



SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

IEIT Systems Co., Ltd.

SPECrate®2017_fp_base = 1140

meta brain NF5280G8 (Intel Xeon 6780E)

SPECrate®2017_fp_peak = 1170

CPU2017 License: 3358

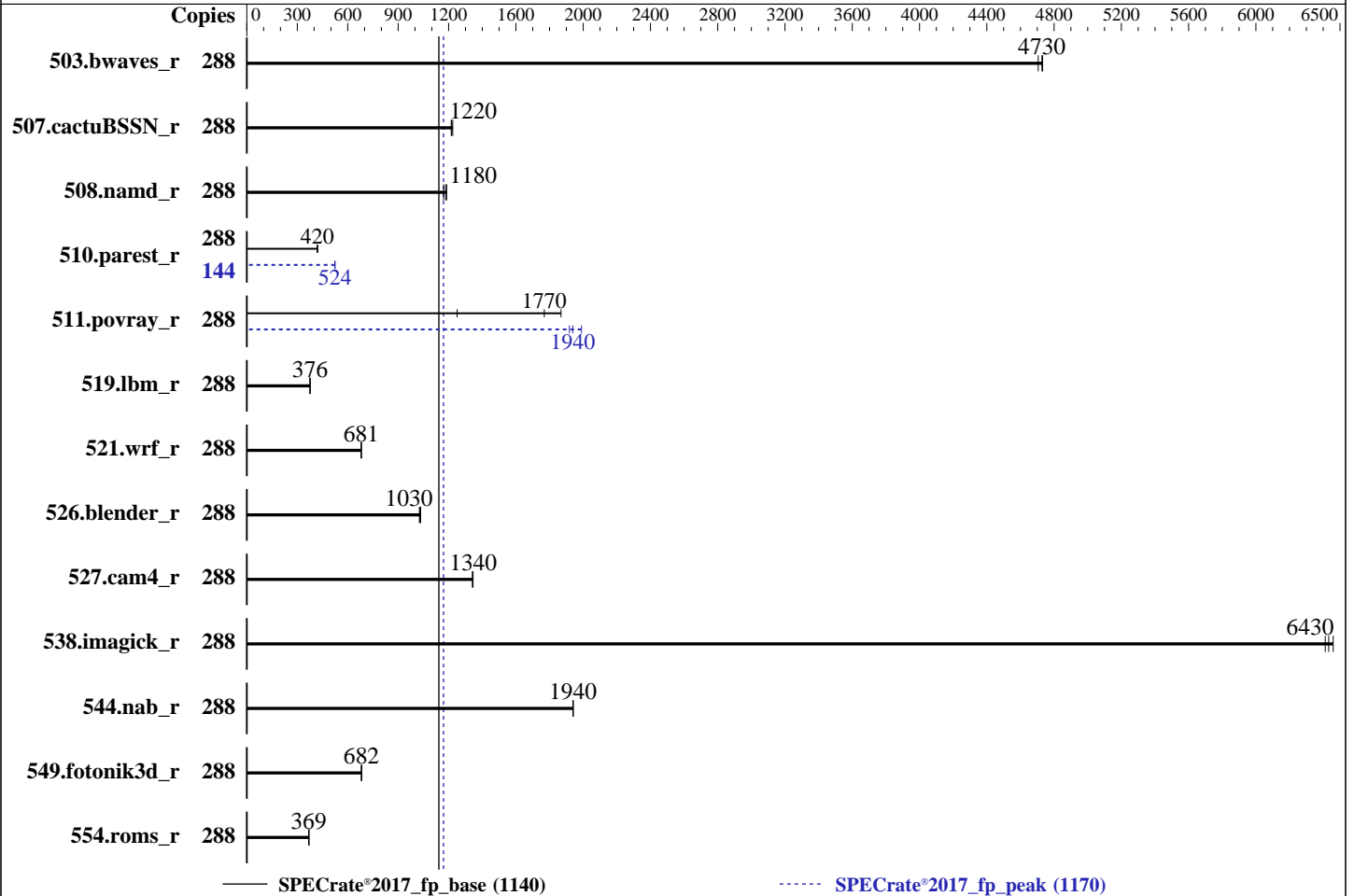
Test Date: Jul-2024

Test Sponsor: IEIT Systems Co., Ltd.

Hardware Availability: Oct-2024

Tested by: IEIT Systems Co., Ltd.

Software Availability: Mar-2024



Hardware

CPU Name: Intel Xeon 6780E
 Max MHz: 3000
 Nominal: 2200
 Enabled: 288 cores, 2 chips
 Orderable: 1,2 chips
 Cache L1: 64 KB I + 32 KB D on chip per core
 L2: 4 MB I+D on chip per core
 L3: 108 MB I+D on chip per chip
 Other: None
 Memory: 1 TB (16 x 64 GB 2Rx4 PC5-6400B-R)
 Storage: 1 x 1.92 TB NVME SSD
 Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP5
 5.14.21-150500.53-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 00.14.00 released Jun-2024
 File System: btrfs
 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	288	611	4730	614	4710	610	4730	288	611	4730	614	4710	610	4730
507.cactuBSSN_r	288	299	1220	300	1220	298	1220	288	299	1220	300	1220	298	1220
508.namd_r	288	231	1180	234	1170	230	1190	288	231	1180	234	1170	230	1190
510.parest_r	288	1795	420	1794	420	1793	420	144	719	524	719	524	720	523
511.povray_r	288	538	1250	380	1770	360	1870	288	351	1920	347	1940	338	1990
519.lbm_r	288	808	376	807	376	807	376	288	808	376	807	376	807	376
521.wrf_r	288	947	681	948	681	950	679	288	947	681	948	681	950	679
526.blender_r	288	427	1030	426	1030	424	1030	288	427	1030	426	1030	424	1030
527.cam4_r	288	375	1340	374	1350	375	1340	288	375	1340	374	1350	375	1340
538.imagick_r	288	111	6460	111	6430	112	6410	288	111	6460	111	6430	112	6410
544.nab_r	288	250	1940	250	1940	250	1940	288	250	1940	250	1940	250	1940
549.fotonik3d_r	288	1643	683	1647	682	1647	681	288	1643	683	1647	682	1647	681
554.roms_r	288	1242	368	1239	369	1242	369	288	1242	368	1239	369	1242	369

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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 = "/home/CPU2017/lib/intel64:/home/CPU2017/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>

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

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General Notes (Continued)

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.

jemalloc, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

Platform Notes

BIOS configuration:
 ENERGY_PERF_BIAS_CFG mode set to Performance
 Hardware Prefetch set to Disable
 VT Support set to Disable

Sysinfo program /home/CPU2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Tue Jul 9 10:35:03 2024

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

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 1. uname -a
 Linux localhost 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
 x86_64 x86_64 x86_64 GNU/Linux

2. w
 10:35:03 up 6:01, 1 user, load average: 177.33, 259.38, 274.49
 USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT

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Platform Notes (Continued)

```
root      tty1      -                04:34    5:59m  1.71s  0.17s  sh
reportable-ic2024.1-lin-sierraforest-rate-20240308.sh
```

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) 4124105
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) 4124105
virtual memory          (kbytes, -v) unlimited
file locks              (-x) unlimited
```

5. sysinfo process ancestry

```
/usr/lib/systemd/systemd --switched-root --system --deserialize 29
login -- root
-bash
sh reportable-ic2024.1-lin-sierraforest-rate-20240308.sh
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=288 -c
  ic2024.1-lin-sierraforest-rate-20240308.cfg --define smt-on --define peakfpcopies=144 --define
  physicalfirst --define invoke_with_interleave --define drop_caches --reportable --tune base,peak -o all
  fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=288 --configfile
  ic2024.1-lin-sierraforest-rate-20240308.cfg --define smt-on --define peakfpcopies=144 --define
  physicalfirst --define invoke_with_interleave --define drop_caches --reportable --tune base,peak
  --output_format all --nopower --runmode rate --tune base:peak --size refrate fprate --nopreenv
  --note-preenv --logfile $SPEC/tmp/CPU2017.035/templogs/preenv.fprate.035.0.log --lognum 035.0
  --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/CPU2017
```

6. /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) 6780E
vendor_id       : GenuineIntel
cpu family      : 6
model           : 175
stepping        : 3
microcode       : 0x130001a0
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores       : 4
siblings        : 4
72 physical ids (chips)
288 processors (hardware threads)
physical id 0:  core ids 0-3
physical id 1:  core ids 0-3
```

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Platform Notes (Continued)

```

physical id 2: core ids 0-3
physical id 3: core ids 0-3
physical id 4: core ids 0-3
physical id 5: core ids 0-3
physical id 6: core ids 0-3
physical id 7: core ids 0-3
physical id 8: core ids 0-3
physical id 9: core ids 0-3
physical id 10: core ids 0-3
physical id 11: core ids 0-3
physical id 12: core ids 0-3
physical id 13: core ids 0-3
physical id 14: core ids 0-3
physical id 15: core ids 0-3
physical id 16: core ids 0-3
physical id 17: core ids 0-3
physical id 18: core ids 0-3
physical id 19: core ids 0-3
physical id 20: core ids 0-3
physical id 21: core ids 0-3
physical id 22: core ids 0-3
physical id 23: core ids 0-3
physical id 24: core ids 0-3
physical id 25: core ids 0-3
physical id 26: core ids 0-3
physical id 27: core ids 0-3
physical id 28: core ids 0-3
physical id 29: core ids 0-3
physical id 30: core ids 0-3
physical id 31: core ids 0-3
physical id 32: core ids 0-3
physical id 33: core ids 0-3
physical id 34: core ids 0-3
physical id 35: core ids 0-3
physical id 64: core ids 0-3
physical id 65: core ids 0-3
physical id 66: core ids 0-3
physical id 67: core ids 0-3
physical id 68: core ids 0-3
physical id 69: core ids 0-3
physical id 70: core ids 0-3
physical id 71: core ids 0-3
physical id 72: core ids 0-3
physical id 73: core ids 0-3
physical id 74: core ids 0-3
physical id 75: core ids 0-3
physical id 76: core ids 0-3
physical id 77: core ids 0-3
physical id 78: core ids 0-3
physical id 79: core ids 0-3
physical id 80: core ids 0-3
physical id 81: core ids 0-3
physical id 82: core ids 0-3
physical id 83: core ids 0-3
physical id 84: core ids 0-3
physical id 85: core ids 0-3
physical id 86: core ids 0-3
physical id 87: core ids 0-3
physical id 88: core ids 0-3
physical id 89: core ids 0-3

```

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Platform Notes (Continued)

```

physical id 90: core ids 0-3
physical id 91: core ids 0-3
physical id 92: core ids 0-3
physical id 93: core ids 0-3
physical id 94: core ids 0-3
physical id 95: core ids 0-3
physical id 96: core ids 0-3
physical id 97: core ids 0-3
physical id 98: core ids 0-3
physical id 99: core ids 0-3
physical id 0: apicids 0,2,4,6
physical id 1: apicids 8,10,12,14
physical id 2: apicids 16,18,20,22
physical id 3: apicids 24,26,28,30
physical id 4: apicids 32,34,36,38
physical id 5: apicids 40,42,44,46
physical id 6: apicids 48,50,52,54
physical id 7: apicids 56,58,60,62
physical id 8: apicids 64,66,68,70
physical id 9: apicids 72,74,76,78
physical id 10: apicids 80,82,84,86
physical id 11: apicids 88,90,92,94
physical id 12: apicids 96,98,100,102
physical id 13: apicids 104,106,108,110
physical id 14: apicids 112,114,116,118
physical id 15: apicids 120,122,124,126
physical id 16: apicids 128,130,132,134
physical id 17: apicids 136,138,140,142
physical id 18: apicids 144,146,148,150
physical id 19: apicids 152,154,156,158
physical id 20: apicids 160,162,164,166
physical id 21: apicids 168,170,172,174
physical id 22: apicids 176,178,180,182
physical id 23: apicids 184,186,188,190
physical id 24: apicids 192,194,196,198
physical id 25: apicids 200,202,204,206
physical id 26: apicids 208,210,212,214
physical id 27: apicids 216,218,220,222
physical id 28: apicids 224,226,228,230
physical id 29: apicids 232,234,236,238
physical id 30: apicids 240,242,244,246
physical id 31: apicids 248,250,252,254
physical id 32: apicids 256,258,260,262
physical id 33: apicids 264,266,268,270
physical id 34: apicids 272,274,276,278
physical id 35: apicids 280,282,284,286
physical id 64: apicids 512,514,516,518
physical id 65: apicids 520,522,524,526
physical id 66: apicids 528,530,532,534
physical id 67: apicids 536,538,540,542
physical id 68: apicids 544,546,548,550
physical id 69: apicids 552,554,556,558
physical id 70: apicids 560,562,564,566
physical id 71: apicids 568,570,572,574
physical id 72: apicids 576,578,580,582
physical id 73: apicids 584,586,588,590
physical id 74: apicids 592,594,596,598
physical id 75: apicids 600,602,604,606
physical id 76: apicids 608,610,612,614
physical id 77: apicids 616,618,620,622

```

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Platform Notes (Continued)

```

physical id 78: apicids 624,626,628,630
physical id 79: apicids 632,634,636,638
physical id 80: apicids 640,642,644,646
physical id 81: apicids 648,650,652,654
physical id 82: apicids 656,658,660,662
physical id 83: apicids 664,666,668,670
physical id 84: apicids 672,674,676,678
physical id 85: apicids 680,682,684,686
physical id 86: apicids 688,690,692,694
physical id 87: apicids 696,698,700,702
physical id 88: apicids 704,706,708,710
physical id 89: apicids 712,714,716,718
physical id 90: apicids 720,722,724,726
physical id 91: apicids 728,730,732,734
physical id 92: apicids 736,738,740,742
physical id 93: apicids 744,746,748,750
physical id 94: apicids 752,754,756,758
physical id 95: apicids 760,762,764,766
physical id 96: apicids 768,770,772,774
physical id 97: apicids 776,778,780,782
physical id 98: apicids 784,786,788,790
physical id 99: apicids 792,794,796,798

```

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 2.37.4:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:          52 bits physical, 48 bits virtual
Byte Order:             Little Endian
CPU(s):                 288
On-line CPU(s) list:   0-287
Vendor ID:              GenuineIntel
Model name:             Intel(R) Xeon(R) 6780E
CPU family:             6
Model:                 175
Thread(s) per core:    1
Core(s) per socket:    4
Socket(s):              72
Stepping:              3
Frequency boost:        enabled
CPU max MHz:           2201.0000
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 rdtscp
                        lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                        nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 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 rdseed adx smap clflushopt clwb intel_pt
                        sha_ni xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
                        cqm_mbm_local avx_vnni wbnoinvd dtherm ida arat pln pts umip pku ospke
                        waitpkg gfni vaes vpclmulqdq tme rdpid bus_lock_detect cldemote movdiri
                        movdir64b enqcmd fsrm md_clear serialize pconfig arch_lbr flush_lld

```

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Platform Notes (Continued)

```

arch_capabilities
L1d cache: 9 MiB (288 instances)
L1i cache: 18 MiB (288 instances)
L2 cache: 288 MiB (72 instances)
L3 cache: 216 MiB (2 instances)
NUMA node(s): 2
NUMA node0 CPU(s): 0-143
NUMA node1 CPU(s): 144-287
Vulnerability Itlb multihit: Not affected
Vulnerability Lltf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Retbleed: 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 Not affected
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	32K	9M	8	Data	1	64	1	64
L1i	64K	18M	8	Instruction	1	128	1	64
L2	4M	288M	16	Unified	2	4096	1	64
L3	108M	216M	12	Unified	3	147456	1	64

8. numactl --hardware

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

```

available: 2 nodes (0-1)
node 0 cpus: 0-143
node 0 size: 515583 MB
node 0 free: 456096 MB
node 1 cpus: 144-287
node 1 size: 515465 MB
node 1 free: 460579 MB
node distances:
node  0  1
 0:  10  21
 1:  21  10

```

9. /proc/meminfo

MemTotal: 1055794400 kB

10. who -r

run-level 3 Jul 9 04:34

11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)

```

Default Target Status
multi-user running

```

12. Services, from systemctl list-unit-files

```

STATE UNIT FILES
enabled apparmor auditd cron firewalld getty@ irqbalance issue-generator kbdsettings kdump

```

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Platform Notes (Continued)

```

enabled-runtime  kdump-early nvme-fc-boot-connections postfix purge-kernels rollback sshd systemd-pstore
disabled         wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
                 systemd-remount-fs
                 boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell ebttables
                 exchange-bmc-os-info grub2-once haveged haveged-switch-root ipmievad issue-add-ssh-keys
                 kexec-load lunmask nfs nfs-blkmap nvme-fc-autoconnect rpcbind rpmconfigcheck serial-getty@
                 systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                 systemd-time-wait-sync systemd-timesyncd
indirect         wickedd

```

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

```

BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
root=UUID=a325eb06-40f4-4cc5-af19-3d970ad882af
splash=silent
mitigations=auto
quiet
security=apparmor
crashkernel=487M,high
crashkernel=72M,low

```

14. cpupower frequency-info

```

analyzing CPU 0:
  current policy: frequency should be within 800 MHz and 2.20 GHz.
                  The governor "ondemand" may decide which speed to use
                  within this range.

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

```

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Platform Notes (Continued)

```

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 SP5

```

```

19. Disk information
SPEC is set to: /home/CPU2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme0n1p2 btrfs 892G 119G 773G 14% /home

```

```

20. /sys/devices/virtual/dmi/id
Product Family: Not specified
Serial: Not Filled

```

```

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:
16x Samsung M321R8GA0PB2-CCPEC 64 GB 2 rank 6400

```

```

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 00.14.00
BIOS Date: 06/21/2024
BIOS Revision: 5.35

```

Compiler Version Notes

```

=====
C | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)
=====

```

```

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=====

```

```

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

```

```

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=====

```

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Compiler Version Notes (Continued)

=====
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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=====

=====
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 2024.1.0 Build 20240308
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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

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Base Compiler Invocation (Continued)

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 -xsierraforest -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

```

C++ benchmarks:

```

-w -std=c++14 -m64 -Wl,-z,muldefs -xsierraforest -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

```

Fortran benchmarks:

```

-w -m64 -Wl,-z,muldefs -xsierraforest -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 -xsierraforest -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -nostandard-realloc-lhs -align array32byte -auto
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

```

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Base Optimization Flags (Continued)

Benchmarks using both C and C++:

```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsierraforest -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:

```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsierraforest -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -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



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Software Availability: Mar-2024

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 -xsierraforest -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-gopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

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.profddata(pass 2) -xCORE-AVX2 -flto
-Ofast -ffast-math -mfpmath=sse -funroll-loops
-gopt-mem-layout-trans=4 -Wno-implicit-int -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes



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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/IEIT-Platform-Settings-intel-V1.0.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/IEIT-Platform-Settings-intel-V1.0.xml>

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