SPEC CPU®2017 Integer Rate Result

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Dell Inc.

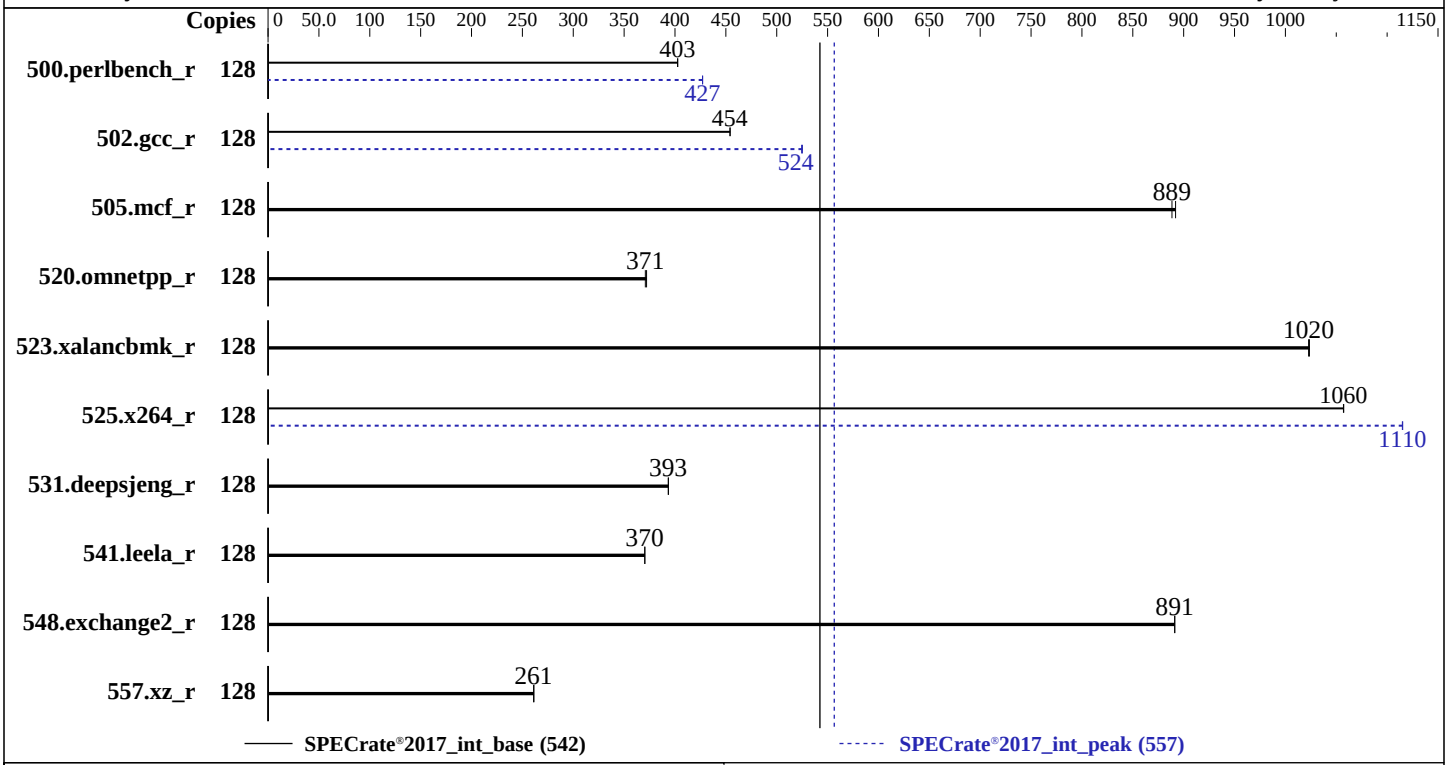
PowerEdge C6620 (Intel Xeon Gold 6454S)

SPECrate®2017_int_base = 542

SPECrate®2017_int_peak = 557

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

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



Hardware

CPU Name:	Intel Xeon Gold 6454S
Max MHz:	3400
Nominal:	2200
Enabled:	64 cores, 2 chips, 2 threads/core
Orderable:	1,2 chips
Cache L1:	32 KB I + 48 KB D on chip per core
L2:	2 MB I+D on chip per core
L3:	60 MB I+D on chip per chip
Other:	None
Memory:	1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
Storage:	125 GB on tmpfs
Other:	None

Software

OS:	Red Hat Enterprise Linux 8.6 (Ootpa) 4.18.0-372.9.1.el8.x86_64
Compiler:	C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
Parallel:	No
Firmware:	Version 0.3.1 released Nov-2022
File System:	tmpfs
System State:	Run level 5 (graphical 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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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	128	506	403	**506**	**403**			128	477	427	**477**	**427**		
502.gcc_r	128	**399**	**454**	399	454			128	345	525	**346**	**524**		
505.mcf_r	128	232	892	**233**	**889**			128	232	892	**233**	**889**		
520.omnetpp_r	128	**453**	**371**	451	372			128	**453**	**371**	451	372		
523.xalancbmk_r	128	132	1020	**132**	**1020**			128	132	1020	**132**	**1020**		
525.x264_r	128	**212**	**1060**	212	1060			128	201	1120	**201**	**1110**		
531.deepsjeng_r	128	373	394	**373**	**393**			128	373	394	**373**	**393**		
541.leela_r	128	**572**	**370**	572	370			128	**572**	**370**	572	370		
548.exchange2_r	128	376	891	**376**	**891**			128	376	891	**376**	**891**		
557.xz_r	128	**530**	**261**	529	261			128	**530**	**261**	529	261		

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SPECrate®2017_int_peak = 557

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-ic2022.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.9-ic2022.1/lib/ia32:/mnt/ram
     disk/cpu2017-1.1.9-ic2022.1/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
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 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"
```

Platform Notes

```
BIOS settings:
                 ADDDC Setting : Disabled
        DIMM Self Healing on
    Uncorrectable Memory Error : Disabled
     Virtualization Technology : Disabled
               Sub NUMA Cluster : 4-way Clustering
       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-ic2022.1/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Tue Jan 17 19:18:42 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
```

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Platform Notes (Continued)

```
 7. lscpu
 8. numactl --hardware
 9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 239 (239-58.el8)
12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
16. tuned-adm active
17. sysctl
18. /sys/kernel/mm/transparent_hugepage
19. /sys/kernel/mm/transparent_hugepage/khugepaged
20. OS release
21. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
22. Disk information
23. /sys/devices/virtual/dmi/id
24. dmidecode
25. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. uname -a
  Linux localhost.localdomain 4.18.0-372.9.1.el8.x86_64 #1 SMP Fri Apr 15 22:12:19 EDT 2022 x86_64 x86_64
  x86_64 GNU/Linux

------------------------------------------------------------
2. w
   19:18:42 up 12 min,  1 user,  load average: 0.56, 0.58, 0.77
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  donald   :1       :1               19:08   ?xdm?  17.42s  0.00s /usr/libexec/gdm-x-session
  --register-session --run-script gnome-session

------------------------------------------------------------
3. Username
  From environment variable $USER:  root
  From the command 'logname':       donald

------------------------------------------------------------
4. ulimit -a
  core file size          (blocks, -c) 0
  data seg size           (kbytes, -d) unlimited
  scheduling priority             (-e) 0
  file size               (blocks, -f) unlimited
  pending signals                 (-i) 4125019
  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) 4125019
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize 17
```

(Continued on next page)

Platform Notes (Continued)

```
 /usr/lib/systemd/systemd --user
 /usr/libexec/gnome-terminal-server
 bash
 sudo su
 su
 bash
 /bin/bash ./DELL_rate.sh
 /bin/bash ./dell-norun-main.sh rate
 /bin/bash ./dell-norun-main.sh rate
 /bin/bash ./dell-norun-specrate.sh --iterations 2 --output_format csv,html,pdf,txt --define
   Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc
 /bin/bash ./dell-norun-specrate.sh --iterations 2 --output_format csv,html,pdf,txt --define
   Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 -c
   ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=64 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak -o all --iterations 2
   --output_format csv,html,pdf,txt --define Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc intrate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 --configfile
   ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=64 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --iterations 2
   --output_format csv,html,pdf,txt --define Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc --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-ic2022.1

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Gold 6454S
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 8
    microcode       : 0x2b000111
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 32
    siblings        : 64
    2 physical ids (chips)
    128 processors (hardware threads)
    physical id 0: core ids 0-31
    physical id 1: core ids 0-31
    physical id 0: apicids 0-63
    physical id 1: apicids 128-191
  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 2.32.1:
  Architecture:        x86_64
  CPU op-mode(s):      32-bit, 64-bit
  Byte Order:          Little Endian
  CPU(s):              128
  On-line CPU(s) list: 0-127
  Thread(s) per core:  2
  Core(s) per socket:  32
  Socket(s):           2
  NUMA node(s):        8
  Vendor ID:           GenuineIntel
```

(Continued on next page)

Platform Notes (Continued)

```
  BIOS Vendor ID:      Intel
  CPU family:          6
  Model:               143
  Model name:          Intel(R) Xeon(R) Gold 6454S
  BIOS Model name:     Intel(R) Xeon(R) Gold 6454S
  Stepping:            8
  CPU MHz:             2200.000
  BogoMIPS:            4400.00
  L1d cache:           48K
  L1i cache:           32K
  L2 cache:            2048K
  L3 cache:            61440K
  NUMA node0 CPU(s):   0,4,8,12,16,20,24,28,64,68,72,76,80,84,88,92
  NUMA node1 CPU(s):   32,36,40,44,48,52,56,60,96,100,104,108,112,116,120,124
  NUMA node2 CPU(s):   2,6,10,14,18,22,26,30,66,70,74,78,82,86,90,94
  NUMA node3 CPU(s):   34,38,42,46,50,54,58,62,98,102,106,110,114,118,122,126
  NUMA node4 CPU(s):   1,5,9,13,17,21,25,29,65,69,73,77,81,85,89,93
  NUMA node5 CPU(s):   33,37,41,45,49,53,57,61,97,101,105,109,113,117,121,125
  NUMA node6 CPU(s):   3,7,11,15,19,23,27,31,67,71,75,79,83,87,91,95
  NUMA node7 CPU(s):   35,39,43,47,51,55,59,63,99,103,107,111,115,119,123,127
  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 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 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

------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 8 nodes (0-7)
  node 0 cpus: 0,4,8,12,16,20,24,28,64,68,72,76,80,84,88,92
  node 0 size: 128216 MB
  node 0 free: 125069 MB
  node 1 cpus: 32,36,40,44,48,52,56,60,96,100,104,108,112,116,120,124
  node 1 size: 129020 MB
  node 1 free: 126921 MB
  node 2 cpus: 2,6,10,14,18,22,26,30,66,70,74,78,82,86,90,94
  node 2 size: 129020 MB
  node 2 free: 127584 MB
  node 3 cpus: 34,38,42,46,50,54,58,62,98,102,106,110,114,118,122,126
  node 3 size: 129020 MB
  node 3 free: 127368 MB
  node 4 cpus: 1,5,9,13,17,21,25,29,65,69,73,77,81,85,89,93
  node 4 size: 129020 MB
  node 4 free: 127801 MB
  node 5 cpus: 33,37,41,45,49,53,57,61,97,101,105,109,113,117,121,125
  node 5 size: 129020 MB
  node 5 free: 128703 MB
  node 6 cpus: 3,7,11,15,19,23,27,31,67,71,75,79,83,87,91,95
  node 6 size: 128978 MB
  node 6 free: 128344 MB
```

(Continued on next page)

Platform Notes (Continued)

```
  node 7 cpus: 35,39,43,47,51,55,59,63,99,103,107,111,115,119,123,127
  node 7 size: 129017 MB
  node 7 free: 128863 MB
  node distances:
  node   0   1   2   3   4   5   6   7
    0:  10  12  12  12  21  21  21  21
    1:  12  10  12  12  21  21  21  21
    2:  12  12  10  12  21  21  21  21
    3:  12  12  12  10  21  21  21  21
    4:  21  21  21  21  10  12  12  12
    5:  21  21  21  21  12  10  12  12
    6:  21  21  21  21  12  12  10  12
    7:  21  21  21  21  12  12  12  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1056065752 kB

------------------------------------------------------------
10. who -r
  run-level 5 Jan 17 19:08

------------------------------------------------------------
11. Systemd service manager version: systemd 239 (239-58.el8)
  Default Target  Status
  graphical       degraded

------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
    UNIT                          LOAD   ACTIVE SUB    DESCRIPTION
  * systemd-udev-settle.service loaded failed failed udev Wait for Complete Device Initialization

------------------------------------------------------------
13. Services, from systemctl list-unit-files
  STATE     UNIT FILES
  enabled   ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon
            atd auditd autovt@ avahi-daemon bluetooth chronyd crond cups display-manager firewalld gdm getty@
            import-state insights-client-boot irqbalance iscsi iscsi-onboot kdump ksm ksmtuned libstoragemgmt
            libvirtd loadmodules lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
            nvmefc-boot-connections ostree-remount qemu-guest-agent rhsmcertd rpcbind rsyslog rtkit-daemon
            selinux-autorelabel-mark smartd sshd sssd syslog timedatex tuned udisks2 vdo vgauthd vmtoolsd
  disabled  arp-ethers blk-availability brltty canberra-system-bootup canberra-system-shutdown
            canberra-system-shutdown-reboot chrony-wait cni-dhcp console-getty cpupower cups-browsed
            debug-shell dnsmasq ebtables gssproxy hwloc-dump-hwdata initial-setup
            initial-setup-reconfiguration iprdump iprinit iprupdate iscsid iscsiuio kpatch kvm_stat ledmon
            libvirt-guests man-db-restart-cache-update ndctl-monitor netcf-transaction nfs-blkmap nfs-convert
            nfs-server nftables numad nvmf-autoconnect oddjobd podman podman-auto-update podman-restart
            psacct ras-mc-ctl rasdaemon rdisc rhcd rhsm rhsm-facts saslauthd serial-getty@ speech-dispatcherd
            sshd-keygen@ switcheroo-control systemd-nspawn@ systemd-resolved tcsd upower virtinterfaced
            virtnetworkd virtnodedevd virtnwfilterd virtproxyd virtqemud virtsecretd virtstoraged
            wpa_supplicant
  indirect  spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo virtlockd
            virtlogd
  masked    systemd-timedated

------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=(hd0,gpt2)/vmlinuz-4.18.0-372.9.1.el8.x86_64
  root=/dev/mapper/rhel-root
  ro
```

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Platform Notes (Continued)

```
  crashkernel=auto
  resume=/dev/mapper/rhel-swap
  rd.lvm.lv=rhel/root
  rd.lvm.lv=rhel/swap
  rhgb
  quiet

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

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

------------------------------------------------------------
17. sysctl
  kernel.numa_balancing               1
  kernel.randomize_va_space           2
  vm.compaction_proactiveness         0
  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

------------------------------------------------------------
18. /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

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

------------------------------------------------------------
20. OS release
  From /etc/*-release /etc/*-version
```

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Platform Notes (Continued)

```
  os-release     Red Hat Enterprise Linux 8.6 (Ootpa)
  redhat-release Red Hat Enterprise Linux release 8.6 (Ootpa)
  system-release Red Hat Enterprise Linux release 8.6 (Ootpa)

------------------------------------------------------------
21. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
  itlb_multihit        Not affected
  l1tf                 Not affected
  mds                  Not affected
  meltdown             Not affected
  spec_store_bypass    Mitigation: Speculative Store Bypass disabled via prctl and seccomp
  spectre_v1           Mitigation: usercopy/swapgs barriers and __user pointer sanitization
  spectre_v2           Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
  srbds                Not affected
  tsx_async_abort      Not affected
For more information, see the Linux documentation on hardware vulnerabilities, for example
     https://www.kernel.org/doc/html/latest/admin-guide/hw-vuln/index.html

------------------------------------------------------------
22. Disk information
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2022.1
  Filesystem     Type   Size  Used Avail Use% Mounted on
  tmpfs          tmpfs  125G  3.7G  122G   3% /mnt/ramdisk

------------------------------------------------------------
23. /sys/devices/virtual/dmi/id
    Vendor:         Dell Inc.
    Product:        PowerEdge C6620
    Product Family: PowerEdge
    Serial:         SL6C201

------------------------------------------------------------
24. 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:
    15x 002C00B3002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800
    1x 002C0632002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800


------------------------------------------------------------
25. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       Dell Inc.
   BIOS Version:      0.3.1
   BIOS Date:         11/24/2022
   BIOS Revision:     0.3
```

Compiler Version Notes

```
==============================================================================================================
C       | 502.gcc_r(peak)
--------------------------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
==============================================================================================================
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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
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==============================================================================================================
C       | 502.gcc_r(peak)
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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)
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==============================================================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
        | 541.leela_r(base, peak)
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Fortran | 548.exchange2_r(base, peak)
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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-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin -lqkmalloc`

C++ benchmarks:
`-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -L/usr/local/intel/compiler/2022.1.0/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/2022.1.0/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
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-AVX512
-Ofast -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fno-strict-overflow
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512
-Ofast -ffast-math -flto -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/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: basepeak = yes

C++ benchmarks:

(Continued on next page)

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-ic2022-official-linux64-revB.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-ic2022-official-linux64-revB.xml`
`http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.3.xml`

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