SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

$SPECrate^{®}2017\_int\_base = 40.7$

ProLiant ML30 Gen11
(2.60 GHz, Intel Xeon E-2414)

$SPECrate^{®}2017\_int\_peak = 42.2$

CPU2017 License: 3   **Test Date:** Feb-2024

Test Sponsor: HPE   **Hardware Availability:** Jan-2024

Tested by: HPE   **Software Availability:** Dec-2023

Benchmark	Copies	base	peak
500.perlbench_r	4	32.6	37.3
502.gcc_r	4	39.7	46.4
505.mcf_r	4	64.4	
520.omnetpp_r	4	25.8	
523.xalancbmk_r	4	58.6	
525.x264_r	4	94.3	101
531.deepsjeng_r	4	29.9	
541.leela_r	4	24.9	
548.exchange2_r	4	89.0	
557.xz_r	4	15.8	

SPECrate®2017_int_base (40.7)   SPECrate®2017_int_peak (42.2)

Hardware

- **CPU Name:** Intel Xeon E-2414
- **Max MHz:** 4500
- **Nominal:** 2600
- **Enabled:** 4 cores, 1 chip
- **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:** 12 MB I+D on chip per chip
- **Other:** None
- **Memory:** 64 GB (2 x 32 GB 2Rx8 PC5-5600B-E, running at 4400), orderable using HPE part# P64339-B21
- **Storage:** 1 x 480 GB SATA SSD
- **Other:** None

Software

- **OS:** SUSE Linux Enterprise Server 15 SP4
  Kernel 5.14.21-150400.22-default
- **Compiler:** C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux;
  Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;
- **Parallel:** No
- **Firmware:** HPE BIOS Version v1.44 01/04/2024 released Jan-2024
- **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

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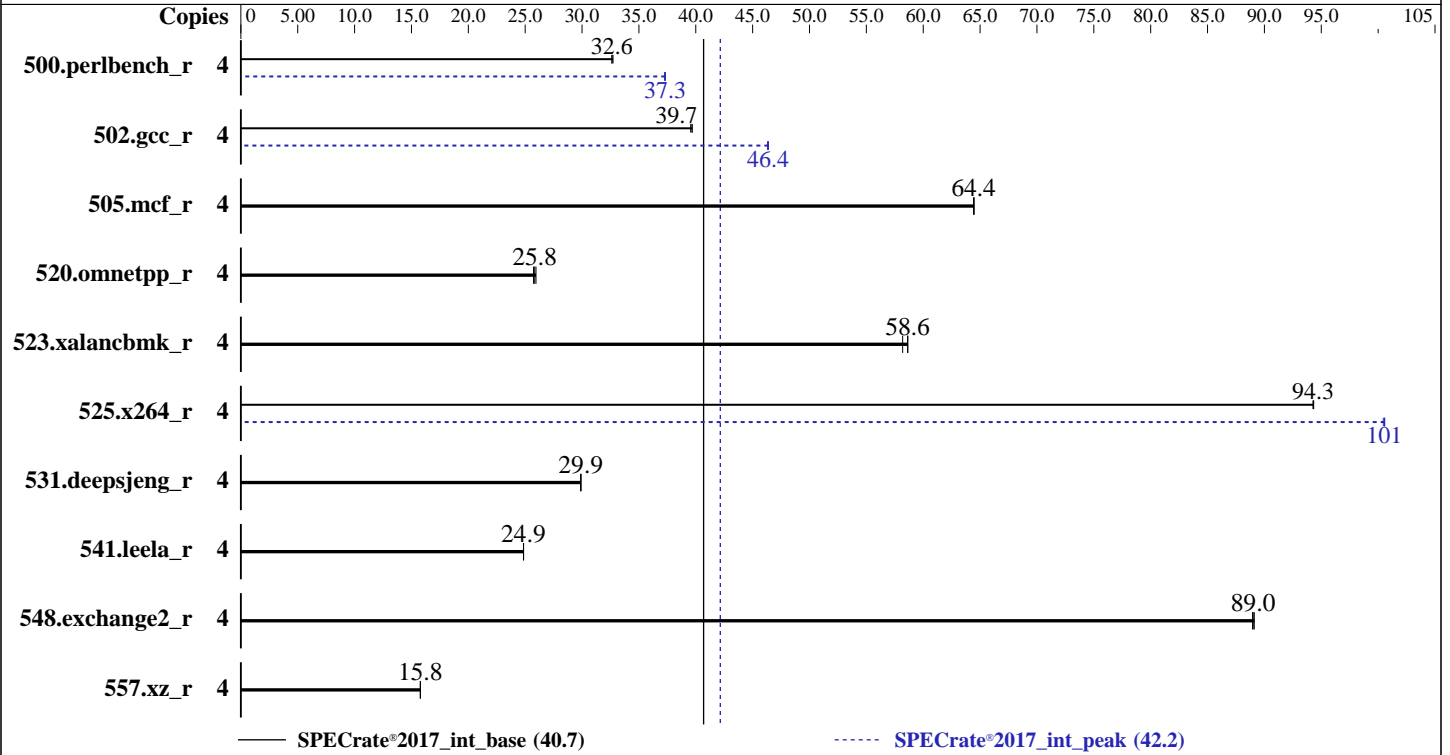(Test Sponsor: HPE)

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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	4	195	32.7	195	32.6	**195**	**32.6**	4	**171**	**37.3**	171	37.3	171	37.3
502.gcc_r	4	**143**	**39.7**	143	39.6	143	39.7	4	122	46.4	122	46.3	**122**	**46.4**
505.mcf_r	4	**100**	**64.4**	100	64.5	100	64.4	4	**100**	**64.4**	100	64.5	100	64.4
520.omnetpp_r	4	**203**	**25.8**	202	26.0	204	25.7	4	**203**	**25.8**	202	26.0	204	25.7
523.xalancbmk_r	4	72.6	58.2	**72.0**	**58.6**	72.0	58.6	4	72.6	58.2	**72.0**	**58.6**	72.0	58.6
525.x264_r	4	**74.3**	**94.3**	74.2	94.3	74.3	94.3	4	69.7	100	69.6	101	**69.6**	**101**
531.deepsjeng_r	4	153	29.9	153	29.9	**153**	**29.9**	4	153	29.9	153	29.9	**153**	**29.9**
541.leela_r	4	266	24.9	**267**	**24.9**	267	24.8	4	266	24.9	**267**	**24.9**	267	24.8
548.exchange2_r	4	118	89.1	**118**	**89.0**	118	89.0	4	118	89.1	**118**	**89.0**	118	89.0
557.xz_r	4	274	15.8	274	15.8	**274**	**15.8**	4	274	15.8	274	15.8	**274**	**15.8**
SPECrate®2017_int_base =	**40.7**													
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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

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
```

(Continued on next page)

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General Notes (Continued)

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 0x121 for
the Intel Xeon E-2414 processor.
BIOS Configuration:
 Workload Profile set to General Throughput Compute
 Thermal Configuration set to Maximum Cooling
 Enhanced Processor Performance Profile set to Enabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Wed Feb 21 08:27:17 2024

 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 249 (249.11+suse.124.g2bc0b2c447)
 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 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
   x86_64 x86_64 x86_64 GNU/Linux


 -------------------------------------------------------------
 2. w
    08:27:17 up 4 min,  0 users,  load average: 0.07, 0.03, 0.00
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT


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

(Continued on next page)

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Platform Notes (Continued)

```
    ----------------------------------------------------------
 4. ulimit -a
    core file size          (blocks, -c) unlimited
    data seg size           (kbytes, -d) unlimited
    scheduling priority             (-e) 0
    file size               (blocks, -f) unlimited
    pending signals                 (-i) 256752
    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) 256752
    virtual memory          (kbytes, -v) unlimited
    file locks                      (-x) unlimited


    ----------------------------------------------------------
 5. sysinfo process ancestry
    /usr/lib/systemd/systemd --switched-root --system --deserialize 29
    sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
    sshd: root@notty
    bash -c cd $SPEC/ && $SPEC/intrateTP.sh
    runcpu --nobuild --action validate --define default-platform-flags --define numcopies=4 -c
      ic2023.2.3-lin-core-avx2-rate-20231121.cfg --define smt-on --define cores=2 --define physicalfirst
      --define no-numa --tune base,peak -o all --define drop_caches intrate
    runcpu --nobuild --action validate --define default-platform-flags --define numcopies=4 --configfile
      ic2023.2.3-lin-core-avx2-rate-20231121.cfg --define smt-on --define cores=2 --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
   $SPEC = /home/cpu2017


    ----------------------------------------------------------
 6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) E E-2414
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 183
    stepping        : 1
    microcode       : 0x121
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 4
    siblings        : 4
    1 physical ids (chips)
    4 processors (hardware threads)
    physical id 0: core ids 0-3
    physical id 0: apicids 0,2,4,6
   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 2.37.2:
    Architecture:             x86_64
    CPU op-mode(s):           32-bit, 64-bit
```

(Continued on next page)

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Platform Notes (Continued)

```
  Address sizes:                   46 bits physical, 48 bits virtual
  Byte Order:                      Little Endian
  CPU(s):                          4
  On-line CPU(s) list:             0-3
  Vendor ID:                       GenuineIntel
  Model name:                      Intel(R) Xeon(R) E E-2414
  CPU family:                      6
  Model:                           183
  Thread(s) per core:              1
  Core(s) per socket:              4
  Socket(s):                       1
  Stepping:                        1
  Frequency boost:                 enabled
  CPU max MHz:                     2601.0000
  CPU min MHz:                     800.0000
  BogoMIPS:                        5222.40
  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 sse4_1 sse4_2
                                   x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm
                                   abm 3dnowprefetch cpuid_fault epb invpcid_single ssbd ibrs ibpb stibp
                                   ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase
                                   tsc_adjust bmi1 avx2 smep bmi2 erms invpcid rdseed adx smap clflushopt
                                   clwb intel_pt sha_ni xsaveopt xsavec xgetbv1 xsaves avx_vnni dtherm ida
                                   arat pln pts umip pku ospke waitpkg gfni vaes vpclmulqdq tme rdpid movdiri
                                   movdir64b fsrm md_clear serialize pconfig arch_lbr flush_l1d
                                   arch_capabilities
  Virtualization:                  VT-x
  L1d cache:                       192 KiB (4 instances)
  L1i cache:                       128 KiB (4 instances)
  L2 cache:                        8 MiB (4 instances)
  L3 cache:                        12 MiB (1 instance)
  NUMA node(s):                    1
  NUMA node0 CPU(s):               0-3
  Vulnerability Itlb multihit:     Not affected
  Vulnerability L1tf:              Not affected
  Vulnerability Mds:               Not affected
  Vulnerability Meltdown:          Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user pointer 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     192K   12 Data              1    64        1             64
      L1i       32K     128K    8 Instruction       1    64        1             64
      L2         2M       8M   16 Unified           2  2048        1             64
      L3        12M      12M    6 Unified           3 32768        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: 0-3
    node 0 size: 64210 MB
    node 0 free: 63624 MB
```

(Continued on next page)

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Platform Notes (Continued)

```
   node distances:
   node   0
     0:  10


   ------------------------------------------------------------
   9. /proc/meminfo
     MemTotal:       65751256 kB


   ------------------------------------------------------------
   10. who -r
     run-level 3 Feb 21 08:23


   ------------------------------------------------------------
   11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
     Default Target  Status
     multi-user      running


   ------------------------------------------------------------
   12. Services, from systemctl list-unit-files
     STATE           UNIT FILES
     enabled         apparmor auditd cron getty@ haveged irqbalance issue-generator kbdsettings lvm2-monitor
                     postfix purge-kernels rollback sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6
                     wickedd-nanny
     enabled-runtime systemd-remount-fs
     disabled        blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell
                     grub2-once haveged-switch-root issue-add-ssh-keys kexec-load lunmask rpmconfigcheck
                     serial-getty@ systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                     systemd-time-wait-sync systemd-timesyncd tuned
     indirect        wickedd


   ------------------------------------------------------------
   13. Linux kernel boot-time arguments, from /proc/cmdline
     BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
     root=UUID=425f9de5-b352-4d79-81b6-6bbcce2666d4
     splash=silent
     resume=/dev/disk/by-uuid/6ac3ae64-fc23-4381-ade9-de98d8923cd3
     mitigations=auto
     quiet
     security=apparmor


   ------------------------------------------------------------
   14. cpupower frequency-info
     analyzing CPU 0:
       current policy: frequency should be within 800 MHz and 2.60 GHz.
                       The governor "performance" may decide which speed to use
                       within this range.
       boost state support:
         Supported: yes
         Active: yes


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


   ------------------------------------------------------------
   16. sysctl
     kernel.numa_balancing            0
     kernel.randomize_va_space        2
     vm.compaction_proactiveness      20
     vm.dirty_background_bytes        0
```

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Platform Notes (Continued)

```
    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                        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 SUSE Linux Enterprise Server 15 SP4


    ----------------------------------------------------------
20. Disk information
SPEC is set to: /home/cpu2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda3       xfs   374G   61G  314G  17% /home


    ----------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:         HPE
    Product:        ProLiant ML30 Gen11
    Product Family: ProLiant
    Serial:         LXVBT01BVHZ03N


    ----------------------------------------------------------
22. dmidecode
    Additional information from dmidecode 3.2 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:
      2x Hynix HMCG88AGBEA084N 32 GB 2 rank 5600, configured at 4400
```

(Continued on next page)

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Platform Notes (Continued)

```
         --------------------------------------------------------------
         23. BIOS
         (This section combines info from /sys/devices and dmidecode.)
            BIOS Vendor:       HPE
            BIOS Version:      1.44
            BIOS Date:         01/04/2024
            BIOS Revision:     1.44
            Firmware Revision: 1.45
```

Compiler Version Notes

```
==============================================================================================
C        | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


==============================================================================================
C        | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.2.3 Build x
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----------------------------------------------------------------------------------------------


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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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


==============================================================================================
Fortran | 548.exchange2_r(base, peak)
----------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
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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 -xCORE-AVX2 -O3 -ffast-math -flto`
`-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
`-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin`
`-lqkmalloc`

C++ benchmarks:
`-w -std=c++14 -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math`
`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
`-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin`
`-lqkmalloc`

Fortran benchmarks:
`-w -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto`
`-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
`-nostandard-realloc-lhs -align array32byte -auto`
`-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin`
`-lqkmalloc`

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant ML30 Gen11
(2.60 GHz, Intel Xeon E-2414)

SPECrate®2017_int_base = 40.7

SPECrate®2017_int_peak = 42.2

CPU2017 License: 3	**Test Date:** Feb-2024
Test Sponsor: HPE	**Hardware Availability:** Jan-2024
Tested by: HPE	**Software Availability:** Dec-2023

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`
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 -flto`
`-Ofast -ffast-math -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -fno-strict-overflow`
`-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin`
`-lqkmalloc`

502.gcc_r: `-m32`
`-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/ia32_lin`
`-std=gnu89 -Wl,-z,muldefs -fprofile-generate`(pass 1)
`-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX2 -flto`
`-Ofast -ffast-math -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -L/usr/local/jemalloc32-5.0.1/lib`
`-ljemalloc`

(Continued on next page)

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Peak Optimization Flags (Continued)

505.mcf_r: `basepeak = yes`

525.x264_r: `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -fno-alias`
`-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin`
`-lqkmalloc`

557.xz_r: `basepeak = yes`

C++ benchmarks:

520.omnetpp_r: `basepeak = yes`

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-RPL-rev2.0.html`
`http://www.spec.org/cpu2017/flags/Intel-ic2023p2-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-RPL-rev2.0.xml`
`http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml`

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

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