



# SPEC CPU®2017 Floating Point Rate Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### ProLiant ML350 Gen11

(2.00 GHz, Intel Xeon Platinum 8460Y+)

## SPECrate®2017\_fp\_base = 777

## SPECrate®2017\_fp\_peak = 824

CPU2017 License: 3

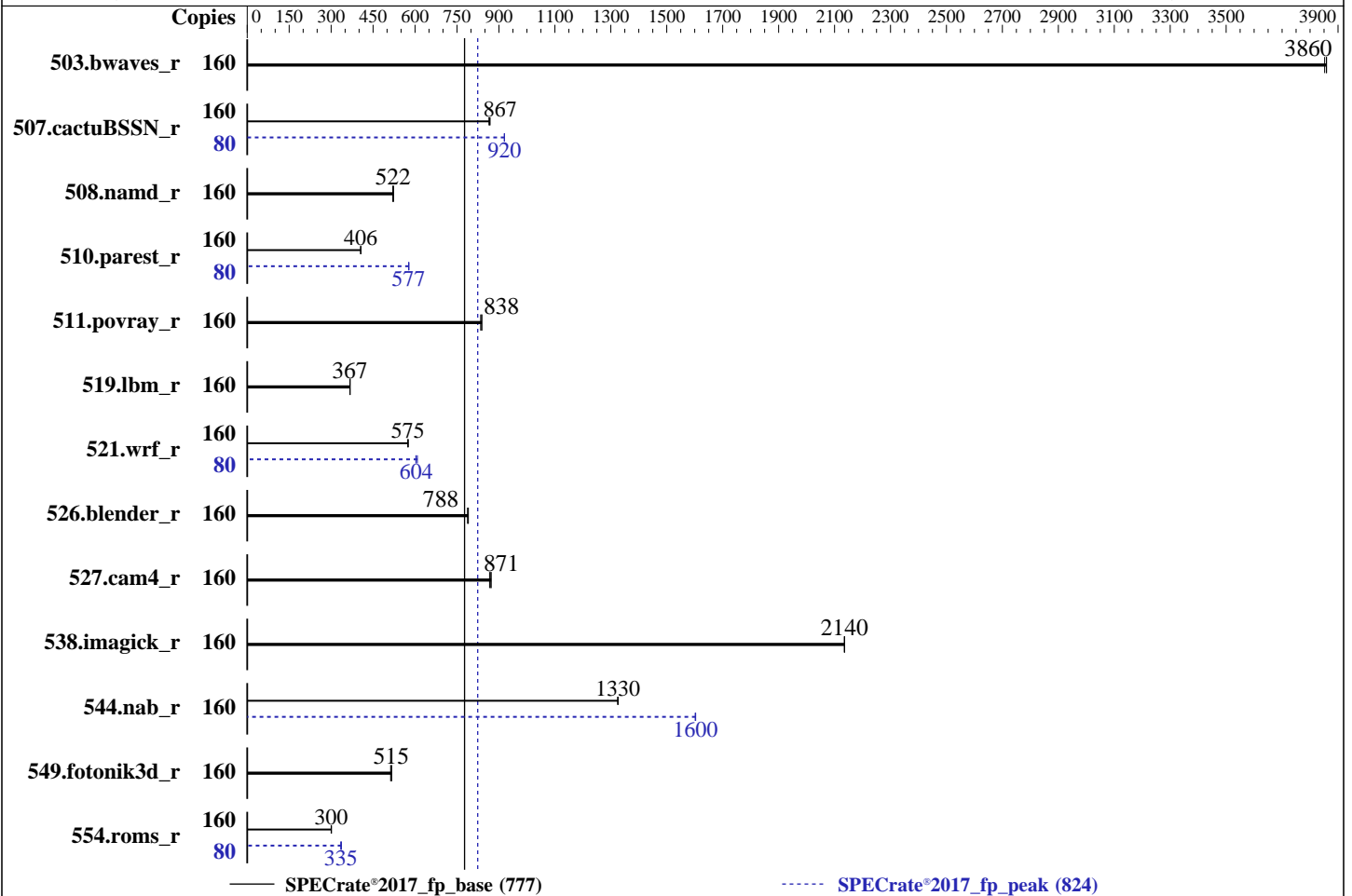
Test Sponsor: HPE

Tested by: HPE

Test Date: Feb-2023

Hardware Availability: Jan-2023

Software Availability: Nov-2022



### Hardware

CPU Name: Intel Xeon Platinum 8460Y+  
 Max MHz: 3700  
 Nominal: 2000  
 Enabled: 80 cores, 2 chips, 2 threads/core  
 Orderable: 1, 2 chip(s)  
 Cache L1: 32 KB I + 48 KB D on chip per core  
 L2: 2 MB I+D on chip per core  
 L3: 105 MB I+D on chip per chip  
 Other: None  
 Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 1 x 400 GB SATA SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux release 9.0 (Plow)  
 Kernel 5.14.0-70.13.1.el9\_0.x86\_64  
 Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;  
 Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;  
 Parallel: No  
 Firmware: HPE BIOS Version v1.22 01/18/2023 released Jan-2023  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other: jemalloc memory allocator V5.0.1  
 Power Management: BIOS and OS set to prefer performance at the cost of additional power usage



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## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	160	<b>416</b>	<b>3860</b>	416	3860	417	3850	160	<b>416</b>	<b>3860</b>	416	3860	417	3850
507.cactuBSSN_r	160	233	868	234	864	<b>234</b>	<b>867</b>	80	110	920	110	919	<b>110</b>	<b>920</b>
508.namd_r	160	292	521	291	523	<b>291</b>	<b>522</b>	160	292	521	291	523	<b>291</b>	<b>522</b>
510.parest_r	160	<b>1031</b>	<b>406</b>	1031	406	1031	406	80	363	577	<b>362</b>	<b>577</b>	362	578
511.povray_r	160	445	839	<b>446</b>	<b>838</b>	448	835	160	445	839	<b>446</b>	<b>838</b>	448	835
519.lbm_r	160	459	367	<b>459</b>	<b>367</b>	459	368	160	459	367	<b>459</b>	<b>367</b>	459	368
521.wrf_r	160	624	574	<b>624</b>	<b>575</b>	623	576	80	<b>296</b>	<b>604</b>	295	608	297	603
526.blender_r	160	308	791	309	788	<b>309</b>	<b>788</b>	160	308	791	309	788	<b>309</b>	<b>788</b>
527.cam4_r	160	<b>321</b>	<b>871</b>	323	866	321	872	160	<b>321</b>	<b>871</b>	323	866	321	872
538.imagick_r	160	186	2140	186	2130	<b>186</b>	<b>2140</b>	160	186	2140	186	2130	<b>186</b>	<b>2140</b>
544.nab_r	160	203	1320	<b>203</b>	<b>1330</b>	203	1330	160	168	1600	<b>168</b>	<b>1600</b>	168	1600
549.fotonik3d_r	160	1208	516	<b>1210</b>	<b>515</b>	1216	513	160	1208	516	<b>1210</b>	<b>515</b>	1216	513
554.roms_r	160	844	301	847	300	<b>847</b>	<b>300</b>	80	<b>379</b>	<b>335</b>	377	337	380	335

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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"  
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>  
IRQ balance service was stopped using "systemctl stop irqbalance.service"  
tuned-adm profile was set to Throughput-Performance using "tuned-adm profile throughput-performance"  
perf-bias for all the CPUs is set using "cpupower set -b 0"

## 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"



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## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.4

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.  
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

The system ROM used for this result contains Intel microcode version 0x2b000161 for the Intel Xeon Platinum 8460Y+ processor.

BIOS Configuration:

Workload Profile set to General Throughput Compute  
Thermal Configuration set to Maximum Cooling  
Enhanced Processor Performance Profile set to Aggressive  
Last Level Cache (LLC) Dead Line Allocation set to Disabled  
Memory Patrol Scrubbing set to Disabled  
Workload Profile set to Custom  
DCU Stream Prefetcher set to Disabled  
Adjacent Sector Prefetch set to Disabled  
Minimum Processor Idle Power Package C-State set to Package C6 (non-retention) State

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost.localdomain Thu Feb 16 15:46:22 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

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## Platform Notes (Continued)

11. Systemd service manager version: systemd 250 (250-6.e19\_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.e19_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
x86_64 x86_64 GNU/Linux
```

2. `w`

```
15:46:22 up 1 min, 0 users, load average: 5.03, 3.66, 1.47
USER      TTY      LOGIN@  IDLE   JCPU   PCPU   WHAT
```

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) 4127095
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) 4127095
virtual memory               (kbytes, -v) unlimited
file locks                   (-x) unlimited
```

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## Platform Notes (Continued)

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@notty
bash -c cd $SPEC/ && $SPEC/fprate.sh
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=160 -c
ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=80 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak -o all fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=160 --configfile
ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=80 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --nopower
--runmode rate --tune base:peak --size refrate fprate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.001/templogs/preenv.fprate.001.0.log --lognum 001.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

```

```

-----
6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) Platinum 8460Y+
vendor_id      : GenuineIntel
cpu family     : 6
model          : 143
stepping       : 6
microcode      : 0x2b000161
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores     : 40
siblings      : 80
2 physical ids (chips)
160 processors (hardware threads)
physical id 0: core ids 0-39
physical id 1: core ids 0-39
physical id 0: apicids 0-79
physical id 1: apicids 128-207

```

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

### 7. lscpu

From lscpu from util-linux 2.37.4:

```

Architecture:      x86_64
CPU op-mode(s):    32-bit, 64-bit
Address sizes:     46 bits physical, 57 bits virtual
Byte Order:        Little Endian

```

(Continued on next page)



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## Platform Notes (Continued)

```

CPU(s): 160
On-line CPU(s) list: 0-159
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
Model name: Intel(R) Xeon(R) Platinum 8460Y+
BIOS Model name: Intel(R) Xeon(R) Platinum 8460Y+
CPU family: 6
Model: 143
Thread(s) per core: 2
Core(s) per socket: 40
Socket(s): 2
Stepping: 6
BogoMIPS: 4000.00
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 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 tpr_shadow
        vnmi flexpriority ept vpid ept_ad 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
        avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq
        avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect
        cldemote movdiri movdir64b enqcmd fsrm md_clear serialize tsxldtrk pconfig
        arch_lbr avx512_fp16 amx_tile flush_lld arch_capabilities

Virtualization: VT-x
L1d cache: 3.8 MiB (80 instances)
L1i cache: 2.5 MiB (80 instances)
L2 cache: 160 MiB (80 instances)
L3 cache: 210 MiB (2 instances)
NUMA node(s): 8
NUMA node0 CPU(s): 0-9,80-89
NUMA node1 CPU(s): 10-19,90-99
NUMA node2 CPU(s): 20-29,100-109
NUMA node3 CPU(s): 30-39,110-119
NUMA node4 CPU(s): 40-49,120-129
NUMA node5 CPU(s): 50-59,130-139
NUMA node6 CPU(s): 60-69,140-149
NUMA node7 CPU(s): 70-79,150-159
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected

```

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## Platform Notes (Continued)

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	3.8M	12	Data	1	64	1	64
L1i	32K	2.5M	8	Instruction	1	64	1	64
L2	2M	160M	16	Unified	2	2048	1	64
L3	105M	210M	15	Unified	3	114688	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: 0-9,80-89
node 0 size: 128732 MB
node 0 free: 128284 MB
node 1 cpus: 10-19,90-99
node 1 size: 129019 MB
node 1 free: 128629 MB
node 2 cpus: 20-29,100-109
node 2 size: 129019 MB
node 2 free: 128549 MB
node 3 cpus: 30-39,110-119
node 3 size: 129019 MB
node 3 free: 128599 MB
node 4 cpus: 40-49,120-129
node 4 size: 129019 MB
node 4 free: 128117 MB
node 5 cpus: 50-59,130-139
node 5 size: 129019 MB
node 5 free: 128480 MB
node 6 cpus: 60-69,140-149
node 6 size: 129019 MB
node 6 free: 128642 MB
node 7 cpus: 70-79,150-159
node 7 size: 128963 MB
node 7 free: 128576 MB
```

node distances:

node	0	1	2	3	4	5	6	7
0:	10	20	30	30	30	30	30	30
1:	20	10	30	30	30	30	30	30
2:	30	30	10	20	30	30	30	30

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3:	30	30	20	10	30	30	30	30
4:	30	30	30	30	10	20	30	30
5:	30	30	30	30	20	10	30	30
6:	30	30	30	30	30	30	10	20
7:	30	30	30	30	30	30	20	10

9. /proc/meminfo

MemTotal: 1056577148 kB

10. who -r

run-level 3 Feb 16 15:45

11. Systemd service manager version: systemd 250 (250-6.e19\_0)

Default Target	Status
multi-user	running

12. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond dbus-broker firewalld getty@ irqbalance iscsi iscsi-onboot kdump libstoragemgmt lvm2-monitor mdmonitor microcode multipathd nis-domainname rhsmcertd rpcbind rsyslog selinux-autorelabel-mark sshd sssd systemd-network-generator udisks2 upower virtqemud
enabled-runtime	systemd-remount-fs
disabled	blk-availability brltty canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot chrony-wait console-getty cpupower debug-shell dnsmasq gssproxy httpd httpd@ hwloc-dump-hwdata ipa-custodia iscsid iscsiuiio kvm_stat libvirt-guests libvirtfd man-db-restart-cache-update ndctl-monitor nfs-blkmap nfs-server nftables nmb numad pmcd pmfind pmie pmie_farm pmlogger pmlogger_farm pmproxy radiusd rdisc rhsm rhsm-facts rpmdb-rebuild saslauthd serial-getty@ smb speech-dispatcherd sshd-keygen@ systemd-boot-check-no-failures systemd-nspawn@ systemd-pstore systemd-sysext virtnetworkkd virtproxyd virtsecretfd virtstoraged
indirect	sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo virtlockd virtlogd

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

BOOT\_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.13.1.e19\_0.x86\_64  
root=/dev/mapper/rhel-root  
ro  
resume=/dev/mapper/rhel-swap  
rd.lvm.lv=rhel/root  
rd.lvm.lv=rhel/swap

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```

14. cpupower frequency-info
   analyzing CPU 0:
     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

```

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## Platform Notes (Continued)

### 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/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/mapper/rhel-home	xf	372G	149G	224G	40%	/home

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

Vendor: HPE  
 Product: ProLiant ML350 Gen11  
 Product Family: ProLiant  
 Serial: CNX20800P7

### 21. dmidecode

Additional information from dmidecode 3.3 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 Hynix HMC94MEBRA121N 64 GB 2 rank 4800

### 22. BIOS

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

BIOS Vendor: HPE  
 BIOS Version: 1.22  
 BIOS Date: 01/18/2023  
 BIOS Revision: 1.22  
 Firmware Revision: 1.20

## 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 2022.1.0 Build 20220316

(Continued on next page)



# SPEC CPU®2017 Floating Point Rate Result

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ProLiant ML350 Gen11

(2.00 GHz, Intel Xeon Platinum 8460Y+)

SPECrate®2017\_fp\_base = 777

SPECrate®2017\_fp\_peak = 824

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Feb-2023

Hardware Availability: Jan-2023

Software Availability: Nov-2022

## Compiler Version Notes (Continued)

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=====  
C++ | 508.namd\_r(base, peak) 510.parest\_r(base, peak)  
=====

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Version 2022.1.0 Build 20220316

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=====  
C++, C | 511.povray\_r(base, peak) 526.blender\_r(base, peak)  
=====

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Version 2022.1.0 Build 20220316

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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2022.1.0 Build 20220316

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=====  
C++, C, Fortran | 507.cactuBSSN\_r(base, peak)  
=====

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Version 2022.1.0 Build 20220316

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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2022.1.0 Build 20220316

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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version  
2022.1.0 Build 20220316

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

=====  
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  
2022.1.0 Build 20220316

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

(Continued on next page)



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**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Feb-2023

**Hardware Availability:** Jan-2023

**Software Availability:** Nov-2022

## Compiler Version Notes (Continued)

-----  
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version  
2022.1.0 Build 20220316

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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2022.1.0 Build 20220316

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

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**CPU2017 License:** 3  
**Test Sponsor:** HPE  
**Tested by:** HPE

**Test Date:** Feb-2023  
**Hardware Availability:** Jan-2023  
**Software Availability:** Nov-2022

## Base Portability Flags (Continued)

554.roms\_r: -DSPEC\_LP64

## Base Optimization Flags

C benchmarks:

```
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

C++ benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -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 -xCORE-AVX512 -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 -xCORE-AVX512 -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 C and C++:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -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
```

## Peak Compiler Invocation

C benchmarks:

icx

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**SPECrate®2017\_fp\_peak = 824**

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Feb-2023

**Hardware Availability:** Jan-2023

**Software Availability:** Nov-2022

## Peak Compiler Invocation (Continued)

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

544.nab\_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast  
-ffast-math -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -qopt-zmm-usage=high -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:

508.namd\_r: basepeak = yes

510.parest\_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib

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**Software Availability:** Nov-2022

## Peak Optimization Flags (Continued)

Fortran benchmarks:

503.bwaves\_r: basepeak = yes

549.fotonik3d\_r: basepeak = yes

```
554.roms_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both Fortran and C:

```
521.wrf_r: -w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -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
```

527.cam4\_r: basepeak = yes

Benchmarks using both C and C++:

511.povray\_r: basepeak = yes

526.blender\_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-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
```

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SPR-rev1.1.html>

[http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64\\_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.html)

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SPR-rev1.1.xml>

[http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64\\_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml)



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Tested with SPEC CPU®2017 v1.1.9 on 2023-02-16 05:16:22-0500.

Report generated on 2023-03-29 00:39:02 by CPU2017 PDF formatter v6442.

Originally published on 2023-03-28.