



SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2025 Standard Performance Evaluation Corporation

Dell Inc.

SPECrate®2017_fp_base = 305

PowerEdge R470 (Intel Xeon 6511P)

SPECrate®2017_fp_peak = 310

CPU2017 License: 6573

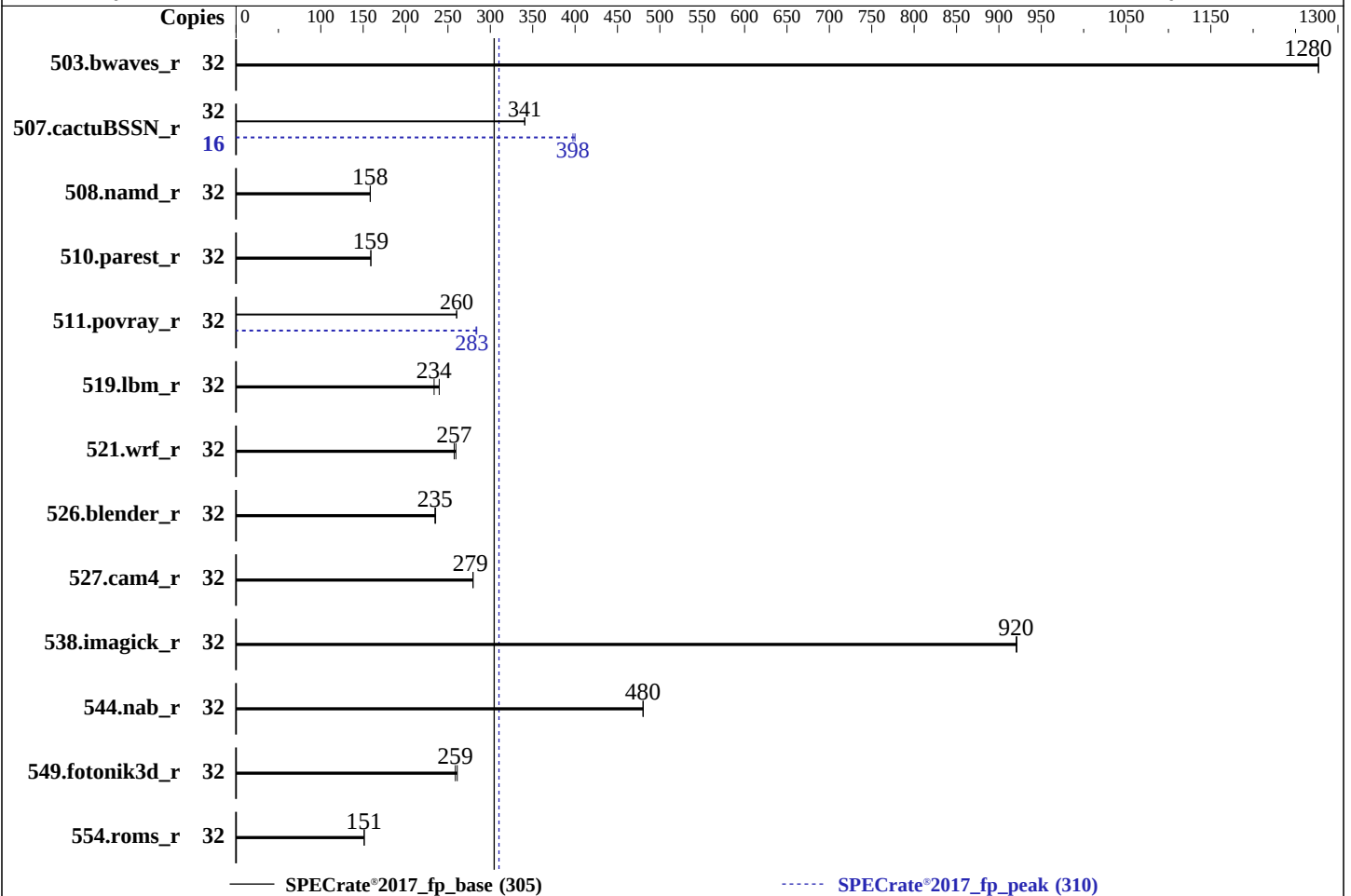
Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jun-2025

Hardware Availability: Apr-2025

Software Availability: Jun-2024



Hardware

CPU Name: Intel Xeon 6511P
Max MHz: 4200
Nominal: 2300
Enabled: 16 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 64 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 72 MB I+D on chip per chip
Other: None
Memory: 256 GB (8 x 32 GB 2Rx8 PC5-6400B-R)
Storage: 50 GB on tmpfs
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP6
6.4.0-150600.21-default
Compiler: C/C++: Version 2024.1 of Intel oneAPI DPC++/C++
Compiler for Linux;
Fortran: Version 2024.1 of Intel Fortran Compiler
for Linux;
Parallel: No
Firmware: Version 1.3.2 released May-2025
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 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	32	251	1280	<u>251</u>	<u>1280</u>			32	251	1280	<u>251</u>	<u>1280</u>		
507.cactuBSSN_r	32	119	341	<u>119</u>	<u>341</u>			16	<u>51.0</u>	<u>398</u>	50.7	400		
508.namd_r	32	<u>192</u>	<u>158</u>	192	158			32	<u>192</u>	<u>158</u>	192	158		
510.parest_r	32	526	159	<u>526</u>	<u>159</u>			32	526	159	<u>526</u>	<u>159</u>		
511.povray_r	32	<u>287</u>	<u>260</u>	287	260			32	<u>264</u>	<u>283</u>	263	284		
519.lbm_r	32	141	240	<u>144</u>	<u>234</u>			32	141	240	<u>144</u>	<u>234</u>		
521.wrf_r	32	276	259	<u>279</u>	<u>257</u>			32	276	259	<u>279</u>	<u>257</u>		
526.blender_r	32	207	235	<u>208</u>	<u>235</u>			32	207	235	<u>208</u>	<u>235</u>		
527.cam4_r	32	<u>200</u>	<u>279</u>	200	280			32	<u>200</u>	<u>279</u>	200	280		
538.imagick_r	32	<u>86.5</u>	<u>920</u>	86.4	921			32	<u>86.5</u>	<u>920</u>	86.4	921		
544.nab_r	32	112	480	<u>112</u>	<u>480</u>			32	112	480	<u>112</u>	<u>480</u>		
549.fotonik3d_r	32	478	261	<u>482</u>	<u>259</u>			32	478	261	<u>482</u>	<u>259</u>		
554.roms_r	32	<u>337</u>	<u>151</u>	336	151			32	<u>337</u>	<u>151</u>	336	151		

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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-ic2024.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.9-ic2024.1/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

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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 50 GB ramdisk created with the cmd: "mount -t tmpfs -o size=50G tmpfs /mnt/ramdisk"

Platform Notes

BIOS Settings:

Virtual NUMA : Enabled
Sub NUMA Cluster : Enabled
Optimizer Mode : Enabled

System Profile : Custom
CPU Power Management : Maximum Performance
Energy Efficient Turbo : Disabled
C1E : Disabled
C-States : Autonomous
Energy Efficient Policy : Performance
CPU Interconnect Bus -
Link Power Management : Disabled
PCI ASPM L1 Link Power Management : Disabled
Correctable Memory ECC SMI : Disabled
DIMM Self Healing -
on Uncorrectable Memory Error : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-ic2024.1/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on 1234567-R470 Wed Jun 4 21:18:01 2025

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 254 (254.10+suse.84.ge8d77af424)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. sysctl
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/khugepaged

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Platform Notes (Continued)

18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

1. `uname -a`
Linux 1234567-R470 6.4.0-150600.21-default #1 SMP PREEMPT_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09)
x86_64 x86_64 x86_64 GNU/Linux

2. `w`
21:18:01 up 3:06, 1 user, load average: 22.52, 29.72, 31.08
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
root tty1 - 18:11 3:00m 1.39s 0.01s /bin/bash
/home/DellFiles/bin/Intel/dell-run-speccpu.sh rate --define DL-VERS=6.2a --output_format html,pdf,txt

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) 1030283
max locked memory (kbytes, -l) 8192
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) 1030283
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited

5. `sysinfo process ancestry`
/usr/lib/systemd/systemd --switched-root --system --deserialize=42
login -- root
-bash
/bin/bash /home/DellFiles/bin/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-VERS=6.2a --output_format
html,pdf,txt
/bin/bash /home/DellFiles/bin/Intel/dell-run-speccpu.sh rate --define DL-VERS=6.2a --output_format
html,pdf,txt
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=32 -c
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=16 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak -o all --iterations 2 --define
DL-VERS=6.2a --output_format html,pdf,txt fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=32 --configfile
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=16 --define physicalfirst

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Platform Notes (Continued)

```
--define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --iterations 2
--define DL-VERS=6.2a --output_format html,pdf,txt --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-ic2024.1
```

6. /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) 6511P
vendor_id       : GenuineIntel
cpu family      : 6
model           : 173
stepping        : 1
microcode       : 0xa0000f2
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
cpu cores       : 16
siblings        : 32
1 physical ids (chips)
32 processors (hardware threads)
physical id 0: core ids 0-15
physical id 0: apicids 0-31
```

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 2.39.3:

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:         52 bits physical, 57 bits virtual
Byte Order:            Little Endian
CPU(s):                32
On-line CPU(s) list:   0-31
Vendor ID:             GenuineIntel
BIOS Vendor ID:        Intel
Model name:            Intel(R) Xeon(R) 6511P
BIOS Model name:       Intel(R) Xeon(R) 6511P   CPU @ 2.3GHz
BIOS CPU family:        179
CPU family:            6
Model:                 173
Thread(s) per core:    2
Core(s) per socket:    16
Socket(s):             1
Stepping:              1
BogoMIPS:              4600.00
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 vmx smx est tm2 ssse3 sdbg fma cx16
xtpr pdcmm 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 intel_ppin cdp_l2
ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow flexpriority ept
vpid ept_ad 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
```

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Platform Notes (Continued)

split_lock_detect user_shstk avx_vnni avx512_bf16 wbnoinvd dtherm ida
arat pln pts hfi vnmi 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

Virtualization:

L1d cache:

L1i cache:

L2 cache:

L3 cache:

NUMA node(s):

NUMA node0 CPU(s):

NUMA node1 CPU(s):

NUMA node2 CPU(s):

NUMA node3 CPU(s):

NUMA node4 CPU(s):

NUMA node5 CPU(s):

NUMA node6 CPU(s):

NUMA node7 CPU(s):

Vulnerability Gather data sampling:

Vulnerability Itlb multihit:

Vulnerability L1tf:

Vulnerability Mds:

Vulnerability Meltdown:

Vulnerability Mmio stale data:

Vulnerability Reg file data sampling:

Vulnerability Retbleed:

Vulnerability Spec rstack overflow:

Vulnerability Spec store bypass:

Vulnerability Spectre v1:

Vulnerability Spectre v2:

VT-x

768 KiB (16 instances)

1 MiB (16 instances)

32 MiB (16 instances)

72 MiB (1 instance)

8

0,8,18,24

2,5,16,21

6,14,22,30

9,12,25,28

3,4,19,20

11,15,27,31

1,10,17,26

7,13,23,29

Not affected

Not affected

Not affected

Not affected

Not affected

Not affected

Not affected

Not affected

Mitigation; Speculative Store Bypass disabled via prctl

Mitigation; usercopy/swaps barriers and __user pointer sanitization

Mitigation; Enhanced / Automatic IBRS; IBPB conditional; RSB filling;

PBRSE-eIBRS Not affected; BHI BHI_DIS_S

Vulnerability Srbds:

Vulnerability Tsx async abort:

Not affected

Not affected

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	768K	12	Data	1	64	1	64
L1i	64K	1M	16	Instruction	1	64	1	64
L2	2M	32M	16	Unified	2	2048	1	64
L3	72M	72M	16	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: 0,8,18,24

node 0 size: 32253 MB

node 0 free: 31908 MB

node 1 cpus: 2,5,16,21

node 1 size: 32254 MB

node 1 free: 31966 MB

node 2 cpus: 6,14,22,30

node 2 size: 32254 MB

node 2 free: 32002 MB

node 3 cpus: 9,12,25,28

node 3 size: 32254 MB

node 3 free: 31970 MB

node 4 cpus: 3-4,19-20

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Platform Notes (Continued)

node 4 size: 32216 MB
node 4 free: 21703 MB
node 5 cpus: 11,15,27,31
node 5 size: 32170 MB
node 5 free: 31414 MB
node 6 cpus: 1,10,17,26
node 6 size: 32221 MB
node 6 free: 31805 MB
node 7 cpus: 7,13,23,29
node 7 size: 31973 MB
node 7 free: 31700 MB

node distances:

node	0	1	2	3	4	5	6	7
0:	10	20	20	20	20	20	20	20
1:	20	10	20	20	20	20	20	20
2:	20	20	10	20	20	20	20	20
3:	20	20	20	10	20	20	20	20
4:	20	20	20	20	10	20	20	20
5:	20	20	20	20	20	10	20	20
6:	20	20	20	20	20	20	10	20
7:	20	20	20	20	20	20	20	10

9. /proc/meminfo

MemTotal: 263782528 kB

10. who -r

run-level 3 Jun 4 18:11

11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)

Default Target	Status
multi-user	running

12. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online YaST2-Firstboot YaST2-Second-Stage apparmor appstream-sync-cache auditd bluetooth cron display-manager getty@ irqbalance issue-generator kbdsettings klog lvm2-monitor nsd nvme-fc-boot-connections nvme-fc-autoconnect postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore wpa_supplicant
enabled-runtime	systemd-remount-fs
disabled	accounts-daemon autofs autoyast-initscripts 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 fsidd gpm grub2-once haveged hwloc-dump-hwdata ipmi ipmievdev issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap nm-cloud-setup nmb openvpn@ ostree-remount pppoe pppoe-server rpcbind rpmconfigcheck rsyncd rtkit-daemon serial-getty@ smartd-generate-opts smb snmpd snmptrapd speech-dispatcherd systemd-boot-check-no-failures systemd-confext systemd-network-generator systemd-sysextd systemd-time-wait-sync systemd-timesyncd udisks2 update-system-flatpaks upower vncserver@ wickedd-wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny wpa_supplicant@
indirect	pcscd systemd-userdbd wickedd

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

BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
root=UUID=ab7dfb23-88fd-492a-bfd3-051bb26b233a

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Platform Notes (Continued)

```
splash=silent
resume=/dev/disk/by-uuid/d2be8e78-3258-43c7-8640-62d816a6521d
mitigations=auto
quiet
security=apparmor
```

```
-----
14. cpupower frequency-info
analyzing CPU 4:
  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+madvice [madvice] never
enabled         [always] madvice 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 SP6
-----
```

```
-----
19. Disk information
-----
```

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Platform Notes (Continued)

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2024.1

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
tmpfs	tmpfs	50G	5.0G	46G	10%	/mnt/ramdisk

20. /sys/devices/virtual/dmi/id

Vendor: Dell Inc.
Product: PowerEdge R470
Product Family: PowerEdge
Serial: 1234567

21. 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 00CE042300CE M321R4GA3PB2-CCPEC 32 GB 2 rank 6400

22. BIOS

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

BIOS Vendor: Dell Inc.
BIOS Version: 1.3.2
BIOS Date: 05/15/2025
BIOS Revision: 1.3

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 2024.1.0 Build 20240308
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C++ | 508.namd_r(base, peak) 510.parest_r(base, peak)

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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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SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

SPECrate®2017_fp_base = 305

PowerEdge R470 (Intel Xeon 6511P)

SPECrate®2017_fp_peak = 310

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jun-2025

Hardware Availability: Apr-2025

Software Availability: Jun-2024

Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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=====

Fortran | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)

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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

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Base Portability Flags (Continued)

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

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

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Software Availability: Jun-2024

Base Optimization Flags (Continued)

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

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Peak Optimization Flags (Continued)

544.nab_r: basepeak = yes

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: basepeak = yes

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: basepeak = yes

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-ic2024-official-linux64.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.13.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-ic2024-official-linux64.xml>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.13.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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