SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL380 Gen11
(2.00 GHz, Intel Xeon Silver 4416+)

$SPECspeed^{®}2017\_int\_base = 14.3$
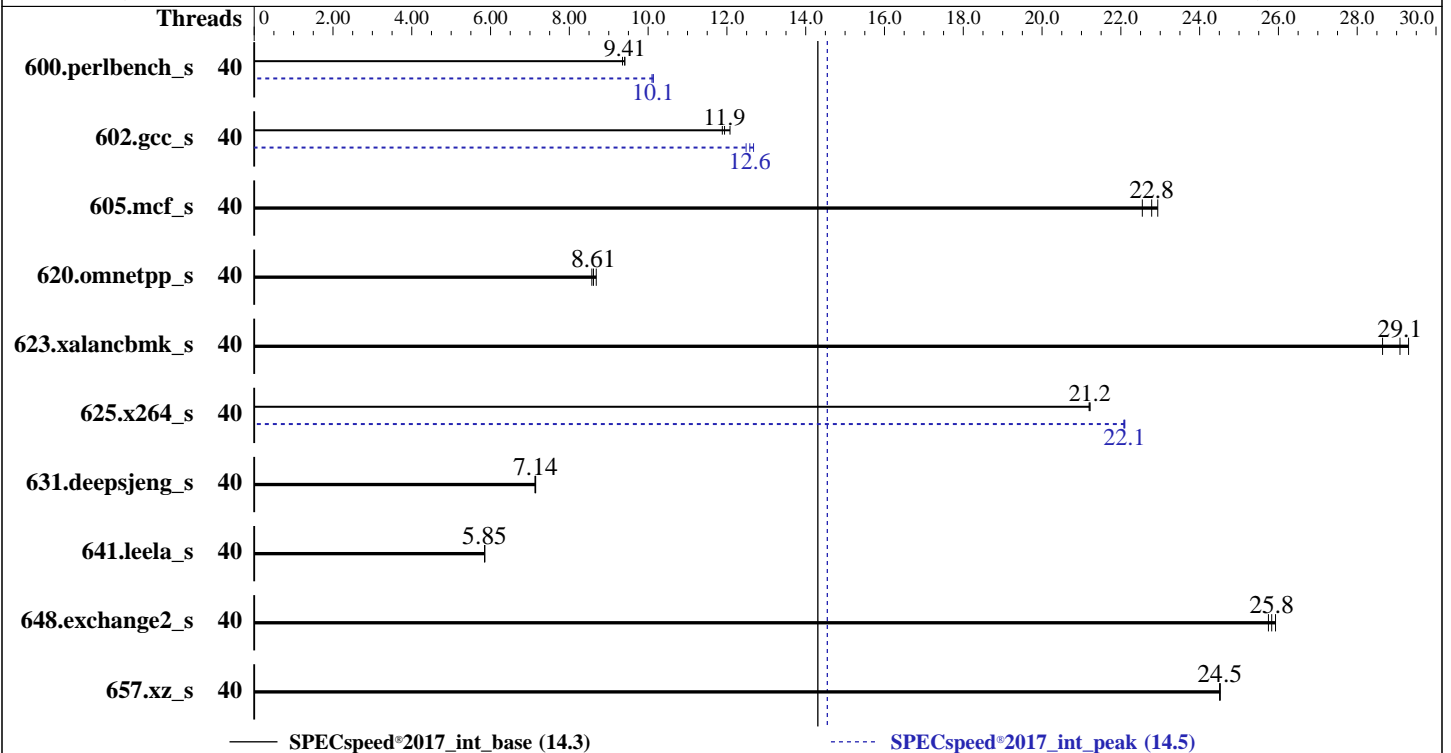
$SPECspeed^{®}2017\_int\_peak = 14.5$

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: May-2023

Hardware Availability: Apr-2023

Software Availability: Dec-2022

Threads				
600.perlbench_s	40	9.41	10.1	
602.gcc_s	40	11.9	12.6	
605.mcf_s	40	22.8		
620.omnetpp_s	40	8.61		
623.xalancbmk_s	40	29.1		
625.x264_s	40	21.2	22.1	
631.deepsjeng_s	40	7.14		
641.leela_s	40	5.85		
648.exchange2_s	40	25.8		
657.xz_s	40	24.5		

—— SPECspeed®2017_int_base (14.3)   ----- SPECspeed®2017_int_peak (14.5)

Hardware

CPU Name: Intel Xeon Silver 4416+
 Max MHz: 3900
 Nominal: 2000
Enabled: 40 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: 37.5 MB I+D on chip per chip
 Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R, running at 4000)
Storage: 1 x 960 GB SATA SSD
Other: None

Software

OS: Red Hat Enterprise Linux release 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: Yes
Firmware: HPE BIOS Version v1.30 03/01/2023 released Mar-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

Standard Performance Evaluation Corporation (info@spec.org)

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CPU2017 License: 3		**Test Date:** May-2023
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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	40	190	9.35	189	9.41	**189**	**9.41**	40	176	10.1	175	10.1	**175**	**10.1**
602.gcc_s	40	330	12.1	335	11.9	**334**	**11.9**	40	314	12.7	319	12.5	**317**	**12.6**
605.mcf_s	40	206	22.9	**207**	**22.8**	209	22.5	40	206	22.9	**207**	**22.8**	209	22.5
620.omnetpp_s	40	188	8.68	190	8.57	**189**	**8.61**	40	188	8.68	190	8.57	**189**	**8.61**
623.xalancbmk_s	40	48.4	29.3	49.5	28.6	**48.7**	**29.1**	40	48.4	29.3	49.5	28.6	**48.7**	**29.1**
625.x264_s	40	83.2	21.2	**83.2**	**21.2**	83.2	21.2	40	79.9	22.1	**79.8**	**22.1**	79.8	22.1
631.deepsjeng_s	40	201	7.13	201	7.14	**201**	**7.14**	40	201	7.13	201	7.14	**201**	**7.14**
641.leela_s	40	292	5.85	**292**	**5.85**	291	5.85	40	292	5.85	**292**	**5.85**	291	5.85
648.exchange2_s	40	114	25.7	**114**	**25.8**	113	25.9	40	114	25.7	**114**	**25.8**	113	25.9
657.xz_s	40	252	24.5	252	24.5	**252**	**24.5**	40	252	24.5	252	24.5	**252**	**24.5**
SPECspeed®2017_int_base =			**14.3**											
SPECspeed®2017_int_peak =			**14.5**											

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>
tuned-adm profile was set to Throughput-Performance using "tuned-adm profile throughput-performance"
```

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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_19/lib/intel64:/home/cpu2017_19/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 8.0
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.
 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 0x2b0001b0 for
the Intel Xeon Silver 4416+ 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_19/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Tue May 16 08:42:32 2023

 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
```

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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. 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
     08:42:32 up 1 min,  0 users,  load average: 0.12, 0.05, 0.02
    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) 2062852
    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) 2062852
    virtual memory              (kbytes, -v) unlimited
    file locks                       (-x) unlimited


  ------------------------------------------------------------
  5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 27
   sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
   sshd: root [priv]
   sshd: root@notty
   bash -c cd $SPEC/ && $SPEC/intspeed_spr.sh
   runcpu --nobuild --action validate --define default-platform-flags -c
     ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=40 --tune base,peak -o all --define
     intspeedaffinity --define drop_caches intspeed
   runcpu --nobuild --action validate --define default-platform-flags --configfile
```

(Continued on next page)

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Hardware Availability: Apr-2023
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Platform Notes (Continued)

```
    ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=40 --tune base,peak --output_format all
    --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_19


    ------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Silver 4416+
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 7
    microcode       : 0x2b0001b0
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 20
    siblings        : 20
    2 physical ids (chips)
    40 processors (hardware threads)
    physical id 0: core ids 0-19
    physical id 1: core ids 0-19
    physical id 0: apicids 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38
    physical id 1: apicids 128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166
  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):                 40
  On-line CPU(s) list:    0-39
  Vendor ID:              GenuineIntel
  BIOS Vendor ID:         Intel(R) Corporation
  Model name:             Intel(R) Xeon(R) Silver 4416+
  BIOS Model name:        Intel(R) Xeon(R) Silver 4416+
  CPU family:             6
  Model:                  143
  Thread(s) per core:     1
  Core(s) per socket:     20
  Socket(s):              2
  Stepping:               7
  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
                          clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec
                          xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
```

(Continued on next page)

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Platform Notes (Continued)

```
                           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:               1.9 MiB (40 instances)
  L1i cache:               1.3 MiB (40 instances)
  L2 cache:                80 MiB (40 instances)
  L3 cache:                75 MiB (2 instances)
  NUMA node(s):            4
  NUMA node0 CPU(s):       0-4,20-24
  NUMA node1 CPU(s):       5-9,25-29
  NUMA node2 CPU(s):       10-14,30-34
  NUMA node3 CPU(s):       15-19,35-39
  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     1.9M   12 Data           1    64       1            64
      L1i      32K     1.3M    8 Instruction    1    64       1            64
      L2        2M      80M   16 Unified        2  2048       1            64
      L3     37.5M      75M   15 Unified        3 40960       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: 0-4,20-24
    node 0 size: 128734 MB
    node 0 free: 128005 MB
    node 1 cpus: 5-9,25-29
    node 1 size: 128985 MB
    node 1 free: 128626 MB
    node 2 cpus: 10-14,30-34
    node 2 size: 129021 MB
    node 2 free: 128680 MB
    node 3 cpus: 15-19,35-39
    node 3 size: 129010 MB
    node 3 free: 128648 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:       528130604 kB

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

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Platform Notes (Continued)

```
 10. who -r
   run-level 3 May 16 08:41


   ------------------------------------------------------------
 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 crond
                   dbus-broker firewalld getty@ irqbalance kdump lvm2-monitor mdmonitor microcode
                   nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sshd sssd
                   systemd-network-generator tuned udisks2 upower
   enabled-runtime systemd-remount-fs
   disabled        blk-availability canberra-system-bootup canberra-system-shutdown
                   canberra-system-shutdown-reboot chrony-wait chronyd console-getty cpupower debug-shell
                   hwloc-dump-hwdata 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-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. 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
```

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Platform Notes (Continued)

```
  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+madvise [madvise] never
  enabled         [always] madvise 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
  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_19
  Filesystem            Type  Size  Used Avail Use% Mounted on
  /dev/mapper/rhel-home xfs   819G  347G  472G  43% /home


  ---------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:         HPE
    Product:        ProLiant DL380 Gen11
    Product Family: ProLiant
    Serial:         CNX21000G7


  ---------------------------------------------------------------
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:
    5x Hynix HMCG88AEBRA168N 32 GB 2 rank 4800, configured at 4000
    8x Hynix HMCG88MEBRA113N 32 GB 2 rank 4800, configured at 4000
    3x Hynix HMCG88MEBRA115N 32 GB 2 rank 4800, configured at 4000


  ---------------------------------------------------------------
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       HPE
    BIOS Version:      1.30
```

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Tested by:	HPE	**Software Availability:**	Dec-2022

Platform Notes (Continued)

```
        BIOS Date:         03/01/2023
        BIOS Revision:     1.30
        Firmware Revision: 1.30
```

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 2023.0.0 Build 20221201
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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 2023.0.0 Build 20221201
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------------------------------------------------------------------------------


==============================================================================
Fortran | 648.exchange2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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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`

(Continued on next page)

SPEC CPU®2017 Integer Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL380 Gen11
(2.00 GHz, Intel Xeon Silver 4416+)

SPECspeed®2017_int_base = 14.3

SPECspeed®2017_int_peak = 14.5

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

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

Base Portability Flags (Continued)

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 -std=c11 -Wl,-z,muldefs -xsapphirerapids -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 -std=c++14 -Wl,-z,muldefs -xsapphirerapids -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 -xsapphirerapids -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
```

SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECspeed®2017_int_base = 14.3

ProLiant DL380 Gen11
(2.00 GHz, Intel Xeon Silver 4416+)

SPECspeed®2017_int_peak = 14.5

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

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-AVX2`(pass 1)
`-flto -Ofast`(pass 1) `-xCORE-AVX512 -O3 -ffast-math`
`-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
`-fiopenmp -DSPEC_OPENMP -fno-strict-overflow`
`-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

602.gcc_s: `-m64 -std=c11 -Wl,-z,muldefs -fprofile-generate`(pass 1)
`-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX2`(pass 1)
`-flto -Ofast`(pass 1) `-xCORE-AVX512 -O3 -ffast-math`
`-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 -xsapphirerapids -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/HPE-Platform-Flags-Intel-SPR-rev1.2.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-SPR-rev1.2.xml
  http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml

SPEC CPU®2017 Integer Speed Result

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(Test Sponsor: HPE)

ProLiant DL380 Gen11
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SPECspeed®2017_int_peak = 14.5

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

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

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

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