SPEC CPU®2017 Integer Rate Result

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Dell Inc.

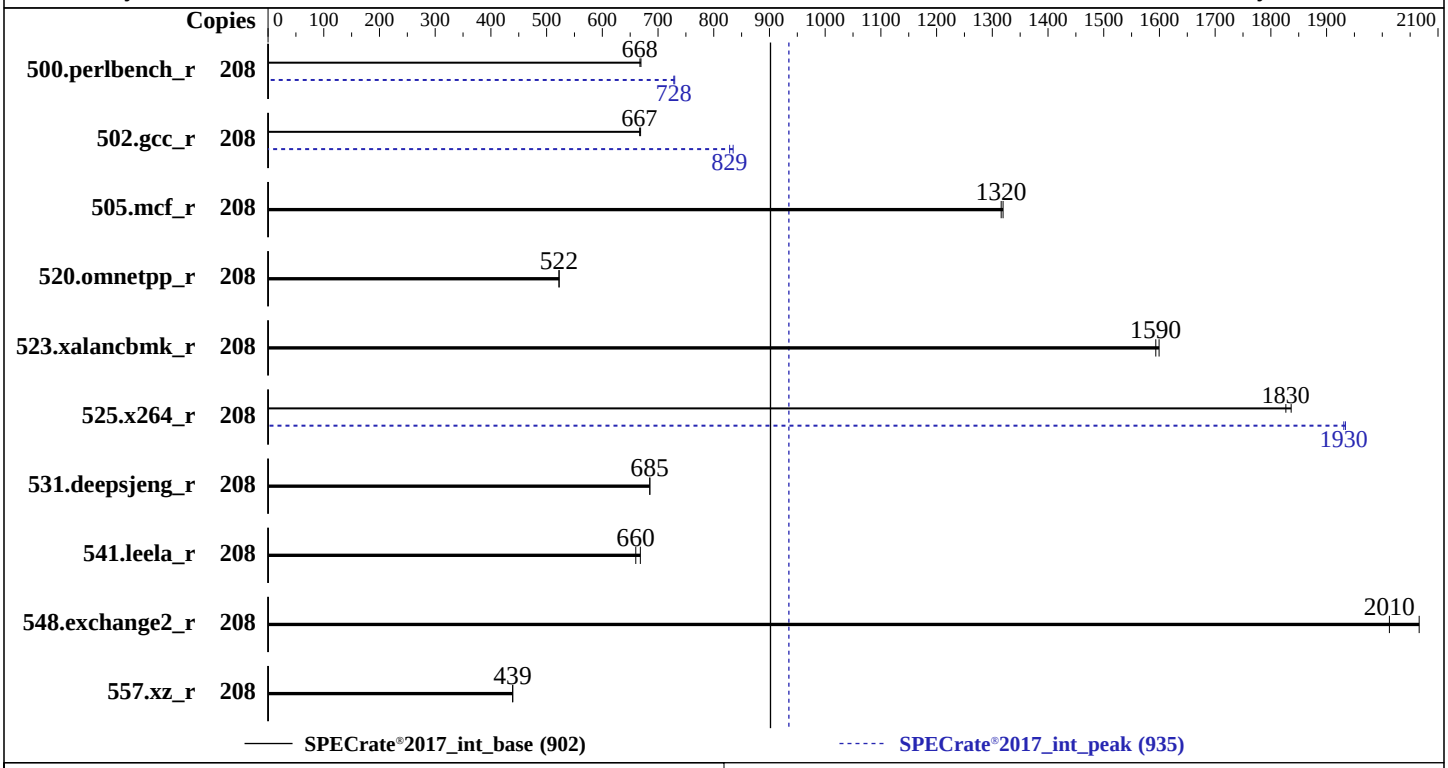
PowerEdge R760xa (Intel Xeon Platinum 8470Q)

SPECrate®2017_int_base = 902

SPECrate®2017_int_peak = 935

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

Test Date: Mar-2023
Hardware Availability: Mar-2023
Software Availability: Dec-2022



Hardware

CPU Name:	Intel Xeon Platinum 8470Q
Max MHz:	3800
Nominal:	2100
Enabled:	104 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:	512 GB (16 x 32 GB 2Rx8 PC5-4800B-R)
Storage:	125 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 1.0.0 released Mar-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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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	208	**496**	**668**	495	669			208	454	730	**455**	**728**		
502.gcc_r	208	**442**	**667**	440	669			208	**355**	**829**	353	835		
505.mcf_r	208	**255**	**1320**	255	1320			208	**255**	**1320**	255	1320		
520.omnetpp_r	208	**523**	**522**	522	523			208	**523**	**522**	522	523		
523.xalancbmk_r	208	137	1600	**138**	**1590**			208	137	1600	**138**	**1590**		
525.x264_r	208	**199**	**1830**	198	1840			208	188	1930	**189**	**1930**		
531.deepsjeng_r	208	**348**	**685**	348	685			208	**348**	**685**	348	685		
541.leela_r	208	**522**	**660**	515	668			208	**522**	**660**	515	668		
548.exchange2_r	208	**271**	**2010**	264	2070			208	**271**	**2010**	264	2070		
557.xz_r	208	**512**	**439**	511	439			208	**512**	**439**	511	439		

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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/ramdisk/cpu2017-1.1.9-ic2023.0/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
       DCU Streamer Prefetcher : Disabled
              Sub NUMA Cluster : 4-way Clustering
                  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 Thu Mar 23 10:55:02 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 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
   10:55:02 up 3 min,  1 user,  load average: 1.02, 1.18, 0.53
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                10:53   38.00s  1.05s  0.00s /bin/bash ./dell-run-specrate.sh
  --iterations 2 --output_format csv,html,pdf,txt -define Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc

------------------------------------------------------------
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) 2060003
  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) 2060003
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize 34
 login -- root
 -bash
 /bin/bash ./DELL_rate.sh
 /bin/bash ./dell-run-main.sh rate
```

(Continued on next page)

Platform Notes (Continued)

```
 /bin/bash ./dell-run-main.sh rate
 /bin/bash ./dell-run-specrate.sh --iterations 2 --output_format csv,html,pdf,txt -define
   Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc
 /bin/bash ./dell-run-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=208 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=104 --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=208 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=104 --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-ic2023.0

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Platinum 8470Q
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 8
    microcode       : 0x2b0001b0
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 52
    siblings        : 104
    2 physical ids (chips)
    208 processors (hardware threads)
    physical id 0: core ids 0-51
    physical id 1: core ids 0-51
    physical id 0: apicids 0-103
    physical id 1: apicids 128-231
  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):                          208
  On-line CPU(s) list:             0-207
  Vendor ID:                       GenuineIntel
  Model name:                      Intel(R) Xeon(R) Platinum 8470Q
  CPU family:                      6
  Model:                           143
  Thread(s) per core:              2
  Core(s) per socket:              52
  Socket(s):                       2
  Stepping:                        8
  BogoMIPS:                        4200.00
  Flags:                           fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                                   clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                                   lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
```

(Continued on next page)

Platform Notes (Continued)

```
                        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:                    4.9 MiB (104 instances)
  L1i cache:                    3.3 MiB (104 instances)
  L2 cache:                     208 MiB (104 instances)
  L3 cache:                     210 MiB (2 instances)
  NUMA node(s):                 8
  NUMA node0 CPU(s):            0,4,8,12,16,20,24,28,32,36,40,44,48,104,108,112,116,120,124,128,132,136,14
                                0,144,148,152
  NUMA node1 CPU(s):            52,56,60,64,68,72,76,80,84,88,92,96,100,156,160,164,168,172,176,180,184,18
                                8,192,196,200,204
  NUMA node2 CPU(s):            2,6,10,14,18,22,26,30,34,38,42,46,50,106,110,114,118,122,126,130,134,138,1
                                42,146,150,154
  NUMA node3 CPU(s):            54,58,62,66,70,74,78,82,86,90,94,98,102,158,162,166,170,174,178,182,186,19
                                0,194,198,202,206
  NUMA node4 CPU(s):            1,5,9,13,17,21,25,29,33,37,41,45,49,105,109,113,117,121,125,129,133,137,14
                                1,145,149,153
  NUMA node5 CPU(s):            53,57,61,65,69,73,77,81,85,89,93,97,101,157,161,165,169,173,177,181,185,18
                                9,193,197,201,205
  NUMA node6 CPU(s):            3,7,11,15,19,23,27,31,35,39,43,47,51,107,111,115,119,123,127,131,135,139,1
                                43,147,151,155
  NUMA node7 CPU(s):            55,59,63,67,71,75,79,83,87,91,95,99,103,159,163,167,171,175,179,183,187,19
                                1,195,199,203,207
  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     4.9M   12 Data            1     64        1             64
     L1i       32K     3.3M    8 Instruction     1     64        1             64
     L2         2M     208M   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: 0,4,8,12,16,20,24,28,32,36,40,44,48,104,108,112,116,120,124,128,132,136,140,144,148,152
  node 0 size: 63885 MB
  node 0 free: 59890 MB
  node 1 cpus: 52,56,60,64,68,72,76,80,84,88,92,96,100,156,160,164,168,172,176,180,184,188,192,196,200,204
  node 1 size: 64505 MB
```

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Platform Notes (Continued)

```
  node 1 free: 60714 MB
  node 2 cpus: 2,6,10,14,18,22,26,30,34,38,42,46,50,106,110,114,118,122,126,130,134,138,142,146,150,154
  node 2 size: 64505 MB
  node 2 free: 55553 MB
  node 3 cpus: 54,58,62,66,70,74,78,82,86,90,94,98,102,158,162,166,170,174,178,182,186,190,194,198,202,206
  node 3 size: 64505 MB
  node 3 free: 64007 MB
  node 4 cpus: 1,5,9,13,17,21,25,29,33,37,41,45,49,105,109,113,117,121,125,129,133,137,141,145,149,153
  node 4 size: 64505 MB
  node 4 free: 63987 MB
  node 5 cpus: 53,57,61,65,69,73,77,81,85,89,93,97,101,157,161,165,169,173,177,181,185,189,193,197,201,205
  node 5 size: 64505 MB
  node 5 free: 63238 MB
  node 6 cpus: 3,7,11,15,19,23,27,31,35,39,43,47,51,107,111,115,119,123,127,131,135,139,143,147,151,155
  node 6 size: 64505 MB
  node 6 free: 64011 MB
  node 7 cpus: 55,59,63,67,71,75,79,83,87,91,95,99,103,159,163,167,171,175,179,183,187,191,195,199,203,207
  node 7 size: 64110 MB
  node 7 free: 63659 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:       527388280 kB

------------------------------------------------------------
10. who -r
  run-level 3 Mar 23 10:53

------------------------------------------------------------
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          ModemManager YaST2-Firstboot YaST2-Second-Stage apparmor auditd avahi-daemon bluetooth
                   cron display-manager getty@ haveged irqbalance iscsi issue-generator kbdsettings kdump
                   kdump-early klog lvm2-monitor nscd 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 avahi-dnsconfd blk-availability
                   bluetooth-mesh boot-sysctl ca-certificates chrony-wait chronyd console-getty cups
                   cups-browsed debug-shell dnsmasq ebtables exchange-bmc-os-info firewalld 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 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
```

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Platform Notes (Continued)

```
                  systemd-time-wait-sync systemd-timesyncd udisks2 upower wpa_supplicant@
  indirect        pcscd saned@ wickedd

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
  root=UUID=d2478c1d-ad56-4880-94a4-2c23c20dc4ec
  splash=silent
  resume=/dev/disk/by-uuid/1d85ce73-4447-4a5a-b6f2-67571d657dff
  mitigations=auto
  quiet
  security=apparmor
  crashkernel=314M,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
```

(Continued on next page)

Platform Notes (Continued)

```
  scan_sleep_millisecs    10000

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

------------------------------------------------------------
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  125G  4.2G  121G   4% /mnt/ramdisk

------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         Dell Inc.
    Product:        PowerEdge R760xa
    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 00CE00B300CE M321R4GA3BB6-CQKEG 32 GB 2 rank 4800


------------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       Dell Inc.
   BIOS Version:      1.0.0
   BIOS Date:         03/10/2023
   BIOS Revision:     1.0
```

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

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Compiler Version Notes (Continued)

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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

(Continued on next page)

Base Portability Flags (Continued)

557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Peak Portability Flags

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

(Continued on next page)

Peak Portability Flags (Continued)

520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

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

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

505.mcf_r: basepeak = yes

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

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

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Peak Optimization Flags (Continued)

523.xalancbmk_r: `basepeak = yes`

531.deepsjeng_r: `basepeak = yes`

541.leela_r: `basepeak = yes`

Fortran benchmarks:

548.exchange2_r: `basepeak = yes`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/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`

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Tested with SPEC CPU®2017 v1.1.9 on 2023-03-23 10:55:02-0400.
Report generated on 2024-01-29 17:53:02 by CPU2017 PS formatter v6716.
Originally published on 2023-07-04.