# SPEC CPU®2017 Integer Rate Result

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## Supermicro
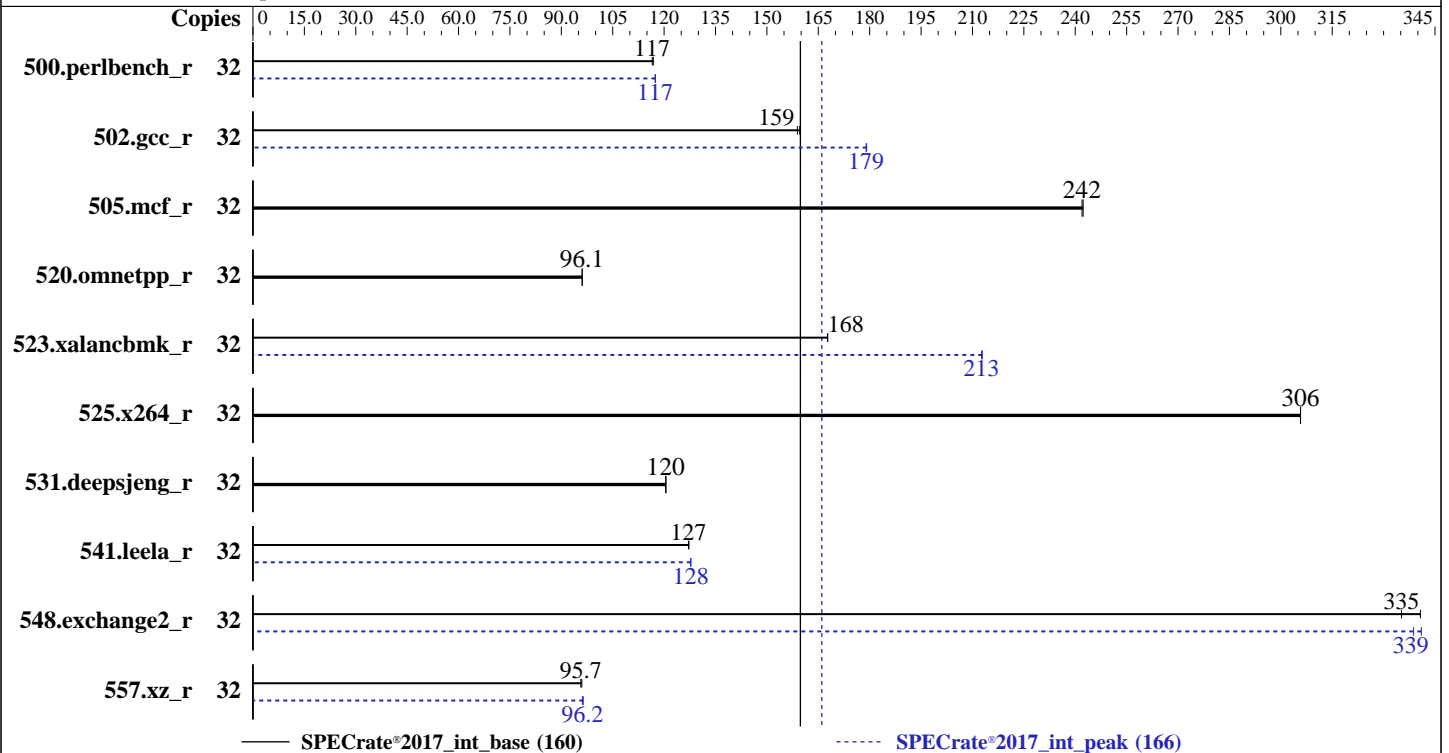
A+ Server 1114S-WN10RT
(H12SSW-NTR , AMD EPYC 7373X)

$SPECrate^{®}2017\_int\_base = 160$

$SPECrate^{®}2017\_int\_peak = 166$

**CPU2017 License:** 001176
**Test Sponsor:** Supermicro
**Tested by:** Supermicro

| Benchmark | Copies | Base | Peak |
|---|---|---|---|
| 500.perlbench_r | 32 | 117 | 117 |
| 502.gcc_r | 32 | 159 | 179 |
| 505.mcf_r | 32 | 242 | |
| 520.omnetpp_r | 32 | 96.1 | |
| 523.xalancbmk_r | 32 | 168 | 213 |
| 525.x264_r | 32 | 306 | |
| 531.deepsjeng_r | 32 | 120 | |
| 541.leela_r | 32 | 127 | 128 |
| 548.exchange2_r | 32 | 335 | 339 |
| 557.xz_r | 32 | 95.7 | 96.2 |

SPECrate®2017_int_base (160)      SPECrate®2017_int_peak (166)

## Hardware

CPU Name: AMD EPYC 7373X
  Max MHz: 3800
  Nominal: 3050
Enabled: 16 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: 768 MB I+D on chip per chip, 96 MB shared / 2 cores
  Other: None
Memory: 256 GB (8 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 3.84 TB NVMe SSD
Other: None

## Software

OS: Ubuntu 20.04.3 LTS
  Kernel 5.4.0-100-generic
Compiler: C/C++/Fortran: Version 3.2.0 of AOCC
Parallel: No
Firmware: Version 2.3a released Jan-2022
File System: ext4
System State: Run level 5 (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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**Test Date:** Feb-2022
**Hardware Availability:** Mar-2022
**Software Availability:** Feb-2022

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 500.perlbench_r | 32 | **437** | **117** | 436 | 117 | | | 32 | 434 | 117 | **434** | **117** | | |
| 502.gcc_r | 32 | 284 | 160 | **285** | **159** | | | 32 | 253 | 179 | **253** | **179** | | |
| 505.mcf_r | 32 | 213 | 242 | **214** | **242** | | | 32 | 213 | 242 | **214** | **242** | | |
| 520.omnetpp_r | 32 | **437** | **96.1** | 437 | 96.1 | | | 32 | **437** | **96.1** | 437 | 96.1 | | |
| 523.xalancbmk_r | 32 | 201 | 168 | **201** | **168** | | | 32 | **159** | **213** | 159 | 213 | | |
| 525.x264_r | 32 | **183** | **306** | 183 | 306 | | | 32 | **183** | **306** | 183 | 306 | | |
| 531.deepsjeng_r | 32 | 304 | 121 | **304** | **120** | | | 32 | 304 | 121 | **304** | **120** | | |
| 541.leela_r | 32 | **417** | **127** | 416 | 127 | | | 32 | **415** | **128** | 415 | 128 | | |
| 548.exchange2_r | 32 | 246 | 341 | **250** | **335** | | | 32 | 246 | 341 | **247** | **339** | | |
| 557.xz_r | 32 | 360 | 96.0 | **361** | **95.7** | | | 32 | **359** | **96.2** | 358 | 96.4 | | |
| **SPECrate®2017_int_base =** | | | **160** | | | | | | | | | | | |
| **SPECrate®2017_int_peak =** | | | **166** | | | | | | | | | | | |

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.
```

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## Operating System Notes (Continued)

```
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 =
      "/home/cpu2017/amd_rate_aocc320_milanx_A_lib/lib;/home/cpu2017/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 Settings:
Determinism Control = Manual
Determinism Slider = Power
cTDP Control = Manual
cTDP = 280
Package Power Limit Control = Manual
Package Power Limit = 280
```

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## Platform Notes (Continued)

```
APBDIS = 1
NUMA Nodes Per Socket = NPS4

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on h12ssw-ntr-7373x Fri Feb 18 05:28:35 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
       1  "physical id"s (chips)
       32 "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

 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):                    32
      On-line CPU(s) list:       0-31
      Thread(s) per core:        2
      Core(s) per socket:        16
      Socket(s):                 1
      NUMA node(s):              8
      Vendor ID:                 AuthenticAMD
      CPU family:                25
      Model:                     1
      Model name:                AMD EPYC 7373X 16-Core Processor
      Stepping:                  2
      Frequency boost:           enabled
      CPU MHz:                   1795.044
      CPU max MHz:               3050.0000
      CPU min MHz:               1500.0000
      BogoMIPS:                  6099.35
      Virtualization:            AMD-V
      L1d cache:                 512 KiB
      L1i cache:                 512 KiB
      L2 cache:                  8 MiB
      L3 cache:                  768 MiB
```

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## Platform Notes (Continued)

```
      NUMA node0 CPU(s):              0,1,16,17
      NUMA node1 CPU(s):              2,3,18,19
      NUMA node2 CPU(s):              4,5,20,21
      NUMA node3 CPU(s):              6,7,22,23
      NUMA node4 CPU(s):              8,9,24,25
      NUMA node5 CPU(s):              10,11,26,27
      NUMA node6 CPU(s):              12,13,28,29
      NUMA node7 CPU(s):              14,15,30,31
      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 always-on, 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
      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

  From lscpu --cache:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE          LEVEL
      L1d       32K      512K   8 Data              1
      L1i       32K      512K   8 Instruction       1
      L2       512K        8M   8 Unified           2
      L3        96M      768M  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: 8 nodes (0-7)
    node 0 cpus: 0 1 16 17
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
    node 0 size: 32058 MB
    node 0 free: 31781 MB
    node 1 cpus: 2 3 18 19
    node 1 size: 32246 MB
    node 1 free: 31851 MB
    node 2 cpus: 4 5 20 21
    node 2 size: 32248 MB
    node 2 free: 31976 MB
    node 3 cpus: 6 7 22 23
    node 3 size: 32218 MB
    node 3 free: 31955 MB
    node 4 cpus: 8 9 24 25
    node 4 size: 32248 MB
    node 4 free: 31954 MB
    node 5 cpus: 10 11 26 27
    node 5 size: 32247 MB
    node 5 free: 32028 MB
    node 6 cpus: 12 13 28 29
    node 6 size: 32248 MB
    node 6 free: 31989 MB
    node 7 cpus: 14 15 30 31
    node 7 size: 32232 MB
    node 7 free: 32046 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:       263934388 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

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

  /usr/bin/lsb_release -d
    Ubuntu 20.04.3 LTS

  From /etc/*release* /etc/*version*
    debian_version: bullseye/sid
```

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## Platform Notes (Continued)

```
    os-release:
        NAME="Ubuntu"
        VERSION="20.04.3 LTS (Focal Fossa)"
        ID=ubuntu
        ID_LIKE=debian
        PRETTY_NAME="Ubuntu 20.04.3 LTS"
        VERSION_ID="20.04"
        HOME_URL="https://www.ubuntu.com/"
        SUPPORT_URL="https://help.ubuntu.com/"

    uname -a:
        Linux h12ssw-ntr-7373x 5.4.0-100-generic #113-Ubuntu SMP Thu Feb 3 18:43:29 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:
                                               always-on, RSB filling
    CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
    CVE-2019-11135 (TSX Asynchronous Abort):   Not affected

    run-level 5 Feb 18 03:31

    SPEC is set to: /home/cpu2017
       Filesystem     Type  Size  Used Avail Use% Mounted on
       /dev/nvme1n1p2 ext4  3.5T   16G  3.3T   1% /


   From /sys/devices/virtual/dmi/id
        Vendor:         Supermicro
        Product:        Super Server
        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.
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
   Memory:
     8x NO DIMM Unknown
     8x SK Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2667

 BIOS:
    BIOS Vendor:         American Megatrends Inc.
    BIOS Version:        2.3a
    BIOS Date:           01/25/2022
    BIOS Revision:       5.22


 (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
------------------------------------------------------------------------------


==============================================================================
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
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------------------------------------------------------------------------------


==============================================================================
```

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```
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)
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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
-------------------------------------------------------------------------------


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

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## Compiler Version Notes (Continued)

```
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++
```

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`

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# 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
-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
```

## Supermicro

A+ Server 1114S-WN10RT
(H12SSW-NTR , AMD EPYC 7373X)

**SPECrate®2017_int_base = 160**

**SPECrate®2017_int_peak = 166**

**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Tested by:** Supermicro  

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

# Base Other Flags (Continued)

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`
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`

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## Supermicro

A+ Server 1114S-WN10RT
(H12SSW-NTR , AMD EPYC 7373X)

SPECrate®2017_int_base = 160

SPECrate®2017_int_peak = 166

# Peak Optimization Flags (Continued)

500.perlbench_r (continued):
```
-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

557.xz_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 -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 -lamdlibm -ljemalloc
```

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
```

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## Supermicro

A+ Server 1114S-WN10RT
(H12SSW-NTR , AMD EPYC 7373X)

SPECrate®2017_int_base = 160

SPECrate®2017_int_peak = 166

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|---|---|---|---|
| **CPU2017 License:** 001176 | | **Test Date:** | Feb-2022 |
| **Test Sponsor:** | Supermicro | **Hardware Availability:** | Mar-2022 |
| **Tested by:** | Supermicro | **Software Availability:** | Feb-2022 |

# Peak Optimization Flags (Continued)

523.xalancbmk_r (continued):
```
-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:
```
-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 -march=znver3
-fveclib=AMDLIBM -ffast-math -mllvm -unroll-aggressive
-mllvm -unroll-threshold=500 -lamdlibm -ljemalloc -lflang
```

# 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/cpu2017v118-aocc3-milanX/amd_rate_aocc320_milanx_A_lib/lib32
```

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

## Supermicro

A+ Server 1114S-WN10RT
(H12SSW-NTR , AMD EPYC 7373X)

SPECrate®2017_int_base = 160

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

# Peak Other Flags (Continued)

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

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The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/aocc320-flags-A1.html`
`http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Milan-revD.html`

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You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/aocc320-flags-A1.xml`
`http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Milan-revD.xml`

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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 2022-02-18 00:28:34-0500.
Report generated on 2022-03-22 10:59:09 by CPU2017 PDF formatter v6442.
Originally published on 2022-03-22.