SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Lenovo Global Technology
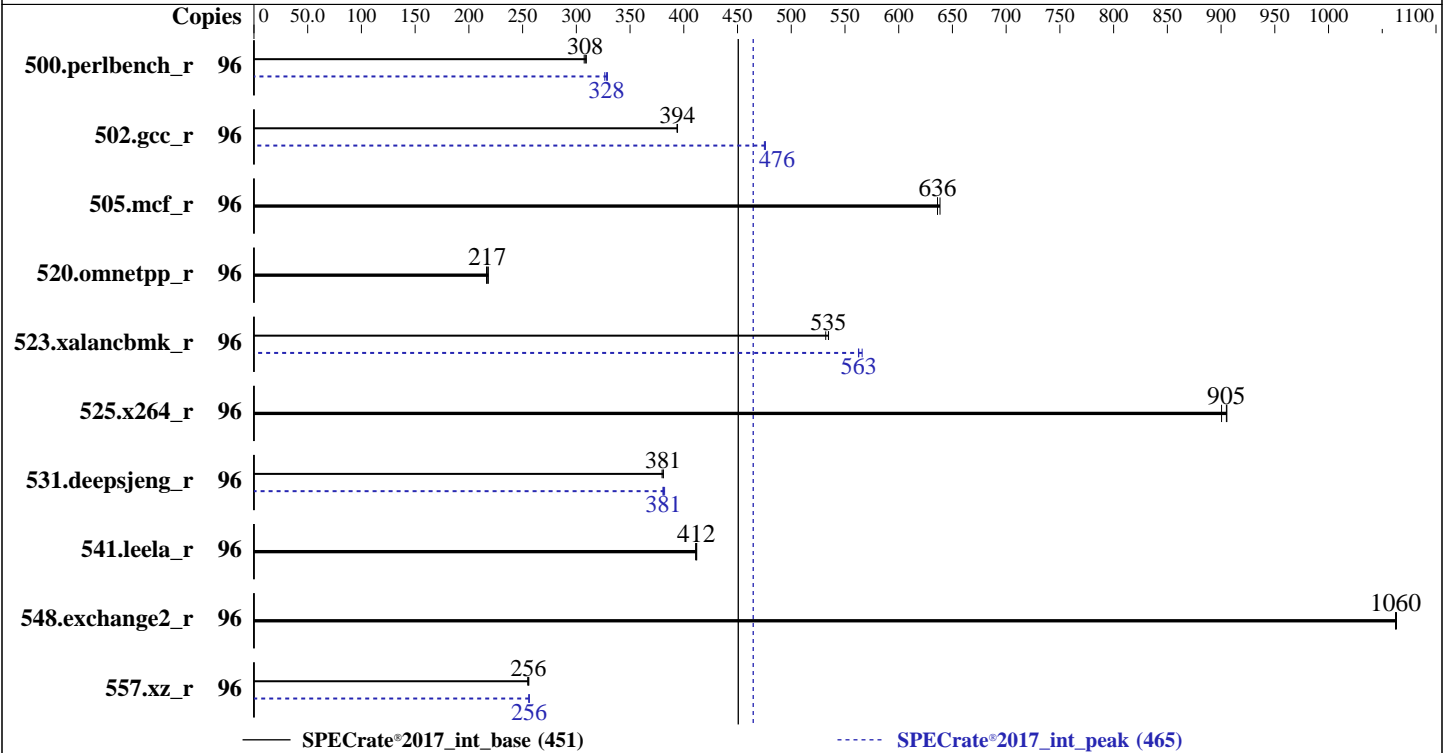
$SPECrate^{®}2017\_int\_base = 451$

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

$SPECrate^{®}2017\_int\_peak = 465$

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

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

Copies

Benchmark	Copies	base	peak
500.perlbench_r	96	308	328
502.gcc_r	96	394	476
505.mcf_r	96	636	
520.omnetpp_r	96	217	
523.xalancbmk_r	96	535	563
525.x264_r	96	905	
531.deepsjeng_r	96	381	381
541.leela_r	96	412	
548.exchange2_r	96	1060	
557.xz_r	96	256	256

SPECrate®2017_int_base (451) ----- SPECrate®2017_int_peak (465)

Hardware

CPU Name: AMD EPYC 74F3
 Max MHz: 4000
 Nominal: 3200
Enabled: 48 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: 256 MB I+D on chip per chip,
 32 MB shared / 3 cores
 Other: None
Memory: 512 GB (16 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 D8E115E 2.01 released Mar-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 set to prefer performance at the cost of additional power usage

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_base = 451

SPECrate®2017_int_peak = 465

CPU2017 License:	9017	**Test Date:**	Apr-2021
Test Sponsor:	Lenovo Global Technology	**Hardware Availability:**	Apr-2021
Tested by:	Lenovo Global Technology	**Software Availability:**	Mar-2021

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	96	**496**	**308**	497	307	494	309	96	465	329	**466**	**328**	468	326
502.gcc_r	96	**345**	**394**	345	394	345	394	96	**286**	**476**	286	476	286	475
505.mcf_r	96	**244**	**636**	244	636	243	638	96	**244**	**636**	244	636	243	638
520.omnetpp_r	96	577	218	**580**	**217**	582	216	96	577	218	**580**	**217**	582	216
523.xalancbmk_r	96	190	535	**190**	**535**	191	532	96	180	563	**180**	**563**	179	566
525.x264_r	96	186	905	**186**	**905**	187	900	96	186	905	**186**	**905**	187	900
531.deepsjeng_r	96	290	380	289	381	**289**	**381**	96	289	381	288	382	**289**	**381**
541.leela_r	96	387	411	386	412	**386**	**412**	96	387	411	386	412	**386**	**412**
548.exchange2_r	96	237	1060	**237**	**1060**	237	1060	96	237	1060	**237**	**1060**	237	1060
557.xz_r	96	**406**	**256**	405	256	407	255	96	**405**	**256**	405	256	405	256
SPECrate®2017_int_base =		**451**												
SPECrate®2017_int_peak =		**465**												

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
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_base = 451

SPECrate®2017_int_peak = 465

CPU2017 License: 9017		**Test Date:**	Apr-2021
Test Sponsor: Lenovo Global Technology		**Hardware Availability:**	Apr-2021
Tested by: Lenovo Global Technology		**Software Availability:**	Mar-2021

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/cpu2017-1.1.5-amd-aocc300-milan-A1/amd_rate_aocc300_milan_A_lib/6
     4;/home/cpu2017-1.1.5-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:
Operating Mode set to Maximum Performance and then set it to Custom Mode
4-Link xGMI Max Speed set to 16Gbps
NUMA nodes per socket set to NPS4
ACPI SRAT L3 Cache as NUMA Domain set to Enable
Memory interleaving set to Disabled

 Sysinfo program /home/cpu2017-1.1.5-amd-aocc300-milan-A1/bin/sysinfo
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_base = 451

SPECrate®2017_int_peak = 465

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

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

Platform Notes (Continued)

```
 Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
 running on localhost Tue Apr  6 16:40:37 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 74F3 24-Core Processor
       2  "physical id"s (chips)
       96 "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 : 24
       siblings  : 48
       physical 0: cores 0 1 2 4 5 6 8 9 10 12 13 14 16 17 18 20 21 22 24 25 26 28 29 30
       physical 1: cores 0 1 2 4 5 6 8 9 10 12 13 14 16 17 18 20 21 22 24 25 26 28 29 30

 From lscpu:
      Architecture:        x86_64
      CPU op-mode(s):      32-bit, 64-bit
      Byte Order:          Little Endian
      Address sizes:       48 bits physical, 48 bits virtual
      CPU(s):              96
      On-line CPU(s) list: 0-95
      Thread(s) per core:  2
      Core(s) per socket:  24
      Socket(s):           2
      NUMA node(s):        16
      Vendor ID:           AuthenticAMD
      CPU family:          25
      Model:               1
      Model name:          AMD EPYC 74F3 24-Core Processor
      Stepping:            1
      CPU MHz:             2988.343
      CPU max MHz:         3200.0000
      CPU min MHz:         1500.0000
      BogoMIPS:            6387.95
      Virtualization:      AMD-V
      L1d cache:           32K
      L1i cache:           32K
      L2 cache:            512K
      L3 cache:            32768K
      NUMA node0 CPU(s):   0-2,48-50
      NUMA node1 CPU(s):   3-5,51-53
      NUMA node2 CPU(s):   6-8,54-56
      NUMA node3 CPU(s):   9-11,57-59
```

(Continued on next page)

Lenovo Global Technology

SPECrate®2017_int_base = 451

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_peak = 465

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

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

Platform Notes (Continued)

```
        NUMA node4 CPU(s):     12-14,60-62
        NUMA node5 CPU(s):     15-17,63-65
        NUMA node6 CPU(s):     18-20,66-68
        NUMA node7 CPU(s):     21-23,69-71
        NUMA node8 CPU(s):     24-26,72-74
        NUMA node9 CPU(s):     27-29,75-77
        NUMA node10 CPU(s):    30-32,78-80
        NUMA node11 CPU(s):    33-35,81-83
        NUMA node12 CPU(s):    36-38,84-86
        NUMA node13 CPU(s):    39-41,87-89
        NUMA node14 CPU(s):    42-44,90-92
        NUMA node15 CPU(s):    45-47,93-95
        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: 16 nodes (0-15)
    node 0 cpus: 0 1 2 48 49 50
    node 0 size: 32066 MB
    node 0 free: 31864 MB
    node 1 cpus: 3 4 5 51 52 53
    node 1 size: 32252 MB
    node 1 free: 32031 MB
    node 2 cpus: 6 7 8 54 55 56
    node 2 size: 32254 MB
    node 2 free: 32059 MB
    node 3 cpus: 9 10 11 57 58 59
    node 3 size: 32252 MB
    node 3 free: 32070 MB
    node 4 cpus: 12 13 14 60 61 62
    node 4 size: 32254 MB
    node 4 free: 32051 MB
    node 5 cpus: 15 16 17 63 64 65
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_base = 451

SPECrate®2017_int_peak = 465

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

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

Platform Notes (Continued)

```
      node 5 size: 32252 MB
      node 5 free: 32070 MB
      node 6 cpus: 18 19 20 66 67 68
      node 6 size: 32254 MB
      node 6 free: 31997 MB
      node 7 cpus: 21 22 23 69 70 71
      node 7 size: 32240 MB
      node 7 free: 32056 MB
      node 8 cpus: 24 25 26 72 73 74
      node 8 size: 32254 MB
      node 8 free: 32068 MB
      node 9 cpus: 27 28 29 75 76 77
      node 9 size: 32252 MB
      node 9 free: 32075 MB
      node 10 cpus: 30 31 32 78 79 80
      node 10 size: 32254 MB
      node 10 free: 32074 MB
      node 11 cpus: 33 34 35 81 82 83
      node 11 size: 32252 MB
      node 11 free: 32076 MB
      node 12 cpus: 36 37 38 84 85 86
      node 12 size: 32254 MB
      node 12 free: 32074 MB
      node 13 cpus: 39 40 41 87 88 89
      node 13 size: 32252 MB
      node 13 free: 32077 MB
      node 14 cpus: 42 43 44 90 91 92
      node 14 size: 32220 MB
      node 14 free: 32039 MB
      node 15 cpus: 45 46 47 93 94 95
      node 15 size: 32251 MB
      node 15 free: 32077 MB
      node distances:
      node   0    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15
        0:  10   11   12   12   12   12   12   12   32   32   32   32   32   32   32   32
        1:  11   10   12   12   12   12   12   12   32   32   32   32   32   32   32   32
        2:  12   12   10   11   12   12   12   12   32   32   32   32   32   32   32   32
        3:  12   12   11   10   12   12   12   12   32   32   32   32   32   32   32   32
        4:  12   12   12   12   10   11   12   12   32   32   32   32   32   32   32   32
        5:  12   12   12   12   11   10   12   12   32   32   32   32   32   32   32   32
        6:  12   12   12   12   12   12   10   11   32   32   32   32   32   32   32   32
        7:  12   12   12   12   12   12   11   10   32   32   32   32   32   32   32   32
        8:  32   32   32   32   32   32   32   32   10   11   12   12   12   12   12   12
        9:  32   32   32   32   32   32   32   32   11   10   12   12   12   12   12   12
       10:  32   32   32   32   32   32   32   32   12   12   10   11   12   12   12   12
       11:  32   32   32   32   32   32   32   32   12   12   11   10   12   12   12   12
       12:  32   32   32   32   32   32   32   32   12   12   12   12   10   11   12   12
```

(Continued on next page)

Lenovo Global Technology

SPECrate®2017_int_base = 451

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_peak = 465

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

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

Platform Notes (Continued)

```
    13:  32  32  32  32  32  32  32  32  12  12  12  12  11  10  12  12
    14:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  10  11
    15:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  10

 From /proc/meminfo
    MemTotal:        528198836 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
                                                    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 Apr 6 10:58
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_base = 451

SPECrate®2017_int_peak = 465

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

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

Platform Notes (Continued)

```
  SPEC is set to: /home/cpu2017-1.1.5-amd-aocc300-milan-A1
     Filesystem      Type   Size  Used Avail Use% Mounted on
     /dev/sdb3       xfs    889G   80G  810G   9% /

  From /sys/devices/virtual/dmi/id
     Vendor:         Lenovo
     Product:        ThinkSystem SR645 MB
     Product Family: ThinkSystem
     Serial:         1234567890


  Additional information from dmidecode follows.  WARNING: Use caution when you interpret
  this section. The 'dmidecode' program reads system data which is "intended to allow
  hardware to be accurately determined", but the intent may not be met, as there are
  frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
    Memory:
      16x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200
      16x Unknown Unknown

  BIOS:
     BIOS Vendor:       Lenovo
     BIOS Version:      D8E115E-2.01
     BIOS Date:         03/04/2021
     BIOS Revision:     2.1
     Firmware Revision: 3.1

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


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

(Continued on next page)

Lenovo Global Technology

SPECrate®2017_int_base = 451

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_peak = 465

CPU2017 License: 9017	**Test Date:** Apr-2021
Test Sponsor: Lenovo Global Technology	**Hardware Availability:** Apr-2021
Tested by: Lenovo Global Technology	**Software Availability:** Mar-2021

Compiler Version Notes (Continued)

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


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

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_base = 451

$SPECrate®2017\_int\_peak = 465$

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

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

Compiler Version Notes (Continued)

```
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++
```

Fortran benchmarks:
```
flang
```

SPEC CPU®2017 Integer Rate Result

Lenovo Global Technology

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_base = 451

SPECrate®2017_int_peak = 465

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

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

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
-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

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_base = 451

SPECrate®2017_int_peak = 465

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

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

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-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`
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`

Lenovo Global Technology

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_base = 451

SPECrate®2017_int_peak = 465

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

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

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: 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 -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:

(Continued on next page)

Lenovo Global Technology

SPECrate®2017_int_base = 451

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_peak = 465

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

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

Peak Optimization Flags (Continued)

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 -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: -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

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes

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

(Continued on next page)

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR645
3.20 GHz, AMD EPYC 74F3

SPECrate®2017_int_base = 451

SPECrate®2017_int_peak = 465

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Apr-2021

Hardware Availability: Apr-2021

Software Availability: Mar-2021

Peak Other Flags (Continued)

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-Milan-D.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-Milan-D.xml
http://www.spec.org/cpu2017/flags/aocc300-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 v1.1.5 on 2021-04-06 04:40:37-0400.
Report generated on 2021-04-27 16:22:14 by CPU2017 PDF formatter v6442.
Originally published on 2021-04-27.