



SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

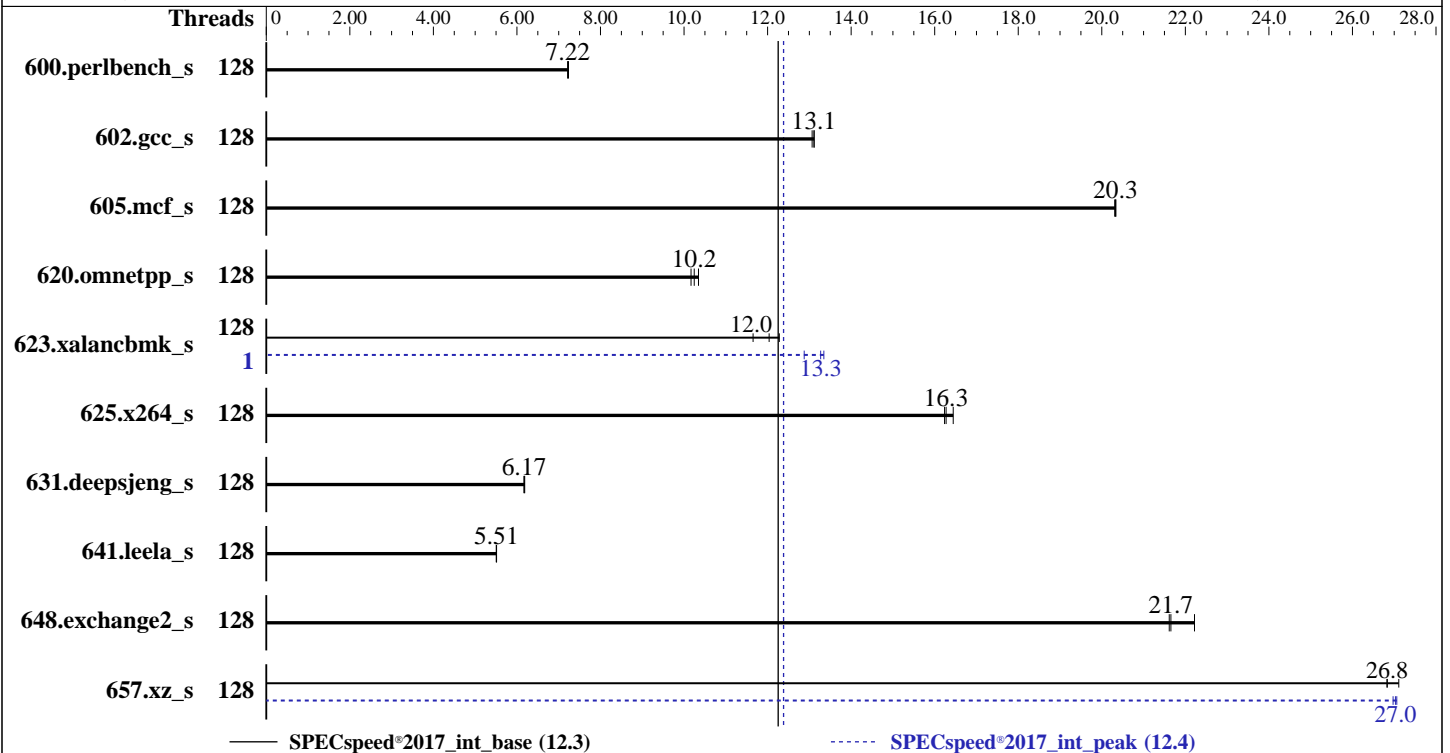
ProLiant DL365 Gen10 Plus v2
(2.20 GHz, AMD EPYC 7773X)

SPECspeed®2017_int_base = 12.3

SPECspeed®2017_int_peak = 12.4

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

Test Date: Feb-2022
Hardware Availability: Mar-2022
Software Availability: Jan-2022



Hardware

CPU Name: AMD EPYC 7773X
 Max MHz: 3500
 Nominal: 2200
 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: 768 MB I+D on chip per chip,
 96 MB shared / 8 cores
 Other: None
 Memory: 2 TB (16 x 128 GB 4Rx4 PC4-3200AA-L)
 Storage: 1 x 400 GB SAS SSD, RAID 0
 Other: None

Software

OS: Ubuntu 20.04.2 LTS (x86_64)
 Kernel 5.13.0-28-generic
 Compiler: C/C++/Fortran: Version 3.2.0 of AOCC
 Parallel: Yes
 Firmware: HPE BIOS Version A42 v2.56 02/10/2022 released
 Feb-2022
 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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Results Table

Benchmark	Base						Peak							
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	128	245	7.23	<u>246</u>	<u>7.22</u>	246	7.21	128	245	7.23	<u>246</u>	<u>7.22</u>	246	7.21
602.gcc_s	128	305	13.1	304	13.1	<u>304</u>	<u>13.1</u>	128	305	13.1	304	13.1	<u>304</u>	<u>13.1</u>
605.mcf_s	128	<u>232</u>	<u>20.3</u>	232	20.3	232	20.3	128	<u>232</u>	<u>20.3</u>	232	20.3	232	20.3
620.omnetpp_s	128	158	10.3	160	10.2	<u>159</u>	<u>10.2</u>	128	158	10.3	160	10.2	<u>159</u>	<u>10.2</u>
623.xalancbmk_s	128	122	11.7	<u>118</u>	<u>12.0</u>	115	12.3	1	110	12.9	106	13.3	<u>107</u>	<u>13.3</u>
625.x264_s	128	107	16.4	<u>108</u>	<u>16.3</u>	109	16.2	128	107	16.4	<u>108</u>	<u>16.3</u>	109	16.2
631.deepsjeng_s	128	232	6.19	232	6.17	<u>232</u>	<u>6.17</u>	128	232	6.19	232	6.17	<u>232</u>	<u>6.17</u>
641.leela_s	128	310	5.50	309	5.51	<u>310</u>	<u>5.51</u>	128	310	5.50	309	5.51	<u>310</u>	<u>5.51</u>
648.exchange2_s	128	132	22.2	136	21.6	<u>136</u>	<u>21.7</u>	128	132	22.2	136	21.6	<u>136</u>	<u>21.7</u>
657.xz_s	128	228	27.1	<u>230</u>	<u>26.8</u>	230	26.8	128	228	27.1	229	27.0	<u>229</u>	<u>27.0</u>

SPECspeed®2017_int_base = **12.3**

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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 limit
'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>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage,
'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run
variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) for all allocations,

(Continued on next page)



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Operating System Notes (Continued)

```
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and  
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:  
GOMP_CPU_AFFINITY = "0-127"  
LD_LIBRARY_PATH =  
    "/home/cpu2017_speed/amd_speed_aocc320_milanx_A_lib/lib;/home/cpu2017_sp  
    eed/amd_speed_aocc320_milanx_A_lib/lib32:"  
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"  
MALLOCONF = "retain:true"  
OMP_DYNAMIC = "false"  
OMP_SCHEDULE = "static"  
OMP_STACKSIZE = "128M"  
OMP_THREAD_LIMIT = "128"
```

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

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

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
Infinity Fabric Power Management set to Disabled
Infinity Fabric Performance State set to P0

The system date and time as discovered by sysinfo is incorrect as the time was not updated prior to the run. The test_date field shows an accurate date for the result.

The system ROM used for this result contains microcode version 0x 0A001227h for the AMD EPYC 7nn3X family of processors. The reference code/AGESA version used in this ROM is version MilanPI 1.0.0.8.

Sysinfo program /home/cpu2017_speed/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on cpu2017-ProLiant-DL365-Gen10-Plus Mon Jan 10 10:33:58 2022

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 7773X 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 from util-linux 2.34:

```
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
```

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Platform Notes (Continued)

```

On-line CPU(s) list:          0-127
Thread(s) per core:          1
Core(s) per socket:          64
Socket(s):                    2
NUMA node(s):                16
Vendor ID:                    AuthenticAMD
CPU family:                   25
Model:                        1
Model name:                   AMD EPYC 7773X 64-Core Processor
Stepping:                     2
Frequency boost:              enabled
CPU MHz:                      2200.000
CPU max MHz:                  2200.0000
CPU min MHz:                  1500.0000
BogoMIPS:                    4392.18
Virtualization:               AMD-V
L1d cache:                    4 MiB
L1i cache:                    4 MiB
L2 cache:                     64 MiB
L3 cache:                     1.5 GiB
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

```

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Platform Notes (Continued)

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 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 rdpru wbnoinvd amd_ppin arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pfthreshold v_vmsave_vmload vgif v_spec_ctrl umip pku ospke vaes vpclmulqdq rdpid overflow_recov succor smca

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL
L1d	32K	4M	8	Data	1
L1i	32K	4M	8	Instruction	1
L2	512K	64M	8	Unified	2
L3	96M	1.5G	16	Unified	3

/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: 128710 MB
node 0 free: 127717 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 129021 MB
node 1 free: 128923 MB
node 2 cpus: 16 17 18 19 20 21 22 23
node 2 size: 128988 MB
node 2 free: 128683 MB
node 3 cpus: 24 25 26 27 28 29 30 31
node 3 size: 129021 MB
node 3 free: 128916 MB
node 4 cpus: 32 33 34 35 36 37 38 39
node 4 size: 129021 MB
node 4 free: 128898 MB
node 5 cpus: 40 41 42 43 44 45 46 47
node 5 size: 129021 MB
node 5 free: 128845 MB
node 6 cpus: 48 49 50 51 52 53 54 55

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Platform Notes (Continued)

```

node 6 size: 129021 MB
node 6 free: 128698 MB
node 7 cpus: 56 57 58 59 60 61 62 63
node 7 size: 116908 MB
node 7 free: 116788 MB
node 8 cpus: 64 65 66 67 68 69 70 71
node 8 size: 129021 MB
node 8 free: 128945 MB
node 9 cpus: 72 73 74 75 76 77 78 79
node 9 size: 129021 MB
node 9 free: 128942 MB
node 10 cpus: 80 81 82 83 84 85 86 87
node 10 size: 129021 MB
node 10 free: 128941 MB
node 11 cpus: 88 89 90 91 92 93 94 95
node 11 size: 129021 MB
node 11 free: 128916 MB
node 12 cpus: 96 97 98 99 100 101 102 103
node 12 size: 129021 MB
node 12 free: 128905 MB
node 13 cpus: 104 105 106 107 108 109 110 111
node 13 size: 129021 MB
node 13 free: 128943 MB
node 14 cpus: 112 113 114 115 116 117 118 119
node 14 size: 129021 MB
node 14 free: 128863 MB
node 15 cpus: 120 121 122 123 124 125 126 127
node 15 size: 129012 MB
node 15 free: 128918 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 11 32 32 32 32 32 32 32
 1: 11 10 11 11 11 11 11 11 11 32 32 32 32 32 32 32
 2: 11 11 10 11 11 11 11 11 11 32 32 32 32 32 32 32
 3: 11 11 11 10 11 11 11 11 11 32 32 32 32 32 32 32
 4: 11 11 11 11 10 11 11 11 11 32 32 32 32 32 32 32
 5: 11 11 11 11 11 10 11 11 11 32 32 32 32 32 32 32
 6: 11 11 11 11 11 11 10 11 11 32 32 32 32 32 32 32
 7: 11 11 11 11 11 11 11 10 11 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

```

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Platform Notes (Continued)

From /proc/meminfo

MemTotal: 2101125640 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
Ubuntu 20.04.2 LTS

From /etc/*release* /etc/*version*

debian_version: bullseye/sid
os-release:
NAME="Ubuntu"
VERSION="20.04.2 LTS (Focal Fossa)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 20.04.2 LTS"
VERSION_ID="20.04"
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"

uname -a:

Linux cpu2017-ProLiant-DL365-Gen10-Plus 5.13.0-28-generic #31~20.04.1-Ubuntu SMP Wed
Jan 19 14:08:10 UTC 2022 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

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Platform Notes (Continued)

CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 5 Jan 10 10:27

SPEC is set to: /home/cpu2017_speed

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda2	ext4	366G	69G	279G	20%	/

From /sys/devices/virtual/dmi/id

```
Vendor:          HPE
Product:         ProLiant DL365 Gen10 Plus
Product Family: ProLiant
Serial:          CN70430NKN
```

Additional information from dmidecode 3.2 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 Samsung M386AAG40AM3-CWE 128 GB 4 rank 3200
16x UNKNOWN NOT AVAILABLE
```

BIOS:

```
BIOS Vendor:      HPE
BIOS Version:     A42
BIOS Date:        02/10/2022
BIOS Revision:    2.56
Firmware Revision: 2.55
```

(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 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on LLVM Mirror.Version.13.0.0)

Target: x86_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin

```
=====  
C++   | 620.omnetpp_s(base, peak) 623.xalanbmk_s(base, peak)  
=====
```

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Compiler Version Notes (Continued)

| 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)

AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on LLVM Mirror.Version.13.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin

=====
Fortran | 648.exchange2_s(base, peak)

AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on LLVM Mirror.Version.13.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/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



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SPECspeed®2017_int_base = 12.3

SPECspeed®2017_int_peak = 12.4

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

Test Date: Feb-2022
Hardware Availability: Mar-2022
Software Availability: Jan-2022

Base Optimization Flags

C benchmarks:

```
-m64 -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 -fopenmp -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -function-specialize -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3 -z muldefs
-DSPEC_OPENMP -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
```

C++ benchmarks:

```
-m64 -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 -fopenmp -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
-fvirtual-function-elimination -fvisibility=hidden -DSPEC_OPENMP
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
```

Fortran benchmarks:

```
-m64 -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 -fopenmp -flto -z muldefs
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -DSPEC_OPENMP
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
```

Base Other Flags

C benchmarks:

```
-Wno-unused-command-line-argument -Wno-return-type
```

C++ benchmarks:

```
-Wno-unused-command-line-argument -Wno-return-type
```

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Base Other Flags (Continued)

Fortran benchmarks:
-Wno-return-type

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: basepeak = yes

602.gcc_s: basepeak = yes

605.mcf_s: basepeak = yes

625.x264_s: basepeak = yes

657.xz_s: -m64 -Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-enable-licm-vrp
-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 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -fopenmp

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Peak Optimization Flags (Continued)

657.xz_s (continued):

```
-flto -fstruct-layout=5 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays
-mllvm -function-specialize -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3
-mllvm -do-block-reorder=aggressive -DSPEC_OPENMP
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
```

C++ benchmarks:

620.omnetpp_s: basepeak = yes

```
623.xalancbmk_s: -m64 -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=aggressive -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -fopenmp
-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=libomp -lomp -lamdlibm -ljemalloc
-lflang
```

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
```

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Peak Other Flags (Continued)

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/HPE-Platform-Flags-AMD-V1.2-EPYC-revR.html>
<http://www.spec.org/cpu2017/flags/aocc320-flags-A1.html>

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-V1.2-EPYC-revR.xml>
<http://www.spec.org/cpu2017/flags/aocc320-flags-A1.xml>

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