SPEC CPU®2017 Integer Rate Result

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Dell Inc.

PowerEdge XE8640 (Intel Xeon Platinum 8460Y+)

$SPECrate^{®}2017\_int\_base = 674$

$SPECrate^{®}2017\_int\_peak = 696$

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

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

Copies	500.perlbench_r 160 — 492 / 536
	502.gcc_r 160 — 540 / 650
	505.mcf_r 160 — 1020
	520.omnetpp_r 160 — 438
	523.xalancbmk_r 160 — 1270
	525.x264_r 160 — 1300 / 1370
	531.deepsjeng_r 160 — 479
	541.leela_r 160 — 455
	548.exchange2_r 160 — 1410
	557.xz_r 160 — 322

——— SPECrate®2017_int_base (674)   ------ SPECrate®2017_int_peak (696)

Hardware

CPU Name: Intel Xeon Platinum 8460Y+
 Max MHz: 3700
 Nominal: 2000
Enabled: 80 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: 105 MB I+D on chip per chip
 Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 100 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 1.2.1 released May-2023
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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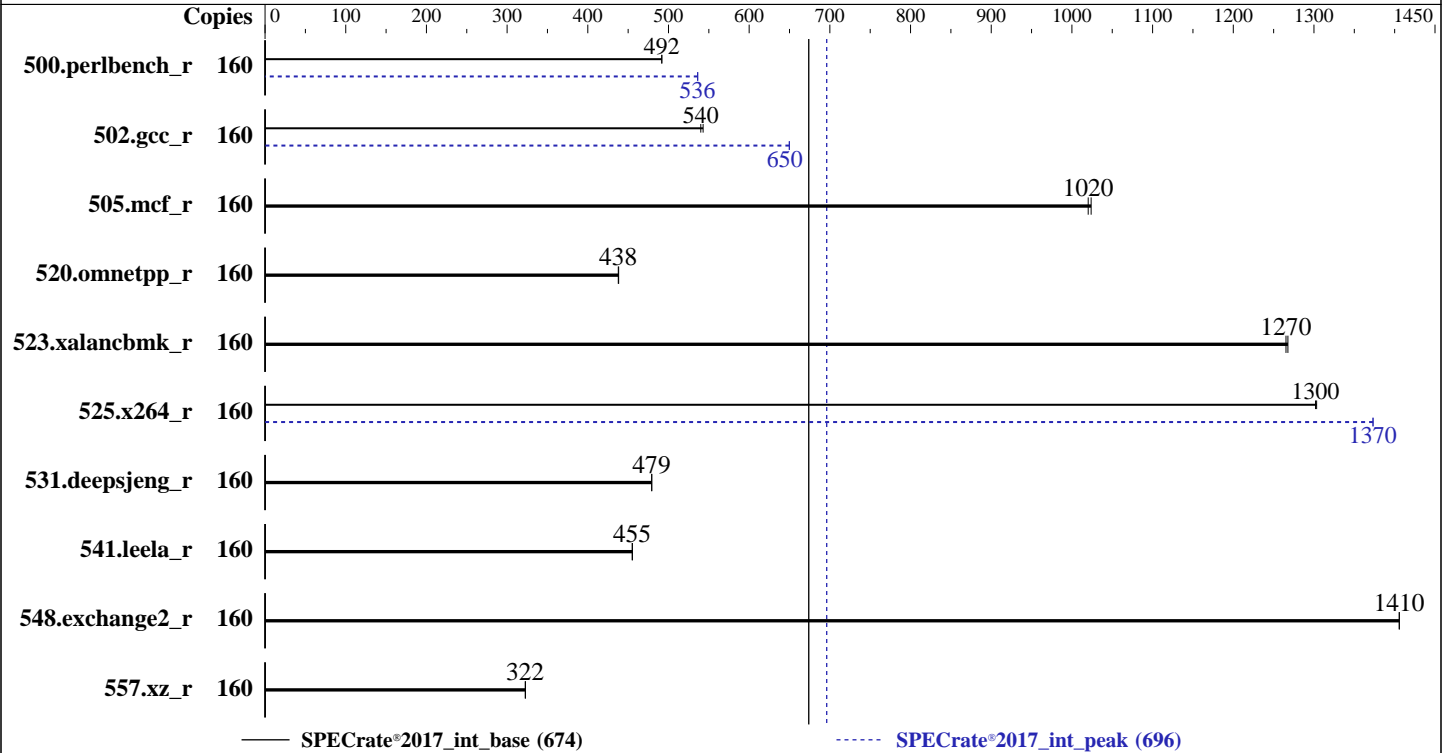**CPU2017 License:** 6573　　　　　　　　　　　　　**Test Date:** Jul-2023
Test Sponsor: Dell Inc.　　　　　　　　　　　**Hardware Availability:** May-2023
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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	160	518	492	**518**	**492**			160	**475**	**536**	475	536		
502.gcc_r	160	**420**	**540**	417	543			160	**349**	**650**	349	650		
505.mcf_r	160	**253**	**1020**	253	1020			160	**253**	**1020**	253	1020		
520.omnetpp_r	160	479	438	**479**	**438**			160	479	438	**479**	**438**		
523.xalancbmk_r	160	**134**	**1270**	133	1270			160	**134**	**1270**	133	1270		
525.x264_r	160	**215**	**1300**	215	1300			160	**204**	**1370**	204	1370		
531.deepsjeng_r	160	383	479	**383**	**479**			160	383	479	**383**	**479**		
541.leela_r	160	582	455	**582**	**455**			160	582	455	**582**	**455**		
548.exchange2_r	160	298	1410	**298**	**1410**			160	298	1410	**298**	**1410**		
557.xz_r	160	535	323	**536**	**322**			160	535	323	**536**	**322**		

　　　　　　　　　　　　　SPECrate®2017_int_base = **674**

　　　　　　　　　　　　　SPECrate®2017_int_peak = **696**

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 100 GB ramdisk created with the cmd: "mount -t tmpfs -o size=100G 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
              Sub NUMA Cluster : 4-way Clustering
                 LLC Prefetch : Disabled
         Dead Line LLC Alloc : Disabled

               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 Thu Jul  6 11:13:13 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
```

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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. cpupower frequency-info
 15. sysctl
 16. /sys/kernel/mm/transparent_hugepage
 17. /sys/kernel/mm/transparent_hugepage/khugepaged
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. 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/lp)
   x86_64 x86_64 x86_64 GNU/Linux

    -----------------------------------------------------------
 2. w
    11:13:14 up 12 min,  4 users,  load average: 0.29, 0.29, 0.20
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                11:08   26.00s  1.17s  0.00s /bin/bash ./dell-run-speccpu.sh rate
   --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --define
   DL-BIOS-SNC=4 --define DL-VERS=v4.5 --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) 4124470
   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) 4124470
   virtual memory          (kbytes, -v) unlimited
   file locks                      (-x) unlimited

    -----------------------------------------------------------
 5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 30
   login -- root
   -bash
   /bin/bash ./DELL_rate.sh
   /bin/bash ./dell-run-main.sh rate
```

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Platform Notes (Continued)

```
  /bin/bash ./dell-run-main.sh rate
  /bin/bash ./dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-adddcD=1
    --define DL-BIOS-VirtD=1 --define DL-BIOS-SNC=4 --define DL-VERS=v4.5 --output_format csv,html,pdf,txt
  /bin/bash ./dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-adddcD=1
    --define DL-BIOS-VirtD=1 --define DL-BIOS-SNC=4 --define DL-VERS=v4.5 --output_format csv,html,pdf,txt
  runcpu --nobuild --action validate --define default-platform-flags --define numcopies=160 -c
    ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=80 --define physicalfirst
    --define invoke_with_interleave --define drop_caches --tune base,peak -o all --iterations 2 --define
    DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --define DL-BIOS-SNC=4
    --define DL-VERS=v4.5 --output_format csv,html,pdf,txt intrate
  runcpu --nobuild --action validate --define default-platform-flags --define numcopies=160 --configfile
    ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=80 --define physicalfirst
    --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --iterations 2
    --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --define
    DL-BIOS-SNC=4 --define DL-VERS=v4.5 --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) Platinum 8460Y+
     vendor_id         : GenuineIntel
     cpu family        : 6
     model             : 143
     stepping          : 8
     microcode         : 0x2b0004b1
     bugs              : spectre_v1 spectre_v2 spec_store_bypass swapgs
     cpu cores         : 40
     siblings          : 80
     2 physical ids (chips)
     160 processors (hardware threads)
     physical id 0: core ids 0-39
     physical id 1: core ids 0-39
     physical id 0: apicids 0-79
     physical id 1: apicids 128-207
  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):                     160
  On-line CPU(s) list:        0-159
  Vendor ID:                  GenuineIntel
  Model name:                 Intel(R) Xeon(R) Platinum 8460Y+
  CPU family:                 6
  Model:                      143
  Thread(s) per core:         2
  Core(s) per socket:         40
  Socket(s):                  2
  Stepping:                   8
  BogoMIPS:                   4000.00
  Flags:                      fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
```

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Platform Notes (Continued)

```
                        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 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 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
  L1d cache:            3.8 MiB (80 instances)
  L1i cache:            2.5 MiB (80 instances)
  L2 cache:             160 MiB (80 instances)
  L3 cache:             210 MiB (2 instances)
  NUMA node(s):         8
  NUMA node0 CPU(s):    0,8,28,30,40,42,50,60,68,74,80,88,108,110,120,122,130,140,148,154
  NUMA node1 CPU(s):    4,12,18,24,34,38,46,54,58,64,84,92,98,104,114,118,126,134,138,144
  NUMA node2 CPU(s):    2,10,16,22,32,36,44,52,62,76,82,90,96,102,112,116,124,132,142,156
  NUMA node3 CPU(s):    6,14,20,26,48,56,66,70,72,78,86,94,100,106,128,136,146,150,152,158
  NUMA node4 CPU(s):    1,9,15,25,35,41,47,61,63,69,81,89,95,105,115,121,127,141,143,149
  NUMA node5 CPU(s):    5,13,17,21,31,39,51,57,67,77,85,93,97,101,111,119,131,137,147,157
  NUMA node6 CPU(s):    3,11,19,29,37,43,49,55,65,75,83,91,99,109,117,123,129,135,145,155
  NUMA node7 CPU(s):    7,23,27,33,45,53,59,71,73,79,87,103,107,113,125,133,139,151,153,159
  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      3.8M   12 Data            1      64       1             64
    L1i      32K      2.5M    8 Instruction     1      64       1             64
    L2        2M      160M   16 Unified         2    2048       1             64
    L3      105M      210M   15 Unified         3  114688       1             64

  ------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 8 nodes (0-7)
  node 0 cpus: 0,8,28,30,40,42,50,60,68,74,80,88,108,110,120,122,130,140,148,154
  node 0 size: 128399 MB
  node 0 free: 127489 MB
  node 1 cpus: 4,12,18,24,34,38,46,54,58,64,84,92,98,104,114,118,126,134,138,144
  node 1 size: 129018 MB
  node 1 free: 119962 MB
  node 2 cpus: 2,10,16,22,32,36,44,52,62,76,82,90,96,102,112,116,124,132,142,156
  node 2 size: 129018 MB
  node 2 free: 128583 MB
  node 3 cpus: 6,14,20,26,48,56,66,70,72,78,86,94,100,106,128,136,146,150,152,158
  node 3 size: 129018 MB
```

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Platform Notes (Continued)

```
   node 3 free: 126401 MB
   node 4 cpus: 1,9,15,25,35,41,47,61,63,69,81,89,95,105,115,121,127,141,143,149
   node 4 size: 129018 MB
   node 4 free: 128808 MB
   node 5 cpus: 5,13,17,21,31,39,51,57,67,77,85,93,97,101,111,119,131,137,147,157
   node 5 size: 128984 MB
   node 5 free: 128775 MB
   node 6 cpus: 3,11,19,29,37,43,49,55,65,75,83,91,99,109,117,123,129,135,145,155
   node 6 size: 129018 MB
   node 6 free: 128572 MB
   node 7 cpus: 7,23,27,33,45,53,59,71,73,79,87,103,107,113,125,133,139,151,153,159
   node 7 size: 128664 MB
   node 7 free: 128374 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:       1055890252 kB


   -------------------------------------------------------------
10. who -r
   run-level 3 Jul 6 11:08 last=5


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


   -------------------------------------------------------------
12. Services, from systemctl list-unit-files
   STATE           UNIT FILES
   enabled         ModemManager YaST2-Firstboot YaST2-Second-Stage apparmor auditd bluetooth cron
                   display-manager firewalld getty@ haveged irqbalance iscsi issue-generator kbdsettings
                   kdump kdump-early klog lvm2-monitor nscd nvmefc-boot-connections postfix purge-kernels
                   rollback rsyslog smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6
                   wickedd-nanny wpa_supplicant
   enabled-runtime systemd-remount-fs
   disabled        NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon
                   appstream-sync-cache autofs autoyast-initscripts blk-availability bluetooth-mesh
                   boot-sysctl ca-certificates chrony-wait chronyd console-getty cups cups-browsed
                   debug-shell dmraid-activation dnsmasq ebtables exchange-bmc-os-info gpm grub2-once
                   haveged-switch-root hwloc-dump-hwdata ipmi ipmievd iscsi-init iscsid iscsiuio
                   issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap
                   nm-cloud-setup nmb nvmf-autoconnect openvpn@ ostree-remount pppoe pppoe-server rdisc
                   rpcbind rpmconfigcheck rsyncd rtkit-daemon serial-getty@ smartd_generate_opts smb snmpd
                   snmptrapd speech-dispatcherd systemd-boot-check-no-failures systemd-network-generator
                   systemd-sysext systemd-time-wait-sync systemd-timesyncd udisks2 upower wpa_supplicant@
   indirect        pcscd saned@ wickedd


   -------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
```

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Platform Notes (Continued)

```
  BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
  root=UUID=96676a86-8cd3-46ed-9bba-65753961bf30
  splash=silent
  mitigations=auto
  quiet
  security=apparmor
  crashkernel=307M,high
  crashkernel=72M,low


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


  -------------------------------------------------------------
15. 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


  -------------------------------------------------------------
16. /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


  -------------------------------------------------------------
17. /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


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

(Continued on next page)

Dell Inc.

PowerEdge XE8640 (Intel Xeon Platinum 8460Y+)

SPECrate®2017_int_base = 674

SPECrate®2017_int_peak = 696

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

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

Platform Notes (Continued)

```
----------------------------------------------------------------
19. Disk information
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2023.0
  Filesystem      Type   Size  Used Avail Use% Mounted on
  tmpfs           tmpfs  100G  4.2G   96G   5% /mnt/ramdisk


----------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         Dell Inc.
    Product:        PowerEdge XE8640
    Product Family: PowerEdge
    Serial:         1234567


----------------------------------------------------------------
21. 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 00AD063200AD HMCG94MEBRA109N 64 GB 2 rank 4800


----------------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:    Dell Inc.
    BIOS Version:   1.2.1
    BIOS Date:      05/17/2023
    BIOS Revision:  1.2
```

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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----------------------------------------------------------------------------------------------


==============================================================================================
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)
```

(Continued on next page)

SPEC CPU®2017 Integer Rate Result

Dell Inc.

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Tested by: Dell Inc.

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

Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------------
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`
557.xz_r: `-DSPEC_LP64`

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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`
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`

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Dell Inc.

PowerEdge XE8640 (Intel Xeon Platinum 8460Y+)

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CPU2017 License: 6573		**Test Date:**	Jul-2023
Test Sponsor: Dell Inc.		**Hardware Availability:** May-2023
Tested by: Dell Inc.		**Software Availability:** Dec-2022

Peak Portability Flags (Continued)

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`

523.xalancbmk_r: `basepeak = yes`

531.deepsjeng_r: `basepeak = yes`

541.leela_r: `basepeak = yes`

(Continued on next page)

Dell Inc.

PowerEdge XE8640 (Intel Xeon Platinum 8460Y+)

SPECrate®2017_int_base = 674

SPECrate®2017_int_peak = 696

CPU2017 License: 6573		**Test Date:**	Jul-2023
Test Sponsor:	Dell Inc.	**Hardware Availability:**	May-2023
Tested by:	Dell Inc.	**Software Availability:**	Dec-2022

Peak Optimization Flags (Continued)

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-v1.5.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-v1.5.xml

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

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