# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

## Hewlett Packard Enterprise

(Test Sponsor: HPE)
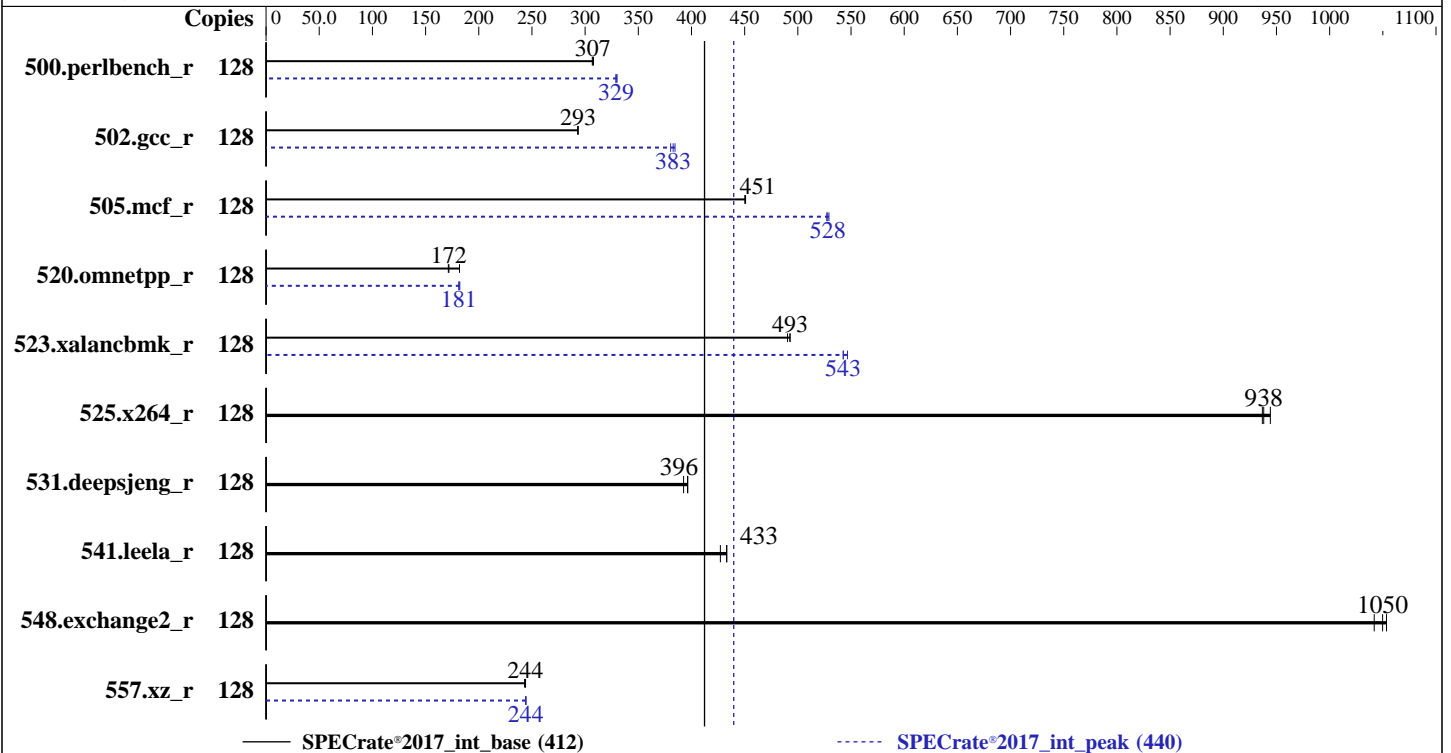
ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

$SPECrate®2017\_int\_base = 412$

$SPECrate®2017\_int\_peak = 440$

**CPU2017 License:** 3     **Test Date:** Feb-2021
**Test Sponsor:** HPE     **Hardware Availability:** Apr-2021
**Tested by:** HPE     **Software Availability:** Mar-2021

| Copies | | Result |
|---|---|---|
| 500.perlbench_r | 128 | 307 (base), 329 (peak) |
| 502.gcc_r | 128 | 293 (base), 383 (peak) |
| 505.mcf_r | 128 | 451 (base), 528 (peak) |
| 520.omnetpp_r | 128 | 172 (base), 181 (peak) |
| 523.xalancbmk_r | 128 | 493 (base), 543 (peak) |
| 525.x264_r | 128 | 938 |
| 531.deepsjeng_r | 128 | 396 |
| 541.leela_r | 128 | 433 |
| 548.exchange2_r | 128 | 1050 |
| 557.xz_r | 128 | 244 (base), 244 (peak) |

SPECrate®2017_int_base (412)     SPECrate®2017_int_peak (440)

## Hardware

CPU Name: AMD EPYC 7763
 Max MHz: 3500
 Nominal: 2450
Enabled: 64 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 512 KB I+D on chip per core
 L3: 256 MB I+D on chip per chip,
 32 MB shared / 8 cores
 Other: None
Memory: 1 TB (8 x 128 GB 4Rx4 PC4-3200AA-L)
Storage: 4 x 480 GB SAS SSD, RAID 0
Other: None

## Software

OS: Ubuntu 20.04.1 LTS (x86_64)
 Kernel 5.4.0-56-generic
Compiler: C/C++/Fortran: Version 3.0.0 of AOCC
Parallel: No
Firmware: HPE BIOS Version A43 v2.40 02/15/2021 released Mar-2021
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 set to prefer performance at the cost of additional power usage

# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

$SPECrate^{®}2017\_int\_base = 412$

$SPECrate^{®}2017\_int\_peak = 440$

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Feb-2021

**Hardware Availability:** Apr-2021

**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 | 128 | **663** | **307** | 664 | 307 | 662 | 308 | 128 | 619 | 329 | **619** | **329** | 617 | 330 |
| 502.gcc_r | 128 | **618** | **293** | 618 | 293 | 618 | 293 | 128 | 471 | 385 | **474** | **383** | 476 | 380 |
| 505.mcf_r | 128 | **459** | **451** | 459 | 450 | 459 | 451 | 128 | **392** | **528** | 391 | 529 | 392 | 527 |
| 520.omnetpp_r | 128 | **977** | **172** | 923 | 182 | 980 | 171 | 128 | **926** | **181** | 922 | 182 | 926 | 181 |
| 523.xalancbmk_r | 128 | 274 | 493 | 276 | 490 | **274** | **493** | 128 | **249** | **543** | 249 | 543 | 247 | 547 |
| 525.x264_r | 128 | 239 | 937 | **239** | **938** | 237 | 944 | 128 | 239 | 937 | **239** | **938** | 237 | 944 |
| 531.deepsjeng_r | 128 | **370** | **396** | 370 | 396 | 374 | 393 | 128 | **370** | **396** | 370 | 396 | 374 | 393 |
| 541.leela_r | 128 | 489 | 433 | 496 | 427 | **490** | **433** | 128 | 489 | 433 | 496 | 427 | **490** | **433** |
| 548.exchange2_r | 128 | 322 | 1040 | 318 | 1050 | **319** | **1050** | 128 | 322 | 1040 | 318 | 1050 | **319** | **1050** |
| 557.xz_r | 128 | 567 | 244 | **567** | **244** | 569 | 243 | 128 | 566 | 244 | **566** | **244** | 566 | 244 |
| **SPECrate®2017_int_base =** | | **412** | | | | | | | | | | | | |
| **SPECrate®2017_int_peak =** | | **440** | | | | | | | | | | | | |

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)**

# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

$SPECrate®2017\_int\_base = 412$

$SPECrate®2017\_int\_peak = 440$

**CPU2017 License:** 3
**Test Sponsor:** HPE
**Tested by:** HPE

**Test Date:** Feb-2021
**Hardware Availability:** Apr-2021
**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.

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
      "/home/SPEC_CPU2017/cpu2017/amd_rate_aocc300_milan_A_lib/64;/home/SPEC_C
      PU2017/cpu2017/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
 Workload Profile set to General Throughput Compute
 Determinism Control set to Manual
  Performance Determinism set to Power Deterministic
 Last-Level Cache (LLC) as NUMA Node set to Enabled
 NUMA memory domains per socket set to Four memory domains per socket
  Infinity Fabric Power Management set to Disabled
    Infinity Fabric Performance State set to P0
 Thermal Configuration set to Maximum Cooling

**(Continued on next page)**

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

$SPECrate^{®}2017\_int\_base = 412$

$SPECrate^{®}2017\_int\_peak = 440$

**CPU2017 License:** 3
**Test Sponsor:** HPE
**Tested by:** HPE

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

## Platform Notes (Continued)

```
 Workload Profile set to Custom
  L2 HW Prefetcher set to Disabled


 Sysinfo program /home/SPEC_CPU2017/cpu2017/bin/sysinfo
 Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
 running on admin Fri Feb 26 15:59:49 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 7763 64-Core Processor
       1  "physical id"s (chips)
       128 "processors"
    cores, siblings (Caution: counting these is hw and system dependent. The following
    excerpts from /proc/cpuinfo might not be reliable.  Use with caution.)
       cpu cores : 64
       siblings  : 128
       physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
       25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
       53 54 55 56 57 58 59 60 61 62 63

 From lscpu:
    Architecture:              x86_64
    CPU op-mode(s):            32-bit, 64-bit
    Byte Order:                Little Endian
    Address sizes:             48 bits physical, 48 bits virtual
    CPU(s):                    128
    On-line CPU(s) list:       0-127
    Thread(s) per core:        2
    Core(s) per socket:        64
    Socket(s):                 1
    NUMA node(s):              8
    Vendor ID:                 AuthenticAMD
    CPU family:                25
    Model:                     1
    Model name:                AMD EPYC 7763 64-Core Processor
    Stepping:                  1
    Frequency boost:           enabled
    CPU MHz:                   3167.915
    CPU max MHz:               2450.0000
    CPU min MHz:               1500.0000
    BogoMIPS:                  4891.06
    Virtualization:            AMD-V
    L1d cache:                 2 MiB
    L1i cache:                 2 MiB
```

**(Continued on next page)**

## Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

$SPECrate®2017\_int\_base = 412$

$SPECrate®2017\_int\_peak = 440$

**CPU2017 License:** 3　　　　　　　　　　　　　　　　**Test Date:**　　　　　Feb-2021
**Test Sponsor:**　　HPE　　　　　　　　　　　　　　**Hardware Availability:** Apr-2021
**Tested by:**　　　　HPE　　　　　　　　　　　　　　**Software Availability:**　Mar-2021

## Platform Notes (Continued)

```
      L2 cache:                       32 MiB
      L3 cache:                       256 MiB
      NUMA node0 CPU(s):              0-7,64-71
      NUMA node1 CPU(s):              8-15,72-79
      NUMA node2 CPU(s):              16-23,80-87
      NUMA node3 CPU(s):              24-31,88-95
      NUMA node4 CPU(s):              32-39,96-103
      NUMA node5 CPU(s):              40-47,104-111
      NUMA node6 CPU(s):              48-55,112-119
      NUMA node7 CPU(s):              56-63,120-127
      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 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 4 5 6 7 64 65 66 67 68 69 70 71
      node 0 size: 128774 MB
      node 0 free: 128260 MB
      node 1 cpus: 8 9 10 11 12 13 14 15 72 73 74 75 76 77 78 79
      node 1 size: 129018 MB
      node 1 free: 128815 MB
```

**(Continued on next page)**

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

SPECrate®2017_int_base = 412

SPECrate®2017_int_peak = 440

**CPU2017 License:** 3
**Test Sponsor:** HPE
**Tested by:** HPE

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

## Platform Notes (Continued)

```
     node 2 cpus: 16 17 18 19 20 21 22 23 80 81 82 83 84 85 86 87
     node 2 size: 128996 MB
     node 2 free: 128763 MB
     node 3 cpus: 24 25 26 27 28 29 30 31 88 89 90 91 92 93 94 95
     node 3 size: 129019 MB
     node 3 free: 128809 MB
     node 4 cpus: 32 33 34 35 36 37 38 39 96 97 98 99 100 101 102 103
     node 4 size: 129020 MB
     node 4 free: 128805 MB
     node 5 cpus: 40 41 42 43 44 45 46 47 104 105 106 107 108 109 110 111
     node 5 size: 129019 MB
     node 5 free: 128805 MB
     node 6 cpus: 48 49 50 51 52 53 54 55 112 113 114 115 116 117 118 119
     node 6 size: 129020 MB
     node 6 free: 128658 MB
     node 7 cpus: 56 57 58 59 60 61 62 63 120 121 122 123 124 125 126 127
     node 7 size: 129006 MB
     node 7 free: 128622 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:       1056640120 kB
     HugePages_Total:        0
     Hugepagesize:        2048 kB

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

  /usr/bin/lsb_release -d
     Ubuntu 20.04.1 LTS

  From /etc/*release* /etc/*version*
     debian_version: bullseye/sid
     os-release:
        NAME="Ubuntu"
        VERSION="20.04.1 LTS (Focal Fossa)"
        ID=ubuntu
        ID_LIKE=debian
```

**(Continued on next page)**

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

$SPECrate®2017\_int\_base = 412$

$SPECrate®2017\_int\_peak = 440$

**CPU2017 License:** 3
**Test Sponsor:** HPE
**Tested by:** HPE

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

## Platform Notes (Continued)

```
        PRETTY_NAME="Ubuntu 20.04.1 LTS"
        VERSION_ID="20.04"
        HOME_URL="https://www.ubuntu.com/"
        SUPPORT_URL="https://help.ubuntu.com/"

  uname -a:
     Linux admin 5.4.0-56-generic #62-Ubuntu SMP Mon Nov 23 19:20:19 UTC 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
  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 26 15:54

  SPEC is set to: /home/SPEC_CPU2017/cpu2017
     Filesystem                      Type  Size  Used Avail Use% Mounted on
     /dev/mapper/ubuntu--vg-ubuntu--lv ext4  196G   78G  109G  42% /

  From /sys/devices/virtual/dmi/id
     Vendor:         HPE
     Product:        ProLiant DL345 Gen10 Plus
     Product Family: ProLiant
     Serial:         J20APP000K


  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:
       8x UNKNOWN M386AAG40AM3-CWE 128 GB 4 rank 3200
       8x UNKNOWN NOT AVAILABLE
```

**(Continued on next page)**

# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

## Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

$SPECrate^®2017\_int\_base = 412$

$SPECrate^®2017\_int\_peak = 440$

**CPU2017 License:** 3
**Test Sponsor:** HPE
**Tested by:** HPE

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

## Platform Notes (Continued)

```
 BIOS:
    BIOS Vendor:       HPE
    BIOS Version:      A43
    BIOS Date:         02/15/2021
    BIOS Revision:     2.40
    Firmware Revision: 2.40

 (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
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)
------------------------------------------------------------------------------
```

**(Continued on next page)**

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

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

$SPECrate®2017\_int\_base = 412$

$SPECrate®2017\_int\_peak = 440$

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Feb-2021

**Hardware Availability:** Apr-2021

**Software Availability:** Mar-2021

## Compiler Version Notes (Continued)

```
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------


==============================================================================
C++      | 523.xalancbmk_r(peak)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------


==============================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
         | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------


==============================================================================
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)**

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

SPECrate®2017_int_base = 412

SPECrate®2017_int_peak = 440

| **CPU2017 License:** 3 | **Test Date:** | Feb-2021 |
|---|---|---|
| **Test Sponsor:** HPE | **Hardware Availability:** | Apr-2021 |
| **Tested by:** HPE | **Software Availability:** | Mar-2021 |

## Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------

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

## 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`

**(Continued on next page)**

# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECrate®2017_int_base = 412

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

SPECrate®2017_int_peak = 440

**CPU2017 License:** 3                                  **Test Date:** Feb-2021
**Test Sponsor:** HPE                      **Hardware Availability:** Apr-2021
**Tested by:** HPE                          **Software Availability:** Mar-2021

# Base Optimization Flags (Continued)

C benchmarks (continued):
```
-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
-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
```

# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

## Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

SPECrate®2017_int_base = 412

SPECrate®2017_int_peak = 440

| | | | |
|---|---|---|---|
| **CPU2017 License:** 3 | | **Test Date:** | Feb-2021 |
| **Test Sponsor:** HPE | | **Hardware Availability:** | Apr-2021 |
| **Tested by:** HPE | | **Software Availability:** | Mar-2021 |

# 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`
`-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`

**(Continued on next page)**

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

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

SPECrate®2017_int_base = 412

SPECrate®2017_int_peak = 440

**CPU2017 License:** 3
**Test Sponsor:** HPE
**Tested by:** HPE

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

# Peak Optimization Flags (Continued)

502.gcc_r (continued):
```
-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
-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
```

**(Continued on next page)**

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

SPECrate®2017_int_base = 412

SPECrate®2017_int_peak = 440

| **CPU2017 License:** 3 | **Test Date:** Feb-2021 |
| **Test Sponsor:** HPE | **Hardware Availability:** Apr-2021 |
| **Tested by:** HPE | **Software Availability:** Mar-2021 |

# Peak Optimization Flags (Continued)

523.xalancbmk_r (continued):
```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -finline-aggressive
-mllvm -unroll-threshold=100 -flv-function-specialization
-mllvm -enable-licm-vrp -mllvm -reroll-loops
-mllvm -aggressive-loop-unswitch
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-ljemalloc
```

531.deepsjeng_r: `basepeak = yes`

541.leela_r: `basepeak = yes`

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`

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/HPE-Platform-Flags-AMD-V1.2-EPYC-revP.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/HPE-Platform-Flags-AMD-V1.2-EPYC-revP.xml

# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL345 Gen10 Plus
(2.45 GHz, AMD EPYC 7763)

SPECrate®2017_int_base = 412

SPECrate®2017_int_peak = 440

**CPU2017 License:** 3
**Test Sponsor:** HPE
**Tested by:** HPE

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

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 2021-02-26 10:59:48-0500.
Report generated on 2021-03-18 15:42:44 by CPU2017 PDF formatter v6255.
Originally published on 2021-03-18.