



SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL380p Gen8

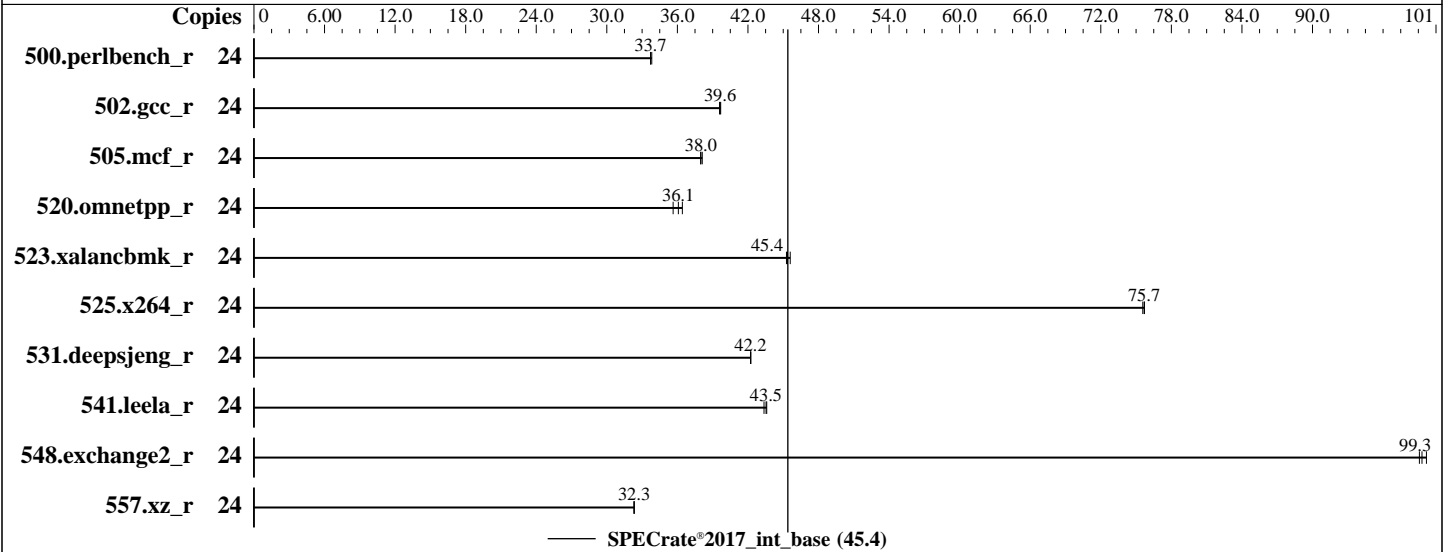
(2.10 GHz, Intel Xeon E5-2620 v2)

SPECrate®2017_int_base = 45.4

SPECrate®2017_int_peak = Not Run

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

Test Date: May-2023
Hardware Availability: May-2019
Software Availability: Dec-2022



Hardware

CPU Name: Intel Xeon E5-2620 v2
 Max MHz: 2600
 Nominal: 2100
 Enabled: 12 cores, 2 chips, 2 threads/core
 Orderable: 1, 2 chip(s)
 Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 256 KB I+D on chip per core
 L3: 15 MB I+D on chip per chip
 Other: None
 Memory: 128 GB (8 x 16 GB 2Rx4 PC3-14900R-13, ECC, running at 1600)
 Storage: 4 x 600 GB SAS 10K HDD, RAID 10
 Other: None

Software

OS: Red Hat Enterprise Linux 9.0 (Plow)
 Kernel 5.14.0-70.13.1.el9_0.x86_64
 Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;
 Parallel: No
 Firmware: HPE BIOS Version P70 05/24/2019 released May-2019
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: Not Applicable
 Other: None
 Power Management: BIOS 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	24	1130	33.8	<u>1133</u>	<u>33.7</u>	1133	33.7							
502.gcc_r	24	859	39.6	<u>857</u>	<u>39.6</u>	856	39.7							
505.mcf_r	24	<u>1021</u>	<u>38.0</u>	1021	38.0	1018	38.1							
520.omnetpp_r	24	865	36.4	884	35.6	<u>873</u>	<u>36.1</u>							
523.xalancbmk_r	24	<u>559</u>	<u>45.4</u>	560	45.3	556	45.6							
525.x264_r	24	556	75.6	555	75.7	<u>555</u>	<u>75.7</u>							
531.deepsjeng_r	24	651	42.2	651	42.2	<u>651</u>	<u>42.2</u>							
541.leela_r	24	<u>913</u>	<u>43.5</u>	912	43.6	916	43.4							
548.exchange2_r	24	<u>633</u>	<u>99.3</u>	631	99.7	635	99.1							
557.xz_r	24	802	32.3	<u>802</u>	<u>32.3</u>	802	32.3							

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor.

For details, please see the config file.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, <http://www.spec.org/osg/policy.html>. This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

This benchmark run is conducted using the latest binaries based on IC23 and to suffice the minimum software requirement, the Operating System used is RHEL9.0



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Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"
MALLOC_CONF = "retain:true"

General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8480+ CPU + 512GB RAM
memory using Red Hat Enterprise Linux 9.0
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.

Platform Notes

The system ROM used for this result contains Intel microcode version 0x42e for
the Intel Xeon E5-2620 v2 processor.

BIOS Configuration:

HP Power Profile set to Custom
Energy/Performance Bias set to Maximum Performance
Thermal Configuration set to Maximum Cooling
Collaborative Power Control set to Disabled
Processor Power and Utilization Monitoring set to Disabled

The reported date by sysinfo is incorrect due to computer clock being not set correctly.
The correct test date is: May-2023.

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Thu Apr 7 05:31:56 2022

SUT (System Under Test) info as seen by some common utilities.

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1. uname -a
2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo

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Platform Notes (Continued)

```

7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 250 (250-6.el9_0)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
16. sysctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS

```

```

-----
1. uname -a
Linux localhost.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
x86_64 x86_64 GNU/Linux

```

```

-----
2. w
 05:31:56 up 1 min,  1 user,  load average: 0.21, 0.13, 0.05
USER      TTY      LOGIN@  IDLE   JCPU   PCPU WHAT
root     pts/0    05:31   12.00s  2.60s  0.01s -bash

```

```

-----
3. Username
From environment variable $USER:  root

```

```

-----
4. ulimit -a
real-time non-blocking time (microseconds, -R) unlimited
core file size              (blocks, -c) 0
data seg size                (kbytes, -d) unlimited
scheduling priority         (-e) 0
file size                    (blocks, -f) unlimited
pending signals              (-i) 515316
max locked memory            (kbytes, -l) 64
max memory size              (kbytes, -m) unlimited
open files                   (-n) 1024
pipe size                    (512 bytes, -p) 8
POSIX message queues         (bytes, -q) 819200
real-time priority           (-r) 0
stack size                   (kbytes, -s) unlimited
cpu time                     (seconds, -t) unlimited
max user processes           (-u) 515316
virtual memory                (kbytes, -v) unlimited
file locks                   (-x) unlimited

```

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@pts/0

```

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Platform Notes (Continued)

```

-bash
-bash
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=24 -c
  HPE-ic2023.0-lin-core-avx-rate-20221201.cfg --define smt-on --define cores=12 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base -o all intrate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=24 --configfile
  HPE-ic2023.0-lin-core-avx-rate-20221201.cfg --define smt-on --define cores=12 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
  rate --tune base --size refrate intrate --nopreenv --note-preenv --logfile
  $SPEC/tmp/CPU2017.001/templots/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

```

```

-----
6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) CPU E5-2620 v2 @ 2.10GHz
vendor_id      : GenuineIntel
cpu family     : 6
model          : 62
stepping      : 4
microcode     : 0x42e
bugs           : cpu_meltdown spectre_v1 spectre_v2 spec_store_bypass l1tf mds swapgs itlb_multihit
cpu cores     : 6
siblings      : 12
2 physical ids (chips)
24 processors (hardware threads)
physical id 0: core ids 0-5
physical id 1: core ids 0-5
physical id 0: apicids 0-11
physical id 1: apicids 32-43

```

Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

```

-----
7. lscpu

From lscpu from util-linux 2.37.4:
Architecture:      x86_64
CPU op-mode(s):   32-bit, 64-bit
Address sizes:     46 bits physical, 48 bits virtual
Byte Order:       Little Endian
CPU(s):           24
On-line CPU(s) list: 0-23
Vendor ID:        GenuineIntel
BIOS Vendor ID:   Intel
Model name:       Intel(R) Xeon(R) CPU E5-2620 v2 @ 2.10GHz
BIOS Model name:  Intel(R) Xeon(R) CPU E5-2620 v2 @ 2.10GHz
CPU family:       6
Model:           62
Thread(s) per core: 2
Core(s) per socket: 6
Socket(s):        2
Stepping:        4
BogoMIPS:         4190.01
Flags:            fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                  clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                  lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
                  cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
                  cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic popcnt tsc_deadline_timer aes
                  xsave avx f16c rdrand lahf_lm cpuid_fault epb pti intel_ppin ssbd ibrs

```

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Platform Notes (Continued)

ibpb stibp tpr_shadow vnmI flexpriority ept vpid fsgsbase smep erms
xsaveopt dtherm ida arat pln pts md_clear flush_lld

VT-x

Virtualization:

L1d cache: 384 KiB (12 instances)

L1i cache: 384 KiB (12 instances)

L2 cache: 3 MiB (12 instances)

L3 cache: 30 MiB (2 instances)

NUMA node(s): 2

NUMA node0 CPU(s): 0-5,12-17

NUMA node1 CPU(s): 6-11,18-23

Vulnerability Itlb multihit: KVM: Mitigation: VMX disabled

Vulnerability L1tf: Mitigation; PTE Inversion; VMX conditional cache flushes, SMT vulnerable

Vulnerability Mds: Mitigation; Clear CPU buffers; SMT vulnerable

Vulnerability Meltdown: Mitigation; PTI

Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl

Vulnerability Spectre v1: Mitigation; usercopy/swaps barriers and __user pointer sanitization

Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP conditional, RSB filling

Vulnerability Srbds: Not affected

Vulnerability Tsx async abort: Not affected

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	32K	384K	8	Data	1	64	1	64
L1i	32K	384K	8	Instruction	1	64	1	64
L2	256K	3M	8	Unified	2	512	1	64
L3	15M	30M	20	Unified	3	12288	1	64

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

available: 2 nodes (0-1)

node 0 cpus: 0-5,12-17

node 0 size: 64369 MB

node 0 free: 63546 MB

node 1 cpus: 6-11,18-23

node 1 size: 64496 MB

node 1 free: 64093 MB

node distances:

node 0 1

0: 10 20

1: 20 10

9. /proc/meminfo

MemTotal: 131958536 kB

10. who -r

run-level 3 Apr 7 05:30

11. Systemd service manager version: systemd 250 (250-6.el9_0)

Default Target Status

multi-user running

12. Services, from systemctl list-unit-files

STATE UNIT FILES

enabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond

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Platform Notes (Continued)

```

dbus-broker firewalld getty@ irqbalance kdump microcode nis-domainname rhsmcertd rsyslog
selinux-autorelabel-mark sshd sssd systemd-network-generator tuned upower
enabled-runtime      systemd-remount-fs
disabled             canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot
                    chrony-wait console-getty cpupower debug-shell hwloc-dump-hwdata ipsec kvm_stat
                    man-db-restart-cache-update nftables powertop rdisc rhsm rhsm-facts rpmdb-rebuild
                    serial-getty@ sshd-keygen@ systemd-boot-check-no-failures systemd-pstore systemd-sysex
indirect             sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo

```

```

-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd0,msdos1)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
root=UUID=8be8cad1-97d3-4e02-adc6-0e82fc3a4309
ro
resume=UUID=08c99414-d9fd-468e-82df-2889991b47bb

```

```

-----
14. cpupower frequency-info
analyzing CPU 0:
Unable to determine current policy
boost state support:
Supported: yes
Active: yes

```

```

-----
15. tuned-adm active
Current active profile: throughput-performance

```

```

-----
16. sysctl
kernel.numa_balancing          1
kernel.randomize_va_space     2
vm.compaction_proactiveness    20
vm.dirty_background_bytes      0
vm.dirty_background_ratio     10
vm.dirty_bytes                 0
vm.dirty_expire_centisecs     3000
vm.dirty_ratio                 40
vm.dirty_writeback_centisecs  500
vm.dirtytime_expire_seconds   43200
vm.extfrag_threshold          500
vm.min_unmapped_ratio         1
vm.nr_hugepages                0
vm.nr_hugepages_mempolicy     0
vm.nr_overcommit_hugepages    0
vm.swappiness                  10
vm.watermark_boost_factor     15000
vm.watermark_scale_factor     10
vm.zone_reclaim_mode          0

```

```

-----
17. /sys/kernel/mm/transparent_hugepage
defrag          always defer defer+madvice [madvice] never
enabled         [always] madvice never
hpage_pmd_size 2097152
shmem_enabled  always within_size advise [never] deny force

```

```

-----
18. /sys/kernel/mm/transparent_hugepage/khugepaged
alloc_sleep_millisecs 60000

```

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Platform Notes (Continued)

```
defrag                1
max_ptes_none         511
max_ptes_shared       256
max_ptes_swap         64
pages_to_scan         4096
scan_sleep_millisecs  10000
```

```
-----
19. OS release
From /etc/*-release /etc/*-version
os-release             Red Hat Enterprise Linux 9.0 (Plow)
redhat-release         Red Hat Enterprise Linux release 9.0 (Plow)
system-release         Red Hat Enterprise Linux release 9.0 (Plow)
-----
```

```
-----
20. Disk information
SPEC is set to: /home/cpu2017
Filesystem             Type  Size  Used Avail Use% Mounted on
/dev/sda5               xfs   484G  14G  471G   3% /home
-----
```

```
-----
21. /sys/devices/virtual/dmi/id
Vendor:                 HP
Product:                ProLiant DL380p Gen8
Product Family:         ProLiant
Serial:                 2M23460331
-----
```

```
-----
22. dmidecode
Additional information from dmidecode 3.3 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 HP 712383-081 16 GB 2 rank 1866, configured at 1600
-----
```

```
-----
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:           HP
BIOS Version:          P70
BIOS Date:             05/24/2019
Firmware Revision:    2.79
-----
```

Compiler Version Notes

```
=====
C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)
-----
```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.1.0 Build 20230320
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

```
=====
C++ | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
-----
```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.1.0 Build 20230320
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

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Compiler Version Notes (Continued)

=====

Fortran | 548.exchange2_r(base)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.1.0 Build 20230320
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64

502.gcc_r: -DSPEC_LP64

505.mcf_r: -DSPEC_LP64

520.omnetpp_r: -DSPEC_LP64

523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX

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:

-w -std=c11 -m64 -Wl,-z,muldefs -xAVX -O3 -ffast-math -flto

-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4

-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin

-lqkmallo

C++ benchmarks:

-w -std=c++14 -m64 -Wl,-z,muldefs -xAVX -O3 -ffast-math -flto

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Base Optimization Flags (Continued)

C++ benchmarks (continued):

```
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin  
-lqkmallo
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xAVX -O3 -ffast-math -flto -mfpmath=sse  
-funroll-loops -qopt-mem-layout-trans=4 -nostandard-realloc-lhs  
-align array32byte -auto  
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin  
-lqkmallo
```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-revA.html>

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-revA.xml>

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.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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