



SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Dell Inc.

SPECrate®2017_fp_base = 992

PowerEdge R760 (Intel Xeon Max 9460)

SPECrate®2017_fp_peak = 1010

CPU2017 License: 6573

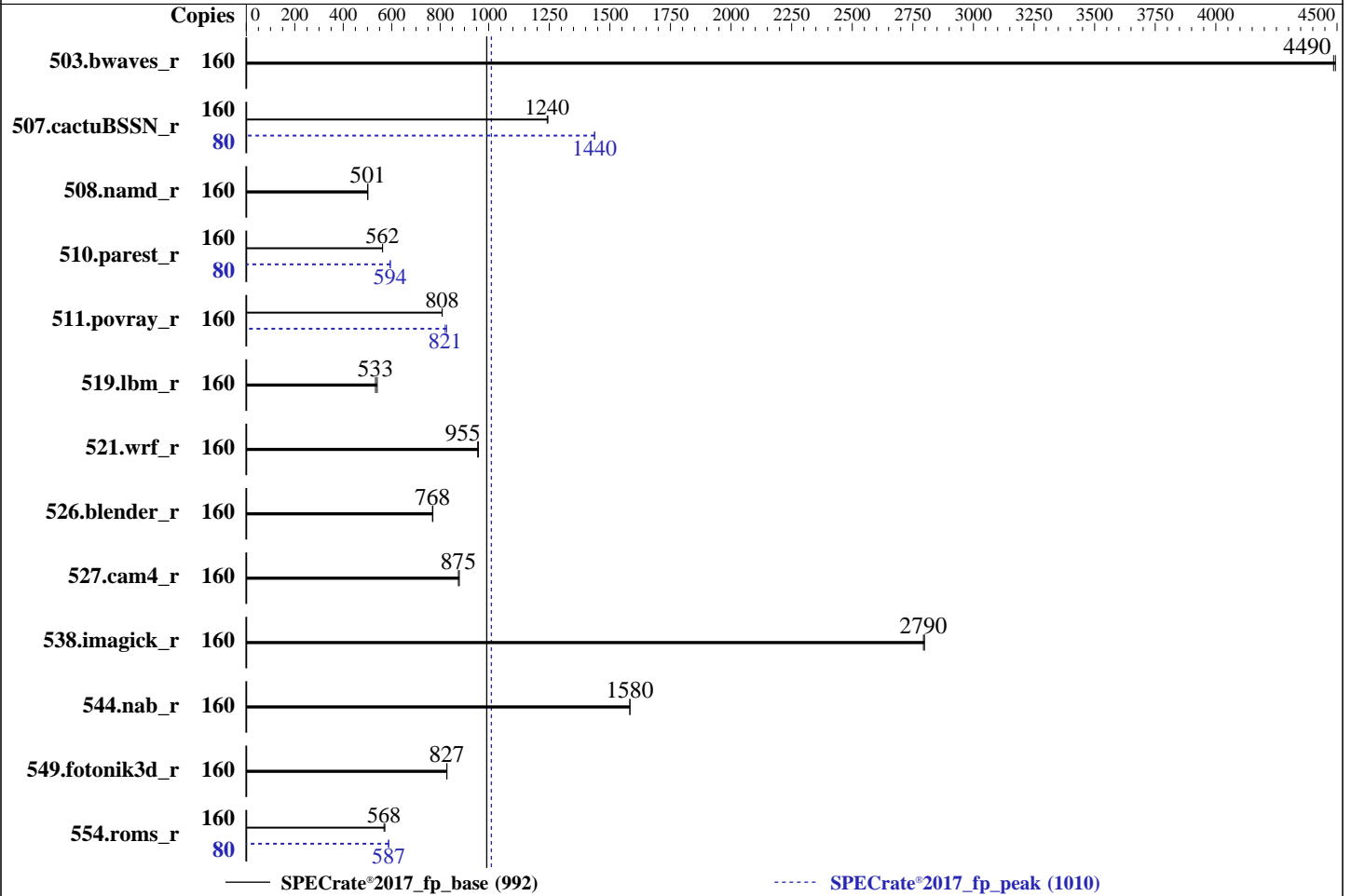
Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Mar-2024

Hardware Availability: May-2023

Software Availability: Dec-2023



Hardware

CPU Name: Intel Xeon Max 9460
 Max MHz: 3500
 Nominal: 2200
 Enabled: 80 cores, 2 chips, 2 threads/core
 Orderable: 1,2 chips
 Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 97.5 MB I+D on chip per chip
 Other: None
 Memory: 1152 GB (16 x 64 GB 2Rx4 PC5-4800B-R + 8 x 16 GB HBM)
 Storage: 100 GB on tmpfs
 Other: CPU Cooling: DLC

Software

OS: SUSE Linux Enterprise Server 15 SP4
 5.14.21-150400.24.81-default
 Compiler: C/C++: Version 2024.0.2 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2024.0.2 of Intel Fortran Compiler for Linux;
 Parallel: No
 Firmware: Version 2.1.3 released Jan-2024
 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	160	358	4490	357	4490			160	358	4490	357	4490		
507.cactuBSSN_r	160	163	1240	163	1240			80	70.5	1440	70.5	1440		
508.namd_r	160	303	501	303	501			160	303	501	303	501		
510.parest_r	160	744	562	745	562			80	352	594	352	594		
511.povray_r	160	463	808	462	809			160	452	826	455	821		
519.lbm_r	160	316	533	312	540			160	316	533	312	540		
521.wrf_r	160	374	958	375	955			160	374	958	375	955		
526.blender_r	160	317	770	317	768			160	317	770	317	768		
527.cam4_r	160	320	875	318	879			160	320	875	318	879		
538.imagick_r	160	142	2800	142	2790			160	142	2800	142	2790		
544.nab_r	160	170	1580	170	1580			160	170	1580	170	1580		
549.fotonik3d_r	160	753	828	754	827			160	753	828	754	827		
554.roms_r	160	445	572	447	568			80	217	587	216	587		

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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-ic2024.0.2/lib/intel64:/mnt/ramdisk/cpu2017-1.1.9-ic2024.0.2/je5.0.1-64"
MALLOCCONF = "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

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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 100 GB ramdisk created with the cmd: "mount -t tmpfs -o size=100G tmpfs /mnt/ramdisk"

Platform Notes

BIOS settings:

ADDC 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
CIE : 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-ic2024.0.2/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on sut Thu Mar 14 22:45:26 2024

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 (249.16+suse.195.gb473c02cc0)
12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline

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Platform Notes (Continued)

```

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

```

```

-----
1. uname -a
Linux sut 5.14.21-150400.24.81-default #1 SMP PREEMPT_DYNAMIC Tue Aug 8 14:10:43 UTC 2023 (90a74a8) x86_64
x86_64 x86_64 GNU/Linux

```

```

-----
2. w
 22:45:26 up 4:32, 1 user, load average: 102.80, 145.73, 154.25
USER   TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
root   tty1    -                18:14   4:30m  2.42s  0.01s /bin/bash
/home/DellFiles/bin/Intel/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=5.0 --output_format html,pdf,txt --define
DL-LQC=1

```

```

-----
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) 4125918
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) 4125918
virtual memory          (kbytes, -v) unlimited
file locks              (-x) unlimited

```

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
/bin/bash ./DELL_rate.sh
/bin/bash /home/DellFiles/bin/dell-run-main.sh rate
/bin/bash /home/DellFiles/bin/dell-run-main.sh rate
/bin/bash /home/DellFiles/bin/Intel/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=5.0 --output_format html,pdf,txt
--define DL-LQC=1
/bin/bash /home/DellFiles/bin/Intel/dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc

```

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Platform Notes (Continued)

```

--define DL-BIOS-LogProc=1 --define DL-BIOS-adddcD=1 --define DL-VERS=5.0 --output_format html, pdf, txt
--define DL-LQC=1
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=160 -c
ic2024.0.2-lin-sapphirerapids-rate-20231213.cfg --define smt-on --define cores=80 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base, peak -o all --define DL-BIOS-SNC=4
--iterations 2 --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-LogProc=1 --define
DL-BIOS-adddcD=1 --define DL-VERS=5.0 --output_format html, pdf, txt --define DL-LQC=1 fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=160 --configfile
ic2024.0.2-lin-sapphirerapids-rate-20231213.cfg --define smt-on --define cores=80 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base, peak --output_format all --define
DL-BIOS-SNC=4 --iterations 2 --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-LogProc=1 --define
DL-BIOS-adddcD=1 --define DL-VERS=5.0 --output_format html, pdf, txt --define DL-LQC=1 --nopower --runmode
rate --tune base:peak --size refrate fprate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.002/temlogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /mnt/ramdisk/cpu2017-1.1.9-ic2024.0.2

```

```

-----
6. /proc/cpuinfo
model name      : Intel (R) Xeon (R) CPU Max 9460
vendor_id      : GenuineIntel
cpu family      : 6
model           : 143
stepping        : 8
microcode       : 0x2c000351
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
cpu cores       : 40
siblings        : 80
2 physical ids (chips)
160 processors (hardware threads)
physical id 0:  core ids 0-39
physical id 1:  core ids 0-39
physical id 0:  apicids 0-79
physical id 1:  apicids 128-207

```

Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

7. lscpu

```

From lscpu from util-linux 2.37.2:
Architecture:      x86_64
CPU op-mode(s):    32-bit, 64-bit
Address sizes:      46 bits physical, 57 bits virtual
Byte Order:         Little Endian
CPU(s):             160
On-line CPU(s) list: 0-159
Vendor ID:          GenuineIntel
Model name:         Intel (R) Xeon (R) CPU Max 9460
CPU family:         6
Model:              143
Thread(s) per core: 2
Core(s) per socket: 40
Socket(s):          2
Stepping:           8
CPU max MHz:        3500.0000
CPU min MHz:        800.0000
BogoMIPS:           4400.00
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

```

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Platform Notes (Continued)

```
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 bmil 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_lld arch_capabilities
```

```
L1d cache: 3.8 MiB (80 instances)
L1i cache: 2.5 MiB (80 instances)
L2 cache: 160 MiB (80 instances)
L3 cache: 195 MiB (2 instances)
NUMA node(s): 8
NUMA node0 CPU(s): 0,8,16,24,32,40,48,56,64,72,80,88,96,104,112,120,128,136,144,152
NUMA node1 CPU(s): 4,12,20,28,36,44,52,60,68,76,84,92,100,108,116,124,132,140,148,156
NUMA node2 CPU(s): 2,10,18,26,34,42,50,58,66,74,82,90,98,106,114,122,130,138,146,154
NUMA node3 CPU(s): 6,14,22,30,38,46,54,62,70,78,86,94,102,110,118,126,134,142,150,158
NUMA node4 CPU(s): 1,9,17,25,33,41,49,57,65,73,81,89,97,105,113,121,129,137,145,153
NUMA node5 CPU(s): 5,13,21,29,37,45,53,61,69,77,85,93,101,109,117,125,133,141,149,157
NUMA node6 CPU(s): 3,11,19,27,35,43,51,59,67,75,83,91,99,107,115,123,131,139,147,155
NUMA node7 CPU(s): 7,15,23,31,39,47,55,63,71,79,87,95,103,111,119,127,135,143,151,159
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 and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSE-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	3.8M	12	Data	1	64	1	64
L1i	32K	2.5M	8	Instruction	1	64	1	64
L2	2M	160M	16	Unified	2	2048	1	64
L3	97.5M	195M	15	Unified	3	106496	1	64

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

```
available: 8 nodes (0-7)
node 0 cpus: 0,8,16,24,32,40,48,56,64,72,80,88,96,104,112,120,128,136,144,152
node 0 size: 128471 MB
node 0 free: 126953 MB
node 1 cpus: 4,12,20,28,36,44,52,60,68,76,84,92,100,108,116,124,132,140,148,156
node 1 size: 129018 MB
node 1 free: 128214 MB
```

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Platform Notes (Continued)

```

node 2 cpus: 2,10,18,26,34,42,50,58,66,74,82,90,98,106,114,122,130,138,146,154
node 2 size: 129018 MB
node 2 free: 128232 MB
node 3 cpus: 6,14,22,30,38,46,54,62,70,78,86,94,102,110,118,126,134,142,150,158
node 3 size: 129018 MB
node 3 free: 128253 MB
node 4 cpus: 1,9,17,25,33,41,49,57,65,73,81,89,97,105,113,121,129,137,145,153
node 4 size: 128972 MB
node 4 free: 128161 MB
node 5 cpus: 5,13,21,29,37,45,53,61,69,77,85,93,101,109,117,125,133,141,149,157
node 5 size: 129018 MB
node 5 free: 128183 MB
node 6 cpus: 3,11,19,27,35,43,51,59,67,75,83,91,99,107,115,123,131,139,147,155
node 6 size: 129018 MB
node 6 free: 116664 MB
node 7 cpus: 7,15,23,31,39,47,55,63,71,79,87,95,103,111,119,127,135,143,151,159
node 7 size: 128970 MB
node 7 free: 128141 MB
node distances:
node  0  1  2  3  4  5  6  7
 0:  10 17 17 17 26 26 26 26
 1:  17 10 17 17 26 26 26 26
 2:  17 17 10 17 26 26 26 26
 3:  17 17 17 10 26 26 26 26
 4:  26 26 26 26 10 17 17 17
 5:  26 26 26 26 17 10 17 17
 6:  26 26 26 26 17 17 10 17
 7:  26 26 26 26 17 17 17 10

```

```

9. /proc/meminfo
   MemTotal:      1056264992 kB

```

```

10. who -r
    run-level 3 Mar 14 18:13

```

```

11. Systemd service manager version: systemd 249 (249.16+suse.195.gb473c02cc0)
    Default Target    Status
    multi-user        degraded

```

```

12. Failed units, from systemctl list-units --state=failed
    UNIT                LOAD    ACTIVE SUB    DESCRIPTION
* postfix.service    loaded failed failed Postfix Mail Transport Agent
* smartd.service     loaded failed failed Self Monitoring and Reporting Technology (SMART) Daemon

```

```

13. Services, from systemctl list-unit-files
    STATE    UNIT FILES
enabled    ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
           YaST2-Firstboot YaST2-Second-Stage auditd bluetooth cron display-manager getty@ haveged
           irqbalance iscsi issue-generator kbdsettings klog lvm2-monitor nscd postfix purge-kernels
           rollback rsyslog smartd sshd systemd-pstore wpa_supplicant
enabled-runtime  systemd-remount-fs
disabled        accounts-daemon apparmor appstream-sync-cache autofsd autoyast-initscripts blk-availability
           bluetooth-mesh boot-sysctl ca-certificates chrony-wait chronyd console-getty cups
           cups-browsed debug-shell dmraid-activation dnsmasq ebttables exchange-bmc-os-info
           fancontrol firewalld gpm grub2-once haveged-switch-root hwloc-dump-hwdata ipmi ipmievd

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```

iscsi-init iscsid iscsiuiio issue-add-ssh-keys kexec-load lm_sensors lunmask man-db-create
multipathd ndctl-monitor nfs nfs-blkmap nfs-server nfsserver nm-cloud-setup nmb
ostree-remount power-profiles-daemon rdisc rpcbind rpmconfigcheck rsyncd rtkit-daemon
serial-getty@ smartd_generate_opts smb snmpd snmptrapd speech-dispatcherd svnserve
systemd-boot-check-no-failures systemd-network-generator systemd-sysext
systemd-time-wait-sync systemd-timesyncd udisks2 upower wicked wickedd-auto4 wickedd-dhcp4
wickedd-dhcp6 wickedd-nanny wpa_supplicant@
indirect pcsd wickedd

```

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

```

BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.24.81-default
root=UUID=1370a640-700c-4b25-a152-2c5f9290f614
splash=silent
mitigations=auto
quiet
security=apparmorpcie_aspm=force
pcie_aspm.policy=powersave
intel_pstate=passive

```

15. cpupower frequency-info

```

analyzing CPU 0:
  current policy: frequency should be within 800 MHz and 3.50 GHz.
                  The governor "ondemand" may decide which speed to use
                  within this range.

boost state support:
  Supported: yes
  Active: yes

```

16. 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

```

17. /sys/kernel/mm/transparent_hugepage

```

defrag          always defer defer+madvice [madvice] never
enabled         [always] madvice never
hpage_pmd_size  2097152
shmem_enabled   always within_size advise [never] deny force

```

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SPECrate®2017_fp_peak = 1010

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Mar-2024

Hardware Availability: May-2023

Software Availability: Dec-2023

Platform Notes (Continued)

18. /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

```

19. OS release

```

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

```

20. Disk information

```

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2024.0.2
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 100G 5.7G 95G 6% /mnt/ramdisk

```

21. /sys/devices/virtual/dmi/id

```

Vendor: Dell Inc.
Product: PowerEdge R760
Product Family: PowerEdge
Serial: SLR7604

```

22. dmidecode

Additional information from dmidecode 3.4 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:
8x 00CE 43 16 GB 3200
2x 00CE00B300CE M321R8GA0BB0-CQKEG 64 GB 2 rank 4800
14x 00CE069D00CE M321R8GA0BB0-CQKVG 64 GB 2 rank 4800

```

23. BIOS

(This section combines info from /sys/devices and dmidecode.)

```

BIOS Vendor: Dell Inc.
BIOS Version: 2.1.3
BIOS Date: 01/10/2024
BIOS Revision: 2.1

```

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 2024.0.2 Build 20231213
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=====

```

```

=====
C++ | 508.namd_r(base, peak) 510.parest_r(base, peak)
=====

```

(Continued on next page)



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Compiler Version Notes (Continued)

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=====
C++, C | 511.povray_r(base, peak) 526.blender_r(base, peak)
=====

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=====
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
=====

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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
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=====
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 2024.0.2 Build 20231213
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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

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Hardware Availability: May-2023

Software Availability: Dec-2023

Base Compiler Invocation (Continued)

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
 -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

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Hardware Availability: May-2023

Software Availability: Dec-2023

Base Optimization Flags (Continued)

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



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Tested by: Dell Inc.

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Hardware Availability: May-2023

Software Availability: Dec-2023

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 -xsapfirerapids -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 -xsapfirerapids -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: 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.profddata(pass 2) -xCORE-AVX2(pass 1)

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Peak Optimization Flags (Continued)

511.povray_r (continued):

```
-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 -xsaphirerapids -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-ic2024-official-linux64.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.9.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.9.xml>

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