SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Lenovo Global Technology

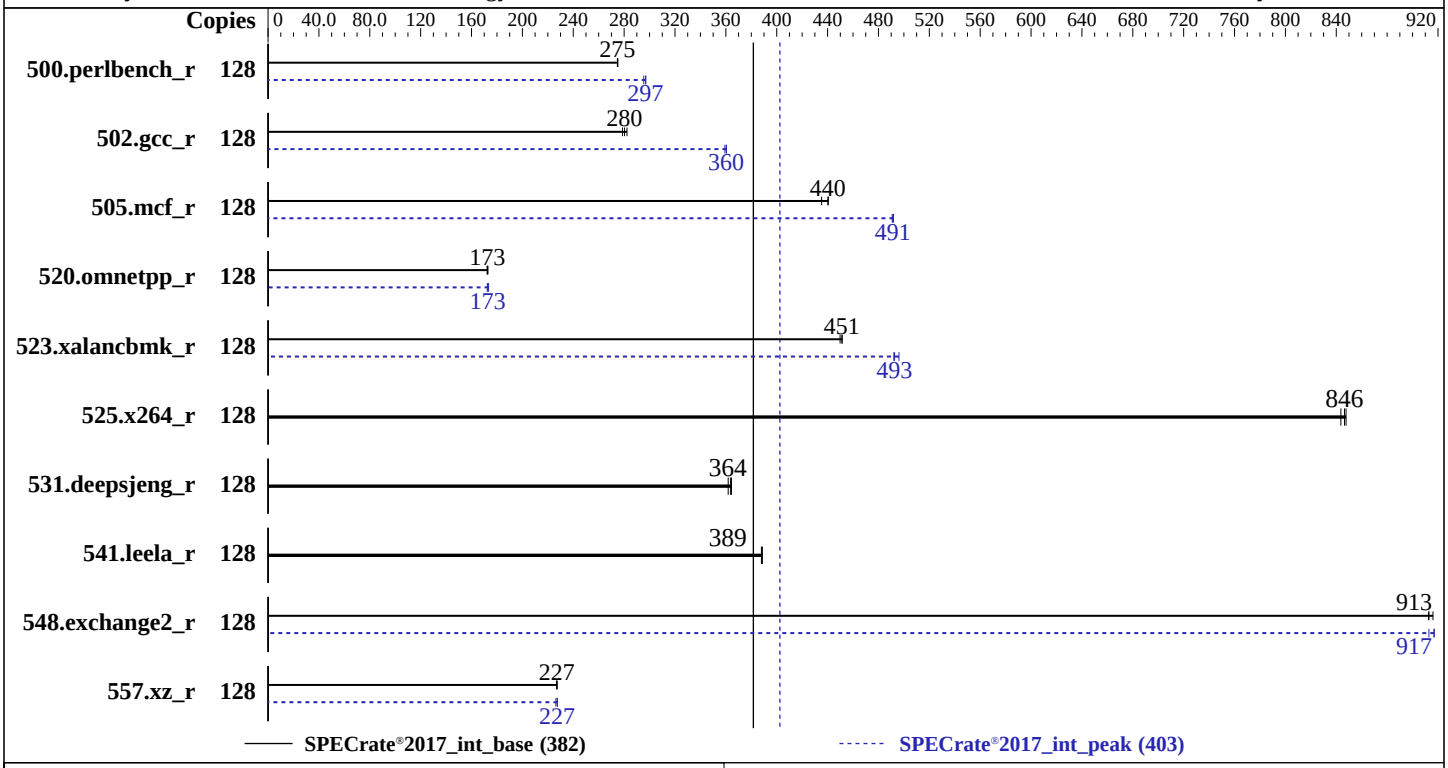
ThinkSystem SR635
2.00 GHz, AMD EPYC 7713

SPECrate®2017_int_base = 382

SPECrate®2017_int_peak = 403

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Aug-2021
Hardware Availability: Jun-2021
Software Availability: Mar-2021



Hardware

CPU Name:	AMD EPYC 7713
Max MHz:	3675
Nominal:	2000
Enabled:	64 cores, 1 chip, 2 threads/core
Orderable:	1 chip
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:	256 GB (8 x 32 GB 2Rx4 PC4-3200AA-R)
Storage:	1 x 960 GB SATA SSD
Other:	None

Software

OS:	SUSE Linux Enterprise Server 15 SP2 (x86_64) Kernel 5.3.18-22-default
Compiler:	C/C++/Fortran: Version 3.0.0 of AOCC
Parallel:	No
Firmware:	Lenovo BIOS Version CFE125U 6.0 released May-2021
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other:	jemalloc: jemalloc memory allocator library v5.1.0
Power Management:	BIOS and OS set to prefer performance at the cost of additional power usage

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	128	741	275	742	275	**742**	**275**	128	690	295	686	297	**686**	**297**
502.gcc_r	128	642	282	650	279	**647**	**280**	128	**503**	**360**	503	360	505	359
505.mcf_r	128	469	441	**470**	**440**	475	435	128	421	491	**421**	**491**	421	492
520.omnetpp_r	128	**973**	**173**	971	173	975	172	128	974	172	**972**	**173**	968	173
523.xalancbmk_r	128	**300**	**451**	299	451	300	450	128	272	496	275	492	**274**	**493**
525.x264_r	128	264	848	266	844	**265**	**846**	128	264	848	266	844	**265**	**846**
531.deepsjeng_r	128	**403**	**364**	405	362	403	364	128	**403**	**364**	405	362	403	364
541.leela_r	128	545	389	546	388	**546**	**389**	128	545	389	546	388	**546**	**389**
548.exchange2_r	128	**367**	**913**	368	913	366	916	128	366	917	**366**	**917**	367	913
557.xz_r	128	609	227	**609**	**227**	608	227	128	**608**	**227**	611	226	608	228

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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>
'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
```

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Operating System Notes (Continued)

'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root for peak integer runs and all FP runs to enable Transparent Hugepages (THP).
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root for base integer runs to enable THP only on request.
'echo 0 > /proc/sys/kernel/numa_balancing' run as root to eliminate NUMA location probing; the workloads are all bound to specific NUMA nodes.

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
"/home/cpu2017-1.1.8-amd-aocc300-milan-A1/amd_rate_aocc300_milan_A_lib/64;/home/cpu2017-1.1.8-amd-aocc300-milan-A1/amd_rate_aocc300_milan_A_lib/32:"
MALLOC_CONF = "retain:true"

Environment variables set by runcpu during the 523.xalancbmk_r peak run:
MALLOC_CONF = "thp:never"

General Notes

Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 512GiB 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

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
NUMA nodes per socket set to NPS4
L2 Stream HW Prefetcher set to Disable
SOC P-states set to P0
LLC as NUMA Node set to Enabled
Memory interleaving set to Disabled

(Continued on next page)

Platform Notes (Continued)

```
Sysinfo program /home/cpu2017-1.1.8-amd-aocc300-milan-A1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost Fri Aug 13 08:17:22 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 7713 64-Core Processor
      1  "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  : 128
      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

From lscpu from util-linux 2.33.1:
     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:  2
     Core(s) per socket:  64
     Socket(s):           1
     NUMA node(s):        8
     Vendor ID:           AuthenticAMD
     CPU family:          25
     Model:               1
     Model name:          AMD EPYC 7713 64-Core Processor
     Stepping:            1
     CPU MHz:             2389.871
     CPU max MHz:         2000.0000
     CPU min MHz:         1500.0000
     BogoMIPS:            3992.55
     Virtualization:      AMD-V
     L1d cache:           32K
     L1i cache:           32K
     L2 cache:            512K
     L3 cache:            32768K
     NUMA node0 CPU(s):   0-7,64-71
     NUMA node1 CPU(s):   8-15,72-79
```

(Continued on next page)

Platform Notes (Continued)

```
      NUMA node2 CPU(s):   16-23,80-87
      NUMA node3 CPU(s):   24-31,88-95
      NUMA node4 CPU(s):   32-39,96-103
      NUMA node5 CPU(s):   40-47,104-111
      NUMA node6 CPU(s):   48-55,112-119
      NUMA node7 CPU(s):   56-63,120-127
      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 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 erms 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: 8 nodes (0-7)
    node 0 cpus: 0 1 2 3 4 5 6 7 64 65 66 67 68 69 70 71
    node 0 size: 32058 MB
    node 0 free: 31797 MB
    node 1 cpus: 8 9 10 11 12 13 14 15 72 73 74 75 76 77 78 79
    node 1 size: 32250 MB
    node 1 free: 32028 MB
    node 2 cpus: 16 17 18 19 20 21 22 23 80 81 82 83 84 85 86 87
    node 2 size: 32252 MB
    node 2 free: 32079 MB
    node 3 cpus: 24 25 26 27 28 29 30 31 88 89 90 91 92 93 94 95
    node 3 size: 32250 MB
    node 3 free: 32068 MB
    node 4 cpus: 32 33 34 35 36 37 38 39 96 97 98 99 100 101 102 103
    node 4 size: 32252 MB
    node 4 free: 32079 MB
    node 5 cpus: 40 41 42 43 44 45 46 47 104 105 106 107 108 109 110 111
    node 5 size: 32216 MB
    node 5 free: 32003 MB
    node 6 cpus: 48 49 50 51 52 53 54 55 112 113 114 115 116 117 118 119
    node 6 size: 32252 MB
    node 6 free: 31966 MB
    node 7 cpus: 56 57 58 59 60 61 62 63 120 121 122 123 124 125 126 127
```

(Continued on next page)

Platform Notes (Continued)

```
  node 7 size: 32237 MB
  node 7 free: 32041 MB
  node distances:
  node   0   1   2   3   4   5   6   7
    0:  10  11  12  12  12  12  12  12
    1:  11  10  12  12  12  12  12  12
    2:  12  12  10  11  12  12  12  12
    3:  12  12  11  10  12  12  12  12
    4:  12  12  12  12  10  11  12  12
    5:  12  12  12  12  11  10  12  12
    6:  12  12  12  12  12  12  10  11
    7:  12  12  12  12  12  12  11  10

From /proc/meminfo
   MemTotal:       263955724 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

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

From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
      VERSION="15-SP2"
      VERSION_ID="15.2"
      PRETTY_NAME="SUSE Linux Enterprise Server 15 SP2"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15:sp2"

uname -a:
   Linux localhost 5.3.18-22-default #1 SMP Wed Jun 3 12:16:43 UTC 2020 (720aeba) 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
```

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Platform Notes (Continued)

```
                                                       sanitization
 CVE-2017-5715 (Spectre variant 2):                     Mitigation: Full AMD retpoline,
                                                      IBPB: conditional, IBRS_FW, STIBP:
                                                       always-on, RSB filling
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):               Not affected

 run-level 3 Aug 13 08:06

 SPEC is set to: /home/cpu2017-1.1.8-amd-aocc300-milan-A1
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda3      xfs   892G   67G  826G   8% /

 From /sys/devices/virtual/dmi/id
     Vendor:         Lenovo
     Product:        ThinkSystem SR635 -[7Y00000000]-
     Product Family: ThinkSystem
     Serial:         0123456789

 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:
     8x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200
     8x Unknown Unknown

 BIOS:
    BIOS Vendor:       Lenovo
    BIOS Version:      CFE125U
    BIOS Date:         05/28/2021
    BIOS Revision:     6.0

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C       | 502.gcc_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------------
```

(Continued on next page)

Compiler Version Notes (Continued)

```
==============================================================================
C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
        | 525.x264_r(base, peak) 557.xz_r(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       | 502.gcc_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------------

==============================================================================
C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
        | 525.x264_r(base, peak) 557.xz_r(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++     | 523.xalancbmk_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------------

==============================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
        | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
------------------------------------------------------------------------------
```

(Continued on next page)

Compiler Version Notes (Continued)

```
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++     | 523.xalancbmk_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------------

==============================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
        | 531.deepsjeng_r(base, peak) 541.leela_r(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 | 548.exchange2_r(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
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

(Continued on next page)

Base Compiler Invocation (Continued)

Fortran benchmarks:
flang

Base Portability Flags

500.perlbench_r: -DSPEC_LINUX_X64 -DSPEC_LP64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LINUX -DSPEC_LP64
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -Wl,-allow-multiple-definition -Wl,-mllvm -Wl,-enable-licm-vrp
-flto -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 -ffast-math
-march=znver3 -fveclib=AMDLIBM -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
-lamdlibm -ljemalloc -lflang -lflangrti

C++ benchmarks:
-m64 -std=c++98 -Wl,-mllvm -Wl,-do-block-reorder=aggressive -flto
-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 -ffast-math
-march=znver3 -fveclib=AMDLIBM -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

(Continued on next page)

Base Optimization Flags (Continued)

C++ benchmarks (continued):
-z muldefs -mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden -lamdlibm
-ljemalloc -lflang -lflangrti

Fortran benchmarks:
-m64 -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-flto -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 -ffast-math
-march=znver3 -fveclib=AMDLIBM -z muldefs -mllvm -unroll-aggressive
-mllvm -unroll-threshold=500 -lamdlibm -ljemalloc -lflang -lflangrti

Base Other Flags

C benchmarks:
-Wno-unused-command-line-argument

C++ benchmarks:
-Wno-unused-command-line-argument

Peak Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Peak Portability Flags

500.perlbench_r: -DSPEC_LINUX_X64 -DSPEC_LP64
502.gcc_r: -D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64

(Continued on next page)

Peak Portability Flags (Continued)

520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LINUX -DSPEC_LP64
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

500.perlbench_r: -m64 -Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-enable-licm-vrp -flto
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-fprofile-instr-generate(pass 1)
-fprofile-instr-use(pass 2) -Ofast -march=znver3
-fveclib=AMDLIBM -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -mllvm -inline-threshold=1000
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=false
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -lamdlibm -ljemalloc

502.gcc_r: -m32 -Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-enable-licm-vrp -flto
-Wl,-mllvm -Wl,-function-specialize -Ofast -march=znver3
-fveclib=AMDLIBM -fstruct-layout=7
-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 -fgnu89-inline
-ljemalloc

505.mcf_r: -m64 -Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-enable-licm-vrp -flto
-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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays

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Peak Optimization Flags (Continued)

505.mcf_r (continued):
-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 -lamdlibm -ljemalloc

525.x264_r: basepeak = yes

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r: -m64 -std=c++98
-Wl,-mllvm -Wl,-do-block-reorder=aggressive -flto
-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 -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
-lamdlibm -ljemalloc

523.xalancbmk_r: -m32 -Wl,-mllvm -Wl,-do-block-reorder=aggressive -flto
-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 -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
-ljemalloc

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

(Continued on next page)

Peak Optimization Flags (Continued)

Fortran benchmarks:
-m64 -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver3 -fveclib=AMDLIBM -mllvm -unroll-aggressive
-mllvm -unroll-threshold=500 -lamdlibm -ljemalloc -lflang -lflangrti

Peak Other Flags

C benchmarks (except as noted below):
-Wno-unused-command-line-argument

502.gcc_r: -L/usr/lib -Wno-unused-command-line-argument
-L/sppo/bin/cpu2017v115aocc3/amd_rate_aocc300_milan_A_lib/32

C++ benchmarks (except as noted below):
-Wno-unused-command-line-argument

523.xalancbmk_r: -L/usr/lib -Wno-unused-command-line-argument
-L/sppo/bin/cpu2017v115aocc3/amd_rate_aocc300_milan_A_lib/32

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Milan1P-G.html
http://www.spec.org/cpu2017/flags/aocc300-flags-A1.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Milan1P-G.xml
http://www.spec.org/cpu2017/flags/aocc300-flags-A1.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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