SPEC CPU®2017 Integer Rate Result

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

$SPECrate^{®}2017\_int\_base = 345$

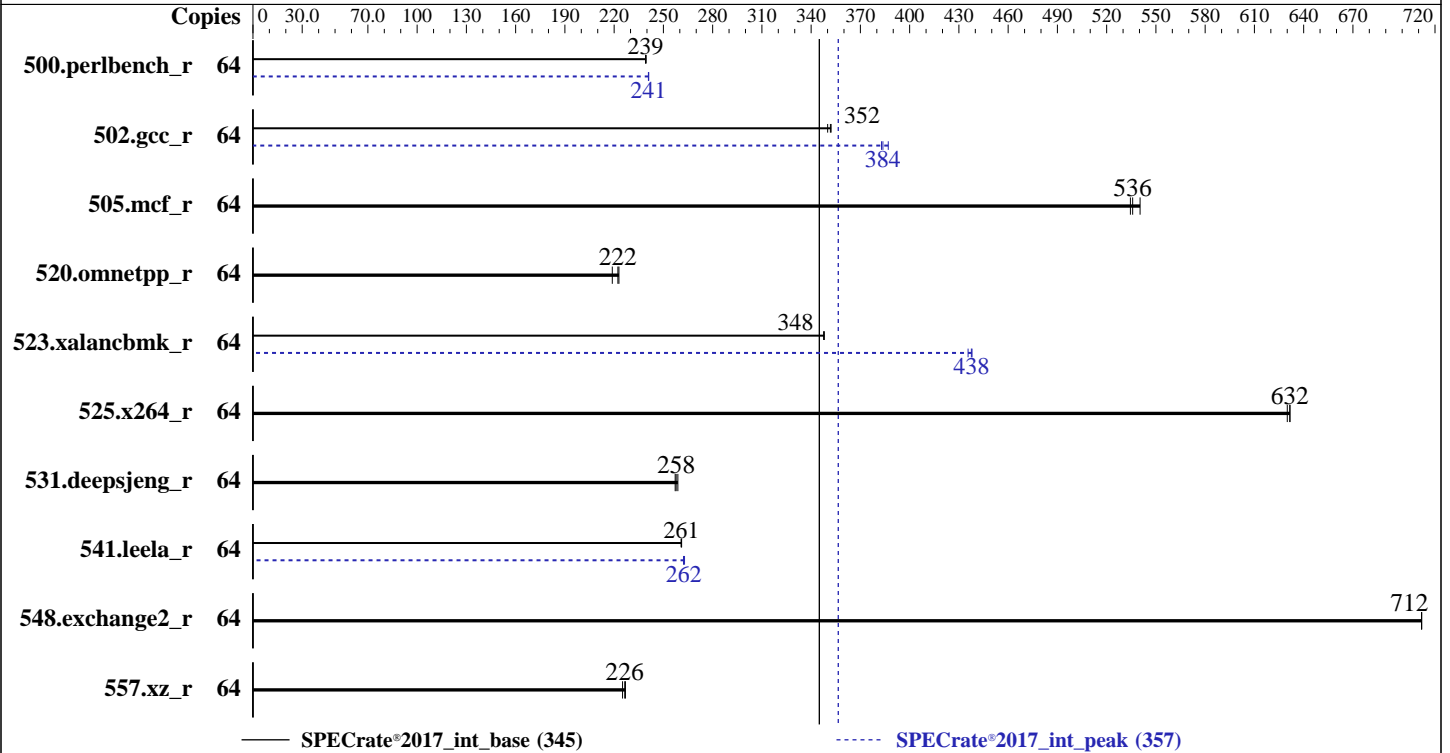$SPECrate^{®}2017\_int\_peak = 357$

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2022
Hardware Availability: Mar-2022
Software Availability: Dec-2021

Copies		
500.perlbench_r	64	239 / 241
502.gcc_r	64	352 / 384
505.mcf_r	64	536
520.omnetpp_r	64	222
523.xalancbmk_r	64	348 / 438
525.x264_r	64	632
531.deepsjeng_r	64	258
541.leela_r	64	261 / 262
548.exchange2_r	64	712
557.xz_r	64	226

SPECrate®2017_int_base (345) ——
SPECrate®2017_int_peak (357) - - - -

Hardware

CPU Name: AMD EPYC 7373X
Max MHz: 3800
Nominal: 3050
Enabled: 32 cores, 2 chips, 2 threads/core
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: 768 MB I+D on chip per chip, 96 MB shared / 2 cores
Other: None
Memory: 1 TB (16 x 64 GB 4Rx4 PC4-3200AA-L)
Storage: 1 x 240 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 3.2.0 of AOCC
Parallel: No
Firmware: Version 0802 released Oct-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.

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

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2022 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

CPU2017 License: 9016	**Test Date:** Mar-2022
Test Sponsor: ASUSTeK Computer Inc.	**Hardware Availability:** Mar-2022
Tested by: ASUSTeK Computer Inc.	**Software Availability:** Dec-2021

Results Table

Benchmark	Base						Peak					
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	64	425	239	426	239	**426**	**239**	64	423	241	423	241	**423**	**241**
502.gcc_r	64	257	352	**258**	**352**	259	350	64	237	383	234	387	**236**	**384**
505.mcf_r	64	191	540	**193**	**536**	194	534	64	191	540	**193**	**536**	194	534
520.omnetpp_r	64	377	223	**378**	**222**	384	219	64	377	223	**378**	**222**	384	219
523.xalancbmk_r	64	194	348	**194**	**348**	194	348	64	155	436	154	438	**154**	**438**
525.x264_r	64	**177**	**632**	178	630	177	632	64	**177**	**632**	178	630	177	632
531.deepsjeng_r	64	283	259	285	257	**285**	**258**	64	283	259	285	257	**285**	**258**
541.leela_r	64	406	261	**406**	**261**	406	261	64	**404**	**262**	403	263	404	262
548.exchange2_r	64	236	712	**236**	**712**	236	712	64	236	712	**236**	**712**	236	712
557.xz_r	64	**305**	**226**	305	227	307	225	64	**305**	**226**	305	227	307	225
SPECrate®2017_int_base =		**345**										
SPECrate®2017_int_peak =		**357**										

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
OS set to performance mode via cpupower frequency-set -g performance

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
```

(Continued on next page)

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

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2022 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

Operating System Notes (Continued)

```
variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) only on request for base runs,
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
To enable THP for all allocations for peak runs,
'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:
LD_LIBRARY_PATH =
     "/spec2017/amd_rate_aocc320_milanx_A_lib/lib;/spec2017/amd_rate_aocc320_
     milanx_A_lib/lib32:"
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 + 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
```

Platform Notes

```
BIOS Configuration:
DLWM Support = Disabled
SVM Mode = Disabled
NUMA nodes per socket = NPS4
APBDIS = 1
Fix SOC P-state = P0
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2022
Hardware Availability: Mar-2022
Software Availability: Dec-2021

Platform Notes (Continued)

```
Engine Boost = Enabled

 Sysinfo program /spec2017/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on localhost Tue Mar 22 11:01:49 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 7373X 16-Core Processor
       2  "physical id"s (chips)
       64 "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 : 16
       siblings  : 32
       physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

 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):              64
       On-line CPU(s) list: 0-63
       Thread(s) per core:  2
       Core(s) per socket:  16
       Socket(s):           2
       NUMA node(s):        8
       Vendor ID:           AuthenticAMD
       CPU family:          25
       Model:               1
       Model name:          AMD EPYC 7373X 16-Core Processor
       Stepping:            2
       CPU MHz:             1858.683
       CPU max MHz:         3050.0000
       CPU min MHz:         1500.0000
       BogoMIPS:            6088.26
       Virtualization:      AMD-V
       L1d cache:           32K
       L1i cache:           32K
       L2 cache:            512K
       L3 cache:            98304K
       NUMA node0 CPU(s):   0-3,32-35
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2022
Hardware Availability: Mar-2022
Software Availability: Dec-2021

Platform Notes (Continued)

```
       NUMA node1 CPU(s):     4-7,36-39
       NUMA node2 CPU(s):     8-11,40-43
       NUMA node3 CPU(s):     12-15,44-47
       NUMA node4 CPU(s):     16-19,48-51
       NUMA node5 CPU(s):     20-23,52-55
       NUMA node6 CPU(s):     24-27,56-59
       NUMA node7 CPU(s):     28-31,60-63
       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 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 32 33 34 35
    node 0 size: 128824 MB
    node 0 free: 128572 MB
    node 1 cpus: 4 5 6 7 36 37 38 39
    node 1 size: 129019 MB
    node 1 free: 128784 MB
    node 2 cpus: 8 9 10 11 40 41 42 43
    node 2 size: 128986 MB
    node 2 free: 128796 MB
    node 3 cpus: 12 13 14 15 44 45 46 47
    node 3 size: 129007 MB
    node 3 free: 128833 MB
    node 4 cpus: 16 17 18 19 48 49 50 51
    node 4 size: 129019 MB
    node 4 free: 128882 MB
    node 5 cpus: 20 21 22 23 52 53 54 55
    node 5 size: 129019 MB
    node 5 free: 128865 MB
    node 6 cpus: 24 25 26 27 56 57 58 59
    node 6 size: 129019 MB
    node 6 free: 128882 MB
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

CPU2017 License: 9016　　　　　　　　　　　　　　　**Test Date:** Mar-2022
Test Sponsor: ASUSTeK Computer Inc.　　　　　　　　**Hardware Availability:** Mar-2022
Tested by: ASUSTeK Computer Inc.　　　　　　　　　**Software Availability:** Dec-2021

Platform Notes (Continued)

```
   node 7 cpus: 28 29 30 31 60 61 62 63
   node 7 size: 129019 MB
   node 7 free: 128864 MB
   node distances:
   node   0   1   2   3   4   5   6   7
     0:  10  12  12  12  32  32  32  32
     1:  12  10  12  12  32  32  32  32
     2:  12  12  10  12  32  32  32  32
     3:  12  12  12  10  32  32  32  32
     4:  32  32  32  32  10  12  12  12
     5:  32  32  32  32  12  10  12  12
     6:  32  32  32  32  12  12  10  12
     7:  32  32  32  32  12  12  12  10

 From /proc/meminfo
    MemTotal:       1056683128 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
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2022
Hardware Availability: Mar-2022
Software Availability: Dec-2021

Platform Notes (Continued)

```
                                          barriers and __user pointer
                                          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 Mar 22 11:01

  SPEC is set to: /spec2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda4       xfs   199G   56G  144G  28% /

  From /sys/devices/virtual/dmi/id
     Vendor:         ASUSTeK COMPUTER INC.
     Product:        RS720A-E11-RS12E
     Product Family: Server
     Serial:         123456789012

  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 M386A8K40DM2-CWE 64 GB 4 rank 3200
      16x Unknown Unknown

  BIOS:
     BIOS Vendor:       American Megatrends Inc.
     BIOS Version:      0802
     BIOS Date:         10/21/2021
     BIOS Revision:     8.2

  (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C         | 502.gcc_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2022
Hardware Availability: Mar-2022
Software Availability: Dec-2021

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 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        | 502.gcc_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/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 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++      | 523.xalancbmk_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/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)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2022
Hardware Availability: Mar-2022
Software Availability: Dec-2021

Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------
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++      | 523.xalancbmk_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin
--------------------------------------------------------------------------


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

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

CPU2017 License: 9016		**Test Date:**	Mar-2022
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Mar-2022
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Dec-2021

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
-Wl,-mllvm -Wl,-enable-loop-fusion -O3 -march=znver3 -fveclib=AMDLIBM
-ffast-math -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 -enable-loop-fusion -z muldefs -lamdlibm -ljemalloc -lflang
```

C++ benchmarks:
```
-m64 -std=c++98 -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
-Wl,-mllvm -Wl,-enable-loop-fusion -O3 -march=znver3 -fveclib=AMDLIBM
-ffast-math -mllvm -enable-partial-unswitch
-mllvm -unroll-threshold=100 -finline-aggressive
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2022
Hardware Availability: Mar-2022
Software Availability: Dec-2021

Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-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
-mllvm -enable-loop-fusion -z muldefs -fvirtual-function-elimination
-fvisibility=hidden -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
-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
-Wl,-mllvm -Wl,-enable-loop-fusion -O3 -march=znver3 -fveclib=AMDLIBM
-ffast-math -z muldefs -mllvm -unroll-aggressive
-mllvm -unroll-threshold=500 -lamdlibm -ljemalloc -lflang
```

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
```

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

CPU2017 License: 9016

Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2022

Hardware Availability: Mar-2022

Software Availability: Dec-2021

Peak Portability Flags

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

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 -ffast-math -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 -ffast-math -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: `basepeak = yes`

525.x264_r: `basepeak = yes`

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2022
Hardware Availability: Mar-2022
Software Availability: Dec-2021

Peak Optimization Flags (Continued)

557.xz_r: `basepeak = yes`

C++ benchmarks:

520.omnetpp_r: `basepeak = yes`

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 -ffast-math`
`-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: `-m64 -std=c++98 -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 -ffast-math`
`-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`
`-fvirtual-function-elimination -fvisibility=hidden`
`-lamdlibm -ljemalloc`

Fortran benchmarks:

548.exchange2_r: `basepeak = yes`

Peak Other Flags

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

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.05 GHz, AMD EPYC 7373X

SPECrate®2017_int_base = 345

SPECrate®2017_int_peak = 357

CPU2017 License: 9016		**Test Date:**	Mar-2022
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Mar-2022
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Dec-2021

Peak Other Flags (Continued)

502.gcc_r: `-L/usr/lib -Wno-unused-command-line-argument`
`-L/sppo/bin/cpu2017v118-aocc3-milanX/amd_rate_aocc320_milanx_A_lib/lib32`

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/cpu2017v118-aocc3-milanX/amd_rate_aocc320_milanx_A_lib/lib32`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-AMD-Milan-V1.6.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/ASUSTekPlatform-Settings-AMD-Milan-V1.6.xml`
`http://www.spec.org/cpu2017/flags/aocc320-flags-A1.xml`

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

Tested with SPEC CPU®2017 v1.1.8 on 2022-03-21 23:01:48-0400.
Report generated on 2022-05-10 19:11:48 by CPU2017 PDF formatter v6442.
Originally published on 2022-05-10.