SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge MX750c (Intel Xeon Silver 4310T, 2.30 GHz)

$SPECrate^{®}2017\_int\_base = 156$

$SPECrate^{®}2017\_int\_peak = 161$

CPU2017 License: 6573
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Apr-2023
Hardware Availability: Apr-2021
Software Availability: Dec-2022

Benchmark	Copies	base	peak
500.perlbench_r	40	102	116
502.gcc_r	40	127	149
505.mcf_r	40	261	
520.omnetpp_r	40	107	
523.xalancbmk_r	40	247	
525.x264_r	40	300	317
531.deepsjeng_r	40	112	
541.leela_r	40	108	
548.exchange2_r	40	320	
557.xz_r	40	81.9	

SPECrate®2017_int_base (156) — SPECrate®2017_int_peak (161)

Hardware

CPU Name: Intel Xeon Silver 4310T
 Max MHz: 3400
 Nominal: 2300
Enabled: 20 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 1.25 MB I+D on chip per core
 L3: 15 MB I+D on chip per chip
 Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)
Storage: 50 GB on tmpfs
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
 5.14.21-150400.22-default
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: Version 1.6.5 released Apr-2022
File System: tmpfs
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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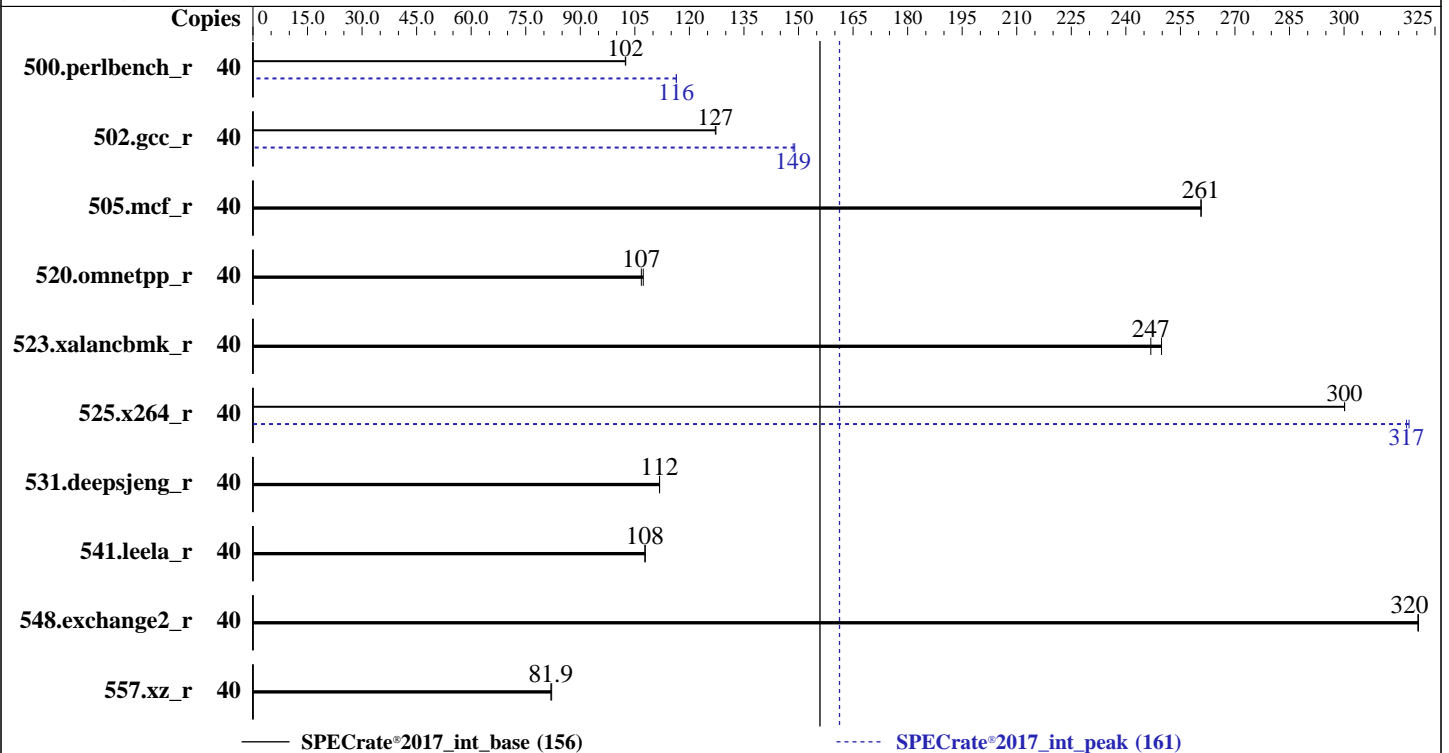
$SPECrate®2017\_int\_peak = 161$

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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	40	**622**	**102**	621	102			40	**547**	**116**	547	116		
502.gcc_r	40	**446**	**127**	445	127			40	**381**	**149**	380	149		
505.mcf_r	40	248	261	**248**	**261**			40	248	261	**248**	**261**		
520.omnetpp_r	40	**491**	**107**	489	107			40	**491**	**107**	489	107		
523.xalancbmk_r	40	169	250	**171**	**247**			40	169	250	**171**	**247**		
525.x264_r	40	233	300	**233**	**300**			40	220	318	**221**	**317**		
531.deepsjeng_r	40	**410**	**112**	410	112			40	**410**	**112**	410	112		
541.leela_r	40	**615**	**108**	614	108			40	**615**	**108**	614	108		
548.exchange2_r	40	327	320	**327**	**320**			40	327	320	**327**	**320**		
557.xz_r	40	526	82.1	**527**	**81.9**			40	526	82.1	**527**	**81.9**		
SPECrate®2017_int_base =		**156**												
SPECrate®2017_int_peak =		**161**												

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"
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
    "/mnt/ramdisk/cpu2017-1.1.9-ic2023.0/lib/intel64:/mnt/ramdisk/cpu2017-1.1.9-ic2023.0/lib/ia32:/mnt/ram
    disk/cpu2017-1.1.9-ic2023.0/je5.0.1-32"
MALLOC_CONF = "retain:true"
```

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General Notes

```
Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4
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>
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

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.

Benchmark run from a 50 GB ramdisk created with the cmd: "mount -t tmpfs -o size=50G tmpfs /mnt/ramdisk"
```

Platform Notes

```
BIOS settings:
                  ADDDC Setting : Disabled
         DIMM Self Healing on
  Uncorrectable Memory Error : Disabled
   Virtualization Technology : Disabled
     DCU Streamer Prefetcher : Disabled
                 LLC Prefetch : Disabled
         Dead Line LLC Alloc : Disabled
               Optimizer Mode : Enabled

               System Profile : Custom
        CPU Power Management : Maximum Performance
                         C1E : Disabled
                   C States : Autonomous
          Memory Patrol Scrub : Disabled
     Energy Efficiency Policy : Performance
          PCI ASPM L1 Link
            Power Management : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-ic2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Fri Apr  7 18:02:42 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
```

(Continued on next page)

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Platform Notes (Continued)

```
   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. sysctl
  15. /sys/kernel/mm/transparent_hugepage
  16. /sys/kernel/mm/transparent_hugepage/khugepaged
  17. OS release
  18. Disk information
  19. /sys/devices/virtual/dmi/id
  20. dmidecode
  21. 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
     18:02:42 up 5 min,  1 user,  load average: 0.39, 0.54, 0.31
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1     -                18:01   33.00s  1.44s  0.00s /bin/bash ./dell-run-speccpu.sh rate
    --define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --output_format
    csv,html,pdf,txt

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

  ------------------------------------------------------------
  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) 4125993
    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) 4125993
    virtual memory          (kbytes, -v) unlimited
    file locks                      (-x) unlimited

  ------------------------------------------------------------
  5. sysinfo process ancestry
  /usr/lib/systemd/systemd linux --switched-root --system --deserialize 29
  login -- root
  -bash
  /bin/bash ./DELL_rate.sh
  /bin/bash ./dell-run-main.sh rate
  /bin/bash ./dell-run-main.sh rate
```

(Continued on next page)

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Platform Notes (Continued)

```
  /bin/bash ./dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-adddcD=1
    --define DL-BIOS-VirtD=1 --output_format csv,html,pdf,txt
  /bin/bash ./dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-adddcD=1
    --define DL-BIOS-VirtD=1 --output_format csv,html,pdf,txt
  runcpu --nobuild --action validate --define default-platform-flags --define numcopies=40 -c
    ic2023.0-lin-core-avx512-rate-20221201.cfg --define smt-on --define cores=20 --define physicalfirst
    --define invoke_with_interleave --define drop_caches --tune base,peak -o all --iterations 2 --define
    DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --output_format
    csv,html,pdf,txt intrate
  runcpu --nobuild --action validate --define default-platform-flags --define numcopies=40 --configfile
    ic2023.0-lin-core-avx512-rate-20221201.cfg --define smt-on --define cores=20 --define physicalfirst
    --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --iterations 2
    --define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1
    --output_format csv,html,pdf,txt --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 = /mnt/ramdisk/cpu2017-1.1.9-ic2023.0


  -------------------------------------------------------------
  6. /proc/cpuinfo
     model name      : Intel(R) Xeon(R) Silver 4310T CPU @ 2.30GHz
     vendor_id       : GenuineIntel
     cpu family      : 6
     model           : 106
     stepping        : 6
     microcode       : 0xd000363
     bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
     cpu cores       : 10
     siblings        : 20
     2 physical ids (chips)
     40 processors (hardware threads)
     physical id 0: core ids 0-9
     physical id 1: core ids 0-9
     physical id 0: apicids 0-19
     physical id 1: apicids 64-83
   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
    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
    Model name:              Intel(R) Xeon(R) Silver 4310T CPU @ 2.30GHz
    CPU family:              6
    Model:                   106
    Thread(s) per core:      2
    Core(s) per socket:      10
    Socket(s):               2
    Stepping:                6
    CPU max MHz:             3400.0000
    CPU min MHz:             800.0000
    BogoMIPS:                4600.00
```

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Platform Notes (Continued)

```
  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 pni pclmulqdq dtes64 monitor ds_cpl 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 invpcid_single intel_ppin ssbd mba
                                    ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
                                    erms invpcid rtm 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 wbnoinvd dtherm ida arat pln pts avx512vbmi umip pku
                                    ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme
                                    avx512_vpopcntdq la57 rdpid fsrm md_clear pconfig flush_l1d
                                    arch_capabilities
  L1d cache:                        960 KiB (20 instances)
  L1i cache:                        640 KiB (20 instances)
  L2 cache:                         25 MiB (20 instances)
  L3 cache:                         30 MiB (2 instances)
  NUMA node(s):                     2
  NUMA node0 CPU(s):                0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38
  NUMA node1 CPU(s):                1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39
  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 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     960K   12 Data              1    64        1             64
    L1i      32K     640K    8 Instruction       1    64        1             64
    L2      1.3M      25M   20 Unified           2  1024        1             64
    L3       15M      30M   12 Unified           3 20480        1             64

  ---------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38
  node 0 size: 515450 MB
  node 0 free: 514465 MB
  node 1 cpus: 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39
  node 1 size: 516070 MB
  node 1 free: 507024 MB
  node distances:
  node   0   1
    0:  10  20
    1:  20  10

  ---------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1056277340 kB

  ---------------------------------------------------------------
10. who -r
```

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Platform Notes (Continued)

```
  run-level 3 Apr 7 17:58


  ------------------------------------------------------------
  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 firewalld getty@ haveged irqbalance issue-generator kbdsettings
                      postfix purge-kernels rollback sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6
                      wickedd-nanny
    enabled-runtime   systemd-remount-fs
    disabled          boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell ebtables
                      grub2-once haveged-switch-root issue-add-ssh-keys kexec-load lunmask rpmconfigcheck rsyncd
                      serial-getty@ systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                      systemd-time-wait-sync systemd-timesyncd
    indirect          wickedd


  ------------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=e9314ed7-76b6-4cdf-8a59-7fef84b3ad52
    linux
    splash=silent
    mitigations=auto
    quiet
    security=apparmor


  ------------------------------------------------------------
  14. 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
    vm.zone_reclaim_mode             0


  ------------------------------------------------------------
  15. /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

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

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Platform Notes (Continued)

```
  16. /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


  ----------------------------------------------------------
  17. OS release
    From /etc/*-release /etc/*-version
    os-release SUSE Linux Enterprise Server 15 SP4


  ----------------------------------------------------------
  18. Disk information
  SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2023.0
    Filesystem     Type  Size  Used Avail Use% Mounted on
    tmpfs          tmpfs  50G  4.2G   46G   9% /mnt/ramdisk


  ----------------------------------------------------------
  19. /sys/devices/virtual/dmi/id
    Vendor:        Dell Inc.
    Product:       PowerEdge MX750c
    Product Family: PowerEdge
    Serial:        JWRRWM3


  ----------------------------------------------------------
  20. 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:
      16x 002C069D002C 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2666


  ----------------------------------------------------------
  21. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:     Dell Inc.
    BIOS Version:    1.6.5
    BIOS Date:       04/15/2022
    BIOS Revision:   1.6
```

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
```

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Compiler Version Notes (Continued)

```
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
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
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==================================================================================
Fortran | 548.exchange2_r(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

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

(Continued on next page)

Dell Inc.

PowerEdge MX750c (Intel Xeon Silver 4310T, 2.30 GHz)

SPECrate®2017_int_base = 156

SPECrate®2017_int_peak = 161

CPU2017 License: 6573
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Apr-2023
Hardware Availability: Apr-2021
Software Availability: Dec-2022

Base 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`

Base Optimization Flags

C benchmarks:
```
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -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 -xCORE-AVX512 -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 -xCORE-AVX512 -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
```

SPEC CPU®2017 Integer Rate Result

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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`(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 -xCORE-AVX512 -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:

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

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Test Date: Apr-2023
Hardware Availability: Apr-2021
Software Availability: Dec-2022

Peak Optimization Flags (Continued)

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/Intel-ic2023-official-linux64.html`
`http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.3.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml`
`http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.3.xml`

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

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