SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

Precision 7960 Rack (Intel Xeon Gold 5418Y)

$SPECrate^{®}2017\_fp\_base = 508$

$SPECrate^{®}2017\_fp\_peak = 524$

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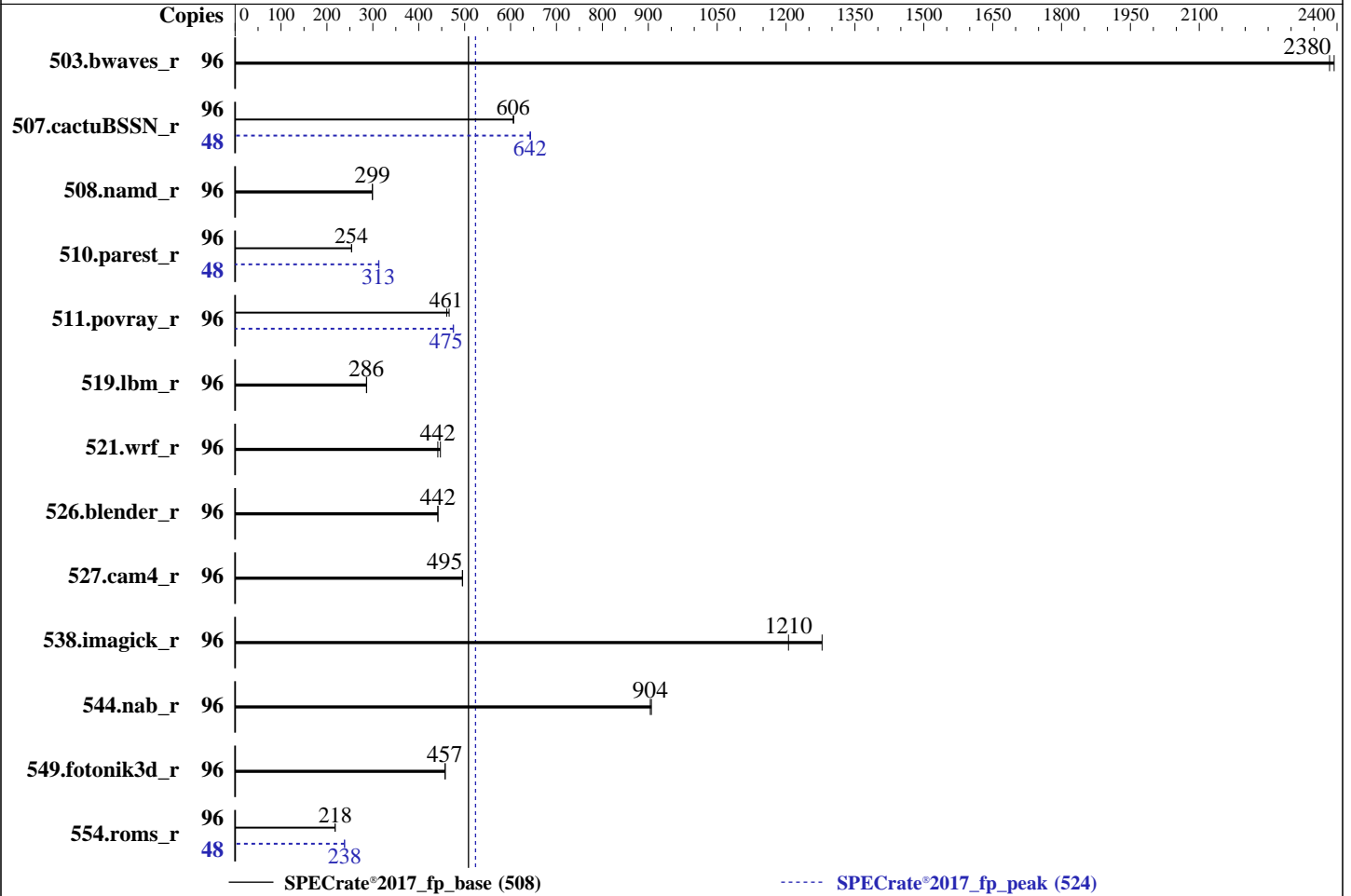**Test Sponsor:** Dell Inc.   **Hardware Availability:** Jul-2023
Tested by: Dell Inc.   **Software Availability:** Dec-2022

Benchmark	Copies	base	peak
503.bwaves_r	96	2380	
507.cactuBSSN_r	96 / 48	606	642
508.namd_r	96	299	
510.parest_r	96 / 48	254	313
511.povray_r	96	461	475
519.lbm_r	96	286	
521.wrf_r	96	442	
526.blender_r	96	442	
527.cam4_r	96	495	
538.imagick_r	96	1210	
544.nab_r	96	904	
549.fotonik3d_r	96	457	
554.roms_r	96 / 48	218	238

SPECrate®2017_fp_base (508)   SPECrate®2017_fp_peak (524)

Hardware

CPU Name: Intel Xeon Gold 5418Y
Max MHz: 3800
Nominal: 2000
Enabled: 48 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: 45 MB I+D on chip per chip
Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R, running at 4400)
Storage: 70 GB on tmpfs
Other: None

Software

OS: Ubuntu 22.04.2 LTS
6.2.0-34-generic
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 1.5.6 released Jul-2023
File System: tmpfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 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
503.bwaves_r	96	**404**	**2380**	402	2390			96	**404**	**2380**	402	2390		
507.cactuBSSN_r	96	**201**	**606**	200	607			48	94.4	644	**94.6**	**642**		
508.namd_r	96	**305**	**299**	305	299			96	**305**	**299**	305	299		
510.parest_r	96	989	254	**991**	**254**			48	401	313	**402**	**313**		
511.povray_r	96	**486**	**461**	481	466			96	471	476	**472**	**475**		
519.lbm_r	96	353	287	**354**	**286**			96	353	287	**354**	**286**		
521.wrf_r	96	**487**	**442**	481	447			96	**487**	**442**	481	447		
526.blender_r	96	**331**	**442**	331	442			96	**331**	**442**	331	442		
527.cam4_r	96	339	496	**339**	**495**			96	339	496	**339**	**495**		
538.imagick_r	96	**198**	**1210**	187	1280			96	**198**	**1210**	187	1280		
544.nab_r	96	178	907	**179**	**904**			96	178	907	**179**	**904**		
549.fotonik3d_r	96	**818**	**457**	817	458			96	**818**	**457**	817	458		
554.roms_r	96	**700**	**218**	700	218			48	320	239	**320**	**238**		

SPECrate®2017_fp_base =	**508**
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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/je5.0.1-64"
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
```

(Continued on next page)

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

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General Notes (Continued)

```
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 70 GB ramdisk created with the cmd: "mount -t tmpfs -o size=70G 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 : 2-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 dell-Precision-7960-Rack Thu Oct 12 21:53:37 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
 8. numactl --hardware
 9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.7)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. sysctl
```

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Platform Notes (Continued)

```
  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 dell-Precision-7960-Rack 6.2.0-34-generic #34~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Thu Sep  7 13:12:03
    UTC 2 x86_64 x86_64 x86_64 GNU/Linux


  -----------------------------------------------------------
  2. w
    21:53:37 up  4:21,  3 users,  load average: 65.86, 88.34, 92.51
    USER      TTY        FROM            LOGIN@   IDLE   JCPU    PCPU WHAT
    dell      tty1       -               17:33    4:19m  0.80s  0.02s -bash
    dell      pts/0      -               17:34    4:19m  0.91s  0.57s sudo ./DELL_rate.sh


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


  -----------------------------------------------------------
  4. ulimit -a
    time(seconds)        unlimited
    file(blocks)         unlimited
    data(kbytes)         unlimited
    stack(kbytes)        unlimited
    coredump(blocks)     0
    memory(kbytes)       unlimited
    locked memory(kbytes) 132063460
    process              4126685
    nofiles              1024
    vmemory(kbytes)      unlimited
    locks                unlimited
    rtprio               0


  -----------------------------------------------------------
  5. sysinfo process ancestry
   /sbin/init splash
   /bin/login -p --
   -bash
   sudo ./DELL_rate.sh
   sudo ./DELL_rate.sh
   /bin/bash ./DELL_rate.sh
   /bin/bash ./dell-run-main.sh rate
   /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-LogProc=1
     --define DL-BIOS-adddcD=1 --define DL-VERS=v4.8 --output_format html,pdf,txt
   /bin/bash ./dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-LogProc=1
     --define DL-BIOS-adddcD=1 --define DL-VERS=v4.8 --output_format html,pdf,txt
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=96 -c
     ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=48 --define physicalfirst
     --define invoke_with_interleave --define drop_caches --tune base,peak -o all --define DL-BIOS-SNC=2
     --define DL-LQC=1 --iterations 2 --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-LogProc=1
     --define DL-BIOS-adddcD=1 --define DL-VERS=v4.8 --output_format html,pdf,txt fprate
```

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Platform Notes (Continued)

```
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=96 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=48 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --define
   DL-BIOS-SNC=2 --define DL-LQC=1 --iterations 2 --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define
   DL-BIOS-LogProc=1 --define DL-BIOS-adddcD=1 --define DL-VERS=v4.8 --output_format html,pdf,txt --nopower
   --runmode rate --tune base:peak --size refrate fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --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) Gold 5418Y
    vendor_id        : GenuineIntel
    cpu family       : 6
    model            : 143
    stepping         : 7
    microcode        : 0x2b0004b1
    bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
    cpu cores        : 24
    siblings         : 48
    2 physical ids (chips)
    96 processors (hardware threads)
    physical id 0: core ids 0-23
    physical id 1: core ids 0-23
    physical id 0: apicids 0-47
    physical id 1: apicids 128-175
  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):                        96
  On-line CPU(s) list:           0-95
  Vendor ID:                     GenuineIntel
  Model name:                    Intel(R) Xeon(R) Gold 5418Y
  CPU family:                    6
  Model:                         143
  Thread(s) per core:            2
  Core(s) per socket:            24
  Socket(s):                     2
  Stepping:                      7
  BogoMIPS:                      4000.00
  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 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
```

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Platform Notes (Continued)

```
                       cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect avx_vnni
                       avx512_bf16 wbnoinvd dtherm ida arat pln pts hfi 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 ibt amx_bf16 avx512_fp16 amx_tile amx_int8 flush_l1d
                       arch_capabilities
  L1d cache:           2.3 MiB (48 instances)
  L1i cache:           1.5 MiB (48 instances)
  L2 cache:            96 MiB (48 instances)
  L3 cache:            90 MiB (2 instances)
  NUMA node(s):        4
  NUMA node0 CPU(s):   0,2,6,10,12,16,20,24,32,36,38,42,48,50,54,58,60,64,68,72,80,84,86,90
  NUMA node1 CPU(s):   4,8,14,18,22,26,28,30,34,40,44,46,52,56,62,66,70,74,76,78,82,88,92,94
  NUMA node2 CPU(s):   1,5,9,13,17,21,25,31,35,37,39,43,49,53,57,61,65,69,73,79,83,85,87,91
  NUMA node3 CPU(s):   3,7,11,15,19,23,27,29,33,41,45,47,51,55,59,63,67,71,75,77,81,89,93,95
  Vulnerability Gather data sampling: Not affected
  Vulnerability Itlb multihit:        Not affected
  Vulnerability L1tf:                 Not affected
  Vulnerability Mds:                  Not affected
  Vulnerability Meltdown:             Not affected
  Vulnerability Mmio stale data:      Not affected
  Vulnerability Retbleed:             Not affected
  Vulnerability Spec rstack overflow: Not affected
  Vulnerability Spec store bypass:    Mitigation; Speculative Store Bypass disabled via prctl
  Vulnerability Spectre v1:           Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:           Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSB-eIBRS
                                      SW sequence
  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     2.3M   12 Data            1     64        1             64
      L1i       32K     1.5M    8 Instruction     1     64        1             64
      L2         2M      96M   16 Unified         2   2048        1             64
      L3        45M      90M   15 Unified         3  49152        1             64


  ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 4 nodes (0-3)
    node 0 cpus: 0,2,6,10,12,16,20,24,32,36,38,42,48,50,54,58,60,64,68,72,80,84,86,90
    node 0 size: 257627 MB
    node 0 free: 256496 MB
    node 1 cpus: 4,8,14,18,22,26,28,30,34,40,44,46,52,56,62,66,70,74,76,78,82,88,92,94
    node 1 size: 258041 MB
    node 1 free: 248221 MB
    node 2 cpus: 1,5,9,13,17,21,25,31,35,37,39,43,49,53,57,61,65,69,73,79,83,85,87,91
    node 2 size: 258041 MB
    node 2 free: 257039 MB
    node 3 cpus: 3,7,11,15,19,23,27,29,33,41,45,47,51,55,59,63,67,71,75,77,81,89,93,95
    node 3 size: 258034 MB
    node 3 free: 256589 MB
    node distances:
    node   0   1   2   3
      0:  10  12  21  21
      1:  12  10  21  21
      2:  21  21  10  12
      3:  21  21  12  10
```

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Platform Notes (Continued)

```
        -----------------------------------------------------------
        9. /proc/meminfo
           MemTotal:       1056507684 kB


        -----------------------------------------------------------
        10. who -r
          run-level 3 Oct 12 17:33 last=5


        -----------------------------------------------------------
        11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.7)
          Default Target  Status
          graphical       running


        -----------------------------------------------------------
        12. Services, from systemctl list-unit-files
          STATE           UNIT FILES
          enabled         ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
                          accounts-daemon anacron apparmor avahi-daemon bluetooth console-setup cron cups
                          cups-browsed dmesg e2scrub_reap getty@ gpu-manager grub-common grub-initrd-fallback
                          irqbalance kerneloops keyboard-setup networkd-dispatcher openvpn power-profiles-daemon
                          rsyslog secureboot-db setvtrgb snapd ssh switcheroo-control systemd-oomd systemd-pstore
                          systemd-resolved systemd-timesyncd thermald ua-reboot-cmds ubuntu-advantage udisks2 ufw
                          unattended-upgrades wpa_supplicant
          enabled-runtime netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
          disabled        acpid brltty console-getty debug-shell nftables openvpn-client@ openvpn-server@ openvpn@
                          rsync rtkit-daemon serial-getty@ speech-dispatcherd systemd-boot-check-no-failures
                          systemd-network-generator systemd-networkd systemd-networkd-wait-online systemd-sysext
                          systemd-time-wait-sync upower wpa_supplicant-nl80211@ wpa_supplicant-wired@
                          wpa_supplicant@
          generated       apport speech-dispatcher
          indirect        saned@ spice-vdagentd uuidd
          masked          alsa-utils cryptdisks cryptdisks-early hwclock pulseaudio-enable-autospawn rc rcS saned
                          sudo x11-common


        -----------------------------------------------------------
        13. Linux kernel boot-time arguments, from /proc/cmdline
          BOOT_IMAGE=/boot/vmlinuz-6.2.0-34-generic
          root=UUID=b08addc0-894d-435d-a619-c0fec2d4a2ec
          ro
          quiet
          splash
          vt.handoff=7


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

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Platform Notes (Continued)

```
  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 Ubuntu 22.04.2 LTS


  ----------------------------------------------------------------
18. Disk information
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2023.0
  Filesystem      Type   Size  Used Avail Use% Mounted on
  tmpfs           tmpfs   70G  4.2G   66G   6% /mnt/ramdisk


  ----------------------------------------------------------------
19. /sys/devices/virtual/dmi/id
    Vendor:         Dell Inc.
    Product:        Precision 7960 Rack
    Product Family: Precision
    Serial:         31LXFZ3


  ----------------------------------------------------------------
20. 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:
    16x 00AD00B300AD HMCG94AEBRA123N 64 GB 2 rank 4800, configured at 4400
    16x Not Specified Not Specified



  ----------------------------------------------------------------
21. BIOS
(This section combines info from /sys/devices and dmidecode.)
  BIOS Vendor:       Dell Inc.
  BIOS Version:      1.5.6
  BIOS Date:         07/29/2023
  BIOS Revision:     1.5
```

Dell Inc.

Precision 7960 Rack (Intel Xeon Gold 5418Y)

SPECrate®2017_fp_base = 508

SPECrate®2017_fp_peak = 524

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

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

Compiler Version Notes

```
==============================================================================
C              | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_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++            | 508.namd_r(base, peak) 510.parest_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++, C         | 511.povray_r(base, peak) 526.blender_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.
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++, C, Fortran | 507.cactuBSSN_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.
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.
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.
------------------------------------------------------------------------------


==============================================================================
Fortran        | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_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.
------------------------------------------------------------------------------


==============================================================================
Fortran, C     | 521.wrf_r(base, peak) 527.cam4_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.
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.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
icx
```

Dell Inc.

Precision 7960 Rack (Intel Xeon Gold 5418Y)

SPECrate®2017_fp_base = 508

SPECrate®2017_fp_peak = 524

Base Compiler Invocation (Continued)

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifx`

Benchmarks using both Fortran and C:
`ifx icx`

Benchmarks using both C and C++:
`icpx icx`

Benchmarks using Fortran, C, and C++:
`icpx icx ifx`

Base Portability Flags

```
503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64
```

Base Optimization Flags

C benchmarks:
```
-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

C++ benchmarks:
```
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
```

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SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

Precision 7960 Rack (Intel Xeon Gold 5418Y)

SPECrate®2017_fp_base = 508

SPECrate®2017_fp_peak = 524

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

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

Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Fortran benchmarks:
```
-w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both Fortran and C:
```
-w -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both C and C++:
```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:
```
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Peak Compiler Invocation

C benchmarks:
```
icx
```

C++ benchmarks:
```
icpx
```

Fortran benchmarks:
```
ifx
```

Benchmarks using both Fortran and C:
```
ifx icx
```

(Continued on next page)

Dell Inc.

Precision 7960 Rack (Intel Xeon Gold 5418Y)

SPECrate®2017_fp_base = 508

SPECrate®2017_fp_peak = 524

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

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

Peak Compiler Invocation (Continued)

Benchmarks using both C and C++:
`icpx icx`

Benchmarks using Fortran, C, and C++:
`icpx icx ifx`

Peak Portability Flags

`Same as Base Portability Flags`

Peak Optimization Flags

C benchmarks:

519.lbm_r: `basepeak = yes`

538.imagick_r: `basepeak = yes`

544.nab_r: `basepeak = yes`

C++ benchmarks:

508.namd_r: `basepeak = yes`

510.parest_r: `-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Fortran benchmarks:

503.bwaves_r: `basepeak = yes`

549.fotonik3d_r: `basepeak = yes`

554.roms_r: `-w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

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SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Dell Inc.

Precision 7960 Rack (Intel Xeon Gold 5418Y)

SPECrate®2017_fp_base = 508

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

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

Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -w -std=c++14 -m64 -std=c11 -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 -Wno-implicit-int
-mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64_revB.2023-10-11.html
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.6.html

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64_revB.2023-10-11.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.6.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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