SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL360 Gen11
(2.00 GHz, Intel Xeon Platinum 8452Y)

$SPECspeed^®2017\_int\_base = 12.3$

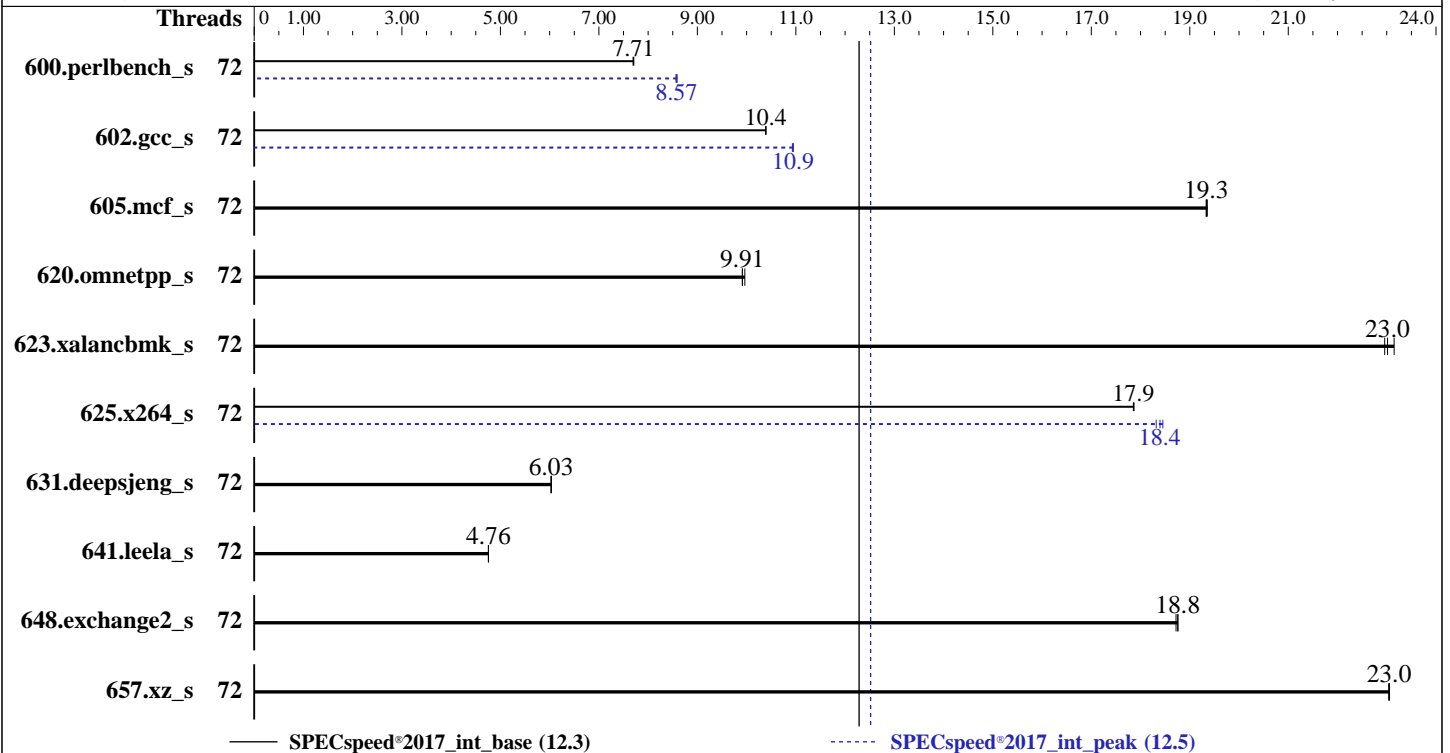$SPECspeed^®2017\_int\_peak = 12.5$

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

Test Date: Feb-2023
Hardware Availability: Jan-2023
Software Availability: May-2022

Threads scale: 0, 1.00, 3.00, 5.00, 7.00, 9.00, 11.0, 13.0, 15.0, 17.0, 19.0, 21.0, 24.0

- 600.perlbench_s 72 — 7.71 (base), 8.57 (peak)
- 602.gcc_s 72 — 10.4 (base), 10.9 (peak)
- 605.mcf_s 72 — 19.3
- 620.omnetpp_s 72 — 9.91
- 623.xalancbmk_s 72 — 23.0
- 625.x264_s 72 — 17.9 (base), 18.4 (peak)
- 631.deepsjeng_s 72 — 6.03
- 641.leela_s 72 — 4.76
- 648.exchange2_s 72 — 18.8
- 657.xz_s 72 — 23.0

SPECspeed®2017_int_base (12.3)   SPECspeed®2017_int_peak (12.5)

Hardware

CPU Name: Intel Xeon Platinum 8452Y
  Max MHz: 3200
  Nominal: 2000
Enabled: 72 cores, 2 chips
Orderable: 1, 2 chip(s)
Cache L1: 32 KB I + 48 KB D on chip per core
  L2: 2 MB I+D on chip per core
  L3: 67.5 MB I+D on chip per chip
  Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 960 GB SATA SSD
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 2022.1 of Intel oneAPI DPC++/C++
  Compiler for Linux;
  Fortran: Version 2022.1 of Intel Fortran Compiler
  for Linux
Parallel: Yes
Firmware: HPE BIOS Version v1.22 01/18/2023 released
  Jan-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS and OS set to prefer performance at
  the cost of additional power usage

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	72	**230**	**7.71**	231	7.69	230	7.71	72	207	8.59	**207**	**8.57**	207	8.57
602.gcc_s	72	**383**	**10.4**	383	10.4	383	10.4	72	364	10.9	**364**	**10.9**	364	10.9
605.mcf_s	72	244	19.4	**244**	**19.3**	244	19.3	72	244	19.4	**244**	**19.3**	244	19.3
620.omnetpp_s	72	165	9.91	164	9.96	**165**	**9.91**	72	165	9.91	164	9.96	**165**	**9.91**
623.xalancbmk_s	72	61.2	23.1	61.7	23.0	**61.6**	**23.0**	72	61.2	23.1	61.7	23.0	**61.6**	**23.0**
625.x264_s	72	98.7	17.9	98.8	17.9	**98.8**	**17.9**	72	95.6	18.5	**95.9**	**18.4**	96.3	18.3
631.deepsjeng_s	72	238	6.03	**238**	**6.03**	238	6.03	72	238	6.03	**238**	**6.03**	238	6.03
641.leela_s	72	359	4.76	359	4.76	**359**	**4.76**	72	359	4.76	359	4.76	**359**	**4.76**
648.exchange2_s	72	**157**	**18.8**	157	18.7	157	18.8	72	**157**	**18.8**	157	18.7	157	18.8
657.xz_s	72	268	23.1	268	23.0	**268**	**23.0**	72	268	23.1	268	23.0	**268**	**23.0**
SPECspeed®2017_int_base =		**12.3**												
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

```
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.
```

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>
```

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CPU2017 License:	3	**Test Date:**	Feb-2023
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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

General Notes

```
  Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
 memory using Red Hat Enterprise Linux 8.4
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, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Platform Notes

```
The system ROM used for this result contains Intel microcode version 0x2b000161 for
the Intel Xeon Platinum 8452Y processor.
BIOS Configuration:
 Workload Profile set to General Peak Frequency Compute
 Thermal Configuration set to Maximum Cooling
 Intel Hyper-Threading set to Disabled
 Memory Patrol Scrubbing set to Disabled
 Last Level Cache (LLC) Prefetch set to Enabled
 Last Level Cache (LLC) Dead Line Allocation set to Disabled
 Enhanced Processor Performance Profile set to Aggressive
 Dead Block Predictor set to Enabled
 Sub-NUMA Clustering set to Enabled SNC2(2-clusters)
 Workload Profile set to Custom
  Adjacent Sector Prefetch set to Disabled
  Minimum Processor Idle Power Package C-State set to No Package State

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Fri Jun 24 16:36:37 2022

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

 ----------------------------------------------------------
 Table of contents
 ----------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
```

(Continued on next page)

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Platform Notes (Continued)

```
   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. sysctl
   16. /sys/kernel/mm/transparent_hugepage
   17. /sys/kernel/mm/transparent_hugepage/khugepaged
   18. OS release
   19. Disk information
   20. /sys/devices/virtual/dmi/id
   21. dmidecode
   22. 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
      16:36:37 up 14 min,  0 users,  load average: 0.00, 0.00, 0.00
     USER     TTY         LOGIN@   IDLE   JCPU   PCPU WHAT


   -----------------------------------------------------------
   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) 4127207
     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) 4127207
     virtual memory              (kbytes, -v) unlimited
     file locks                          (-x) unlimited


   -----------------------------------------------------------
   5. sysinfo process ancestry
    /usr/lib/systemd/systemd --switched-root --system --deserialize 28
    sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
    sshd: root [priv]
    sshd: root@notty
    bash -c cd $SPEC/ && $SPEC/intspeed.sh
    runcpu --nobuild --action validate --define default-platform-flags -c
      ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=72 --tune base,peak -o all --define
      intspeedaffinity --define drop_caches intspeed
    runcpu --nobuild --action validate --define default-platform-flags --configfile
      ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=72 --tune base,peak --output_format all
```

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Hardware Availability: Jan-2023
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Platform Notes (Continued)

```
    --define intspeedaffinity --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed
    intspeed --nopreenv --note-preenv --logfile $SPEC/tmp/CPU2017.001/templogs/preenv.intspeed.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) Platinum 8452Y
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 6
    microcode       : 0x2b000161
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 36
    siblings        : 36
    2 physical ids (chips)
    72 processors (hardware threads)
    physical id 0: core ids 0-35
    physical id 1: core ids 0-35
    physical id 0: apicids
    0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70
    physical id 1: apicids
    128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,1
    80,182,184,186,188,190,192,194,196,198
  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, 57 bits virtual
  Byte Order:                Little Endian
  CPU(s):                    72
  On-line CPU(s) list:       0-71
  Vendor ID:                 GenuineIntel
  BIOS Vendor ID:            Intel(R) Corporation
  Model name:                Intel(R) Xeon(R) Platinum 8452Y
  BIOS Model name:           Intel(R) Xeon(R) Platinum 8452Y
  CPU family:                6
  Model:                     143
  Thread(s) per core:        1
  Core(s) per socket:        36
  Socket(s):                 2
  Stepping:                  6
  BogoMIPS:                  4000.00
  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 art arch_perfmon pebs bts rep_good nopl xtopology
                             nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                             ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1
                             sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
                             lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3
                             invpcid_single cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow
                             vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2
                             erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
```

(Continued on next page)

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Platform Notes (Continued)

```
                         clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec
                         xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
                         split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts
                         avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq
                         avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect
                         cldemote movdiri movdir64b enqcmd fsrm md_clear serialize tsxldtrk pconfig
                         arch_lbr avx512_fp16 amx_tile flush_l1d arch_capabilities
  Virtualization:        VT-x
  L1d cache:             3.4 MiB (72 instances)
  L1i cache:             2.3 MiB (72 instances)
  L2 cache:              144 MiB (72 instances)
  L3 cache:              135 MiB (2 instances)
  NUMA node(s):          4
  NUMA node0 CPU(s):     0-8,36-44
  NUMA node1 CPU(s):     9-17,45-53
  NUMA node2 CPU(s):     18-26,54-62
  NUMA node3 CPU(s):     27-35,63-71
  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
  Vulnerability Spectre v1:       Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:       Mitigation; Enhanced IBRS, IBPB 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      48K      3.4M   12 Data            1     64       1              64
    L1i      32K      2.3M    8 Instruction     1     64       1              64
    L2        2M      144M   16 Unified         2   2048       1              64
    L3     67.5M      135M   15 Unified         3  73728       1              64

    ----------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0-8,36-44
  node 0 size: 257757 MB
  node 0 free: 257229 MB
  node 1 cpus: 9-17,45-53
  node 1 size: 258043 MB
  node 1 free: 257581 MB
  node 2 cpus: 18-26,54-62
  node 2 size: 258007 MB
  node 2 free: 257581 MB
  node 3 cpus: 27-35,63-71
  node 3 size: 258033 MB
  node 3 free: 257120 MB
  node distances:
  node   0   1   2   3
    0:  10  20  30  30
    1:  20  10  30  30
    2:  30  30  10  20
    3:  30  30  20  10

    ----------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1056605828 kB
```

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Platform Notes (Continued)

```
    ----------------------------------------------------------
    10. who -r
      run-level 3 Jun 24 16:21


    ----------------------------------------------------------
    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
                        dbus-broker firewalld getty@ irqbalance kdump lvm2-monitor mdmonitor microcode
                        nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sshd sssd
                        systemd-network-generator udisks2
      enabled-runtime   systemd-remount-fs
      disabled          blk-availability chrony-wait console-getty cpupower debug-shell kvm_stat
                        man-db-restart-cache-update nftables rdisc rhsm rhsm-facts rpmdb-rebuild serial-getty@
                        sshd-keygen@ systemd-boot-check-no-failures systemd-pstore systemd-sysext
      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,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
      root=/dev/mapper/rhel-root
      ro
      resume=/dev/mapper/rhel-swap
      rd.lvm.lv=rhel/root
      rd.lvm.lv=rhel/swap


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


    ----------------------------------------------------------
    15. 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                  20
      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                   60
      vm.watermark_boost_factor       15000
      vm.watermark_scale_factor       10
```

(Continued on next page)

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Platform Notes (Continued)

```
  vm.zone_reclaim_mode              0


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


   ----------------------------------------------------------------
17. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs  60000
  defrag                     1
  max_ptes_none            511
  max_ptes_shared          256
  max_ptes_swap             64
  pages_to_scan           4096
  scan_sleep_millisecs   10000


   ----------------------------------------------------------------
18. 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)


   ----------------------------------------------------------------
19. Disk information
SPEC is set to: /home/cpu2017
  Filesystem             Type  Size  Used Avail Use% Mounted on
  /dev/mapper/rhel-home xfs   819G  136G  683G  17% /home


   ----------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         HPE
    Product:        ProLiant DL360 Gen11
    Product Family: ProLiant
    Serial:         CNX20800PZ


   ----------------------------------------------------------------
21. 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:
    16x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800


   ----------------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       HPE
    BIOS Version:      1.22
    BIOS Date:         01/18/2023
    BIOS Revision:     1.22
    Firmware Revision: 1.10
```

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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)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
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------------------------------------------------------------------------------


==============================================================================
C++      | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak)
         | 641.leela_s(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
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------------------------------------------------------------------------------


==============================================================================
Fortran | 648.exchange2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
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------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`icx`

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifx`

Base Portability Flags

600.perlbench_s: `-DSPEC_LP64 -DSPEC_LINUX_X64`
602.gcc_s: `-DSPEC_LP64`
605.mcf_s: `-DSPEC_LP64`
620.omnetpp_s: `-DSPEC_LP64`
623.xalancbmk_s: `-DSPEC_LP64 -DSPEC_LINUX`
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`

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen11
(2.00 GHz, Intel Xeon Platinum 8452Y)

SPECspeed®2017_int_base = 12.3

SPECspeed®2017_int_peak = 12.5

CPU2017 License: 3		**Test Date:**	Feb-2023
Test Sponsor:	HPE	**Hardware Availability:**	Jan-2023
Tested by:	HPE	**Software Availability:**	May-2022

Base Optimization Flags

C benchmarks:

```
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

C++ benchmarks:

```
-m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Fortran benchmarks:

```
-m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Peak Compiler Invocation

C benchmarks:
```
icx
```

C++ benchmarks:
```
icpx
```

Fortran benchmarks:
```
ifx
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -O3
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-fno-strict-overflow -L/usr/local/jemalloc64-5.0.1/lib
```

(Continued on next page)

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen11
(2.00 GHz, Intel Xeon Platinum 8452Y)

$SPECspeed®2017\_int\_base = 12.3$

$SPECspeed®2017\_int\_peak = 12.5$

CPU2017 License:	3	**Test Date:**	Feb-2023
Test Sponsor:	HPE	**Hardware Availability:**	Jan-2023
Tested by:	HPE	**Software Availability:**	May-2022

Peak Optimization Flags (Continued)

600.perlbench_s (continued):
`-ljemalloc`

602.gcc_s: `-m64 -std=c11 -Wl,-z,muldefs -fprofile-generate`(pass 1)
`-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX512 -O3`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP`
`-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

605.mcf_s: `basepeak = yes`

625.x264_s: `-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -O3`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP`
`-fno-alias -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

657.xz_s: `basepeak = yes`

C++ benchmarks:

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`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SPR-rev1.1.html

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SPR-rev1.1.xml

SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL360 Gen11
(2.00 GHz, Intel Xeon Platinum 8452Y)

SPECspeed®2017_int_base = 12.3

SPECspeed®2017_int_peak = 12.5

CPU2017 License: 3	**Test Date:** Feb-2023
Test Sponsor: HPE	**Hardware Availability:** Jan-2023
Tested by: HPE	**Software Availability:** May-2022

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

Tested with SPEC CPU®2017 v1.1.9 on 2022-06-24 07:06:37-0400.
Report generated on 2024-01-29 17:30:25 by CPU2017 PDF formatter v6716.
Originally published on 2023-04-11.