



SPEC CPU®2017 Floating Point Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

HPE Compute Scale-up Server 3200

(1.90 GHz, Intel Xeon Platinum 8490H)

SPECrate®2017_fp_base = 5810

SPECrate®2017_fp_peak = 6120

CPU2017 License: 3

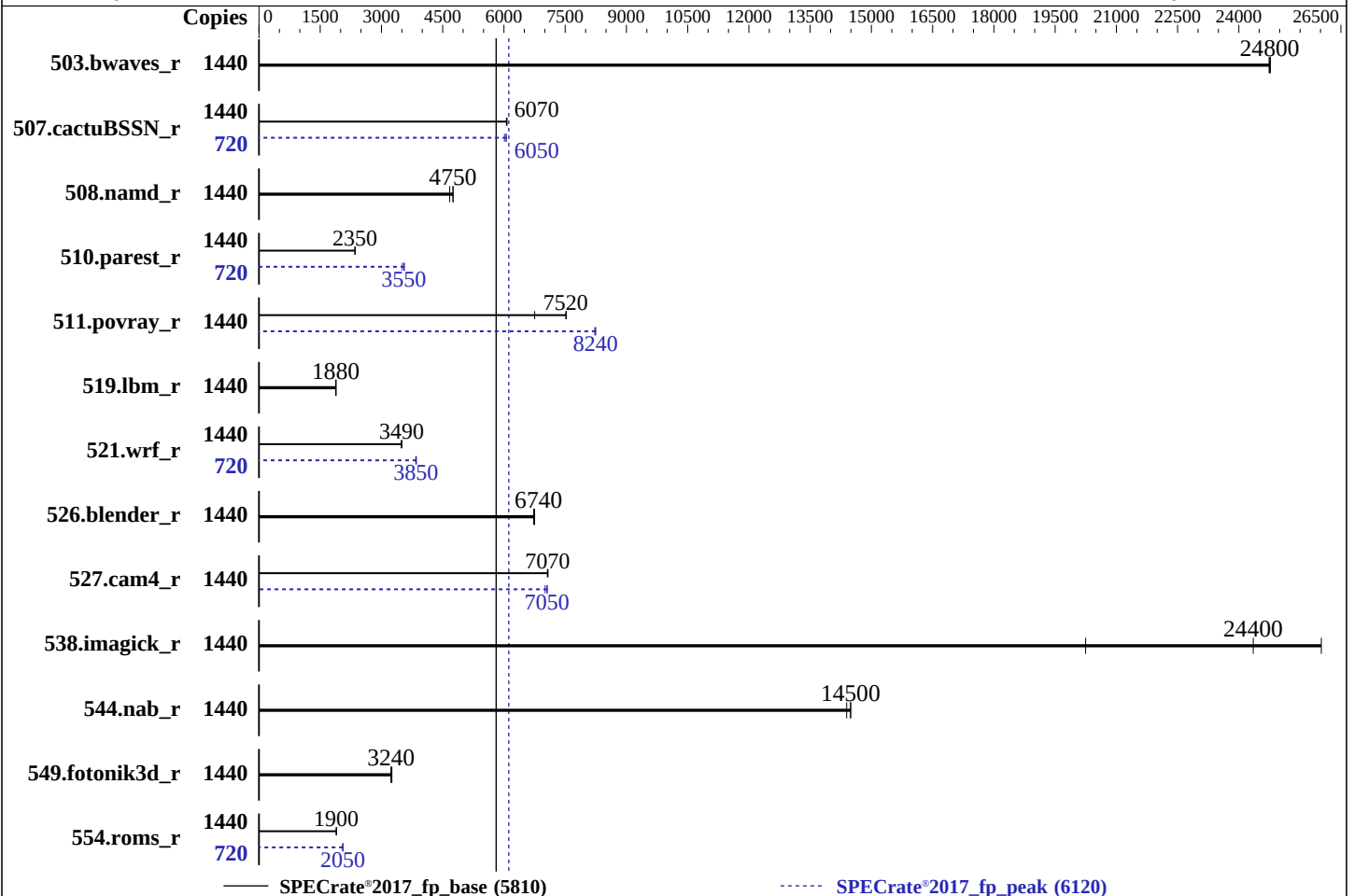
Test Sponsor: HPE

Tested by: HPE

Test Date: Mar-2025

Hardware Availability: Sep-2023

Software Availability: Mar-2025



Hardware

CPU Name: Intel Xeon Platinum 8490H
Max MHz: 3500
Nominal: 1900
Enabled: 720 cores, 12 chips, 2 threads/core
Orderable: 4, 8, 12 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: 6 TB (96 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 1.5 TB NVMe SSD
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP6
Kernel 6.4.0-150600.23.42-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: HPE Firmware Bundle Version 1.55.96 03/06/2025 released
Mar-2025
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	1440	584	24700	583	24800	583	24800	1440	584	24700	583	24800	583	24800
507.cactuBSSN_r	1440	300	6070	301	6060	300	6070	720	150	6060	151	6050	152	6010
508.namd_r	1440	293	4670	288	4750	288	4750	1440	293	4670	288	4750	288	4750
510.parest_r	1440	1603	2350	1601	2350	1598	2360	720	536	3510	529	3560	530	3550
511.povray_r	1440	447	7530	447	7520	498	6750	1440	409	8230	408	8240	408	8250
519.lbm_r	1440	806	1880	806	1880	805	1890	1440	806	1880	806	1880	805	1890
521.wrf_r	1440	924	3490	923	3490	923	3490	720	419	3850	418	3860	420	3840
526.blender_r	1440	325	6740	326	6730	325	6750	1440	325	6740	326	6730	325	6750
527.cam4_r	1440	356	7080	357	7060	356	7070	1440	357	7050	359	7010	357	7060
538.imagick_r	1440	138	26000	177	20200	147	24400	1440	138	26000	177	20200	147	24400
544.nab_r	1440	167	14500	168	14400	167	14500	1440	167	14500	168	14400	167	14500
549.fotonik3d_r	1440	1734	3240	1724	3260	1733	3240	1440	1734	3240	1724	3260	1733	3240
554.roms_r	1440	1207	1900	1207	1900	1208	1890	720	557	2050	557	2050	557	2050

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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>

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"
MALLOCONF = "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
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)

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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-2017-5715 (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:

Workload Profile set to Custom

Energy/Performance Bias set to Maximum Performance

Energy Efficient Turbo set to Disabled

Advanced Memory Protection set to Advanced ECC Support

SR-IOV set to Disabled

Intel Virtualization Technology (Intel VT, VT-x) set to Disabled

Adjacent Sector Prefetch set to Disabled

DCU Stream Prefetcher set to Disabled

Last Level Cache (LLC) Dead Line Allocation set to Disabled

Enhanced Processor Performance Profile set to Aggressive

Memory Patrol Scrubbing set to Disabled

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197

running on sph-187 Sat Mar 29 23:06:25 2025

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

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9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 254 (254.23+suse.141.g9376e684d0)
12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
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17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS

1. uname -a
Linux sph-187 6.4.0-150600.23.42-default #1 SMP PREEMPT_DYNAMIC Fri Mar 7 09:53:00 UTC 2025 (7bf6ecd)

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Platform Notes (Continued)

x86_64 x86_64 x86_64 GNU/Linux

2. w

```
23:06:25 up 20:11, 1 user, load average: 0.37, 0.29, 0.12
USER      TTY      FROM          LOGIN@   IDLE   JCPU   PCPU WHAT
test      ttyS0    -             03:02   19:59m 0.12s  0.04s login -- test
test      pts/0    -             03:06    6.00s  1.60s  0.08s sudo su
```

3. Username

```
From environment variable $USER: root
From the command 'logname': test
```

4. ulimit -a

```
core file size          (blocks, -c) 0
data seg size           (kbytes, -d) unlimited
scheduling priority     (-e) 0
file size               (blocks, -f) unlimited
pending signals         (-i) 24377852
max locked memory       (kbytes, -l) 8192
max memory size         (kbytes, -m) unlimited
open files              (-n) 100000
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) 24377852
virtual memory          (kbytes, -v) unlimited
file locks              (-x) unlimited
```

5. sysinfo process ancestry

```
/usr/lib/systemd/systemd --switched-root --system --deserialize=42
login -- test
-bash
sudo su
sudo su
su
bash
bash
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=1440 -c
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=720 --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=1440 --configfile
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=720 --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/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017
```

6. /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) Platinum 8490H
vendor_id       : GenuineIntel
cpu family      : 6
model           : 143
```

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Platform Notes (Continued)

```
stepping          : 6
microcode         : 0x2b000639
bugs              : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb bhi
cpu cores         : 60
siblings          : 120
12 physical ids (chips)
1440 processors (hardware threads)
physical id 0: core ids 0-59
physical id 1: core ids 0-59
physical id 2: core ids 0-59
physical id 3: core ids 0-59
physical id 4: core ids 0-59
physical id 5: core ids 0-59
physical id 6: core ids 0-59
physical id 7: core ids 0-59
physical id 8: core ids 0-59
physical id 9: core ids 0-59
physical id 10: core ids 0-59
physical id 11: core ids 0-59
physical id 0: apicids 0-119
physical id 1: apicids 128-247
physical id 2: apicids 256-375
physical id 3: apicids 384-503
physical id 4: apicids 512-631
physical id 5: apicids 640-759
physical id 6: apicids 768-887
physical id 7: apicids 896-1015
physical id 8: apicids 1024-1143
physical id 9: apicids 1152-1271
physical id 10: apicids 1280-1399
physical id 11: apicids 1408-1527
```

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

7. lscpu

From lscpu from util-linux 2.39.3:

```
Architecture:      x86_64
CPU op-mode(s):    32-bit, 64-bit
Address sizes:      52 bits physical, 57 bits virtual
Byte Order:        Little Endian
CPU(s):            1440
On-line CPU(s) list: 0-1439
Vendor ID:         GenuineIntel
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):         12
Stepping:          6
CPU(s) scaling MHz: 23%
CPU max MHz:       3500.0000
CPU min MHz:       800.0000
BogoMIPS:          3800.03
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 arch_perfmon pebs bts rep_good nopl
                  xtology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor
```

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Platform Notes (Continued)

ds_cpl smx est tm2 ssse3 sdbg fma cx16 xtrp 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
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 xsavec cqm_llc
cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect
user_shstk avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp
hwp_act_window hwp_pkg_req avx512vbmi umip pku ospke waitpkg
avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme
avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri
movdir64b enqcmd fsrm md_clear serialize tsxldtrk pconfig arch_lbr
ibt amx_bf16 avx512_fp16 amx_tile amx_int8 flush_l1d
arch_capabilities

L1d cache: 33.8 MiB (720 instances)
L1i cache: 22.5 MiB (720 instances)
L2 cache: 1.4 GiB (720 instances)
L3 cache: 1.3 GiB (12 instances)

NUMA node(s): 12
NUMA node0 CPU(s): 0-59,720-779
NUMA node1 CPU(s): 60-119,780-839
NUMA node2 CPU(s): 120-179,840-899
NUMA node3 CPU(s): 180-239,900-959
NUMA node4 CPU(s): 240-299,960-1019
NUMA node5 CPU(s): 300-359,1020-1079
NUMA node6 CPU(s): 360-419,1080-1139
NUMA node7 CPU(s): 420-479,1140-1199
NUMA node8 CPU(s): 480-539,1200-1259
NUMA node9 CPU(s): 540-599,1260-1319
NUMA node10 CPU(s): 600-659,1320-1379
NUMA node11 CPU(s): 660-719,1380-1439

Vulnerability Gather data sampling: Not affected
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Reg file data sampling: Not affected
Vulnerability Retbleed: Not affected
Vulnerability Spec rstack overflow: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced / Automatic IBRS; IBPB conditional; RSB filling; PBRSE-eIBRS SW sequence; BHI BHI_DIS_S
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	33.8M	12	Data	1	64	1	64
L1i	32K	22.5M	8	Instruction	1	64	1	64
L2	2M	1.4G	16	Unified	2	2048	1	64
L3	112.5M	1.3G	15	Unified	3	122880	1	64

8. numactl --hardware

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

available: 12 nodes (0-11)

node 0 cpus: 0-59,720-779

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Platform Notes (Continued)

```
node 0 size: 506924 MB
node 0 free: 504497 MB
node 1 cpus: 60-119,780-839
node 1 size: 508062 MB
node 1 free: 506007 MB
node 2 cpus: 120-179,840-899
node 2 size: 508062 MB
node 2 free: 506012 MB
node 3 cpus: 180-239,900-959
node 3 size: 508062 MB
node 3 free: 506070 MB
node 4 cpus: 240-299,960-1019
node 4 size: 508062 MB
node 4 free: 505838 MB
node 5 cpus: 300-359,1020-1079
node 5 size: 508062 MB
node 5 free: 505852 MB
node 6 cpus: 360-419,1080-1139
node 6 size: 508062 MB
node 6 free: 505820 MB
node 7 cpus: 420-479,1140-1199
node 7 size: 508062 MB
node 7 free: 505804 MB
node 8 cpus: 480-539,1200-1259
node 8 size: 508062 MB
node 8 free: 505616 MB
node 9 cpus: 540-599,1260-1319
node 9 size: 508024 MB
node 9 free: 505408 MB
node 10 cpus: 600-659,1320-1379
node 10 size: 508062 MB
node 10 free: 505335 MB
node 11 cpus: 660-719,1380-1439
node 11 size: 506986 MB
node 11 free: 504644 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11
  0: 10 16 16 18 40 40 40 40 40 40 40 40
  1: 16 10 18 16 40 40 40 40 40 40 40 40
  2: 16 18 10 16 40 40 40 40 40 40 40 40
  3: 18 16 16 10 40 40 40 40 40 40 40 40
  4: 40 40 40 40 10 16 16 18 40 40 40 40
  5: 40 40 40 40 16 10 18 16 40 40 40 40
  6: 40 40 40 40 16 18 10 16 40 40 40 40
  7: 40 40 40 40 18 16 16 10 40 40 40 40
  8: 40 40 40 40 40 40 40 10 16 16 18 18
  9: 40 40 40 40 40 40 40 16 10 18 16 16
10: 40 40 40 40 40 40 40 16 18 10 16 16
11: 40 40 40 40 40 40 40 18 16 16 10 10
```

9. /proc/meminfo
MemTotal: 6240765740 kB

10. who -r
run-level 3 Mar 29 02:57

11. Systemd service manager version: systemd 254 (254.23+suse.141.g9376e684d0)

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Platform Notes (Continued)

Default Target Status
multi-user degraded

12. Failed units, from systemctl list-units --state=failed

UNIT	LOAD	ACTIVE	SUB	DESCRIPTION
* dcdchkgracefulshutdown.service	loaded	failed	failed	Check if previous system shutdown was graceful
* postfix.service	loaded	failed	failed	Postfix Mail Transport Agent

13. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	YaST2-Firstboot YaST2-Second-Stage apparmor appstream-sync-cache auditd bluetooth chronyd cpuset_cpunodemap cpuset_memory_spread cron dcd dcdchkgracefulshutdown dcdshutdown display-manager getty@ hpe-auto-config hpe_irqbalance issue-generator kbdsettings kdump kdump-early kdump-notify klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore vgauthd vmblock-fuse vmtoolsd vsftpd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
enabled-runtime	systemd-fsck-root systemd-remount-fs
disabled	accounts-daemon amavis apache2 apache2@ autofs autoyast-initscripts blk-availability bluetooth-mesh boot-sysctl ca-certificates certmonger chrony-wait clamav-milter clamd clamonnacc console-getty cups cups-browsed cxi-monitor dcdiag debug-shell ebttables exchange-bmc-os-info firewallld fsidd gpm grub2-once haveged ipmi ipmiev d irqbalance issue-add-ssh-keys kexec-load lunmask man-db-create mariadb mariadb@ multipathd named ndctl-monitor nfs nfs-blkmap nfs-server nfsserver nmb ostree-remount rpcbind rpmconfigcheck rsyncd rtkit-daemon smartd_generate_opts smb snmpd snmptrapd spamd spamd speech-dispatcherd srp_daemon srp_daemon_port@ sysstat systemd-boot-check-no-failures systemd-confext systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd udisks2 update-system-flatpaks upower vncserver@ winbind ypbind
indirect	pcscd serial-getty@ systemd-userdbd tftpd wickedd

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

```
BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.23.42-default  
root=UUID=804ffac3-72bb-4ca7-bed1-4d64ea03e98a  
rd.auto=1  
console=ttyS0,115200n8  
selinux=0  
security=  
splash=silent  
mitigations=auto  
console=ttyS0,115200  
udev.children-max=512  
nmi_watchdog=0  
uv_nmi.action=kdump  
add_efi_memmap  
tsc=nowatchdog  
earlyprintk=ttyS0,115200  
log_buf_len=8M  
numa_balancing=disable  
crashkernel=1G,high  
watchdog_thresh=60  
workqueue.watchdog_thresh=120
```

15. cpupower frequency-info

analyzing CPU 547:
current policy: frequency should be within 800 MHz and 3.50 GHz.
The governor "performance" may decide which speed to use
within this range.

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Platform Notes (Continued)

boost state support:

Supported: yes

Active: yes

16. 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
vm.watermark_scale_factor    10
vm.zone_reclaim_mode         0
```

17. /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
```

18. /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
```

19. OS release

```
From /etc/*-release /etc/*-version
os-release          SUSE Linux Enterprise Server 15 SP6
hpe-foundation-release HPE Foundation Software 2.5.5, Build 753.1560.250305T0100.a.sles15sp6hpe-250305T0100
```

20. Disk information

SPEC is set to: /home/cpu2017

```
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme2n1p2 xfs 1.5T 38G 1.5T 3% /
```

21. /sys/devices/virtual/dmi/id

```
Vendor:      HPE
Product:     Compute Scale-up Server 3200
Product Family: 1590PID03030201
```

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Hardware Availability: Sep-2023

Software Availability: Mar-2025

Platform Notes (Continued)

Serial: 5UF2491355-000

22. dmidecode

Additional information from dmidecode 3.6 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:

96x Samsung M321R8GA0BB0-CQKZH 64 GB 2 rank 4800

23. BIOS

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

BIOS Vendor: HPE

BIOS Version: Bundle:1.55.96-20250319_050100 SFW:009.036.014.000.2503060426

BIOS Date: 03/06/2025

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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=====

=====
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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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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=====

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

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
=====

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Software Availability: Mar-2025

Compiler Version Notes (Continued)

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=====
Fortran, C | 521.wrf_r(base, peak) 527.cam4_r(base, peak)

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

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Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using both C and C++:

icpx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

Base Portability Flags

503.bwaves_r: -DSPEC_LP64

507.cactuBSSN_r: -DSPEC_LP64

508.namd_r: -DSPEC_LP64

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

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Base Portability Flags (Continued)

549.fotonik3d_r: -DSPEC_LP64

554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:

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

C++ benchmarks:

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

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

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

Benchmarks using both C and C++:

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

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
```



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Tested by: HPE

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Hardware Availability: Sep-2023

Software Availability: Mar-2025

Peak Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using both C and C++:

icpx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes

538.imagick_r: basepeak = yes

544.nab_r: basepeak = yes

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: -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

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Software Availability: Mar-2025

Peak Optimization Flags (Continued)

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: -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++:

511.povray_r: -w -std=c++14 -m64 -std=c11 -Wl, -z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)
-flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int
-mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

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

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SDSS-rev1.2.html>

<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.html>

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SDSS-rev1.2.xml>

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