SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)
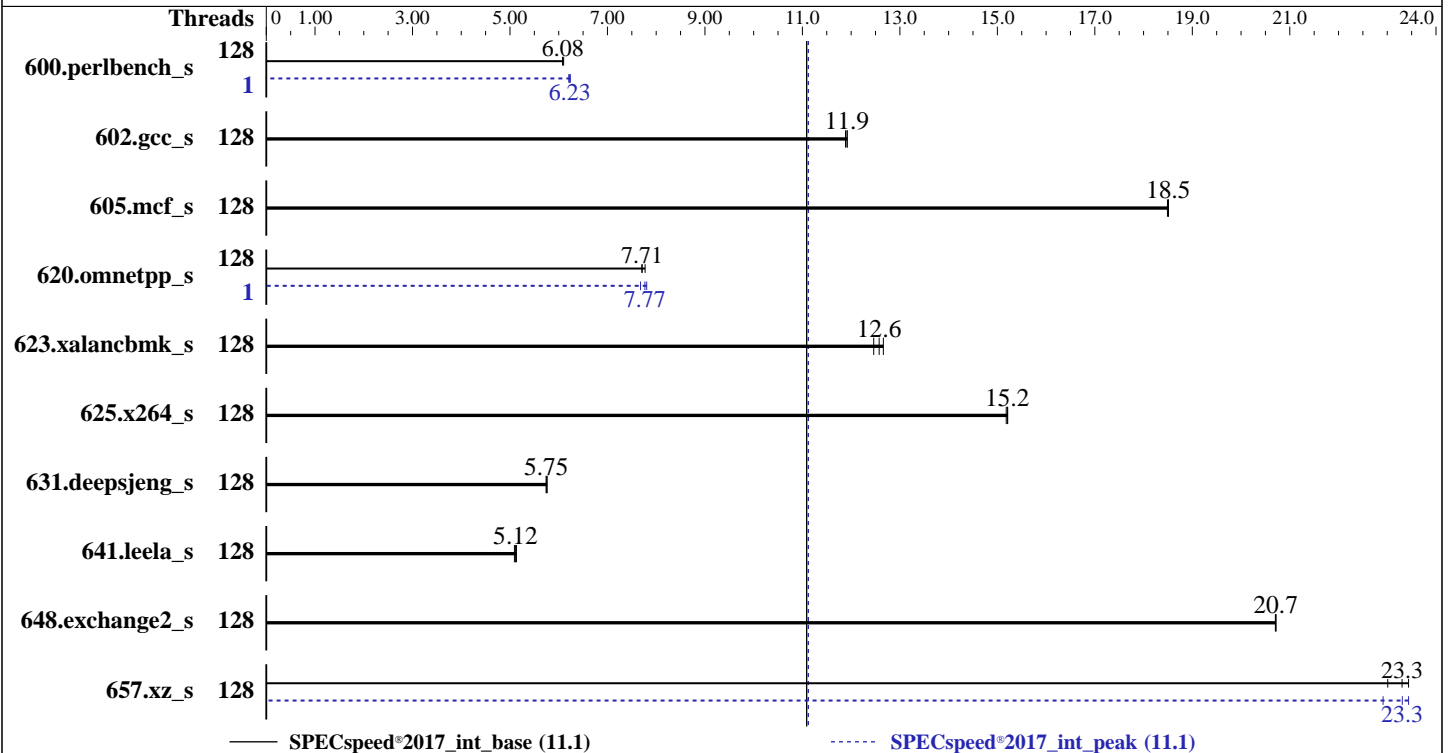
ProLiant DL385 Gen10 Plus v2
(2.45 GHz, AMD EPYC 7763)

$SPECspeed^{®}2017\_int\_base = 11.1$

$SPECspeed^{®}2017\_int\_peak = 11.1$

CPU2017 License: 3   **Test Date:** Feb-2021

Test Sponsor: HPE   **Hardware Availability:** Apr-2021

Tested by: HPE   **Software Availability:** Mar-2021

Benchmark	Threads	Result
600.perlbench_s	128	6.08
	1	6.23
602.gcc_s	128	11.9
605.mcf_s	128	18.5
620.omnetpp_s	128	7.71
	1	7.77
623.xalancbmk_s	128	12.6
625.x264_s	128	15.2
631.deepsjeng_s	128	5.75
641.leela_s	128	5.12
648.exchange2_s	128	20.7
657.xz_s	128	23.3
		23.3

SPECspeed®2017_int_base (11.1)   SPECspeed®2017_int_peak (11.1)

Hardware

CPU Name: AMD EPYC 7763
 Max MHz: 3500
 Nominal: 2450
Enabled: 128 cores, 2 chips
Orderable: 1, 2 chip(s)
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 512 KB I+D on chip per core
 L3: 256 MB I+D on chip per chip,
 32 MB shared / 8 cores
 Other: None
Memory: 2 TB (16 x 128 GB 4Rx4 PC4-3200AA-L)
Storage: 1 x 182 GB SATA SSD, RAID 0
Other: None

Software

OS: Ubuntu 20.04.1 LTS (x86_64)
 Kernel 5.4.0-42-generic
Compiler: C/C++/Fortran: Version 3.0.0 of AOCC
Parallel: Yes
Firmware: HPE BIOS Version A42 v2.40 02/15/2021 released Mar-2021
File System: ext4
System State: Run level 5 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 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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CPU2017 License: 3	**Test Date:** Feb-2021
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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	128	**292**	**6.08**	292	6.08	291	6.10	1	285	6.24	286	6.21	**285**	**6.23**
602.gcc_s	128	334	11.9	335	11.9	**334**	**11.9**	128	334	11.9	335	11.9	**334**	**11.9**
605.mcf_s	128	**255**	**18.5**	255	18.5	255	18.5	128	**255**	**18.5**	255	18.5	255	18.5
620.omnetpp_s	128	210	7.77	212	7.71	**211**	**7.71**	1	209	7.81	212	7.68	**210**	**7.77**
623.xalancbmk_s	128	**113**	**12.6**	114	12.5	112	12.7	128	**113**	**12.6**	114	12.5	112	12.7
625.x264_s	128	**116**	**15.2**	116	15.2	116	15.2	128	**116**	**15.2**	116	15.2	116	15.2
631.deepsjeng_s	128	249	5.76	**249**	**5.75**	250	5.74	128	249	5.76	**249**	**5.75**	250	5.74
641.leela_s	128	**334**	**5.12**	335	5.09	332	5.13	128	**334**	**5.12**	335	5.09	332	5.13
648.exchange2_s	128	142	20.7	142	20.7	**142**	**20.7**	128	142	20.7	142	20.7	**142**	**20.7**
657.xz_s	128	**265**	**23.3**	264	23.4	269	23.0	128	270	22.9	264	23.4	**265**	**23.3**
SPECspeed®2017_int_base =		**11.1**											
SPECspeed®2017_int_peak =		**11.1**											

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>
'echo 8 > /proc/sys/vm/dirty_ratio' run as root to limit dirty cache to 8% of
memory.
'echo 1 > /proc/sys/vm/swappiness' run as root to limit swap usage to minimum
necessary.
'echo 1 > /proc/sys/vm/zone_reclaim_mode' run as root to free node-local memory
and avoid remote memory usage.
'sync; echo 3 > /proc/sys/vm/drop_caches' run as root to reset filesystem caches.
'sysctl -w kernel.randomize_va_space=0' run as root to disable address space layout
randomization (ASLR) to reduce run-to-run variability.
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root to enable
```

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Standard Performance Evaluation Corporation (info@spec.org)　　　　https://www.spec.org/

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Operating System Notes (Continued)

```
Transparent Hugepages (THP) for this run.
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root for peak
runs of 628.pop2_s and 638.imagick_s to enable THP only on request.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-127"
LD_LIBRARY_PATH =
     "/home/cpu2017_B1/amd_speed_aocc300_milan_B_lib/64;/home/cpu2017_B1/amd_
     speed_aocc300_milan_B_lib/32:"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "128"

Environment variables set by runcpu during the 600.perlbench_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 657.xz_s peak run:
GOMP_CPU_AFFINITY = "0-127"
```

General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 1TiB Memory using openSUSE 15.2

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 v4.8.2 in RHEL 7.4 (No options specified)
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2
```

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Platform Notes

```
 BIOS Configuration
  Workload Profile set to General Peak Frequency Compute
  AMD SMT Option set to Disabled
  Determinism Control set to Manual
   Performance Determinism set to Power Deterministic
  Last-Level Cache (LLC) as NUMA Node set to Enabled
  NUMA memory domains per socket set to One memory domain per socket
  Thermal Configuration set to Maximum Cooling
  Workload Profile set to Custom
  Infinity Fabric Power Management set to Disabled
   Infinity Fabric Performance State set to P0
  Power Regulator set to OS Control Mode


  Sysinfo program /home/cpu2017_B1/bin/sysinfo
  Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
  running on dl385g10v2 Sun Feb 28 21:35:26 2021


  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 7763 64-Core Processor
        2  "physical id"s (chips)
        128 "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 : 64
        siblings  : 64
        physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
        25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
        53 54 55 56 57 58 59 60 61 62 63
        physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
        25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
        53 54 55 56 57 58 59 60 61 62 63


  From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     Address sizes:         48 bits physical, 48 bits virtual
     CPU(s):                128
     On-line CPU(s) list:   0-127
     Thread(s) per core:    1
     Core(s) per socket:    64
     Socket(s):             2
     NUMA node(s):          16
```

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Platform Notes (Continued)

```
         Vendor ID:                         AuthenticAMD
         CPU family:                        25
         Model:                             1
         Model name:                        AMD EPYC 7763 64-Core Processor
         Stepping:                          1
         Frequency boost:                   enabled
         CPU MHz:                           1790.691
         CPU max MHz:                        2450.0000
         CPU min MHz:                        1500.0000
         BogoMIPS:                          4890.66
         Virtualization:                    AMD-V
         L1d cache:                         4 MiB
         L1i cache:                         4 MiB
         L2 cache:                          64 MiB
         L3 cache:                          512 MiB
         NUMA node0 CPU(s):                 0-7
         NUMA node1 CPU(s):                 8-15
         NUMA node2 CPU(s):                 16-23
         NUMA node3 CPU(s):                 24-31
         NUMA node4 CPU(s):                 32-39
         NUMA node5 CPU(s):                 40-47
         NUMA node6 CPU(s):                 48-55
         NUMA node7 CPU(s):                 56-63
         NUMA node8 CPU(s):                 64-71
         NUMA node9 CPU(s):                 72-79
         NUMA node10 CPU(s):                80-87
         NUMA node11 CPU(s):                88-95
         NUMA node12 CPU(s):                96-103
         NUMA node13 CPU(s):                104-111
         NUMA node14 CPU(s):                112-119
         NUMA node15 CPU(s):                120-127
         Vulnerability Itlb multihit:       Not affected
         Vulnerability L1tf:                Not affected
         Vulnerability Mds:                 Not affected
         Vulnerability Meltdown:            Not affected
         Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via
         prctl and seccomp
         Vulnerability Spectre v1:          Mitigation; usercopy/swapgs barriers and __user
         pointer sanitization
         Vulnerability Spectre v2:          Mitigation; Full AMD retpoline, IBPB conditional,
         IBRS_FW, STIBP disabled, RSB filling
         Vulnerability Srbds:               Not affected
         Vulnerability Tsx async abort:     Not affected
         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 nonstop_tsc cpuid extd_apicid
         aperfmperf pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe
```

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Platform Notes (Continued)

```
     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_llc mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs
     ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 invpcid 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 wbnoinvd arat npt lbrv svm_lock
     nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pfthreshold
     v_vmsave_vmload vgif umip pku ospke vaes vpclmulqdq 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 3 4 5 6 7
     node 0 size: 128775 MB
     node 0 free: 128575 MB
     node 1 cpus: 8 9 10 11 12 13 14 15
     node 1 size: 129022 MB
     node 1 free: 128897 MB
     node 2 cpus: 16 17 18 19 20 21 22 23
     node 2 size: 129022 MB
     node 2 free: 128837 MB
     node 3 cpus: 24 25 26 27 28 29 30 31
     node 3 size: 129022 MB
     node 3 free: 128890 MB
     node 4 cpus: 32 33 34 35 36 37 38 39
     node 4 size: 129022 MB
     node 4 free: 128785 MB
     node 5 cpus: 40 41 42 43 44 45 46 47
     node 5 size: 128997 MB
     node 5 free: 128794 MB
     node 6 cpus: 48 49 50 51 52 53 54 55
     node 6 size: 129022 MB
     node 6 free: 128856 MB
     node 7 cpus: 56 57 58 59 60 61 62 63
     node 7 size: 116909 MB
     node 7 free: 116774 MB
     node 8 cpus: 64 65 66 67 68 69 70 71
     node 8 size: 129022 MB
     node 8 free: 128901 MB
     node 9 cpus: 72 73 74 75 76 77 78 79
     node 9 size: 129022 MB
     node 9 free: 128916 MB
     node 10 cpus: 80 81 82 83 84 85 86 87
     node 10 size: 129022 MB
```

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Platform Notes (Continued)

```
   node 10 free: 128843 MB
   node 11 cpus: 88 89 90 91 92 93 94 95
   node 11 size: 129022 MB
   node 11 free: 128911 MB
   node 12 cpus: 96 97 98 99 100 101 102 103
   node 12 size: 129022 MB
   node 12 free: 128919 MB
   node 13 cpus: 104 105 106 107 108 109 110 111
   node 13 size: 129022 MB
   node 13 free: 128912 MB
   node 14 cpus: 112 113 114 115 116 117 118 119
   node 14 size: 129022 MB
   node 14 free: 128918 MB
   node 15 cpus: 120 121 122 123 124 125 126 127
   node 15 size: 129016 MB
   node 15 free: 128908 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  11  11  11  11  32  32  32  32  32  32  32  32
     1:  11  10  11  11  11  11  11  11  32  32  32  32  32  32  32  32
     2:  11  11  10  11  11  11  11  11  32  32  32  32  32  32  32  32
     3:  11  11  11  10  11  11  11  11  32  32  32  32  32  32  32  32
     4:  11  11  11  11  10  11  11  11  32  32  32  32  32  32  32  32
     5:  11  11  11  11  11  10  11  11  32  32  32  32  32  32  32  32
     6:  11  11  11  11  11  11  10  11  32  32  32  32  32  32  32  32
     7:  11  11  11  11  11  11  11  10  32  32  32  32  32  32  32  32
     8:  32  32  32  32  32  32  32  32  10  11  11  11  11  11  11  11
     9:  32  32  32  32  32  32  32  32  11  10  11  11  11  11  11  11
    10:  32  32  32  32  32  32  32  32  11  11  10  11  11  11  11  11
    11:  32  32  32  32  32  32  32  32  11  11  11  10  11  11  11  11
    12:  32  32  32  32  32  32  32  32  11  11  11  11  10  11  11  11
    13:  32  32  32  32  32  32  32  32  11  11  11  11  11  10  11  11
    14:  32  32  32  32  32  32  32  32  11  11  11  11  11  11  10  11
    15:  32  32  32  32  32  32  32  32  11  11  11  11  11  11  11  10


 From /proc/meminfo
    MemTotal:       2101211748 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 /sbin/tuned-adm active
     Current active profile: throughput-performance

 /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
    performance

 /usr/bin/lsb_release -d
```

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Platform Notes (Continued)

```
    Ubuntu 20.04.1 LTS

 From /etc/*release* /etc/*version*
    debian_version: bullseye/sid
    os-release:
        NAME="Ubuntu"
        VERSION="20.04.1 LTS (Focal Fossa)"
        ID=ubuntu
        ID_LIKE=debian
        PRETTY_NAME="Ubuntu 20.04.1 LTS"
        VERSION_ID="20.04"
        HOME_URL="https://www.ubuntu.com/"
        SUPPORT_URL="https://help.ubuntu.com/"

 uname -a:
    Linux dl385g10v2 5.4.0-42-generic #46-Ubuntu SMP Fri Jul 10 00:24:02 UTC 2020 x86_64
    x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2018-12207 (iTLB Multihit):               Not affected
 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: usercopy/swapgs
                                               barriers and __user pointer
                                               sanitization
 CVE-2017-5715 (Spectre variant 2):            Mitigation: Full AMD retpoline,
                                              IBPB: conditional, IBRS_FW, STIBP:
                                               disabled, RSB filling
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):      Not affected

 run-level 5 Feb 28 18:35

 SPEC is set to: /home/cpu2017_B1
    Filesystem                      Type  Size  Used Avail Use% Mounted on
    /dev/mapper/ubuntu--vg-ubuntu--lv ext4  182G   97G   76G  57% /

 From /sys/devices/virtual/dmi/id
    Vendor:          HPE
    Product:         ProLiant DL385 Gen10 Plus
    Product Family:  ProLiant
    Serial:          CN79340HC3
```

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Platform Notes (Continued)

```
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 UNKNOWN M386AAG40AM3-CWE 128 GB 4 rank 3200
    16x UNKNOWN NOT AVAILABLE

 BIOS:
    BIOS Vendor:       HPE
    BIOS Version:      A42
    BIOS Date:         02/15/2021
    BIOS Revision:     2.40
    Firmware Revision: 2.40

 (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)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------------


==============================================================================
C++      | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
         | 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------------


==============================================================================
Fortran | 648.exchange2_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
```

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Test Sponsor: HPE
Tested by: HPE

Test Date: Feb-2021
Hardware Availability: Apr-2021
Software Availability: Mar-2021

Compiler Version Notes (Continued)

```
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/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:
```
-m64 -mno-adx -mno-sse4a -Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-enable-licm-vrp -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -function-specialize -flv-function-specialization
```

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SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL385 Gen10 Plus v2
(2.45 GHz, AMD EPYC 7763)

SPECspeed®2017_int_base = 11.1

SPECspeed®2017_int_peak = 11.1

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Feb-2021
Hardware Availability: Apr-2021
Software Availability: Mar-2021

Base Optimization Flags (Continued)

C benchmarks (continued):
```
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3 -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-lflang -lflangrti
```

C++ benchmarks:
```
-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-do-block-reorder=aggressive
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -mllvm -enable-partial-unswitch
-mllvm -unroll-threshold=100 -finline-aggressive
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -extra-vectorizer-passes -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -mllvm -convert-pow-exp-to-int=false
-z muldefs -mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
-lflangrti
```

Fortran benchmarks:
```
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -z muldefs
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
-lflangrti
```

Base Other Flags

C benchmarks:
```
-Wno-unused-command-line-argument -Wno-return-type
```

C++ benchmarks:
```
-Wno-unused-command-line-argument -Wno-return-type
```

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

SPEC CPU®2017 Integer Speed Result

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SPECspeed®2017_int_base = 11.1

ProLiant DL385 Gen10 Plus v2
(2.45 GHz, AMD EPYC 7763)

SPECspeed®2017_int_peak = 11.1

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Feb-2021
Hardware Availability: Apr-2021
Software Availability: Mar-2021

Peak Compiler Invocation

C benchmarks:
```
clang
```

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

Fortran benchmarks:
```
flang
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
 600.perlbench_s: -m64 -mno-adx -mno-sse4a -Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-enable-licm-vrp
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=5 -mllvm -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
```

```
 602.gcc_s: basepeak = yes
```

```
 605.mcf_s: basepeak = yes
```

```
 625.x264_s: basepeak = yes
```

```
 657.xz_s: Same as 600.perlbench_s
```

C++ benchmarks:

(Continued on next page)

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Hewlett Packard Enterprise
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ProLiant DL385 Gen10 Plus v2
(2.45 GHz, AMD EPYC 7763)

$SPECspeed®2017\_int\_base = 11.1$

$SPECspeed®2017\_int\_peak = 11.1$

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Feb-2021
Hardware Availability: Apr-2021
Software Availability: Mar-2021

Peak Optimization Flags (Continued)

620.omnetpp_s: `-m64 -std=c++98 -mno-adx -mno-sse4a`
`-Wl,-mllvm -Wl,-do-block-reorder=aggressive`
`-Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast`
`-march=znver3 -fveclib=AMDLIBM -ffast-math -flto`
`-finline-aggressive -mllvm -unroll-threshold=100`
`-flv-function-specialization -mllvm -enable-licm-vrp`
`-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch`
`-mllvm -reduce-array-computations=3`
`-mllvm -global-vectorize-slp=true`
`-mllvm -do-block-reorder=aggressive`
`-fvirtual-function-elimination -fvisibility=hidden`
`-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm`
`-ljemalloc -lflang`

623.xalancbmk_s: `basepeak = yes`

631.deepsjeng_s: `basepeak = yes`

641.leela_s: `basepeak = yes`

Fortran benchmarks:

648.exchange2_s: `basepeak = yes`

Peak Other Flags

C benchmarks:
`-Wno-unused-command-line-argument -Wno-return-type`

C++ benchmarks:
`-Wno-unused-command-line-argument -Wno-return-type`

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/aocc300-flags-A1.html`
`http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-V1.2-EPYC-revP.html`

SPEC CPU®2017 Integer Speed Result

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(Test Sponsor: HPE)

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SPECspeed®2017_int_base = 11.1

SPECspeed®2017_int_peak = 11.1

CPU2017 License:	3	**Test Date:**	Feb-2021
Test Sponsor:	HPE	**Hardware Availability:**	Apr-2021
Tested by:	HPE	**Software Availability:**	Mar-2021

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/aocc300-flags-A1.xml
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-V1.2-EPYC-revP.xml

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