SPEC CPU®2017 Integer Rate Result

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Dell Inc.

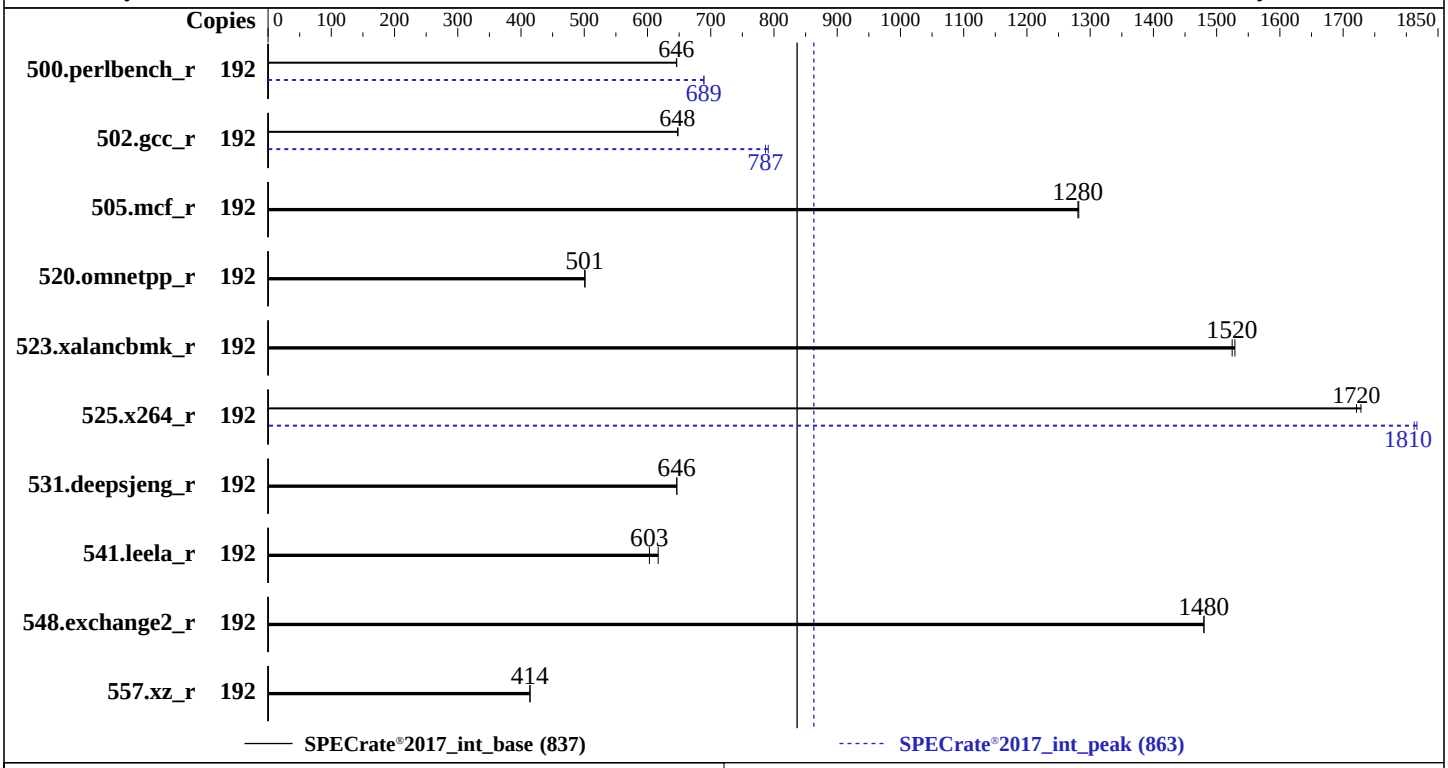
PowerEdge C6620 (Intel Xeon Platinum 8468)

SPECrate®2017_int_base = 837

SPECrate®2017_int_peak = 863

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

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



Hardware

CPU Name:	Intel Xeon Platinum 8468
Max MHz:	3800
Nominal:	2100
Enabled:	96 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:	125 GB on tmpfs
Other:	None

Software

OS:	SUSE Linux Enterprise Server 15 SP4 5.14.21-150400.22-default
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 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	192	473	646	**473**	**646**			192	**444**	**689**	443	689		
502.gcc_r	192	419	648	**420**	**648**			192	344	791	**346**	**787**		
505.mcf_r	192	**242**	**1280**	242	1280			192	**242**	**1280**	242	1280		
520.omnetpp_r	192	502	501	**503**	**501**			192	502	501	**503**	**501**		
523.xalancbmk_r	192	133	1530	**133**	**1520**			192	133	1530	**133**	**1520**		
525.x264_r	192	**195**	**1720**	195	1730			192	**186**	**1810**	185	1820		
531.deepsjeng_r	192	340	646	**340**	**646**			192	340	646	**340**	**646**		
541.leela_r	192	515	617	**527**	**603**			192	515	617	**527**	**603**		
548.exchange2_r	192	340	1480	**340**	**1480**			192	340	1480	**340**	**1480**		
557.xz_r	192	500	414	**501**	**414**			192	500	414	**501**	**414**		

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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-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 Thu Jan 12 09:29:27 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. 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
   09:29:27 up 4 min,  1 user,  load average: 1.59, 5.02, 2.72
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                09:27   55.00s  0.99s  0.00s /bin/bash ./dell-norun-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) 4124433
  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) 4124433
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited

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

(Continued on next page)

Platform Notes (Continued)

```
 /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=192 -c
   ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=96 --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=192 --configfile
   ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=96 --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) Platinum 8468
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 8
    microcode       : 0x2b000111
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 48
    siblings        : 96
    2 physical ids (chips)
    192 processors (hardware threads)
    physical id 0: core ids 0-47
    physical id 1: core ids 0-47
    physical id 0: apicids 0-95
    physical id 1: apicids 128-223
  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):                          192
  On-line CPU(s) list:             0-191
  Vendor ID:                       GenuineIntel
  Model name:                      Intel(R) Xeon(R) Platinum 8468
  CPU family:                      6
  Model:                           143
  Thread(s) per core:              2
  Core(s) per socket:              48
  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
                                   nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
```

(Continued on next page)

Platform Notes (Continued)

```
                        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:            4.5 MiB (96 instances)
  L1i cache:            3 MiB (96 instances)
  L2 cache:             192 MiB (96 instances)
  L3 cache:             210 MiB (2 instances)
  NUMA node(s):         8
  NUMA node0 CPU(s):    0,4,8,12,16,20,24,28,32,36,40,44,96,100,104,108,112,116,120,124,128,132,13
                        6,140
  NUMA node1 CPU(s):    48,52,56,60,64,68,72,76,80,84,88,92,144,148,152,156,160,164,168,172,176,18
                        0,184,188
  NUMA node2 CPU(s):    2,6,10,14,18,22,26,30,34,38,42,46,98,102,106,110,114,118,122,126,130,134,1
                        38,142
  NUMA node3 CPU(s):    50,54,58,62,66,70,74,78,82,86,90,94,146,150,154,158,162,166,170,174,178,18
                        2,186,190
  NUMA node4 CPU(s):    1,5,9,13,17,21,25,29,33,37,41,45,97,101,105,109,113,117,121,125,129,133,13
                        7,141
  NUMA node5 CPU(s):    49,53,57,61,65,69,73,77,81,85,89,93,145,149,153,157,161,165,169,173,177,18
                        1,185,189
  NUMA node6 CPU(s):    3,7,11,15,19,23,27,31,35,39,43,47,99,103,107,111,115,119,123,127,131,135,1
                        39,143
  NUMA node7 CPU(s):    51,55,59,63,67,71,75,79,83,87,91,95,147,151,155,159,163,167,171,175,179,18
                        3,187,191
  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     4.5M   12 Data            1     64        1             64
     L1i       32K       3M    8 Instruction     1     64        1             64
     L2         2M     192M   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: 0,4,8,12,16,20,24,28,32,36,40,44,96,100,104,108,112,116,120,124,128,132,136,140
  node 0 size: 128398 MB
  node 0 free: 127098 MB
  node 1 cpus: 48,52,56,60,64,68,72,76,80,84,88,92,144,148,152,156,160,164,168,172,176,180,184,188
  node 1 size: 128983 MB
  node 1 free: 128678 MB
```

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Platform Notes (Continued)

```
  node 2 cpus: 2,6,10,14,18,22,26,30,34,38,42,46,98,102,106,110,114,118,122,126,130,134,138,142
  node 2 size: 129017 MB
  node 2 free: 121259 MB
  node 3 cpus: 50,54,58,62,66,70,74,78,82,86,90,94,146,150,154,158,162,166,170,174,178,182,186,190
  node 3 size: 129017 MB
  node 3 free: 128764 MB
  node 4 cpus: 1,5,9,13,17,21,25,29,33,37,41,45,97,101,105,109,113,117,121,125,129,133,137,141
  node 4 size: 129017 MB
  node 4 free: 128827 MB
  node 5 cpus: 49,53,57,61,65,69,73,77,81,85,89,93,145,149,153,157,161,165,169,173,177,181,185,189
  node 5 size: 129017 MB
  node 5 free: 128853 MB
  node 6 cpus: 3,7,11,15,19,23,27,31,35,39,43,47,99,103,107,111,115,119,123,127,131,135,139,143
  node 6 size: 129017 MB
  node 6 free: 128830 MB
  node 7 cpus: 51,55,59,63,67,71,75,79,83,87,91,95,147,151,155,159,163,167,171,175,179,183,187,191
  node 7 size: 128659 MB
  node 7 free: 128457 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:       1055877820 kB

------------------------------------------------------------
10. who -r
  run-level 3 Jan 12 09:26

------------------------------------------------------------
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 kdump
                   kdump-early lvm2-monitor postfix purge-kernels rollback sshd wicked wickedd-auto4
                   wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
  enabled-runtime  systemd-remount-fs
  disabled         blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell
                   ebtables grub2-once haveged-switch-root issue-add-ssh-keys kexec-load lunmask nfs
                   nfs-blkmap rdisc rpcbind 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=3b24f3a7-eacd-4a3a-aef5-ee833c654599
```

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Platform Notes (Continued)

```
  splash=silent
  mitigations=auto
  quiet
  security=apparmor
  crashkernel=311M,high
  crashkernel=72M,low

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

------------------------------------------------------------
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-ic2022.1
  Filesystem     Type   Size  Used Avail Use% Mounted on
  tmpfs          tmpfs  125G  3.7G  122G   3% /mnt/ramdisk

------------------------------------------------------------
19. /sys/devices/virtual/dmi/id
    Vendor:         Dell Inc.
```

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Platform Notes (Continued)

```
     Product:        PowerEdge C6620
     Product Family: PowerEdge
     Serial:         SL6C201

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


 ------------------------------------------------------------
 21. 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.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
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.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
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.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
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++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
        | 541.leela_r(base, peak)
--------------------------------------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
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==============================================================================================================
Fortran | 548.exchange2_r(base, peak)
------------------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
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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

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Base Optimization Flags (Continued)

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:

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

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