



# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

## Lenovo Global Technology

Wentian WR5220 G3  
(1.90 GHz, Intel Xeon Platinum 8490H)

SPECrate®2017\_fp\_base = 966

SPECrate®2017\_fp\_peak = Not Run

CPU2017 License: 9017

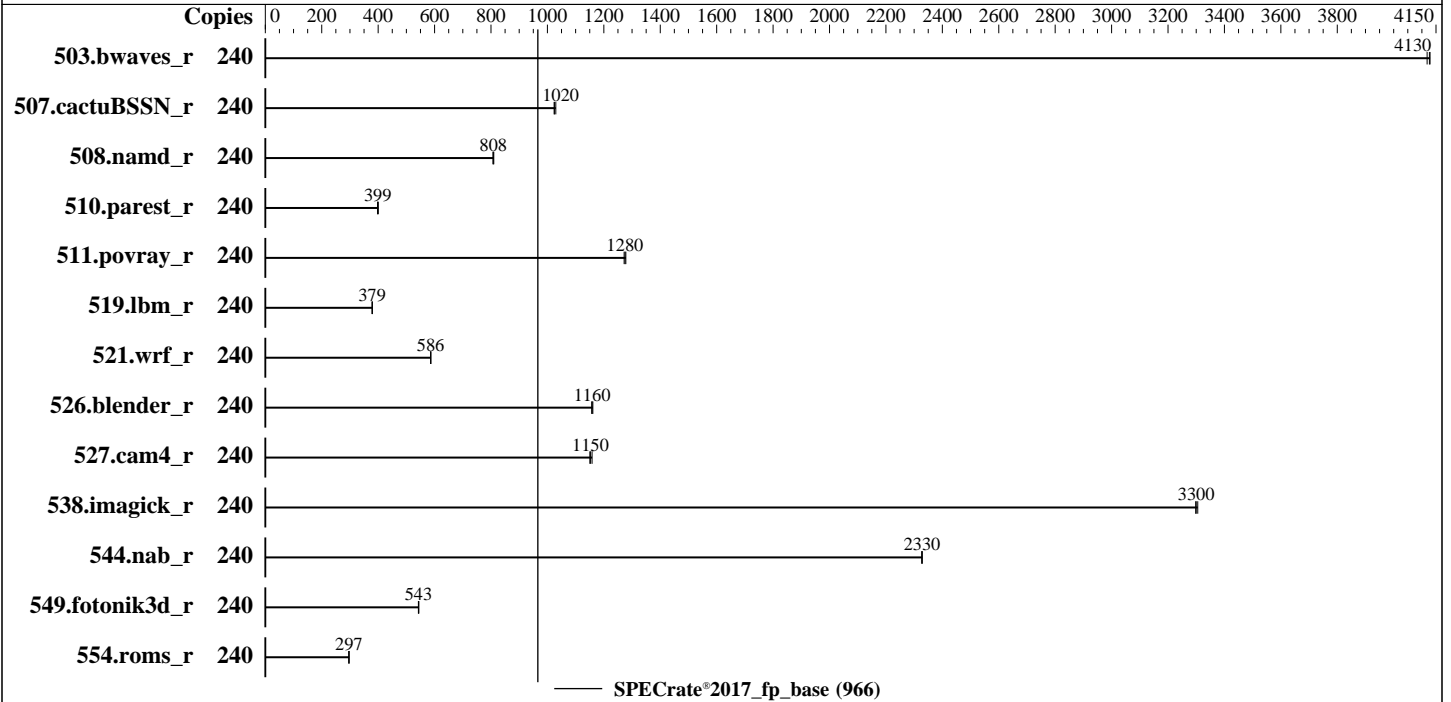
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Apr-2023

Hardware Availability: Jan-2023

Software Availability: Dec-2022



### Hardware

CPU Name: Intel Xeon Platinum 8490H  
 Max MHz: 3500  
 Nominal: 1900  
 Enabled: 120 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: 112.5 MB I+D on chip per chip  
 Other: None  
 Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 1 x 3.84 TB SATA SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux 9.0 (Plow)  
 Kernel 5.14.0-70.13.1.el9\_0.x86\_64  
 Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux;  
 Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;  
 Parallel: No  
 Firmware: Lenovo BIOS Version T8E120T 0.36 released Feb-2023  
 File System: xfs  
 System State: Run level 5 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 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	240	583	4130	<b>583</b>	<b>4130</b>	584	4120							
507.cactuBSSN_r	240	<b>297</b>	<b>1020</b>	295	1030	297	1020							
508.namd_r	240	282	810	282	807	<b>282</b>	<b>808</b>							
510.parest_r	240	1578	398	<b>1574</b>	<b>399</b>	1568	400							
511.povray_r	240	438	1280	<b>439</b>	<b>1280</b>	441	1270							
519.lbm_r	240	668	379	667	379	<b>667</b>	<b>379</b>							
521.wrf_r	240	917	586	916	587	<b>917</b>	<b>586</b>							
526.blender_r	240	315	1160	<b>315</b>	<b>1160</b>	316	1160							
527.cam4_r	240	365	1150	362	1160	<b>364</b>	<b>1150</b>							
538.imagick_r	240	181	3310	<b>181</b>	<b>3300</b>	181	3300							
544.nab_r	240	<b>174</b>	<b>2330</b>	174	2330	173	2330							
549.fotonik3d_r	240	1718	544	<b>1722</b>	<b>543</b>	1724	543							
554.roms_r	240	<b>1286</b>	<b>297</b>	1288	296	1285	297							

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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"  
OS set to performance mode via cpupower frequency-set -g performance

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:  
LD\_LIBRARY\_PATH = "/home/cpu\_report/lib/intel64:/home/cpu\_report/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:  
 Power Mode set to Custom  
 SNC set to Enable SNC4 (4-clusters)  
 LLC Prefetch set to Enabled  
 DCU Streamer Prefetcher set to Disabled  
 C1 Enhanced Mode set to Disabled  
 Patrol Scrub set to Disabled  
 Intel Virtualization Technology set to Disabled  
 Package C State set to C0/C1 state

Sysinfo program /home/cpu\_report/bin/sysinfo  
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
 running on localhost.localdomain Tue Apr 18 01:29:18 2023

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 250 (250-6.el9\_0)
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
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

-----

1. uname -a  
 Linux localhost.localdomain 5.14.0-70.13.1.el9\_0.x86\_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86\_64  
 x86\_64 x86\_64 GNU/Linux

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## Platform Notes (Continued)

```

2. w
   01:29:18 up 10:29,  1 user,  load average: 166.54, 221.50, 231.79
USER      TTY      LOGIN@  IDLE   JCPU   PCPU WHAT
root      :l       15:09   ?xdm?  37:15  0.00s /usr/libexec/gdm-x-session --register-session --run-script
gnome-session

```

```

3. Username
   From environment variable $USER:  root

```

```

4. ulimit -a
real-time non-blocking time (microseconds, -R) unlimited
core file size              (blocks, -c) 0
data seg size                (kbytes, -d) unlimited
scheduling priority         (-e) 0
file size                    (blocks, -f) unlimited
pending signals              (-i) 4124555
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) 4124555
virtual memory                (kbytes, -v) unlimited
file locks                   (-x) unlimited

```

```

5. sysinfo process ancestry
/usr/lib/systemd/systemd rhgb --switched-root --system --deserialize 31
/usr/lib/systemd/systemd --user
/usr/libexec/gnome-terminal-server
bash
bash
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=240 -c
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=120 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base -o all fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=240 --configfile
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=120 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
rate --tune base --size refrate fprate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.002/templots/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu_report

```

```

6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) Platinum 8490H
vendor_id      : GenuineIntel
cpu family     : 6
model          : 143
stepping       : 6
microcode      : 0x2b000161
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores      : 60
siblings       : 120

```

(Continued on next page)



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### Platform Notes (Continued)

2 physical ids (chips)  
240 processors (hardware threads)  
physical id 0: core ids 0-59  
physical id 1: core ids 0-59  
physical id 0: apicids 0-119  
physical id 1: apicids 128-247

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:          46 bits physical, 57 bits virtual
Byte Order:             Little Endian
CPU(s):                 240
On-line CPU(s) list:   0-239
Vendor ID:              GenuineIntel
BIOS Vendor ID:        Intel(R) Corporation
Model name:             Intel(R) Xeon(R) Platinum 8490H
BIOS Model name:       Intel(R) Xeon(R) Platinum 8490H
CPU family:             6
Model:                  143
Thread(s) per core:    2
Core(s) per socket:    60
Socket(s):              2
Stepping:               6
CPU max MHz:            3500.0000
CPU min MHz:            800.0000
BogoMIPS:               3800.00
Flags:                  fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                        clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                        lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                        nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                        ds_cpl smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2
                        x2apic movbe popcnt tsc_deadline_timer xsave avx f16c rdrand lahf_lm abm
                        3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3 invpcid_single
                        intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase
                        tsc_adjust bmi1 avx2 smep bmi2 erms invpcid 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 hwp hwp_act_window hwp_epp hwp_pkg_req
                        avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vpcmlmulqdq avx512_vnni
                        avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote
                        movdiri movdir64b enqcmd fsrm md_clear serialize tsxldtrk pconfig arch_lbr
                        avx512_fp16 amx_tile flush_l1d arch_capabilities
L1d cache:             5.6 MiB (120 instances)
L1i cache:             3.8 MiB (120 instances)
L2 cache:              240 MiB (120 instances)
L3 cache:              225 MiB (2 instances)
NUMA node(s):         8
NUMA node0 CPU(s):    0-14,120-134
NUMA node1 CPU(s):    15-29,135-149
NUMA node2 CPU(s):    30-44,150-164
NUMA node3 CPU(s):    45-59,165-179
NUMA node4 CPU(s):    60-74,180-194
NUMA node5 CPU(s):    75-89,195-209

```

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### Platform Notes (Continued)

```

NUMA node6 CPU(s):          90-104,210-224
NUMA node7 CPU(s):          105-119,225-239
Vulnerability Itlb multihit: Not affected
Vulnerability Lltf:         Not affected
Vulnerability Mds:          Not affected
Vulnerability Meltdown:     Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1:   Mitigation; usercopy/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2:   Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbds:        Not affected
Vulnerability Tsx async abort: Not affected

```

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	5.6M	12	Data	1	64	1	64
L1i	32K	3.8M	8	Instruction	1	64	1	64
L2	2M	240M	16	Unified	2	2048	1	64
L3	112.5M	225M	15	Unified	3	122880	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: 0-14,120-134
node 0 size: 128131 MB
node 0 free: 109880 MB
node 1 cpus: 15-29,135-149
node 1 size: 129017 MB
node 1 free: 114739 MB
node 2 cpus: 30-44,150-164
node 2 size: 129017 MB
node 2 free: 114749 MB
node 3 cpus: 45-59,165-179
node 3 size: 129017 MB
node 3 free: 114712 MB
node 4 cpus: 60-74,180-194
node 4 size: 129017 MB
node 4 free: 114421 MB
node 5 cpus: 75-89,195-209
node 5 size: 128981 MB
node 5 free: 113427 MB
node 6 cpus: 90-104,210-224
node 6 size: 129017 MB
node 6 free: 114735 MB
node 7 cpus: 105-119,225-239
node 7 size: 128997 MB
node 7 free: 114301 MB
node distances:
node  0  1  2  3  4  5  6  7
0:  10 12 12 12 21 21 21 21
1:  12 10 12 12 21 21 21 21
2:  12 12 10 12 21 21 21 21
3:  12 12 12 10 21 21 21 21
4:  21 21 21 21 10 12 12 12
5:  21 21 21 21 12 10 12 12
6:  21 21 21 21 12 12 10 12
7:  21 21 21 21 12 12 12 10

```

9. /proc/meminfo

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### Platform Notes (Continued)

MemTotal: 1055946492 kB

-----  
10. who -r  
run-level 5 Apr 17 15:00

-----  
11. Systemd service manager version: systemd 250 (250-6.el9\_0)  
Default Target Status  
graphical running

-----  
12. Services, from systemctl list-unit-files  
STATE UNIT FILES  
enabled ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online  
accounts-daemon atd auditd avahi-daemon bluetooth chronyd crond cups dbus-broker firewallld  
gdm getty@ insights-client-boot irqbalance iscsi iscsi-onboot kdump libstoragemgmt  
lm\_sensors low-memory-monitor lvm2-monitor mcelog mdmonitor microcode multipathd  
nis-domainname nvme-fc-boot-connections ostree-remount pmcd pmie pmlogger  
power-profiles-daemon qemu-guest-agent rhsmcertd rpcbind rsyslog rtkit-daemon  
selinux-autorelabel-mark smartd sshd sssd switcheroo-control sysstat  
systemd-network-generator udisks2 upower vgaauthd virtgemud vmtoolsd  
enabled-runtime systemd-remount-fs  
disabled arp-ethers autofs blk-availability brltty canberra-system-bootup canberra-system-shutdown  
canberra-system-shutdown-reboot chrony-wait cni-dhcp console-getty cpupower cups-browsed  
dbus-daemon debug-shell dnsmasq dovecot fancontrol fcoe grafana-server gssproxy httpd  
httpd@ ibacm iprdump iprinit iprupdate ipsec iscsid iscsiui kpatch kvm\_stat ledmon  
libvirt-guests libvirtd lldpad man-db-restart-cache-update named named-chroot nfs-blkmap  
nfs-server nftables nmb numad nvme-fc-autoconnect pmfind pmie\_farm pmlogger\_farm pmproxy  
podman podman-auto-update podman-restart postfix powertop psacct ras-mc-ctl rasdaemon  
rdisc rhcd rhsm rhsm-facts rpmdm-rebuild rrdcached saslauthd serial-getty@ smb snmpd  
snmptrapd spamassassin speech-dispatcherd srp\_daemon srp\_daemon\_port@ sshd-keygen@  
systemd-boot-check-no-failures systemd-nspawn@ systemd-pstore systemd-sysext target  
targetclid tog-pegasus trace-cmd virtinterfaced virtnetworkd virtnodedevd virtnwfilterd  
virtproxyd virtsecretd virtstoraged vsftpd wpa\_supplicant  
indirect pcsd spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo  
virtlockd virtlogd vsftpd@

-----  
13. Linux kernel boot-time arguments, from /proc/cmdline  
BOOT\_IMAGE=(hd0,gpt6)/boot/vmlinuz-5.14.0-70.13.1.el9\_0.x86\_64  
root=UUID=0fcc2b80-3b7a-487a-8bd6-e3cddec3d533  
ro  
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M  
resume=UUID=d8abe978-c0ca-4381-ac68-dadfc58fd1c9  
rhgb  
quiet

-----  
14. cpupower frequency-info  
analyzing CPU 0:  
current policy: frequency should be within 800 MHz and 3.50 GHz.  
The governor "performance" may decide which speed to use  
within this range.  
boost state support:  
Supported: yes  
Active: yes

-----  
15. sysctl

(Continued on next page)





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### Platform Notes (Continued)

```

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      Red Hat Enterprise Linux 9.0 (Plow)
redhat-release Red Hat Enterprise Linux release 9.0 (Plow)
system-release Red Hat Enterprise Linux release 9.0 (Plow)

```

```

-----
19. Disk information
SPEC is set to: /home/cpu_report
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda6       xfs   954G  154G  800G  17% /

```

```

-----
20. /sys/devices/virtual/dmi/id
Vendor:      Lenovo
Product:     Lenovo Wentian GB5520 V3
Product Family: Lenovo
Serial:      J80007RK

```

```

-----
21. dmidecode
Additional information from dmidecode 3.3 follows.  WARNING: Use caution when you interpret this section.

```

(Continued on next page)





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### Platform Notes (Continued)

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:**

- 2x Samsung M321R8GA0BB0-CQKEG 64 GB 2 rank 4800
- 13x Samsung M321R8GA0BB0-CQKMG 64 GB 2 rank 4800
- 1x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800

22. BIOS

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

```

BIOS Vendor:      LENOVO
BIOS Version:     T8E120T-0.36
BIOS Date:        02/13/2023
BIOS Revision:    5.29

```

### Compiler Version Notes

```

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

```

```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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=====

```

```

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

```

```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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=====

```

```

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

```

```

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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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=====

```

```

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

```

```

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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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=====

```

```

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

```

```

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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=====

```

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# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

## Lenovo Global Technology

Wentian WR5220 G3  
(1.90 GHz, Intel Xeon Platinum 8490H)

SPECrate®2017\_fp\_base = 966

SPECrate®2017\_fp\_peak = Not Run

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Apr-2023

Hardware Availability: Jan-2023

Software Availability: Dec-2022

## Compiler Version Notes (Continued)

=====  
Fortran, C | 521.wrf\_r(base) 527.cam4\_r(base)  
=====

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201

Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201

Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
=====

## Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using both C and C++:

icpx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

## Base Portability Flags

503.bwaves\_r: -DSPEC\_LP64

507.cactuBSSN\_r: -DSPEC\_LP64

508.namd\_r: -DSPEC\_LP64

510.parest\_r: -DSPEC\_LP64

511.povray\_r: -DSPEC\_LP64

519.lbm\_r: -DSPEC\_LP64

521.wrf\_r: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG -convert big\_endian

526.blender\_r: -DSPEC\_LP64 -DSPEC\_LINUX -funsigned-char

527.cam4\_r: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG

538.imagick\_r: -DSPEC\_LP64

544.nab\_r: -DSPEC\_LP64

549.fotonik3d\_r: -DSPEC\_LP64

554.roms\_r: -DSPEC\_LP64



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## Base Optimization Flags

C benchmarks:

```
-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-Wno-implicit-int -mprefer-vector-width=512 -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

C++ benchmarks:

```
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast  
-ffast-math -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs  
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both C and C++:

```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast  
-ffast-math -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512  
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:

```
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast  
-ffast-math -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512  
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-WR5220-G3-R.html>

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html>

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

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-WR5220-G3-R.xml>

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml>



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