SPEC CPU®2017 Integer Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus
(3.20 GHz, AMD EPYC 7343)

HPE

SPECraten®2017_int_base = 310
SPECraten®2017_int_peak = 319

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

Test Date: May-2021
Hardware Availability: Jun-2021
Software Availability: Mar-2021

Copies

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base (310)</th>
<th>SPECrate®2017_int_peak (319)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r 64</td>
<td>212</td>
</tr>
<tr>
<td>502.gcc_r 64</td>
<td>245</td>
</tr>
<tr>
<td>505.mcf_r 64</td>
<td>264</td>
</tr>
<tr>
<td>520.omnetpp_r 64</td>
<td>151</td>
</tr>
<tr>
<td>523.xalancbmk_r 64</td>
<td>368</td>
</tr>
<tr>
<td>525.x264_r 64</td>
<td>646</td>
</tr>
<tr>
<td>531.deepsjeng_r 64</td>
<td>263</td>
</tr>
<tr>
<td>541.leela_r 64</td>
<td>276</td>
</tr>
<tr>
<td>548.exchange2_r 64</td>
<td>730</td>
</tr>
<tr>
<td>557.xz_r 64</td>
<td>170</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: AMD EPYC 7343
Max MHz: 3900
Nominal: 3200
Enabled: 32 cores, 2 chips, 2 threads/core
Orderable: 1.2 chip(s)
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 512 KB I+D on chip per core
L3: 128 MB I+D on chip per chip, 32 MB shared / 4 cores
Other: None
Memory: 2 TB (16 x 128 GB 4Rx4 PC4-3200AA-L)
Storage: 1 x 196 GB SATA 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 A42 v2.42 04/29/2021 released Apr-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
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>64</td>
<td>479</td>
<td>213</td>
<td>481</td>
<td>212</td>
<td>480</td>
<td>212</td>
<td>64</td>
<td>458</td>
<td>223</td>
<td>460</td>
<td>221</td>
<td>458</td>
<td>222</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>64</td>
<td>368</td>
<td>246</td>
<td>370</td>
<td>245</td>
<td>369</td>
<td>245</td>
<td>64</td>
<td>307</td>
<td>295</td>
<td>308</td>
<td>294</td>
<td>308</td>
<td>294</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>64</td>
<td>218</td>
<td>474</td>
<td>217</td>
<td>476</td>
<td>217</td>
<td>477</td>
<td>64</td>
<td>218</td>
<td>474</td>
<td>217</td>
<td>476</td>
<td>217</td>
<td>477</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>64</td>
<td>554</td>
<td>151</td>
<td>555</td>
<td>151</td>
<td>550</td>
<td>153</td>
<td>64</td>
<td>557</td>
<td>151</td>
<td>547</td>
<td>154</td>
<td>551</td>
<td>153</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>64</td>
<td>183</td>
<td>369</td>
<td>184</td>
<td>368</td>
<td>184</td>
<td>368</td>
<td>64</td>
<td>174</td>
<td>388</td>
<td>175</td>
<td>387</td>
<td>175</td>
<td>387</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>64</td>
<td>175</td>
<td>642</td>
<td>173</td>
<td>646</td>
<td>173</td>
<td>649</td>
<td>64</td>
<td>175</td>
<td>642</td>
<td>173</td>
<td>646</td>
<td>173</td>
<td>649</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>64</td>
<td>277</td>
<td>265</td>
<td>280</td>
<td>262</td>
<td>279</td>
<td>263</td>
<td>64</td>
<td>277</td>
<td>265</td>
<td>278</td>
<td>264</td>
<td>277</td>
<td>265</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>64</td>
<td>384</td>
<td>276</td>
<td>384</td>
<td>276</td>
<td>373</td>
<td>284</td>
<td>64</td>
<td>383</td>
<td>277</td>
<td>372</td>
<td>285</td>
<td>380</td>
<td>279</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>64</td>
<td>228</td>
<td>735</td>
<td>230</td>
<td>730</td>
<td>231</td>
<td>726</td>
<td>64</td>
<td>228</td>
<td>735</td>
<td>230</td>
<td>730</td>
<td>231</td>
<td>726</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>64</td>
<td>406</td>
<td>170</td>
<td>409</td>
<td>169</td>
<td>406</td>
<td>170</td>
<td>64</td>
<td>406</td>
<td>170</td>
<td>409</td>
<td>169</td>
<td>406</td>
<td>170</td>
</tr>
</tbody>
</table>

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 DL365 Gen10 Plus
(3.20 GHz, AMD EPYC 7343)

SPECrate®2017_int_base = 310
SPECrate®2017_int_peak = 319

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/amd_rate_aocc300_milan_A_lib/64;/home/SPEC_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

Submitted_by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>
Submitted: Mon May 24 12:41:46 EDT 2021
Submission: cpu2017-20210524-26436.sub

Submitted_by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>
Submitted: Tue Jun  1 09:17:25 EDT 2021
Submission: cpu2017-20210524-26436.sub

Platform Notes

BIOS Configuration
Workload Profile set to General Throughput Compute

(Continued on next page)
Platform Notes (Continued)

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
Workload Profile set to Custom
L2 HW Prefetcher set to Disabled

Sysinfo program /home/SPEC_CPU2017/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on admin Wed Apr 1 17:28:53 2020

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 7343 16-Core Processor
  2 "physical id"s (chips)
  64 "processors"
  cores, siblings (Caution: counting these is hw and system dependent. The following
  excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
  cpu cores : 16
  siblings : 32
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  Address sizes: 48 bits physical, 48 bits virtual
  CPU(s): 64
  On-line CPU(s) list: 0-63
  Thread(s) per core: 2
  Core(s) per socket: 16
  Socket(s): 2
  NUMA node(s): 8
  Vendor ID: AuthenticAMD
  CPU family: 25
  Model: 1
  Model name: AMD EPYC 7343 16-Core Processor
  Stepping: 1
  CPU MHz: 2339.353
  BogoMIPS: 6388.09

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus
(3.20 GHz, AMD EPYC 7343)

Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_int_base = 310
SPECrate®2017_int_peak = 319

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

Test Date: May-2021
Hardware Availability: Jun-2021
Software Availability: Mar-2021

Platform Notes (Continued)

Virtualization: AMD-V
L1d cache: 1 MiB
L1i cache: 1 MiB
L2 cache: 16 MiB
L3 cache: 256 MiB
NUMA node0 CPU(s): 0-3,32-35
NUMA node1 CPU(s): 4-7,36-39
NUMA node2 CPU(s): 8-11,40-43
NUMA node3 CPU(s): 12-15,44-47
NUMA node4 CPU(s): 16-19,48-51
NUMA node5 CPU(s): 20-23,52-55
NUMA node6 CPU(s): 24-27,56-59
NUMA node7 CPU(s): 28-31,60-63
Vulnerability Itlb multihit: Not affected
Vulnerability Ltlf: 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 sanitation
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 rdtsscp 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 dnowprefetch osvw ibr skinit wdt tce topoext perfctr_core perfctr_nb bprext perfctr_llc mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibbp stibp vmmcall fsqsgbase bml1 avx2 smep bmi2 invpcid cmq rdt_a rdseed adx map clflushopt clwb sha ni xsaveopt xsavec xgetbv1 xsaves cmq_llc cmq_occup_llc cmq_global_state cmq_mbb_local clzero irperf xsaverpr vmbnoinvd arat npt lbv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pfthreshold v_vmsave_vmload vgif umip pkp ospe vaep vpcmvm loading_recov succor smca

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

Available: 8 nodes (0-7)
node 0 cpus: 0 1 2 3 32 33 34 35
node 0 size: 257977 MB
node 0 free: 257488 MB

(Continued on next page)
Hewlett Packard Enterprise

ProLiant DL365 Gen10 Plus

(3.20 GHz, AMD EPYC 7343)

SPECrate®2017_int_base = 310

SPECrate®2017_int_peak = 319

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

Test Date: May-2021
Hardware Availability: Jun-2021
Software Availability: Mar-2021

Platform Notes (Continued)

node 1 cpus: 4 5 6 7 36 37 38 39
node 1 size: 258045 MB
node 1 free: 257847 MB
node 2 cpus: 8 9 10 11 40 41 42 43
node 2 size: 258045 MB
node 2 free: 257856 MB
node 3 cpus: 12 13 14 15 44 45 46 47
node 3 size: 258033 MB
node 3 free: 257803 MB
node 4 cpus: 16 17 18 19 48 49 50 51
node 4 size: 258045 MB
node 4 free: 257873 MB
node 5 cpus: 20 21 22 23 52 53 54 55
node 5 size: 258045 MB
node 5 free: 257882 MB
node 6 cpus: 24 25 26 27 56 57 58 59
node 6 size: 258021 MB
node 6 free: 257830 MB
node 7 cpus: 28 29 30 31 60 61 62 63
node 7 size: 258044 MB
node 7 free: 257871 MB

node distances:

node 0 1 2 3 4 5 6 7
0:  10 12 12 12 32 32 32 32
1:  12 10 12 12 32 32 32 32
2:  12 12 10 12 32 32 32 32
3:  12 12 12 10 32 32 32 32
4:  32 32 32 32 10 12 12 12
5:  32 32 32 32 12 10 12 12
6:  32 32 32 32 12 12 10 12
7:  32 32 32 32 12 12 12 10

From /proc/meminfo
MemTotal:       2113617224 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
/sbin/tuned-adm active
    Current active profile: balanced
/usr/bin/lsb_release -d
    Ubuntu 20.04.1 LTS

From /etc/*release* /etc/*version*
    debian_version: bullseye/sid
    os-release:
        NAME="Ubuntu"

(Continued on next page)
**SPEC CPU®2017 Integer Rate Result**

Hewlett Packard Enterprise  
(Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus  
(3.20 GHz, AMD EPYC 7343)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>310</td>
<td>319</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>May-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability</td>
<td>Jun-2021</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Mar-2021</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

```bash
VERSION="20.04.1 LTS (Focal Fossa)"
ID=ubuntu
ID_LIKE=debian
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): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapsaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBF: 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 Apr 1 17:24

SPEC is set to: /home/SPEC_CPU2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/mapper/ubuntu--vg-ubuntu--lv</td>
<td>ext4</td>
<td>196G</td>
<td>43G</td>
<td>144G</td>
<td>23%</td>
<td>/</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

<table>
<thead>
<tr>
<th>Vendor</th>
<th>HPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product:</td>
<td>ProLiant DL365 Gen10 Plus</td>
</tr>
<tr>
<td>Product Family:</td>
<td>ProLiant</td>
</tr>
<tr>
<td>Serial:</td>
<td>CN70430NKR</td>
</tr>
</tbody>
</table>

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:

(Continued on next page)
### Platform Notes (Continued)

16x Samsung M386AAG40AM3-CWE 128 GB 4 rank 3200  
16x UNKNOWN NOT AVAILABLE

**BIOS:**  
- **Vendor:** HPE  
- **Version:** A42  
- **Date:** 04/29/2021  
- **Revision:** 2.42  
- **Firmware Revision:** 2.42

(End of data from sysinfo program)

### Compiler Version Notes

<table>
<thead>
<tr>
<th>C</th>
<th>502.gcc_r(peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>----------------</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>C</th>
<th>500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>C</th>
<th>502.gcc_r(peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>----------------</td>
</tr>
</tbody>
</table>

**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

(Continued on next page)
Hewlett Packard Enterprise
ProLiant DL365 Gen10 Plus (3.20 GHz, AMD EPYC 7343)

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

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
ProLiant DL365 Gen10 Plus
(3.20 GHz, AMD EPYC 7343)

SPECrate®2017_int_base = 310
SPECrate®2017_int_peak = 319

Compiler Version Notes (Continued)

C
| 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
| 525.x264_r(base, peak) 557.xz_r(base, peak)

AMD clang version 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++
| 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: i386-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)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus
(3.20 GHz, AMD EPYC 7343)

SPEC CPU®2017 Integer Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_int_base = 310
SPECrate®2017_int_peak = 319

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

Test Date: May-2021
Hardware Availability: Jun-2021
Software Availability: Mar-2021

Compiler Version Notes (Continued)
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

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.xalancmk_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
-ffto -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-gnu-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3 -z muldefs
-lamdlibm -ljemalloc -lflang -llangrti

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 -llangrti

Fortran benchmarks:
-m64 -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-ffto -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 -llangrti

Base Other Flags

C benchmarks:
- W-no-unused-command-line-argument
**SPEC CPU®2017 Integer Rate Result**  
Copyright 2017-2021 Standard Performance Evaluation Corporation

| Hewlett Packard Enterprise  | SPECrate®2017_int_base = 310 |
| ProLiant DL365 Gen10 Plus (3.20 GHz, AMD EPYC 7343) | SPECrate®2017_int_peak = 319 |

| CPU2017 License: 3 | Test Date: | May-2021 |
| Test Sponsor: HPE | Hardware Availability: | Jun-2021 |
| Tested by: HPE | Software Availability: | Mar-2021 |

**Base Other Flags (Continued)**

C++ benchmarks:
- `-Wno-unused-command-line-argument`

**Peak Compiler Invocation**

**C benchmarks**
- `clang`

**C++ benchmarks**
- `clang++`

**Fortran benchmarks**
- `flang`

**Peak Portability Flags**

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

**Peak Optimization Flags**

**C benchmarks**

- `-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`

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

Hewlett Packard Enterprise
ProLiant DL365 Gen10 Plus
(3.20 GHz, AMD EPYC 7343)

SPECrate®2017_int_base = 310
SPECrate®2017_int_peak = 319

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

Test Date: May-2021
Hardware Availability: Jun-2021
Software Availability: Mar-2021

Peak Optimization Flags (Continued)

500.perlbench_r (continued):
- 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 -fsstruct-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: basepeak = yes

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-nofallback-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.xalanmbk_r: -m32 -Wl,-mllvm -Wl,-do-block-reorder=aggressive -flto
- Wl,-mllvm -Wl,-function-specialize
- Wl,-mllvm -Wl,-align-all-nofallback-blocks=6
- Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
- march=znver3 -fveclib=AMDLIBM -finline-aggressive
- mllvm -unroll-threshold=100 -flv-function-specialization

(Continued on next page)
Peak Optimization Flags (Continued)

523.xalancbmk_r (continued):
-mlir -enable-lcmm-vrp -mlir -reroll-loops
-mlir -aggressive-loop-unswitch
-mlir -reduce-array-computations=3
-mlir -global-vectorize-slp=true
-mlir -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

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/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/HPE-Platform-Flags-AMD-V1.2-EPYC-revP.xml
SPEC CPU®2017 Integer Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus
(3.20 GHz, AMD EPYC 7343)

SPECrates®2017_int_base = 310
SPECrates®2017_int_peak = 319

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

Test Date: May-2021
Hardware Availability: Jun-2021
Software Availability: Mar-2021

SPEC CPU and SPECrates are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2020-04-01 13:28:52-0400.
Originally published on 2021-06-08.