SPEC CPU®2017 Floating Point Rate Result

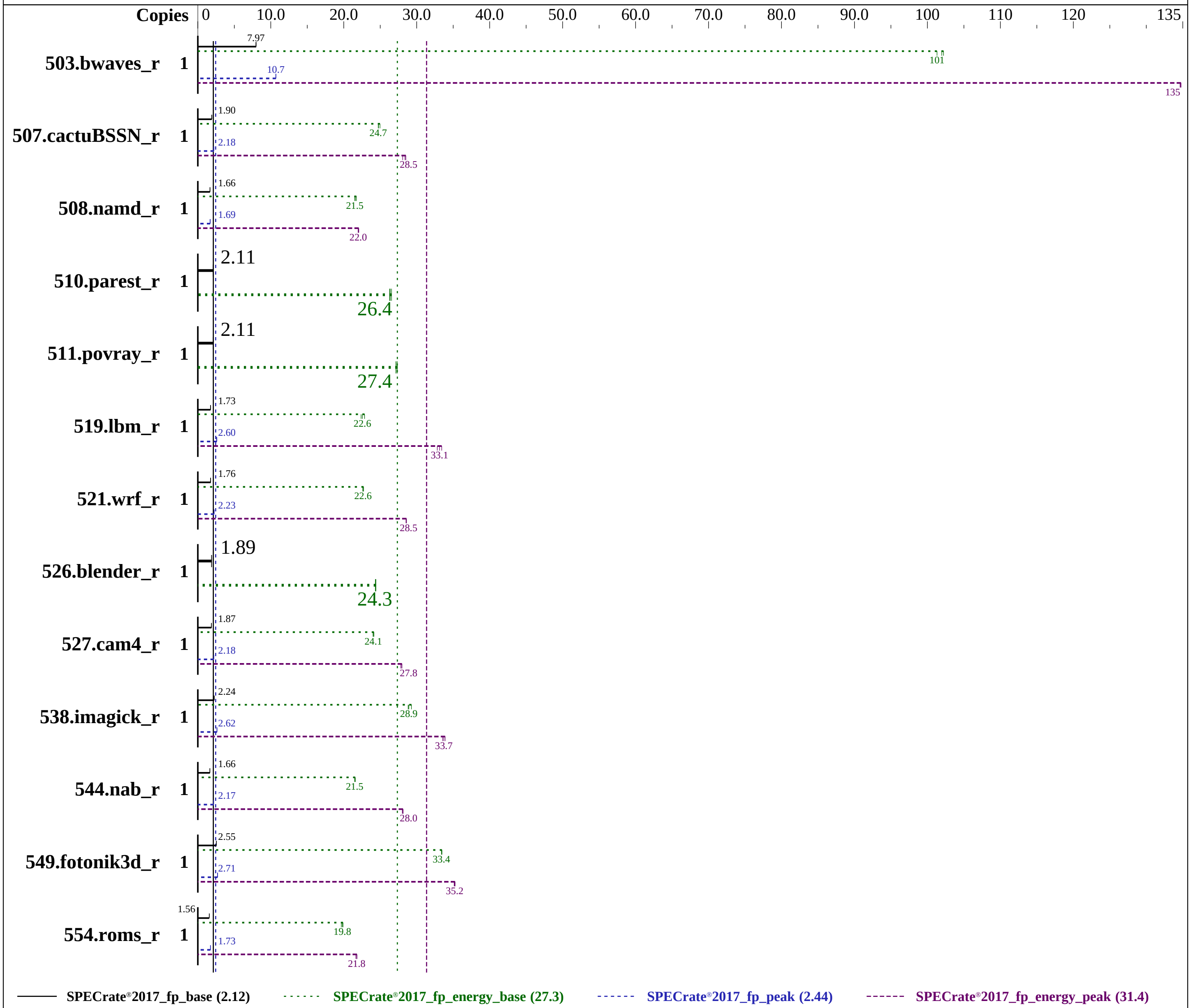
Lenovo Global Technology

(Test Sponsor: Ampere Computing, Inc.)

ThinkSystem HR330A
(3.00 GHz Ampere eMAG 8180)

SPECrate®2017_fp_base =	2.12
SPECrate®2017_fp_energy_base =	27.3
SPECrate®2017_fp_peak =	2.44
SPECrate®2017_fp_energy_peak =	31.4

CPU2017 License:	6412	**Test Date:**	Feb-2026
Test Sponsor:	Ampere Computing, Inc.	**Hardware Availability:**	Apr-2019
Tested by:	Ampere Computing, Inc.	**Software Availability:**	Aug-2025



Hardware

CPU Name:	Ampere eMAG 8180
Max MHz:	3300
Nominal:	3000
Enabled:	32 cores, 1 chip
Orderable:	1 chips

(Continued on next page)

Software

OS:	Ubuntu 24.04.1 LTS kernel 6.8.0 (64KB pages)
Compiler:	C/C++/Fortran: Version 15.2.0 of GCC
Parallel:	No
Firmware:	Version 1.12 released Nov-2019
File System:	ext4

(Continued on next page)

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Hardware (Continued)

Cache L1:	32 KB I + 32 KB D on chip per core
L2:	4 MB I+D on chip per chip (256 KiB shared / 2 cores)
L3:	32 MB I+D on chip per chip
Other:	None
Memory:	128 GB (8 x 16 GB 2Rx4 PC4-2666V-R)
Storage:	1 x 480 GB SATA SSD
Other:	CPU Cooling: Air

Software (Continued)

System State:	Run level 5 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	64-bit
Other:	jemalloc v5.3+, commit hash 1972241
Power Management:	OS CPU governor set to "performance"

Power

Max. Power (W):	95.83
Idle Power (W):	75.38
Min. Temperature (C):	20.81
Elevation (m):	60
Line Standard:	120 V / 60 Hz / 1 phase / 2 wire
Provisioning:	Line powered

Power Settings

Management FW:	Version 11.05.111 of Falcon BMC
Memory Mode:	Normal

Power-Relevant Hardware

Power Supply:	1 x 550 W (non-redundant)
Details:	Lenovo 03LD785 550 Watt High Efficiency Platinum AC Power Supply
Backplane:	N/A
Other Storage:	N/A
Storage Model #s:	1 x Lenovo 01PE965 (480GB SATA SSD) connected to on-board HBA
NICs Installed:	1 x Lenovo 01PE857 @ 10 GbE (2 ports ethernet)
NICs Enabled (FW/OS):	2 / 1
NICs Connected/Speed:	1 @ 1 Gbps
Other HW Model #s:	--

Power Analyzer

Power Analyzer:	cpu-reference-ptd:8000
Hardware Vendor:	Yokogawa
Model:	YokogawaWT310E
Serial Number:	T11733385
Input Connection:	Serial over USB
Metrology Institute:	NIST
Calibration By:	Yokogawa USA
Calibration Label:	T126622
Calibration Date:	18-Aug-2025
PTDaemon® Version:	1.11.3 (0c074d7d; 2025-10-15)
Setup Description:	Directly connected
Current Ranges Used:	5A
Voltage Range Used:	150V

Temperature Meter

Temperature Meter:	cpu-reference-ptd:9000
Hardware Vendor:	PCSensor
Model:	USB9097+DS18B20
Serial Number:	--
Input Connection:	USB
PTDaemon Version:	1.11.3 (0c074d7d; 2025-10-15)
Setup Description:	In front of SUT front panel primary air inlet

Base Results Table

Benchmark	Copies	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power

Table continues on next page. Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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CPU2017 License:	6412	**Test Date:**	Feb-2026
Test Sponsor:	Ampere Computing, Inc.	**Hardware Availability:**	Apr-2019
Tested by:	Ampere Computing, Inc.	**Software Availability:**	Aug-2025

Base Results Table (Continued)

Benchmark	Copies	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
503.bwaves_r	1	1254	8.00	107	102	85.3	89.8	1259	7.96	107	102	85.1	88.4	**1258**	**7.97**	**108**	**101**	**85.7**	**89.1**
507.cactuBSSN_r	1	665	1.90	55.7	25.0	83.9	89.0	**665**	**1.90**	**56.3**	**24.7**	**84.6**	**86.5**	663	1.91	56.2	24.8	84.7	86.5
508.namd_r	1	571	1.66	47.6	21.7	83.5	87.3	**571**	**1.66**	**48.1**	**21.5**	**84.3**	**88.0**	571	1.66	48.0	21.6	84.1	87.0
510.parest_r	1	1239	2.11	107	26.6	86.6	88.5	1241	2.11	108	26.3	87.3	89.7	**1239**	**2.11**	**108**	**26.4**	**87.1**	**89.2**
511.povray_r	1	**1104**	**2.11**	**92.6**	**27.4**	**83.9**	**86.8**	1104	2.11	93.3	27.2	84.5	87.5	1104	2.12	93.2	27.2	84.5	88.0
519.lbm_r	1	604	1.74	52.4	22.9	86.7	89.4	608	1.73	53.5	22.4	88.0	90.8	**608**	**1.73**	**53.1**	**22.6**	**87.4**	**90.3**
521.wrf_r	1	1274	1.76	108	22.7	84.5	87.1	1273	1.76	108	22.6	85.0	87.7	**1273**	**1.76**	**108**	**22.6**	**84.8**	**89.3**
526.blender_r	1	807	1.89	67.6	24.4	83.7	92.4	807	1.89	67.7	24.3	83.9	91.3	**807**	**1.89**	**67.8**	**24.3**	**84.0**	**92.1**
527.cam4_r	1	934	1.87	78.9	24.1	84.5	90.3	932	1.88	79.3	24.0	85.0	87.8	**933**	**1.87**	**79.2**	**24.1**	**84.9**	**88.0**
538.imagick_r	1	1112	2.24	92.0	29.3	82.8	90.7	1112	2.24	93.4	28.8	84.0	86.3	**1112**	**2.24**	**93.1**	**28.9**	**83.8**	**87.3**
544.nab_r	1	1016	1.66	84.6	21.6	83.3	86.0	**1016**	**1.66**	**84.9**	**21.5**	**83.5**	**87.5**	1016	1.66	84.6	21.6	83.2	87.8
549.fotonik3d_r	1	**1528**	**2.55**	**130**	**33.4**	**85.1**	**87.3**	1528	2.55	130	33.4	85.0	89.0	1528	2.55	130	33.5	84.9	87.7
554.roms_r	1	1018	1.56	88.1	19.9	86.5	89.0	1020	1.56	89.1	19.7	87.3	89.8	**1019**	**1.56**	**88.4**	**19.8**	**86.8**	**90.5**

SPECrate®2017_fp_base = 2.12

SPECrate®2017_fp_energy_base = 27.3

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Peak Results Table

Benchmark	Copies	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
503.bwaves_r	1	939	10.7	81.1	135	86.4	88.3	**938**	**10.7**	**81.1**	**135**	**86.5**	**89.0**	937	10.7	81.2	135	86.7	93.8
507.cactuBSSN_r	1	**579**	**2.18**	**48.8**	**28.5**	**84.2**	**86.2**	587	2.16	49.5	28.1	84.4	94.4	578	2.19	49.0	28.4	84.7	87.5
508.namd_r	1	562	1.69	47.1	22.0	83.9	87.4	562	1.69	46.9	22.1	83.6	89.5	**562**	**1.69**	**47.1**	**22.0**	**83.8**	**87.5**
510.parest_r	1	1239	2.11	107	26.6	86.6	88.5	1241	2.11	108	26.3	87.3	89.7	**1239**	**2.11**	**108**	**26.4**	**87.1**	**89.2**
511.povray_r	1	**1104**	**2.11**	**92.6**	**27.4**	**83.9**	**86.8**	1104	2.11	93.3	27.2	84.5	87.5	1104	2.12	93.2	27.2	84.5	88.0
519.lbm_r	1	**405**	**2.60**	**36.1**	**33.1**	**89.1**	**91.8**	410	2.57	36.5	32.8	88.9	91.8	405	2.60	35.8	33.4	88.5	91.2
521.wrf_r	1	**1004**	**2.23**	**85.7**	**28.5**	**85.4**	**88.1**	1004	2.23	85.6	28.6	85.2	87.5	1006	2.23	85.5	28.6	85.0	87.0
526.blender_r	1	807	1.89	67.6	24.4	83.7	92.4	807	1.89	67.7	24.3	83.9	91.3	**807**	**1.89**	**67.8**	**24.3**	**84.0**	**92.1**
527.cam4_r	1	802	2.18	68.4	27.9	85.3	88.5	**803**	**2.18**	**68.4**	**27.8**	**85.2**	**88.0**	803	2.18	68.1	28.0	84.7	87.4
538.imagick_r	1	947	2.63	79.5	33.9	83.9	86.0	949	2.62	80.3	33.6	84.5	87.1	**949**	**2.62**	**79.9**	**33.7**	**84.1**	**88.1**
544.nab_r	1	777	2.17	64.9	28.1	83.5	85.9	777	2.17	64.9	28.1	83.5	85.4	**777**	**2.17**	**65.1**	**28.0**	**83.8**	**87.5**
549.fotonik3d_r	1	1441	2.70	124	35.1	85.8	87.7	**1440**	**2.71**	**123**	**35.2**	**85.6**	**89.8**	1439	2.71	123	35.3	85.6	87.8
554.roms_r	1	**921**	**1.73**	**80.5**	**21.8**	**87.4**	**89.9**	917	1.73	80.4	21.8	87.6	90.2	923	1.72	80.9	21.7	87.6	90.3

SPECrate®2017_fp_peak = 2.44

SPECrate®2017_fp_energy_peak = 31.4

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

```
The config file option 'submit' was used.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/usr/lib64/:/usr/lib/:/lib64:/home/mjm/jemalloc/lib"
```

General Notes

```
507.cactuBSSN_r (peak): "snprintf" src.alt was used.

507.cactuBSSN_r (base): "snprintf" src.alt was used.

jemalloc is a general purpose malloc(3) implementation that emphasizes
fragmentation avoidance and scalable concurrency support.
sources available from https://github.com/facebook/jemalloc/tree/1972241
and built via "./configure --with-lg-quantum=3" which used system gcc-14 -O3

This benchmark result is intended to provide perspective on
past power and/or performance using the historical hardware
and/or software described on this result page.

The system as described on this result page was formerly
generally available. At the time of this publication, it may
not be shipping, and/or may not be supported, and/or may fail
to meet other tests of General Availability described in the
SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result
that would be measured were this benchmark run with hardware
and software available as of the publication date.
```

Platform Notes

```
Sysinfo program /home/mjm/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on emag Sat Feb 28 08:48:05 2026

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 255 (255.4-1ubuntu8.8)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. sysctl
15. /sys/kernel/mm/transparent_hugepage
16. /sys/kernel/mm/transparent_hugepage/khugepaged
17. OS release
18. Disk information
19. /sys/devices/virtual/dmi/id
20. dmidecode
```

(Continued on next page)

Platform Notes (Continued)

```
21. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. uname -a
  Linux emag 6.8.0 #1 SMP PREEMPT_DYNAMIC Fri Feb 28 00:25:30 UTC 2025 aarch64 aarch64 aarch64 GNU/Linux

------------------------------------------------------------
2. w
   08:48:05 up 71 days,  9:13,  2 users,  load average: 3.41, 19.65, 27.10
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  mjm               10.13.114.186    28Jan26  1:51m  0.00s  0.02s sshd: mjm [priv]

------------------------------------------------------------
3. Username
  From environment variable $USER:  mjm

------------------------------------------------------------
4. ulimit -a
  time(seconds)        unlimited
  file(blocks)         unlimited
  data(kbytes)         unlimited
  stack(kbytes)        unlimited
  coredump(blocks)     0
  memory(kbytes)       unlimited
  locked memory(kbytes) 16691648
  process              128681
  nofiles              1024
  vmemory(kbytes)      unlimited
  locks                unlimited
  rtprio               0

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --system --deserialize=66
 SCREEN
 -bin/tcsh
 runcpu --flagsurl=$SPEC/gcc.2024-08-14.xml --reportable -c emag-O3-gcc15 --tune=base,peak -n 3 -C 1 fprate
 runcpu --flagsurl $SPEC/gcc.2024-08-14.xml --reportable --configfile emag-O3-gcc15 --tune base,peak
   --iterations 3 --copies 1 --runmode rate --tune base:peak --size refrate fprate --nopreenv --note-preenv
   --logfile $SPEC/tmp/CPU2017.094/templogs/preenv.fprate.094.0.log --lognum 094.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo -f
$SPEC = /home/mjm/cpu2017

------------------------------------------------------------
6. /proc/cpuinfo
    CPU implementer : 0x50
    CPU architecture: 8
    CPU variant     : 0x3
    CPU part        : 0x000
    CPU revision    : 2
    Features        : fp asimd evtstrm aes pmull sha1 sha2 crc32 cpuid

------------------------------------------------------------
7. lscpu

From lscpu from util-linux 2.39.3:
```

(Continued on next page)

Platform Notes (Continued)

```
    Architecture:                    aarch64
    CPU op-mode(s):                  32-bit, 64-bit
    Byte Order:                      Little Endian
    CPU(s):                          32
    On-line CPU(s) list:             0-31
    Vendor ID:                       APM
    Model name:                      -
    Model:                           2
    Thread(s) per core:              1
    Core(s) per socket:              32
    Socket(s):                       1
    Stepping:                        0x3
    Frequency boost:                 disabled
    CPU(s) scaling MHz:              100%
    CPU max MHz:                     2911.7639
    CPU min MHz:                     363.9700
    BogoMIPS:                        80.00
    Flags:                           fp asimd evtstrm aes pmull sha1 sha2 crc32 cpuid
    L1d cache:                       1 MiB (32 instances)
    L1i cache:                       1 MiB (32 instances)
    L2 cache:                        4 MiB (16 instances)
    NUMA node(s):                    1
    NUMA node0 CPU(s):               0-31
    Vulnerability Gather data sampling: Not affected
    Vulnerability Itlb multihit:     Not affected
    Vulnerability L1tf:              Not affected
    Vulnerability Mds:               Not affected
    Vulnerability Meltdown:          Mitigation; PTI
    Vulnerability Mmio stale data:   Not affected
    Vulnerability Retbleed:          Not affected
    Vulnerability Spec rstack overflow: Not affected
    Vulnerability Spec store bypass: Vulnerable
    Vulnerability Spectre v1:        Mitigation; __user pointer sanitization
    Vulnerability Spectre v2:        Vulnerable
    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       1M    8 Data            1
       L1i       32K       1M    8 Instruction     1
       L2       256K       4M   32 Unified         2

  ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 1 nodes (0)
    node 0 cpus: 0-31
    node 0 size: 130403 MB
    node 0 free: 92927 MB
    node distances:
    node   0
      0:  10

  ------------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       133533376 kB
```

(Continued on next page)

Platform Notes (Continued)

```
------------------------------------------------------------
10. who -r
  run-level 5 Dec 18 23:35

------------------------------------------------------------
11. Systemd service manager version: systemd 255 (255.4-1ubuntu8.8)
  Default Target  Status
  graphical       running

------------------------------------------------------------
12. Services, from systemctl list-unit-files
  STATE            UNIT FILES
  enabled          ModemManager apparmor apport blk-availability cloud-config cloud-final cloud-init
                   cloud-init-local console-setup cron dmesg e2scrub_reap finalrd getty@ grub-common
                   grub-initrd-fallback keyboard-setup lvm2-monitor multipathd networkd-dispatcher open-iscsi
                   open-vm-tools pollinate power-profiles-daemon rsyslog secureboot-db setvtrgb snapd sysstat
                   systemd-networkd systemd-networkd-wait-online systemd-pstore systemd-resolved
                   systemd-timesyncd ua-reboot-cmds ubuntu-advantage udisks2 ufw unattended-upgrades vgauth
  enabled-runtime  netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
  disabled         console-getty debug-shell ipmievd iscsid nftables rsync ssh systemd-boot-check-no-failures
                   systemd-confext systemd-network-generator systemd-networkd-wait-online@
                   systemd-pcrlock-file-system systemd-pcrlock-firmware-code systemd-pcrlock-firmware-config
                   systemd-pcrlock-machine-id systemd-pcrlock-make-policy
                   systemd-pcrlock-secureboot-authority systemd-pcrlock-secureboot-policy systemd-sysext
                   systemd-time-wait-sync
  generated        openipmi perlbal
  indirect         serial-getty@ systemd-sysupdate systemd-sysupdate-reboot uuidd
  masked           cryptdisks cryptdisks-early hwclock multipath-tools-boot screen-cleanup sudo x11-common

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-6.8.0
  root=UUID=16268541-06d0-4374-97ca-2d512d4db26f
  ro
  cma=1024M
  iommu.passthrough=1

------------------------------------------------------------
14. sysctl
  kernel.numa_balancing               0
  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
```

(Continued on next page)

Platform Notes (Continued)

```
  vm.watermark_scale_factor          10
  vm.zone_reclaim_mode                0

------------------------------------------------------------
15. /sys/kernel/mm/transparent_hugepage
  defrag          always defer defer+madvise [madvise] never
  enabled         always [madvise] never
  hpage_pmd_size  536870912
  shmem_enabled   always within_size advise [never] deny force

------------------------------------------------------------
16. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                      1
  max_ptes_none            8191
  max_ptes_shared          4096
  max_ptes_swap            1024
  pages_to_scan           65536
  scan_sleep_millisecs    10000

------------------------------------------------------------
17. OS release
  From /etc/*-release /etc/*-version
  os-release Ubuntu 24.04.1 LTS

------------------------------------------------------------
18. Disk information
SPEC is set to: /home/mjm/cpu2017
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda2      ext4  439G  298G  119G  72% /

------------------------------------------------------------
19. /sys/devices/virtual/dmi/id
    Vendor:         Lenovo
    Product:        HR330A            7X33CTO1WW
    Product Family: Lenovo ThinkSystem HR330A/HR350A

------------------------------------------------------------
20. dmidecode
  Additional information from dmidecode 3.5 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 Samsung M393A2K43CB2-CTD 16 GB 2 rank 2667


------------------------------------------------------------
21. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       LENOVO
   BIOS Version:      HVE104N-1.12
   BIOS Date:         11/29/2019
   BIOS Revision:     1.12
   Firmware Revision: 1.7
```

Power Settings Notes

```
OS CPU governor was set using the command:
echo performance | tee /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor
```

Compiler Version Notes

```
==============================================================================================================
C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)
--------------------------------------------------------------------------------------------------------------
gcc (GCC) 15.2.0
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This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
C++             | 508.namd_r(base, peak) 510.parest_r(base, peak)
--------------------------------------------------------------------------------------------------------------
g++ (GCC) 15.2.0
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This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
C++, C          | 511.povray_r(base, peak) 526.blender_r(base, peak)
--------------------------------------------------------------------------------------------------------------
g++ (GCC) 15.2.0
Copyright (C) 2025 Free Software Foundation, Inc.
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warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
gcc (GCC) 15.2.0
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warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
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==============================================================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
--------------------------------------------------------------------------------------------------------------
g++ (GCC) 15.2.0
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gcc (GCC) 15.2.0
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GNU Fortran (GCC) 15.2.0
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warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
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==============================================================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
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```

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Compiler Version Notes (Continued)

```
GNU Fortran (GCC) 15.2.0
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Fortran, C      | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
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GNU Fortran (GCC) 15.2.0
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gcc (GCC) 15.2.0
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warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
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```

Base Compiler Invocation

C benchmarks:
`gcc`

C++ benchmarks:
`g++`

Fortran benchmarks:
`gfortran`

Benchmarks using both Fortran and C:
`gfortran gcc`

Benchmarks using both C and C++:
`g++ gcc`

Benchmarks using Fortran, C, and C++:
`g++ gcc gfortran`

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_CASE_FLAG -fconvert=big-endian -DSPEC_LP64`
526.blender_r: `-funsigned-char -DSPEC_LINUX -DSPEC_LP64`
527.cam4_r: `-DSPEC_CASE_FLAG -DSPEC_LP64`
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:
`-mabi=lp64 -std=c99 -g -O3 -mcpu=native -flto=16`
`-fno-strict-aliasing -L/home/mjm/jemalloc/lib -ljemalloc`

C++ benchmarks:
`-mabi=lp64 -std=c++03 -g -O3 -mcpu=native -flto=16`
`-L/home/mjm/jemalloc/lib -ljemalloc`

Fortran benchmarks:
`-mabi=lp64 -g -O3 -mcpu=native -flto=16 -L/home/mjm/jemalloc/lib`
`-ljemalloc`

Benchmarks using both Fortran and C:
`-mabi=lp64 -std=c99 -g -O3 -mcpu=native -flto=16`
`-fno-strict-aliasing -L/home/mjm/jemalloc/lib -ljemalloc`

Benchmarks using both C and C++:
`-mabi=lp64 -std=c++03 -std=c99 -g -O3 -mcpu=native -flto=16`
`-fno-strict-aliasing -L/home/mjm/jemalloc/lib -ljemalloc`

Benchmarks using Fortran, C, and C++:
`-mabi=lp64 -std=c++03 -std=c99 -g -O3 -mcpu=native -flto=16`
`-fno-strict-aliasing -L/home/mjm/jemalloc/lib -ljemalloc`

Base Other Flags

C benchmarks:
`-Wno-error=implicit-int`

Fortran benchmarks:
`-fallow-argument-mismatch`

Benchmarks using both Fortran and C:
`-Wno-error=implicit-int -fallow-argument-mismatch`

Benchmarks using both C and C++:
`-Wno-error=implicit-int`

Benchmarks using Fortran, C, and C++:
`-Wno-error=implicit-int -fallow-argument-mismatch`

Peak Compiler Invocation

C benchmarks:
`gcc`

C++ benchmarks:
`g++`

Fortran benchmarks:
`gfortran`

Benchmarks using both Fortran and C:
`gfortran gcc`

Benchmarks using both C and C++:
`g++ gcc`

Benchmarks using Fortran, C, and C++:
`g++ gcc gfortran`

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
-mabi=lp64 -std=c99 -fprofile-generate -fprofile-use -g -Ofast
-mcpu=native -flto=16 -L/home/mjm/jemalloc/lib -ljemalloc

C++ benchmarks:

508.namd_r: -mabi=lp64 -std=c++03 -fprofile-generate -fprofile-use
-g -Ofast -mcpu=native -flto=16 -L/home/mjm/jemalloc/lib
-ljemalloc

510.parest_r: basepeak = yes

Fortran benchmarks:
-mabi=lp64 -fprofile-generate -fprofile-use -g -Ofast -mcpu=native
-flto=16 -L/home/mjm/jemalloc/lib -ljemalloc

Benchmarks using both Fortran and C:

521.wrf_r: -mabi=lp64 -std=c99 -fprofile-generate -fprofile-use -g
-Ofast -mcpu=native -flto=16 -L/home/mjm/jemalloc/lib
-ljemalloc

527.cam4_r: -mabi=lp64 -std=c99 -fprofile-generate -fprofile-use -g
-Ofast -mcpu=native -flto=16 -fno-strict-aliasing
-L/home/mjm/jemalloc/lib -ljemalloc

Benchmarks using both C and C++:

511.povray_r: basepeak = yes

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:
-mabi=lp64 -std=c++03 -std=c99 -fprofile-generate -fprofile-use -g
-Ofast -mcpu=native -flto=16 -L/home/mjm/jemalloc/lib -ljemalloc

Peak Other Flags

Benchmarks using both Fortran and C:

521.wrf_r: -fallow-argument-mismatch

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Peak Other Flags (Continued)

527.cam4_r: `-Wno-error=implicit-int -fallow-argument-mismatch`

Benchmarks using both C and C++:
`-Wno-error=implicit-int`

The flags file that was used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/gcc.2026-04-28.00.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/cpu2017/flags/gcc.2026-04-28.00.xml

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