Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL325 Gen10 Plus v2  
(2.80 GHz, AMD EPYC 7543P)  

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

| Threads | SPECspeed®2017_int_base = 12.4 | SPECspeed®2017_int_peak = 12.5  
|---|---|---  
| 32 |  
| 0 |  
| 1 |  
| 6.67 | 6.97 | 13.4 | 20.9 | 8.67 | 14.2 | 17.2 | 23.2 | 25.1  
| 600.perlbench_s | | | | | | | |  
| 602.gcc_s | | | | | | | |  
| 605.mcf_s | | | | | | | |  
| 620.omnetpp_s | | | | | | | |  
| 623.xalancbmk_s | | | | | | | |  
| 625.x264_s | | | | | | | |  
| 631.deepsjeng_s | | | | | | | |  
| 641.leela_s | | | | | | | |  
| 648.exchange2_s | | | | | | | |  
| 657.xz_s | | | | | | | |  

| Hardware | Software  
|---|---  
| CPU Name: AMD EPYC 7543P  
Max MHz: 3700  
Nominal: 2800  
Enabled: 32 cores, 1 chip  
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 / 4 cores  
Other: None  
Memory: 1 TB (8 x 128 GB 4Rx4 PC4-3200AA-L)  
Storage: 1 x 800 GB SAS SSD, RAID 0  
Other: None  
| OS: Ubuntu 20.04.1 LTS (x86_64)  
Kernel 5.4.0-54-generic  
Compiler: C/C++/Fortran: Version 3.0.0 of AOCC  
Parallel: Yes  
Firmware: HPE BIOS Version A43 v2.40 02/15/2021 released Mar-2021  
File System: ext4  
System State: Run level 5 (multi-user, GUI disabled)  
Base Pointers: 64-bit  
Peak Pointers: 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  
|
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CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE  

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>266</td>
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<td>6.46</td>
<td>266</td>
<td>6.67</td>
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<td>295</td>
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<td>20.8</td>
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<td>102</td>
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<td>32</td>
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<tr>
<td>648.exchange2_s</td>
<td>32</td>
<td>124</td>
<td>23.7</td>
<td>127</td>
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<td>657.xz_s</td>
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<td>25.1</td>
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<td>246</td>
</tr>
</tbody>
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SPECspeed®2017_int_base = 12.4  
SPECspeed®2017_int_peak = 12.5

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  
'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/transparenthugepage/defrag' run as root to enable

(Continued on next page)
Operating System Notes (Continued)

Transparent Hugepages (THP) for this run. 'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root for peak runs of 628.pop2_s and 638.imagick_s to enable THP only on request.

The real test date is Apr-2021. The clock was mistakenly set to 2020 before the benchmark was run.

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-31"
LD_LIBRARY_PATH =
    "/cpu2017/amd_speed_aocc300_milan_B_lib/64;/cpu2017/amd_speed_aocc300_milan_B_lib/32:"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "32"

Environment variables set by runcpu during the 600.perlbench_s peak run:
GOMP_CPU_AFFINITY = "0"

General Notes

Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 1TiB Memory using openSUSE 15.2

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

jemalloc: configured and built with GCC v4.8.2 in RHEL 7.4 (No options specified)
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2

Platform Notes

BIOS Configuration
- Workload Profile set to General Peak Frequency Compute
- AMD SMT Option set to Disabled
- Determinism Control set to Manual

(Continued on next page)
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SPEC®2017_int_base = 12.4
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<td>Hardware Availability: Jun-2021</td>
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<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Mar-2021</td>
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</tbody>
</table>

Platform Notes (Continued)

Performance Determinism set to Power Deterministic
Last-Level Cache (LLC) as NUMA Node set to Enabled
NUMA memory domains per socket set to One memory domain per socket
Thermal Configuration set to Maximum Cooling
Workload Profile set to Custom
   Infinity Fabric Power Management set to Disabled
   Infinity Fabric Performance State set to P0
Power Regulator set to OS Control Mode

Sysinfo program /cpu2017/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on dl325gen10plus Wed Apr 1 17:27:44 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 7543P 32-Core Processor
  1 "physical id"s (chips)
  32 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 32
siblings : 32
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

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): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 1
Core(s) per socket: 32
Socket(s): 1
NUMA node(s): 8
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 7543P 32-Core Processor
Stepping: 1
Frequency boost: enabled
CPU MHz: 3295.935
CPU max MHz: 2800.0000

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

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SPECspeed®2017_int_base = 12.4
SPECspeed®2017_int_peak = 12.5

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

Platform Notes (Continued)

CPU min MHz: 1500.0000
BogoMIPS: 5589.18
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
NUMA node1 CPU(s): 4-7
NUMA node2 CPU(s): 8-11
NUMA node3 CPU(s): 12-15
NUMA node4 CPU(s): 16-19
NUMA node5 CPU(s): 20-23
NUMA node6 CPU(s): 24-27
NUMA node7 CPU(s): 28-31
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitation
Vulnerability Spectre v2: Mitigation; Full AMD retpoline, IBPB conditional, IBRS_FW, STIBF disabled, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected
Flags: fpu vme de pse36 cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmx ext2 sse3 pdcmo cmov cmov cmov cmov cmov
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

(Continued on next page)
Platform Notes (Continued)

node 0 size: 128776 MB
node 0 free: 128597 MB
node 1 cpus: 4 5 6 7
node 1 size: 129022 MB
node 1 free: 128925 MB
node 2 cpus: 8 9 10 11
node 2 size: 129022 MB
node 2 free: 128864 MB
node 3 cpus: 12 13 14 15
node 3 size: 129022 MB
node 3 free: 128902 MB
node 4 cpus: 16 17 18 19
node 4 size: 129022 MB
node 4 free: 128887 MB
node 5 cpus: 20 21 22 23
node 5 size: 128998 MB
node 5 free: 128839 MB
node 6 cpus: 24 25 26 27
node 6 size: 129022 MB
node 6 free: 128860 MB
node 7 cpus: 28 29 30 31
node 7 size: 116909 MB
node 7 free: 116650 MB
node distances:

node   0   1   2   3   4   5   6   7
0:  10  11  11  11  11  11  11  11
1:  11  10  11  11  11  11  11  11
2:  11  11  10  11  11  11  11  11
3:  11  11  11  10  11  11  11  11
4:  11  11  11  11  10  11  11  11
5:  11  11  11  11  11  10  11  11
6:  11  11  11  11  11  11  10  11
7:  11  11  11  11  11  11  11  10

From /proc/meminfo

MemTotal:       1044274732 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

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

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SPECspeed®2017_int_base = 12.4
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Platform Notes (Continued)

os-release:
NAME="Ubuntu"
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 dl325gen10plus 5.4.0-54-generic #60-Ubuntu SMP Fri Nov 6 10:37:59 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
CVE-2018-3639 (Speculative Store Bypass): Bypass disabled via prctl and
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs
CVE-2017-5715 (Spectre variant 2): barriers and __user pointer
CVE-2020-0543 (Special Register Buffer Data Sampling): Mitigation: Full AMD retpoline,
CVE-2019-11135 (TSX Asynchronous Abort): IBPB: conditional, IBRS_FW, STIBP:
Not affected
disabled, RSB filling

run-level 5 Apr 1 17:23

SPEC is set to: /cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb2 ext4 733G 23G 673G 4% /

From /sys/devices/virtual/dmi/id
Vendor: HPE
Product: ProLiant DL325 Gen10 Plus
Product Family: ProLiant
Serial: CN79290FKQ

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

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

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

Platform Notes (Continued)

frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

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

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
| 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(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++
| 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(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
| 648.exchange2_s(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)
**SPEC CPU®2017 Integer Speed Result**

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**Compiler Version Notes (Continued)**

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**Base Compiler Invocation**

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

---

**Base Portability Flags**

```plaintext
600.perlbench_s: -DSPEC_LINUX_X64 -DSPEC_LP64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LINUX -DSPEC_LP64
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64
```

---

**Base Optimization Flags**

C benchmarks:
-m64 -mno-adx -mno-sse4a -Wl,-allow-multiple-definition
- Wl,-mlllvm -Wl,-enable-lcvm-vrp -Wl,-mlllvm -Wl,-region-vectorize
- Wl,-mlllvm -Wl,-function-specialize
- Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
- Wl,-mlllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
- fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
- mlllvm -unroll-threshold=50 -mlllvm -inline-threshold=1000
- fremap-arrays -mlllvm -function-specialize -flv-function-specialization
- mlllvm -enable-gvn-hoist -mlllvm -global-vectorize-slp=true
- mlllvm -enable-lcvm-vrp -mlllvm -reduce-array-computations=3 -z muldefs
- DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
- lflang -lflangrti

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Base Optimization Flags (Continued)

C++ benchmarks:
-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-do-block-reorder=aggressive
-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 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -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-pass -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 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
-lflangrti

Fortran benchmarks:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-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 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -z muldefs
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
-lflangrti

Base Other Flags

C benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

C++ benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

Fortran benchmarks:
-Wno-return-type
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL325 Gen10 Plus v2
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SPEC CPU®2017 Integer Speed Result
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SPEC®2017_int_base = 12.4  
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Test Sponsor: HPE
Tested by: HPE

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

Peak Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -m64 -mno-adx -mno-sse4a -Wl,-allow-multiple-definition  
-Wl,-ml1vm -Wl,--enable-licm-vrp  
-Wl,-ml1vm -Wl,--function-specialize  
-Wl,-ml1vm -Wl,--align-all-nofallthru-blocks=6  
-Wl,-ml1vm -Wl,--reduce-array-computations=3 -Ofast  
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto  
-fstruct-layout=5 -ml1vm -unroll-threshold=50  
-fremap-arrays -flv-function-specialization  
-ml1vm -inline-threshold=1000 -ml1vm -enable-gvn-hoist  
-ml1vm -global-vectorize-slp=true  
-ml1vm -function-specialize -ml1vm -enable-licm-vrp  
-ml1vm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp  
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

602.gcc_s: basepeak = yes

605.mcf_s: basepeak = yes

625.x264_s: basepeak = yes

657.xz_s: basepeak = yes

C++ benchmarks:

(Continued on next page)
Hewlett Packard Enterprise
(2.80 GHz, AMD EPYC 7543P)

SPECspeed®2017_int_base = 12.4
SPECspeed®2017_int_peak = 12.5

Peak Optimization Flags (Continued)

620.omnetpp_s: basepeak = yes
623.xalancbmk_s: basepeak = yes
631.deepsjeng_s: basepeak = yes
641.leela_s: basepeak = yes

Fortran benchmarks:
648.exchange2_s: basepeak = yes

Peak Other Flags

C benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

C++ benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

Fortran benchmarks:
-Wno-return-type

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

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

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