# SPEC CPU®2017 Integer Rate Result

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## Dell Inc.

PowerEdge R6525 (AMD EPYC 7543 32-Core Processor)

$SPECrate^{®}2017\_int\_base = 538$

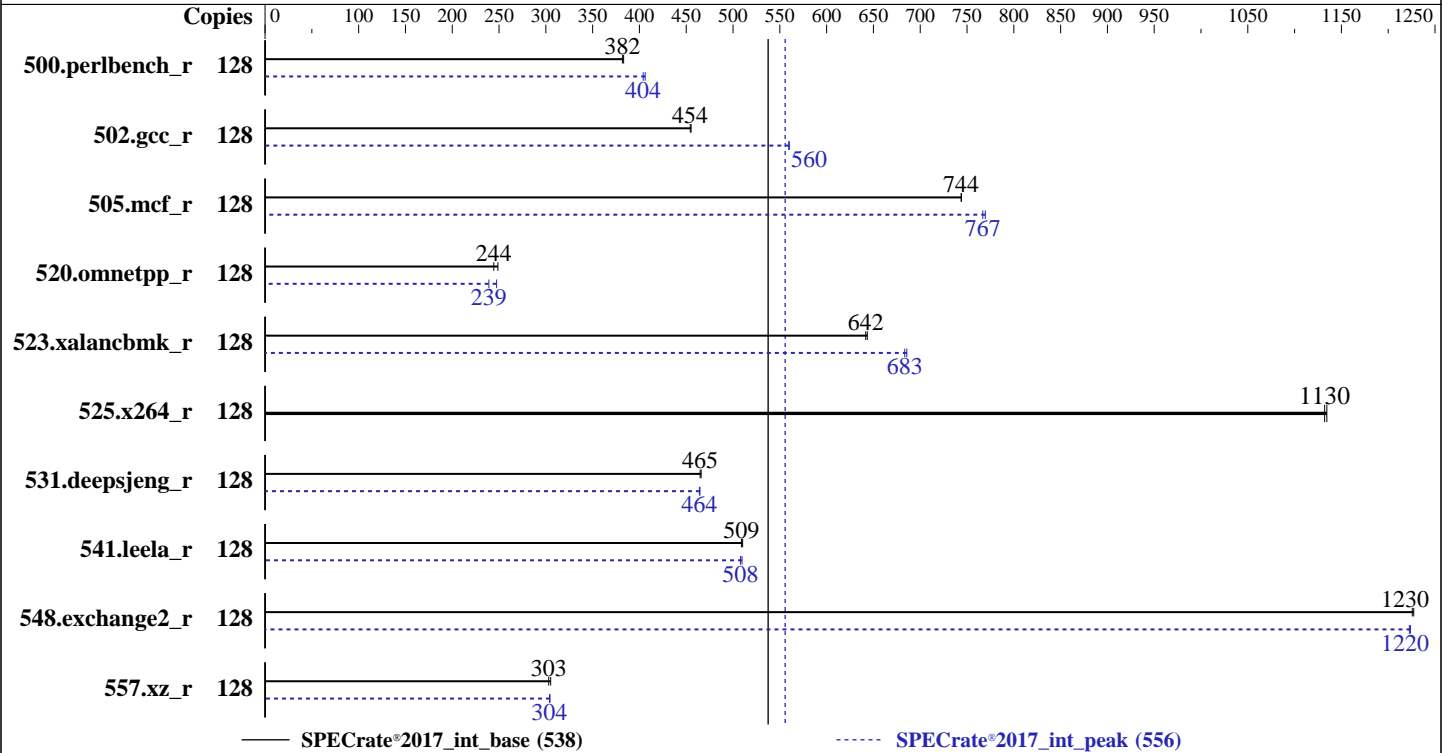$SPECrate^{®}2017\_int\_peak = 556$

**CPU2017 License:** 55
**Test Sponsor:** Dell Inc.
**Tested by:** Dell Inc.

**Test Date:** Feb-2021
**Hardware Availability:** Mar-2021
**Software Availability:** Mar-2021

| Benchmark | Copies | base | peak |
|---|---|---|---|
| 500.perlbench_r | 128 | 382 | 404 |
| 502.gcc_r | 128 | 454 | 560 |
| 505.mcf_r | 128 | 744 | 767 |
| 520.omnetpp_r | 128 | 244 | 239 |
| 523.xalancbmk_r | 128 | 642 | 683 |
| 525.x264_r | 128 | 1130 | |
| 531.deepsjeng_r | 128 | 465 | 464 |
| 541.leela_r | 128 | 509 | 508 |
| 548.exchange2_r | 128 | 1230 | 1220 |
| 557.xz_r | 128 | 303 | 304 |

SPECrate®2017_int_base (538)    SPECrate®2017_int_peak (556)

## Hardware

CPU Name: AMD EPYC 7543
 Max MHz: 3700
 Nominal: 2800
Enabled: 64 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 / 4
  cores
 Other: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)
Storage: 128 GB on tmpfs
Other: None

## Software

OS: Red Hat Enterprise Linux 8.3 (Ootpa)
  4.18.0-240.el8.x86_64
Compiler: C/C++/Fortran: Version 3.0.0 of AOCC
Parallel: No
Firmware: Version 2.0.3 released Jan-2021
File System: tmpfs
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 | **534** | **382** | 532 | 383 | | | 128 | **504** | **404** | 502 | 406 | | |
| 502.gcc_r | 128 | 398 | 455 | **399** | **454** | | | 128 | **324** | **560** | 324 | 560 | | |
| 505.mcf_r | 128 | **278** | **744** | 278 | 744 | | | 128 | 269 | 770 | **270** | **767** | | |
| 520.omnetpp_r | 128 | **687** | **244** | 675 | 249 | | | 128 | 679 | 247 | **702** | **239** | | |
| 523.xalancbmk_r | 128 | 210 | 643 | **211** | **642** | | | 128 | **198** | **683** | 197 | 686 | | |
| 525.x264_r | 128 | **198** | **1130** | 198 | 1130 | | | 128 | **198** | **1130** | 198 | 1130 | | |
| 531.deepsjeng_r | 128 | **316** | **465** | 315 | 466 | | | 128 | 316 | 465 | **316** | **464** | | |
| 541.leela_r | 128 | **416** | **509** | 415 | 510 | | | 128 | **417** | **508** | 416 | 510 | | |
| 548.exchange2_r | 128 | **274** | **1230** | 273 | 1230 | | | 128 | **274** | **1220** | 274 | 1220 | | |
| 557.xz_r | 128 | 453 | 305 | **456** | **303** | | | 128 | 454 | 304 | **455** | **304** | | |

SPECrate®2017_int_base = **538**

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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
```

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## Operating System Notes (Continued)

```
randomization (ASLR) to reduce run-to-run variability.

'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'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.
```

## Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/mnt/ramdisk/cpu2017-1.1.5/amd_rate_aocc300_milan_A_lib/64;/mnt/ramdisk
     /cpu2017-1.1.5/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 + 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.
 Benchmark run from a 225 GB ramdisk created with the cmd: "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk"
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:
    Memory Interleaving      : Disabled
    NUMA Nodes per Socket    : 4
    L3 Cache as NUMA Domain  : Enabled
    Virtualization Technology : Disabled
    DRAM Refresh Delay       : Performance
    System Profile           : Custom
```

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## Platform Notes (Continued)

```
      CPU Power Management    : Maximum Performance
      Memory Patrol Scrub     : Disabled
      PCI ASPM L1 Link
          Power Management    : Disabled


  Sysinfo program /mnt/ramdisk/cpu2017-1.1.5/bin/sysinfo
  Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
  running on rhel-8-3-amd Tue Feb 23 15:00:57 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 7543 32-Core Processor
        2  "physical id"s (chips)
        128 "processors"
     cores, siblings (Caution: counting these is hw and system dependent. The following
     excerpts from /proc/cpuinfo might not be reliable.  Use with caution.)
        cpu cores : 32
        siblings  : 64
        physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
        25 26 27 28 29 30 31
        physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
        25 26 27 28 29 30 31


  From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     CPU(s):                128
     On-line CPU(s) list:   0-127
     Thread(s) per core:    2
     Core(s) per socket:    32
     Socket(s):             2
     NUMA node(s):          16
     Vendor ID:             AuthenticAMD
     CPU family:            25
     Model:                 1
     Model name:            AMD EPYC 7543 32-Core Processor
     Stepping:              1
     CPU MHz:               2476.197
     BogoMIPS:              5589.65
     Virtualization:        AMD-V
     L1d cache:             32K
     L1i cache:             32K
     L2 cache:              512K
```

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## Platform Notes (Continued)

```
      L3 cache:              32768K
      NUMA node0 CPU(s):     0-3,64-67
      NUMA node1 CPU(s):     4-7,68-71
      NUMA node2 CPU(s):     8-11,72-75
      NUMA node3 CPU(s):     12-15,76-79
      NUMA node4 CPU(s):     16-19,80-83
      NUMA node5 CPU(s):     20-23,84-87
      NUMA node6 CPU(s):     24-27,88-91
      NUMA node7 CPU(s):     28-31,92-95
      NUMA node8 CPU(s):     32-35,96-99
      NUMA node9 CPU(s):     36-39,100-103
      NUMA node10 CPU(s):    40-43,104-107
      NUMA node11 CPU(s):    44-47,108-111
      NUMA node12 CPU(s):    48-51,112-115
      NUMA node13 CPU(s):    52-55,116-119
      NUMA node14 CPU(s):    56-59,120-123
      NUMA node15 CPU(s):    60-63,124-127
      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 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 sme ssbd mba sev 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 amd_ppin 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 3 64 65 66 67
    node 0 size: 31788 MB
    node 0 free: 31672 MB
    node 1 cpus: 4 5 6 7 68 69 70 71
    node 1 size: 32223 MB
    node 1 free: 32158 MB
    node 2 cpus: 8 9 10 11 72 73 74 75
    node 2 size: 32233 MB
    node 2 free: 32164 MB
    node 3 cpus: 12 13 14 15 76 77 78 79
    node 3 size: 32217 MB
```

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## Platform Notes (Continued)

```
     node 3 free: 32155 MB
     node 4 cpus: 16 17 18 19 80 81 82 83
     node 4 size: 32241 MB
     node 4 free: 32016 MB
     node 5 cpus: 20 21 22 23 84 85 86 87
     node 5 size: 32231 MB
     node 5 free: 27513 MB
     node 6 cpus: 24 25 26 27 88 89 90 91
     node 6 size: 32239 MB
     node 6 free: 32091 MB
     node 7 cpus: 28 29 30 31 92 93 94 95
     node 7 size: 32182 MB
     node 7 free: 32080 MB
     node 8 cpus: 32 33 34 35 96 97 98 99
     node 8 size: 32223 MB
     node 8 free: 32195 MB
     node 9 cpus: 36 37 38 39 100 101 102 103
     node 9 size: 32233 MB
     node 9 free: 32197 MB
     node 10 cpus: 40 41 42 43 104 105 106 107
     node 10 size: 32237 MB
     node 10 free: 32198 MB
     node 11 cpus: 44 45 46 47 108 109 110 111
     node 11 size: 32229 MB
     node 11 free: 32199 MB
     node 12 cpus: 48 49 50 51 112 113 114 115
     node 12 size: 32243 MB
     node 12 free: 32197 MB
     node 13 cpus: 52 53 54 55 116 117 118 119
     node 13 size: 32219 MB
     node 13 free: 32195 MB
     node 14 cpus: 56 57 58 59 120 121 122 123
     node 14 size: 32239 MB
     node 14 free: 32197 MB
     node 15 cpus: 60 61 62 63 124 125 126 127
     node 15 size: 32242 MB
     node 15 free: 32194 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
```

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## Platform Notes (Continued)

```
    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
   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:       527936680 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 /sbin/tuned-adm active
     Current active profile: throughput-performance

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux"
       VERSION="8.3 (Ootpa)"
       ID="rhel"
       ID_LIKE="fedora"
       VERSION_ID="8.3"
       PLATFORM_ID="platform:el8"
       PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
       ANSI_COLOR="0;31"
    redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
    system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

 uname -a:
    Linux rhel-8-3-amd 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020 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
```

**(Continued on next page)**

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```
 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 Nov 25 12:31

 SPEC is set to: /mnt/ramdisk/cpu2017-1.1.5
    Filesystem      Type   Size  Used Avail Use% Mounted on
    tmpfs           tmpfs  128G  4.5G  124G   4% /mnt/ramdisk


 From /sys/devices/virtual/dmi/id
     Vendor:         Dell Inc.
     Product:        PowerEdge R6525
     Product Family: PowerEdge
     Serial:         C3KRPX2


 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:
     1x 80AD80B380AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
     15x 80AD863280AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
     16x Not Specified Not Specified

 BIOS:
    BIOS Vendor:        Dell Inc.
    BIOS Version:       2.0.3
    BIOS Date:          01/15/2021
    BIOS Revision:      2.0

 (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
------------------------------------------------------------------------------
```

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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)
------------------------------------------------------------------------------
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)
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  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)**

## Dell Inc.

PowerEdge R6525 (AMD EPYC 7543 32-Core Processor)

SPECrate®2017_int_base = 538

SPECrate®2017_int_peak = 556

**CPU2017 License:** 55
**Test Sponsor:** Dell Inc.
**Tested by:** Dell Inc.

**Test Date:** Feb-2021
**Hardware Availability:** Mar-2021
**Software Availability:** Mar-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 -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)**

## Dell Inc.

PowerEdge R6525 (AMD EPYC 7543 32-Core Processor)

SPECrate®2017_int_base = 538

SPECrate®2017_int_peak = 556

**CPU2017 License:** 55　　　　　　　　　　　　　　　　　**Test Date:**　　　　　　　Feb-2021
**Test Sponsor:**　Dell Inc.　　　　　　　　　　　　　　**Hardware Availability:** Mar-2021
**Tested by:**　　　Dell Inc.　　　　　　　　　　　　　　**Software Availability:**　Mar-2021

# 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)**

## Dell Inc.

PowerEdge R6525 (AMD EPYC 7543 32-Core Processor)

SPECrate®2017_int_base = 538

$SPECrate^{®}2017\_int\_peak = 556$

**CPU2017 License:** 55
**Test Sponsor:** Dell Inc.
**Tested by:** Dell Inc.

**Test Date:** Feb-2021
**Hardware Availability:** Mar-2021
**Software Availability:** Mar-2021

# 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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## Dell Inc.

PowerEdge R6525 (AMD EPYC 7543 32-Core Processor)

SPECrate®2017_int_base = 538

SPECrate®2017_int_peak = 556

**CPU2017 License:** 55
**Test Sponsor:** Dell Inc.
**Tested by:** Dell Inc.

**Test Date:** Feb-2021
**Hardware Availability:** Mar-2021
**Software Availability:** Mar-2021

# 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: `Same as 520.omnetpp_r`

541.leela_r: `Same as 520.omnetpp_r`

**(Continued on next page)**

## Dell Inc.

PowerEdge R6525 (AMD EPYC 7543 32-Core Processor)

SPECrate®2017_int_base = 538

SPECrate®2017_int_peak = 556

**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test Date:** Feb-2021

**Hardware Availability:** Mar-2021

**Software Availability:** Mar-2021

# 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/aocc300-flags-A1.html
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-AMD-Milan-rev1.0.html
```

You can also download the XML flags sources by saving the following links:
```
http://www.spec.org/cpu2017/flags/aocc300-flags-A1.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-AMD-Milan-rev1.0.xml
```

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

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