SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant ML110 Gen11
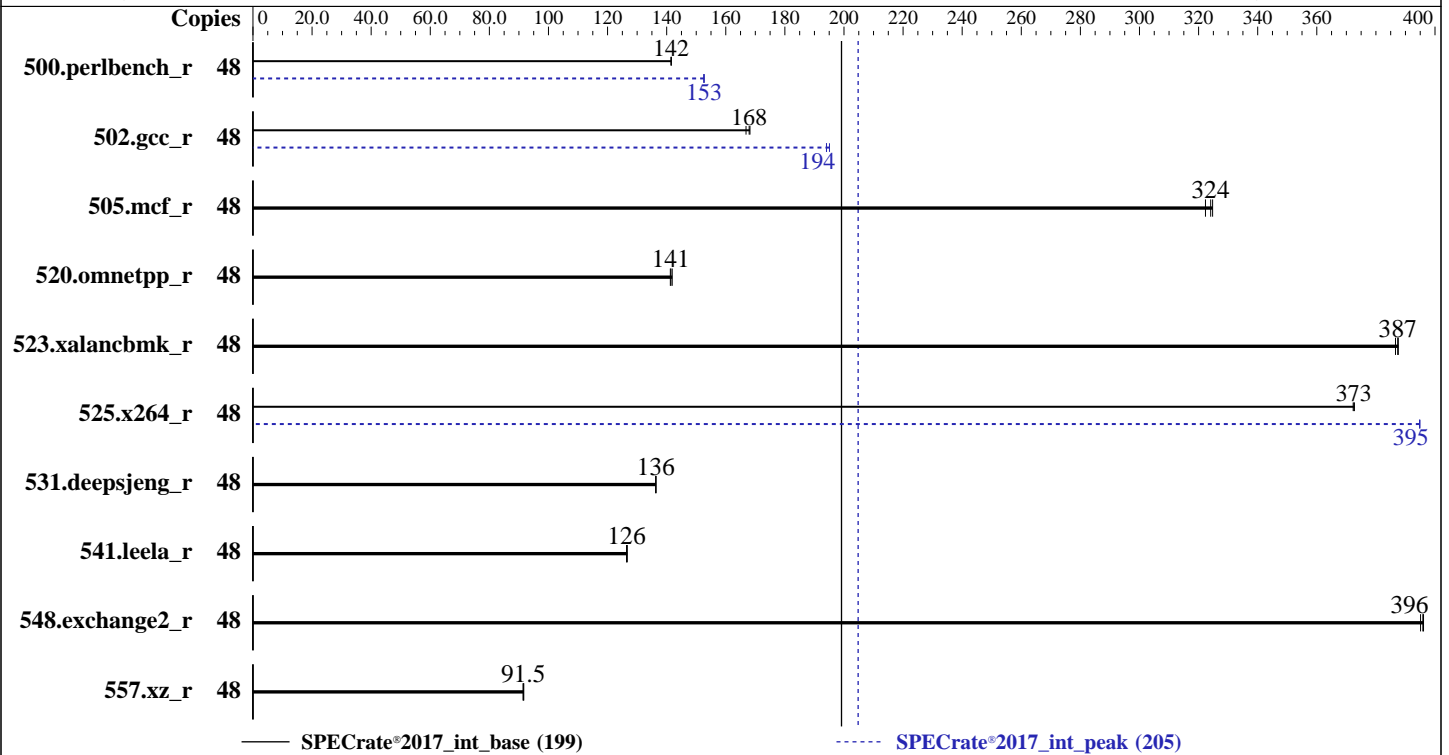(1.8 GHz, Intel Xeon Gold 5418N)

$SPECrate^{®}2017\_int\_base = 199$

$SPECrate^{®}2017\_int\_peak = 205$

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Apr-2023

Hardware Availability: May-2023

Software Availability: Dec-2022

Copies	Result
500.perlbench_r 48	142 / 153
502.gcc_r 48	168 / 194
505.mcf_r 48	324
520.omnetpp_r 48	141
523.xalancbmk_r 48	387
525.x264_r 48	373 / 395
531.deepsjeng_r 48	136
541.leela_r 48	126
548.exchange2_r 48	396
557.xz_r 48	91.5

—— SPECrate®2017_int_base (199)   ····· SPECrate®2017_int_peak (205)

Hardware

CPU Name: Intel Xeon Gold 5418N

Max MHz: 3800

Nominal: 1800

Enabled: 24 cores, 1 chip, 2 threads/core

Orderable: 1 chip

Cache L1: 32 KB I + 48 KB D on chip per core

L2: 2 MB I+D on chip per core

L3: 45 MB I+D on chip per chip

Other: None

Memory: 256 GB (8 x 32 GB 2Rx8 PC5-4800B-R, running at 4000)

Storage: 1 x 240 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 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 v1.30 03/01/2023 released Mar-2023

File System: xfs

System State: Run level 3 (multi-user)

Base Pointers: 64-bit

Peak Pointers: 32/64-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)

https://www.spec.org/

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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	48	540	142	540	142	**540**	**142**	48	500	153	**501**	**153**	501	153
502.gcc_r	48	404	168	**405**	**168**	407	167	48	350	194	**350**	**194**	348	195
505.mcf_r	48	239	325	241	322	**239**	**324**	48	239	325	241	322	**239**	**324**
520.omnetpp_r	48	446	141	444	142	**445**	**141**	48	446	141	444	142	**445**	**141**
523.xalancbmk_r	48	**131**	**387**	131	388	131	387	48	**131**	**387**	131	388	131	387
525.x264_r	48	225	373	**226**	**373**	226	372	48	213	395	**213**	**395**	213	395
531.deepsjeng_r	48	404	136	403	136	**403**	**136**	48	404	136	403	136	**403**	**136**
541.leela_r	48	628	127	629	126	**629**	**126**	48	628	127	629	126	**629**	**126**
548.exchange2_r	48	**318**	**396**	317	396	318	395	48	**318**	**396**	317	396	318	395
557.xz_r	48	566	91.6	567	91.4	**567**	**91.5**	48	566	91.6	567	91.4	**567**	**91.5**

SPECrate®2017_int_base =	**199**
SPECrate®2017_int_peak =	**205**

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 taskset mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate taskset 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
tuned-adm profile was set to accelerator-performance  using "tuned-adm profile accelerator-performance"
perf-bias for all the CPUs is set using "cpupower set -b 0"
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
```

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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 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 0x2b0001b0 for
the Intel Xeon Gold 5418N processor.
BIOS Configuration:
 Workload Profile set to General Throughput Compute
 Memory Patrol Scrubbing set to Disabled
 Workload Profile set to Custom
 Minimum Processor Idle Power Package C-State set to Package C6 (non-retention) State
 DCU Stream Prefetcher set to Disabled
 Adjacent Sector Prefetch set to Disabled
 Last Level Cache (LLC) Dead Line Allocation set to Disabled
 Enhanced Processor Performance Profile set to Aggressive
 Thermal Configuration set to Maximum Cooling

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Tue Apr 25 17:03:26 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
 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
```

(Continued on next page)

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Platform Notes (Continued)

```
 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
    17:03:26 up 2 min,  0 users,  load average: 0.03, 0.04, 0.01
   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) 1029888
   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) 1029888
   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@notty
 bash -c cd $SPEC/ && $SPEC/intrate.sh
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=48 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=24 --define physicalfirst
   --define no-numa --tune base,peak -o all --define drop_caches intrate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=48 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=24 --define physicalfirst
   --define no-numa --tune base,peak --output_format all --define drop_caches --nopower --runmode rate --tune
   base:peak --size refrate intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
```

(Continued on next page)

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Hardware Availability: May-2023

Software Availability: Dec-2022

Platform Notes (Continued)

```
  $SPEC = /home/cpu2017


  -----------------------------------------------------------
6. /proc/cpuinfo
     model name      : Intel(R) Xeon(R) Gold 5418N
     vendor_id       : GenuineIntel
     cpu family      : 6
     model           : 143
     stepping        : 7
     microcode       : 0x2b0001b0
     bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
     cpu cores       : 24
     siblings        : 48
     1 physical ids (chips)
     48 processors (hardware threads)
     physical id 0: core ids 0-23
     physical id 0: apicids 0-47
  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):                       48
    On-line CPU(s) list:          0-47
    Vendor ID:                    GenuineIntel
    BIOS Vendor ID:               Intel(R) Corporation
    Model name:                   Intel(R) Xeon(R) Gold 5418N
    BIOS Model name:              Intel(R) Xeon(R) Gold 5418N
    CPU family:                   6
    Model:                        143
    Thread(s) per core:           2
    Core(s) per socket:           24
    Socket(s):                    1
    Stepping:                     7
    BogoMIPS:                     3600.00
    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
                                  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:                    1.1 MiB (24 instances)
```

(Continued on next page)

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Platform Notes (Continued)

```
  L1i cache:                      768 KiB (24 instances)
  L2 cache:                       48 MiB (24 instances)
  L3 cache:                       45 MiB (1 instance)
  NUMA node(s):                   1
  NUMA node0 CPU(s):              0-47
  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     1.1M  12 Data            1    64    1             64
     L1i       32K     768K   8 Instruction     1    64    1             64
     L2         2M      48M  16 Unified         2  2048    1             64
     L3        45M      45M  15 Unified         3 49152    1             64

    ----------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0-47
  node 0 size: 257512 MB
  node 0 free: 256560 MB
  node distances:
  node   0
    0:  10

    ----------------------------------------------------------
9. /proc/meminfo
   MemTotal:       263692288 kB

    ----------------------------------------------------------
10. who -r
   run-level 3 Apr 25 17:01

    ----------------------------------------------------------
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 tuned udisks2
   enabled-runtime systemd-remount-fs
   disabled        blk-availability chrony-wait console-getty cpupower debug-shell 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

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

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Platform Notes (Continued)

```
 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/rhel00-root
   ro
   resume=/dev/mapper/rhel00-swap
   rd.lvm.lv=rhel00/root
   rd.lvm.lv=rhel00/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: accelerator-performance


   ----------------------------------------------------------
 16. sysctl
   kernel.numa_balancing            0
   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+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

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

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Platform Notes (Continued)

```
  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/mapper/rhel00-home xfs   148G   60G   89G  40% /home

  --------------------------------------------------------------
  21. /sys/devices/virtual/dmi/id
      Vendor:         HPE
      Product:        ProLiant ML110 Gen11
      Product Family: ProLiant
      Serial:         CNX2230TMQ

  --------------------------------------------------------------
  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 Hynix HMCG88MEBRA113N 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
     BIOS Date:         03/01/2023
     BIOS Revision:     1.30
     Firmware Revision: 1.10
```

Compiler Version Notes

```
==============================================================================================
C      | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


==============================================================================================
C      | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
       | 557.xz_r(base, peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


==============================================================================================
C      | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.0.0 Build 20221201
```

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Compiler Version Notes (Continued)

```
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C        | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
         | 557.xz_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
         | 541.leela_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran | 548.exchange2_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 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

(Continued on next page)

Hewlett Packard Enterprise

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ProLiant ML110 Gen11
(1.8 GHz, Intel Xeon Gold 5418N)

$\text{SPECrate}^{®}2017\_\text{int\_base} = 199$

$\text{SPECrate}^{®}2017\_\text{int\_peak} = 205$

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Apr-2023

Hardware Availability: May-2023

Software Availability: Dec-2022

Base Portability Flags (Continued)

557.xz_r: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
```
-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -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
-lqkmalloc
```

C++ benchmarks:
```
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -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
-lqkmalloc
```

Fortran benchmarks:
```
-w -m64 -Wl,-z,muldefs -xsapphirerapids -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
-lqkmalloc
```

Peak Compiler Invocation

C benchmarks:
```
icx
```

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

Fortran benchmarks:
```
ifx
```

Peak Portability Flags

500.perlbench_r: `-DSPEC_LP64 -DSPEC_LINUX_X64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`
505.mcf_r: `-DSPEC_LP64`

(Continued on next page)

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant ML110 Gen11
(1.8 GHz, Intel Xeon Gold 5418N)

SPECrate®2017_int_base = 199

SPECrate®2017_int_peak = 205

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

Peak Portability Flags (Continued)

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`

Peak Optimization Flags

C benchmarks:

500.perlbench_r: `-w -std=c11 -m64 -Wl,-z,muldefs`
`-fprofile-generate`(pass 1)
`-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX2`(pass 1)
`-flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse`
`-funroll-loops -qopt-mem-layout-trans=4`
`-fno-strict-overflow`
`-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`
`-lqkmalloc`

502.gcc_r: `-m32`
`-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/ia32_lin`
`-std=gnu89 -Wl,-z,muldefs -fprofile-generate`(pass 1)
`-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX2`(pass 1)
`-flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse`
`-funroll-loops -qopt-mem-layout-trans=4`
`-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc`

505.mcf_r: `basepeak = yes`

525.x264_r: `-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -fno-alias`
`-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`
`-lqkmalloc`

557.xz_r: `basepeak = yes`

C++ benchmarks:

520.omnetpp_r: `basepeak = yes`

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SPEC CPU®2017 Integer Rate Result

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ProLiant ML110 Gen11
(1.8 GHz, Intel Xeon Gold 5418N)

SPECrate®2017_int_base = 199

SPECrate®2017_int_peak = 205

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

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

Peak Optimization Flags (Continued)

523.xalancbmk_r: `basepeak = yes`

531.deepsjeng_r: `basepeak = yes`

541.leela_r: `basepeak = yes`

Fortran benchmarks:

548.exchange2_r: `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

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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

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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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