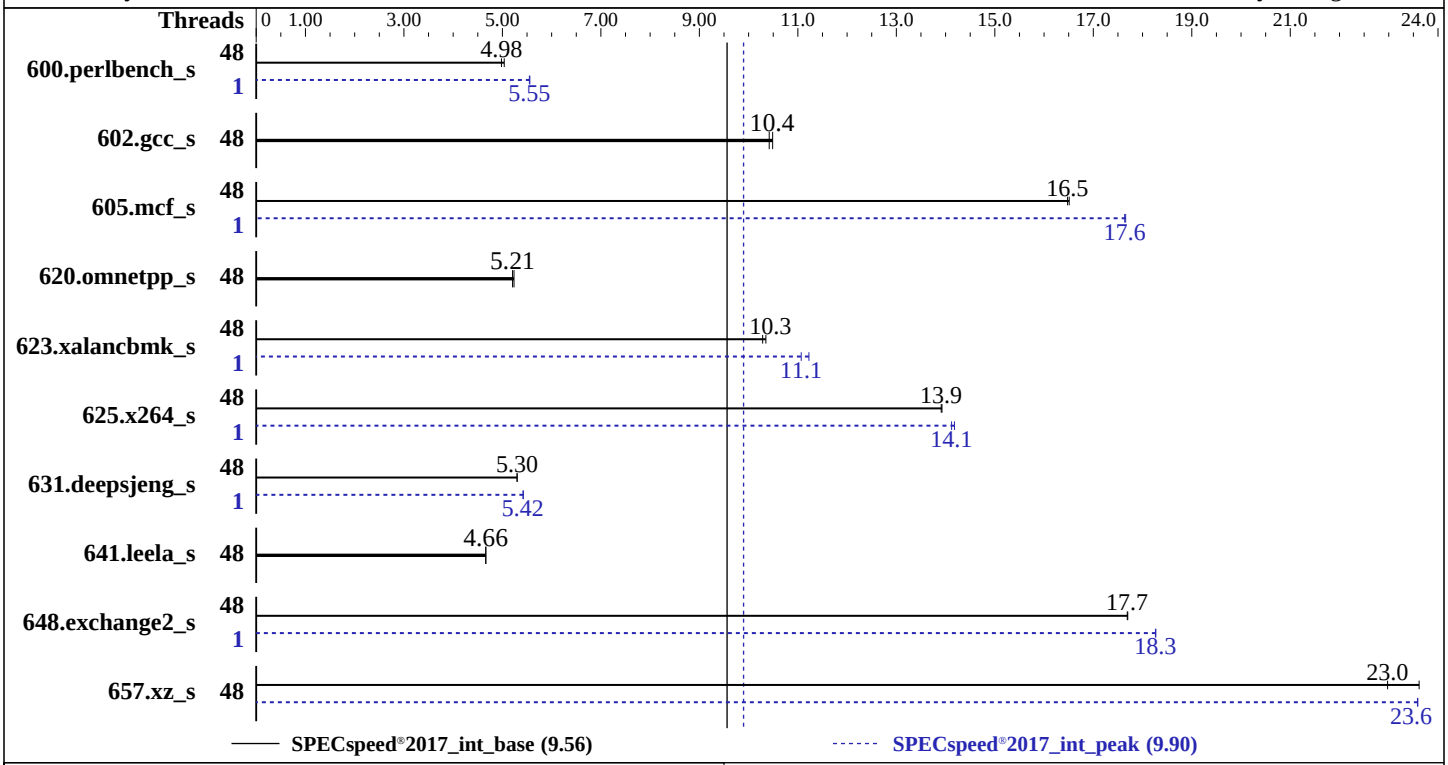
PowerEdge R7525 (AMD EPYC 7F72, 3.20 GHz)

SPECspeed®2017_int_base = 9.56

SPECspeed®2017_int_peak = 9.90

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

**Test Date:** Apr-2020
**Hardware Availability:** Jul-2020
**Software Availability:** Aug-2019




## 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 960 GB SATA SSD |
| Other: | None |

## Software

| | |
|---|---|
| OS: | SUSE Linux Enterprise Server 15 SP1 kernel 4.12.14-195-default |
| Compiler: | C/C++/Fortran: Version 2.0.0 of AOCC |
| Parallel: | Yes |
| Firmware: | Version 1.4.6 released Apr-2020 |
| File System: | tmpfs |
| 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. |

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## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 600.perlbench_s | 48 | 352 | 5.04 | **356** | **4.98** | | | 1 | **320** | **5.55** | 319 | 5.56 | | |
| 602.gcc_s | 48 | 380 | 10.5 | **382** | **10.4** | | | 48 | 380 | 10.5 | **382** | **10.4** | | |
| 605.mcf_s | 48 | 286 | 16.5 | **287** | **16.5** | | | 1 | **268** | **17.6** | 267 | 17.7 | | |
| 620.omnetpp_s | 48 | 312 | 5.24 | **313** | **5.21** | | | 48 | 312 | 5.24 | **313** | **5.21** | | |
| 623.xalancbmk_s | 48 | 137 | 10.4 | **138** | **10.3** | | | 1 | 126 | 11.2 | **128** | **11.1** | | |
| 625.x264_s | 48 | 127 | 13.9 | **127** | **13.9** | | | 1 | 124 | 14.2 | **125** | **14.1** | | |
| 631.deepsjeng_s | 48 | 270 | 5.30 | **271** | **5.30** | | | 1 | **264** | **5.42** | 264 | 5.43 | | |
| 641.leela_s | 48 | 366 | 4.66 | **366** | **4.66** | | | 48 | 366 | 4.66 | **366** | **4.66** | | |
| 648.exchange2_s | 48 | **166** | **17.7** | 166 | 17.7 | | | 1 | 161 | 18.3 | **161** | **18.3** | | |
| 657.xz_s | 48 | **269** | **23.0** | 262 | 23.6 | | | 48 | 262 | 23.6 | **262** | **23.6** | | |

**SPECspeed®2017_int_base = 9.56**

**SPECspeed®2017_int_peak = 9.90**

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 = "0-47"
LD_LIBRARY_PATH =
     "/mnt/ramdisk/cpu2017-1.1.0/amd_speed_aocc200_rome_C_lib/64;/mnt/ramdisk
     /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 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 = "0-47"
```

## 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.
Benchmark run from a 225 GB ramdisk created with the cmd; "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk".
jemalloc: configured and built with GCC v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto
```

**(Continued on next page)**

## General Notes (Continued)

```
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 Auto
  ApbDis set to Disabled
  DLWM set to Unforced
  Logical Processor Disabled

 Sysinfo program /mnt/ramdisk/cpu2017-1.1.0/bin/sysinfo
 Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
 running on linux-g3ob Thu Apr 23 10:21:18 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
    excerpts 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
```

**(Continued on next page)**

## Platform Notes (Continued)

```
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:    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:               3194.003
BogoMIPS:              6388.00
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 rdtscp lm
constant_tsc rep_good nopl xtopology nonstop_tsc cpuid extd_apicid aperfmperf pni
```

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## Platform Notes (Continued)

```
      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 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
      fsgsbase bmi1 avx2 smep bmi2 cqm rdt_a rdseed adx smap clflushopt clwb sha_ni
      xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
      clzero irperf xsaveerptr arat npt lbrv svm_lock 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: 24 nodes (0-23)
    node 0 cpus: 0 1
    node 0 size: 20922 MB
    node 0 free: 20834 MB
    node 1 cpus: 2 3
    node 1 size: 21502 MB
    node 1 free: 21470 MB
    node 2 cpus: 4 5
    node 2 size: 21504 MB
    node 2 free: 21463 MB
    node 3 cpus: 6 7
    node 3 size: 21502 MB
    node 3 free: 21448 MB
    node 4 cpus: 8 9
    node 4 size: 21502 MB
    node 4 free: 21468 MB
    node 5 cpus: 10 11
    node 5 size: 21503 MB
    node 5 free: 21455 MB
    node 6 cpus: 12 13
    node 6 size: 21502 MB
    node 6 free: 21466 MB
    node 7 cpus: 14 15
    node 7 size: 21502 MB
    node 7 free: 21474 MB
    node 8 cpus: 16 17
    node 8 size: 21504 MB
    node 8 free: 21477 MB
    node 9 cpus: 18 19
    node 9 size: 21502 MB
    node 9 free: 21472 MB
    node 10 cpus: 20 21
```

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## Platform Notes (Continued)

```
   node 10 size: 21473 MB
   node 10 free: 21443 MB
   node 11 cpus: 22 23
   node 11 size: 21491 MB
   node 11 free: 21456 MB
   node 12 cpus: 24 25
   node 12 size: 21502 MB
   node 12 free: 21471 MB
   node 13 cpus: 26 27
   node 13 size: 21502 MB
   node 13 free: 21452 MB
   node 14 cpus: 28 29
   node 14 size: 21504 MB
   node 14 free: 21466 MB
   node 15 cpus: 30 31
   node 15 size: 21502 MB
   node 15 free: 21467 MB
   node 16 cpus: 32 33
   node 16 size: 21502 MB
   node 16 free: 21470 MB
   node 17 cpus: 34 35
   node 17 size: 21503 MB
   node 17 free: 21476 MB
   node 18 cpus: 36 37
   node 18 size: 21502 MB
   node 18 free: 19574 MB
   node 19 cpus: 38 39
   node 19 size: 21502 MB
   node 19 free: 21450 MB
   node 20 cpus: 40 41
   node 20 size: 21504 MB
   node 20 free: 16940 MB
   node 21 cpus: 42 43
   node 21 size: 21502 MB
   node 21 free: 21467 MB
   node 22 cpus: 44 45
   node 22 size: 21502 MB
   node 22 free: 21437 MB
   node 23 cpus: 46 47
   node 23 size: 21502 MB
   node 23 free: 21405 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19
   20  21  22  23
     0:  10  11  11  11  11  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
     32  32  32  32
     1:  11  10  11  11  11  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
```

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## Platform Notes (Continued)

```
     32  32  32  32
     2:  11  11  10  11  11  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
     32  32  32  32
     3:  11  11  11  10  11  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
     32  32  32  32
     4:  11  11  11  11  10  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
     32  32  32  32
     5:  11  11  11  11  11  10  12  12  12  12  12  12  32  32  32  32  32  32  32  32
     32  32  32  32
     6:  12  12  12  12  12  12  10  11  11  11  11  11  32  32  32  32  32  32  32  32
     32  32  32  32
     7:  12  12  12  12  12  12  11  10  11  11  11  11  32  32  32  32  32  32  32  32
     32  32  32  32
     8:  12  12  12  12  12  12  11  11  10  11  11  11  32  32  32  32  32  32  32  32
     32  32  32  32
     9:  12  12  12  12  12  12  11  11  11  10  11  11  32  32  32  32  32  32  32  32
     32  32  32  32
    10:  12  12  12  12  12  12  11  11  11  11  10  11  32  32  32  32  32  32  32  32
    32  32  32  32
    11:  12  12  12  12  12  12  11  11  11  11  11  10  32  32  32  32  32  32  32  32
    32  32  32  32
    12:  32  32  32  32  32  32  32  32  32  32  32  32  10  11  11  11  11  11  12  12
    12  12  12  12
    13:  32  32  32  32  32  32  32  32  32  32  32  32  11  10  11  11  11  11  12  12
    12  12  12  12
    14:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  10  11  11  11  12  12
    12  12  12  12
    15:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  10  11  11  12  12
    12  12  12  12
    16:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  10  11  12  12
    12  12  12  12
    17:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  10  12  12
    12  12  12  12
    18:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  10  11
    11  11  11  11
    19:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  10
    11  11  11  11
    20:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  11
    10  11  11  11
    21:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  11
    11  10  11  11
    22:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  11
    11  11  10  11
    23:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  11
    11  11  11  10

From /proc/meminfo
```


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## Platform Notes (Continued)

```
    MemTotal:       527825644 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:
    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: disabled, RSB
                                            filling

  run-level 3 Apr 23 10:08 last=5

  SPEC is set to: /mnt/ramdisk/cpu2017-1.1.0
    Filesystem     Type   Size  Used Avail Use% Mounted on
    tmpfs          tmpfs  225G  4.3G  221G   2% /mnt/ramdisk

  From /sys/devices/virtual/dmi/id
     BIOS:    Dell Inc. 1.4.6 04/10/2020
     Vendor:  Dell Inc.
     Product: PowerEdge R7525
     Product Family: PowerEdge
     Serial:  48LN333

  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
```

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## Platform Notes (Continued)

```
 frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
   Memory:
     16x 802C80B3802C 36ASF4G72PZ-3G2E7 32 GB 2 rank 3200
     16x 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)
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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Target: x86_64-unknown-linux-gnu
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------------------------------------------------------------------------------

==============================================================================
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)
```


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## Compiler Version Notes (Continued)

```
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
------------------------------------------------------------------------------

==============================================================================
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

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## Base Portability Flags (Continued)

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
-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`

## 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`

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## Peak Optimization Flags (Continued)

600.perlbench_s (continued):
-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
-lmvec -lamdlibm -fopenmp=libomp -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
-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

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
-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)

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

C++ benchmarks:

620.omnetpp_s: basepeak = yes

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=1000 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lpthread -ldl -ljemalloc

631.deepsjeng_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=1000 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang

641.leela_s: basepeak = yes

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

Fortran benchmarks:
`-Wno-return-type`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/aocc200-flags-C4.html`
`http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE9.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/aocc200-flags-C4.xml`
`http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE9.xml`


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Tested with SPEC CPU®2017 v1.1.0 on 2020-04-23 11:21:18-0400.
Report generated on 2020-05-12 14:54:57 by CPU2017 PS formatter v6255.
Originally published on 2020-05-12.