SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

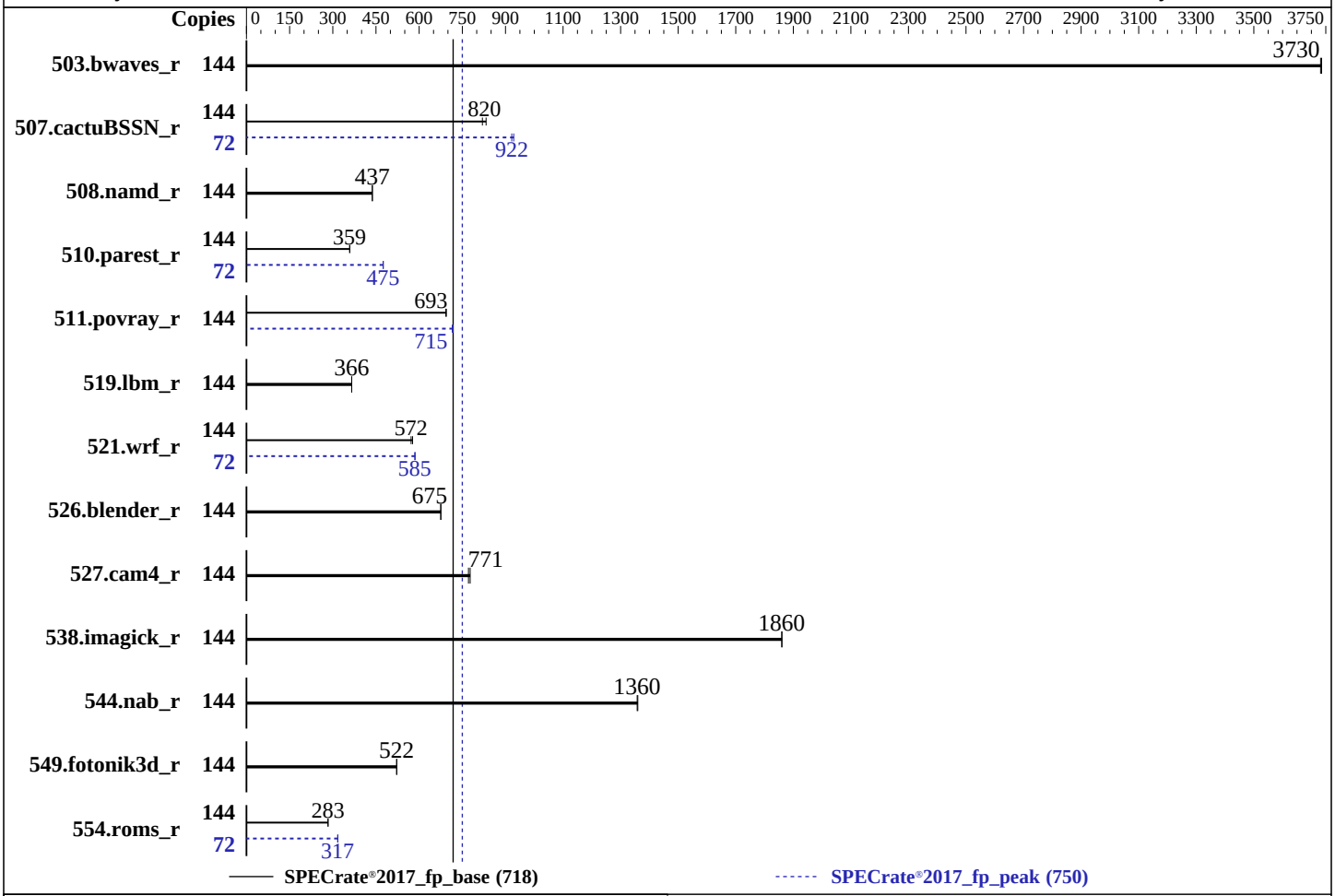
PowerEdge R760xa (Intel Xeon Platinum 8452Y)

SPECrate®2017_fp_base = 718

SPECrate®2017_fp_peak = 750

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 8452Y
Max MHz:	3200
Nominal:	2000
Enabled:	72 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:	67.5 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:	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.

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	144	**387**	**3730**	387	3740			144	**387**	**3730**	387	3740		
507.cactuBSSN_r	144	219	833	**222**	**820**			72	**98.9**	**922**	98.2	929		
508.namd_r	144	**313**	**437**	313	437			144	**313**	**437**	313	437		
510.parest_r	144	**1051**	**359**	1050	359			72	**397**	**475**	396	475		
511.povray_r	144	484	695	**485**	**693**			144	**470**	**715**	468	718		
519.lbm_r	144	415	366	**415**	**366**			144	415	366	**415**	**366**		
521.wrf_r	144	**564**	**572**	559	577			72	275	586	**276**	**585**		
526.blender_r	144	**325**	**675**	325	676			144	**325**	**675**	325	676		
527.cam4_r	144	**327**	**771**	324	777			144	**327**	**771**	324	777		
538.imagick_r	144	192	1860	**193**	**1860**			144	192	1860	**193**	**1860**		
544.nab_r	144	178	1360	**179**	**1360**			144	178	1360	**179**	**1360**		
549.fotonik3d_r	144	**1076**	**522**	1075	522			144	**1076**	**522**	1075	522		
554.roms_r	144	**808**	**283**	807	284			72	**361**	**317**	360	317		

SPECrate®2017_fp_base = 718

SPECrate®2017_fp_peak = 750

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)

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 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 01:53:58 2023

SUT (System Under Test) info as seen by some common utilities.

------------------------------------------------------------
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------------------------------------------------------------
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 2. w
 3. Username
 4. ulimit -a
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 6. /proc/cpuinfo
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 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
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Platform Notes (Continued)

```
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
   01:53:58 up  4:28,  1 user,  load average: 103.96, 134.07, 139.58
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                21:26    4:21m  1.59s  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) 2060066
  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) 2060066
  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
 /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=144 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=72 --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 fprate
```

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Platform Notes (Continued)

```
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=144 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=72 --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 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) Platinum 8452Y
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 8
    microcode       : 0x2b0001b0
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 36
    siblings        : 72
    2 physical ids (chips)
    144 processors (hardware threads)
    physical id 0: core ids 0-35
    physical id 1: core ids 0-35
    physical id 0: apicids 0-71
    physical id 1: apicids 128-199
  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):                          144
  On-line CPU(s) list:             0-143
  Vendor ID:                       GenuineIntel
  Model name:                      Intel(R) Xeon(R) Platinum 8452Y
  CPU family:                      6
  Model:                           143
  Thread(s) per core:              2
  Core(s) per socket:              36
  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
                                   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
```

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Platform Notes (Continued)

```
                                 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:                     3.4 MiB (72 instances)
  L1i cache:                     2.3 MiB (72 instances)
  L2 cache:                      144 MiB (72 instances)
  L3 cache:                      135 MiB (2 instances)
  NUMA node(s):                  8
  NUMA node0 CPU(s):             0,4,8,12,16,20,24,28,32,72,76,80,84,88,92,96,100,104
  NUMA node1 CPU(s):             36,40,44,48,52,56,60,64,68,108,112,116,120,124,128,132,136,140
  NUMA node2 CPU(s):             2,6,10,14,18,22,26,30,34,74,78,82,86,90,94,98,102,106
  NUMA node3 CPU(s):             38,42,46,50,54,58,62,66,70,110,114,118,122,126,130,134,138,142
  NUMA node4 CPU(s):             1,5,9,13,17,21,25,29,33,73,77,81,85,89,93,97,101,105
  NUMA node5 CPU(s):             37,41,45,49,53,57,61,65,69,109,113,117,121,125,129,133,137,141
  NUMA node6 CPU(s):             3,7,11,15,19,23,27,31,35,75,79,83,87,91,95,99,103,107
  NUMA node7 CPU(s):             39,43,47,51,55,59,63,67,71,111,115,119,123,127,131,135,139,143
  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     3.4M   12 Data            1    64        1             64
     L1i       32K     2.3M    8 Instruction     1    64        1             64
     L2         2M     144M   16 Unified         2  2048        1             64
     L3      67.5M     135M   15 Unified         3 73728        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: 0,4,8,12,16,20,24,28,32,72,76,80,84,88,92,96,100,104
  node 0 size: 63887 MB
  node 0 free: 48597 MB
  node 1 cpus: 36,40,44,48,52,56,60,64,68,108,112,116,120,124,128,132,136,140
  node 1 size: 64507 MB
  node 1 free: 57091 MB
  node 2 cpus: 2,6,10,14,18,22,26,30,34,74,78,82,86,90,94,98,102,106
  node 2 size: 64507 MB
  node 2 free: 57127 MB
  node 3 cpus: 38,42,46,50,54,58,62,66,70,110,114,118,122,126,130,134,138,142
  node 3 size: 64507 MB
  node 3 free: 56600 MB
  node 4 cpus: 1,5,9,13,17,21,25,29,33,73,77,81,85,89,93,97,101,105
  node 4 size: 64507 MB
  node 4 free: 48403 MB
  node 5 cpus: 37,41,45,49,53,57,61,65,69,109,113,117,121,125,129,133,137,141
  node 5 size: 64507 MB
  node 5 free: 57091 MB
  node 6 cpus: 3,7,11,15,19,23,27,31,35,75,79,83,87,91,95,99,103,107
  node 6 size: 64472 MB
  node 6 free: 54442 MB
  node 7 cpus: 39,43,47,51,55,59,63,67,71,111,115,119,123,127,131,135,139,143
```

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Platform Notes (Continued)

```
  node 7 size: 64146 MB
  node 7 free: 56638 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:       527404436 kB

------------------------------------------------------------
10. who -r
  run-level 3 Mar 22 21:26

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

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Platform Notes (Continued)

```
  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

------------------------------------------------------------
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   61G   65G  49% /mnt/ramdisk

------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         Dell Inc.
    Product:        PowerEdge R760xa
```

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Platform Notes (Continued)

```
     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               | 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
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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==============================================================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
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Compiler Version Notes (Continued)

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Fortran, C      | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
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Base Compiler Invocation

C benchmarks:
icx

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

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Base Portability Flags (Continued)

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
-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

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

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Peak Optimization Flags (Continued)

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

Benchmarks using both Fortran and C:

521.wrf_r: -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

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

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