



# SPEC CPU®2017 Integer Rate Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

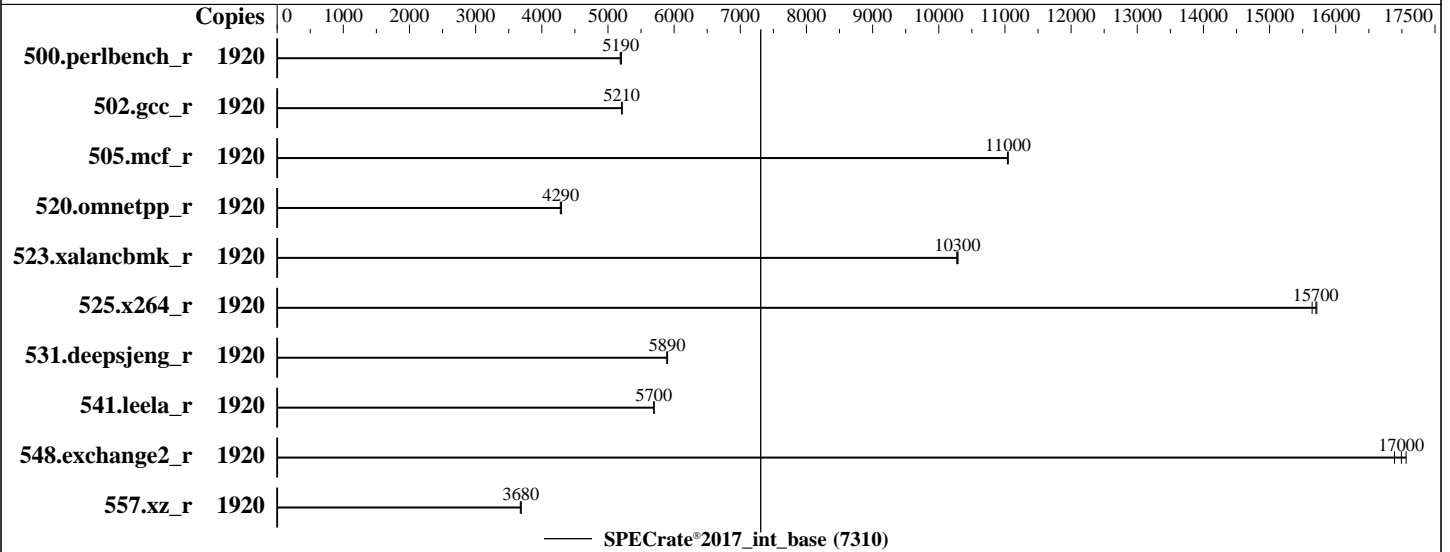
HPE Compute Scale-up Server 3200  
(1.90 GHz, Intel Xeon Platinum 8490H)

SPECrate®2017\_int\_base = 7310

SPECrate®2017\_int\_peak = Not Run

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

Test Date: Jan-2024  
Hardware Availability: Dec-2023  
Software Availability: Dec-2023



### Hardware

CPU Name: Intel Xeon Platinum 8490H  
 Max MHz: 3500  
 Nominal: 1900  
 Enabled: 960 cores, 16 chips, 2 threads/core  
 Orderable: 4, 8, 16 chip(s)  
 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: 8 TB (128 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 1 x 6.4 TB NVMe SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux 8.8 (Ootpa)  
 4.18.0-477.10.1.el8\_8.x86\_64  
 Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++  
 Compiler for Linux;  
 Fortran: Version 2023.2.3 of Intel Fortran  
 Compiler for Linux;  
 Parallel: No  
 Firmware: HPE Firmware Bundle Version 1.10.342 released  
 Dec-2023  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: HPE Foundation Software 2.5.0  
 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
500.perlbench_r	1920	587	5200	589	5190	<b>588</b>	<b>5190</b>							
502.gcc_r	1920	522	5210	<b>522</b>	<b>5210</b>	521	5220							
505.mcf_r	1920	<b>281</b>	<b>11000</b>	281	11000	281	11000							
520.omnetpp_r	1920	589	4280	<b>587</b>	<b>4290</b>	586	4300							
523.xalancbmk_r	1920	197	10300	197	10300	<b>197</b>	<b>10300</b>							
525.x264_r	1920	215	15600	214	15700	<b>214</b>	<b>15700</b>							
531.deepsjeng_r	1920	<b>373</b>	<b>5890</b>	373	5900	374	5890							
541.leela_r	1920	<b>558</b>	<b>5700</b>	558	5700	558	5690							
548.exchange2_r	1920	298	16900	295	17100	<b>296</b>	<b>17000</b>							
557.xz_r	1920	562	3690	<b>563</b>	<b>3680</b>	564	3670							

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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"  
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>

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:  
LD\_LIBRARY\_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"  
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  
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)

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## General Notes (Continued)

is mitigated in the system as tested and documented.

## Platform Notes

The system ROM used for this result contains Intel microcode version 0x2b0004d0 for the Intel Xeon Platinum 8490H processor.

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-201 Fri Jan 19 13:14:34 2024

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 239 (239-74.el8\_8)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
16. sysctl
17. /sys/kernel/mm/transparent\_hugepage
18. /sys/kernel/mm/transparent\_hugepage/khugepaged
19. OS release
20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS

-----  
1. uname -a  
Linux sph-201 4.18.0-477.10.1.el8\_8.x86\_64 #1 SMP Wed Apr 5 13:35:01 EDT 2023 x86\_64 x86\_64 x86\_64  
GNU/Linux

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## Platform Notes (Continued)

```
-----
2. w
   13:14:34 up 15 min,  1 user,  load average: 0.17, 0.56, 1.05
USER      TTY      FROM          LOGIN@      IDLE        JCPU      PCPU      WHAT
test      ttyS0    -             13:05       9.00s      1.52s     0.03s    login -- test
```

```
-----
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) 32506863
   max locked memory       (kbytes, -l) 64
   max memory size         (kbytes, -m) unlimited
   open files              (-n) 40000
   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) 32506863
   virtual memory          (kbytes, -v) unlimited
   file locks              (-x) unlimited
```

```
-----
5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 17
login -- test
-bash
sudo su
su
bash
bash
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=1920 -c
  ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=960 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base -o all intrate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=1920 --configfile
  ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=960 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
  rate --tune base --size refrate intrate --nopreenv --note-preenv --logfile
  $$SPEC/tmp/CPU2017.003/templogs/preenv.intrate.003.0.log --lognum 003.0 --from_runcpu 2
specperl $$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
   stepping       : 8
   microcode      : 0x2b0004d0
   bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
   cpu cores      : 60
```

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## Platform Notes (Continued)

```

siblings          : 120
16 physical ids (chips)
1920 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 12: core ids 0-59
physical id 13: core ids 0-59
physical id 14: core ids 0-59
physical id 15: 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
physical id 12: apicids 1536-1655
physical id 13: apicids 1664-1783
physical id 14: apicids 1792-1911
physical id 15: apicids 1920-2039

```

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 2.32.1:
Architecture:      x86_64
CPU op-mode(s):   32-bit, 64-bit
Byte Order:       Little Endian
CPU(s):           1920
On-line CPU(s) list: 0-1919
Thread(s) per core: 2
Core(s) per socket: 60
Socket(s):        16
NUMA node(s):    16
Vendor ID:        GenuineIntel
BIOS Vendor ID:   Intel(R) Corporation
CPU family:       6
Model:            143
Model name:       Intel(R) Xeon(R) Platinum 8490H
BIOS Model name:  Intel(R) Xeon(R) Platinum 8490H
Stepping:         8
CPU MHz:          3499.963
CPU max MHz:      3500.0000

```

(Continued on next page)



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## Platform Notes (Continued)

```

CPU min MHz:      800.0000
BogoMIPS:         3799.96
L1d cache:        48K
L1i cache:        32K
L2 cache:         2048K
L3 cache:         115200K
NUMA node0 CPU(s): 0-59,960-1019
NUMA node1 CPU(s): 60-119,1020-1079
NUMA node2 CPU(s): 120-179,1080-1139
NUMA node3 CPU(s): 180-239,1140-1199
NUMA node4 CPU(s): 240-299,1200-1259
NUMA node5 CPU(s): 300-359,1260-1319
NUMA node6 CPU(s): 360-419,1320-1379
NUMA node7 CPU(s): 420-479,1380-1439
NUMA node8 CPU(s): 480-539,1440-1499
NUMA node9 CPU(s): 540-599,1500-1559
NUMA node10 CPU(s): 600-659,1560-1619
NUMA node11 CPU(s): 660-719,1620-1679
NUMA node12 CPU(s): 720-779,1680-1739
NUMA node13 CPU(s): 780-839,1740-1799
NUMA node14 CPU(s): 840-899,1800-1859
NUMA node15 CPU(s): 900-959,1860-1919
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 xtopology nonstop_tsc cpuid aperfmperf 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 aes 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_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 amx_bf16 avx512_fp16 amx_tile amx_int8
flush_l1d arch_capabilities

```

8. numactl --hardware

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

```

available: 16 nodes (0-15)
node 0 cpus: 0-59,960-1019
node 0 size: 506926 MB
node 0 free: 505566 MB
node 1 cpus: 60-119,1020-1079
node 1 size: 508063 MB
node 1 free: 506724 MB
node 2 cpus: 120-179,1080-1139
node 2 size: 508063 MB
node 2 free: 507216 MB
node 3 cpus: 180-239,1140-1199
node 3 size: 508063 MB
node 3 free: 507234 MB
node 4 cpus: 240-299,1200-1259
node 4 size: 508063 MB
node 4 free: 507471 MB
node 5 cpus: 300-359,1260-1319
node 5 size: 508063 MB
node 5 free: 507367 MB

```

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## Platform Notes (Continued)

```

node 6 cpus: 360-419,1320-1379
node 6 size: 508063 MB
node 6 free: 507477 MB
node 7 cpus: 420-479,1380-1439
node 7 size: 508020 MB
node 7 free: 507314 MB
node 8 cpus: 480-539,1440-1499
node 8 size: 508063 MB
node 8 free: 507479 MB
node 9 cpus: 540-599,1500-1559
node 9 size: 508063 MB
node 9 free: 507409 MB
node 10 cpus: 600-659,1560-1619
node 10 size: 508063 MB
node 10 free: 507375 MB
node 11 cpus: 660-719,1620-1679
node 11 size: 508063 MB
node 11 free: 507262 MB
node 12 cpus: 720-779,1680-1739
node 12 size: 508063 MB
node 12 free: 507344 MB
node 13 cpus: 780-839,1740-1799
node 13 size: 508063 MB
node 13 free: 507319 MB
node 14 cpus: 840-899,1800-1859
node 14 size: 508063 MB
node 14 free: 507313 MB
node 15 cpus: 900-959,1860-1919
node 15 size: 506994 MB
node 15 free: 506086 MB

```

node distances:

```

node  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
0:  10 16 16 18 40 40 40 40 40 40 40 40 40 40 40 40
1:  16 10 18 16 40 40 40 40 40 40 40 40 40 40 40 40
2:  16 18 10 16 40 40 40 40 40 40 40 40 40 40 40 40
3:  18 16 16 10 40 40 40 40 40 40 40 40 40 40 40 40
4:  40 40 40 40 10 16 16 18 40 40 40 40 40 40 40 40
5:  40 40 40 40 16 10 18 16 40 40 40 40 40 40 40 40
6:  40 40 40 40 16 18 10 16 40 40 40 40 40 40 40 40
7:  40 40 40 40 18 16 16 10 40 40 40 40 40 40 40 40
8:  40 40 40 40 40 40 40 40 10 16 16 18 40 40 40 40
9:  40 40 40 40 40 40 40 40 16 10 18 16 40 40 40 40
10: 40 40 40 40 40 40 40 40 16 18 10 16 40 40 40 40
11: 40 40 40 40 40 40 40 40 18 16 16 10 40 40 40 40
12: 40 40 40 40 40 40 40 40 40 40 40 40 10 16 16 18
13: 40 40 40 40 40 40 40 40 40 40 40 40 16 10 18 16
14: 40 40 40 40 40 40 40 40 40 40 40 40 16 18 10 16
15: 40 40 40 40 40 40 40 40 40 40 40 40 18 16 16 10

```

```

-----
9. /proc/meminfo
   MemTotal:      8321815872 kB

```

```

-----
10. who -r
    run-level 3 Jan 19 13:01

```

```

-----
11. Systemd service manager version: systemd 239 (239-74.el8_8)
    Default Target Status

```

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## Platform Notes (Continued)

multi-user      running

### 12. Services, from systemctl list-unit-files

```

STATE UNIT FILES
enabled ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
abrt-journal-core abrt-oops abrt-vmcore abrt-xorg abrt-d accounts-daemon atd auditd autovt@
avahi-daemon chronyd cpuset_cpunodemap cpuset_memory_spread crond dcd dcdchkgracefulshutdown
dcdshutdown display-manager gdm getty@ hpe-auto-config hpe_irqbalance import-state
insights-client-boot iscsi iscsi-onboot kdump ksm ksmtuned libstoragemgmt libvirt-d lm_sensors
loadmodules lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
nvme-fc-boot-connections ostree-remount pmcd pmie pmlogger qemu-guest-agent rpcbind rsyslog
rtkit-daemon selinux-autorelabel-mark smartd sshd sssd syslog sysstat timedatex tuned udisks2 vdo
vgauthd vmtoolsd vsftpd
disabled abrt-ccpp abrt-pstoreoops arp-ethers autofs blk-availability bluetooth brltty
canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot cgdbxd
chrony-wait cni-dhcp console-getty cpupower cups cups-browsed debug-shell dnf-system-upgrade
dnsmasq dovecot ebttables fancontrol fcoe firewalld grafana-server gssproxy httpd httpd@ ibacm
iprdump iprinit iprupdate ipsec irqbalance iscsid iscsiui kpatch kvm_stat ledmon libvirt-guests
lldpad man-db-restart-cache-update named named-chroot ndctl-monitor netcf-transaction nfs-blkmap
nfs-convert nfs-server nftables nmb numad nvme-autoconnect oddjobd pmfind pmie_farm pmlogger_farm
pmpoxy podman podman-auto-update podman-clean-transient podman-kube@ podman-restart postfix
powertop psacct ras-mc-ctl rasdaemon rdisc rhcd rrdcached saslauthd sendmail sm-client smb snmpd
snmptrapd spamassassin speech-dispatcherd srp_daemon srp_daemon_port@ sshd-keygen@
switcheroo-control systemd-nspawn@ systemd-pstore systemd-resolved target targetclid tcsh
tog-pegasus trace-cmd upower virtinterfaced virtnetworkd virtnodevdev virtnwfilterd virtproxyd
virtqemud virtsecret virtstorged wpa_supplicant ypbind
indirect pcsd serial-getty@ spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh
sssd-sudo virtlockd virtlogd vsftpd@
masked systemd-timedated

```

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

```

BOOT_IMAGE=(hd2,gpt4)/boot/vmlinuz-4.18.0-477.10.1.el8_8.x86_64
root=UUID=e65a817a-ec5a-4172-8f09-b6a7120f7868
ro
loglevel=3
rd.auto=1
console=ttyS0,115200n8
selinux=0
security=
console=ttyS0,115200
udev.children-max=512
nmi_watchdog=0
uv_nmi.action=kdump
add_efi_memmap
tsc=nowatchdog
bau=0
earlyprintk=ttyS0,115200
log_buf_len=8M
numa_balancing=disable
crashkernel=1G,high

```

### 14. cpupower frequency-info

```

analyzing CPU 0:
  current policy: frequency should be within 3.50 GHz and 3.50 GHz.
                  The governor "performance" may decide which speed to use
                  within this range.
  boost state support:

```

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

**Test Date:** Jan-2024  
**Hardware Availability:** Dec-2023  
**Software Availability:** Dec-2023

## Platform Notes (Continued)

Supported: yes  
Active: yes

-----  
15. tuned-adm active  
Current active profile: throughput-performance

-----  
16. sysctl  
kernel.numa\_balancing 0  
kernel.randomize\_va\_space 2  
vm.compaction\_proactiveness 0  
vm.dirty\_background\_bytes 0  
vm.dirty\_background\_ratio 10  
vm.dirty\_bytes 0  
vm.dirty\_expire\_centisecs 3000  
vm.dirty\_ratio 40  
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 10  
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\_swap 64  
pages\_to\_scan 4096  
scan\_sleep\_millisecs 10000

-----  
19. OS release  
From /etc/\*-release /etc/\*-version  
os-release Red Hat Enterprise Linux 8.8 (Ootpa)  
hpe-foundation-release HPE Foundation Software 2.5.0, Build 750.0880.240110T0100.a.rhel88hpe-240110T0100  
redhat-release Red Hat Enterprise Linux release 8.8 (Ootpa)  
system-release Red Hat Enterprise Linux release 8.8 (Ootpa)

-----  
20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities  
itlb\_multihit Not affected  
lltf Not affected  
mds Not affected  
meltdown Not affected  
mmio\_stale\_data Not affected

(Continued on next page)



# SPEC CPU®2017 Integer 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\_int\_base = 7310

SPECrate®2017\_int\_peak = Not Run

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## Platform Notes (Continued)

retbleed	Not affected
spec_store_bypass	Mitigation: Speculative Store Bypass disabled via prctl
spectre_v1	Mitigation: usercopy/swaps barriers and __user pointer sanitization
spectre_v2	Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling, PBRSE-eIBRS: SW sequence
srbds	Not affected
tsx_async_abort	Not affected

For more information, see the Linux documentation on hardware vulnerabilities, for example <https://www.kernel.org/doc/html/latest/admin-guide/hw-vuln/index.html>

### 21. Disk information

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/nvme0n1p4	xf	2.3T	258G	2.1T	12%	/

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

Vendor:	HPE
Product:	Compute Scale-up Server 3200
Product Family:	1590PID03030201
Serial:	5UF2491412-000

### 23. 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:

63x Samsung M321R8GA0BB0-CQKDG	64 GB	2 rank	4800
65x Samsung M321R8GA0BB0-CQKZH	64 GB	2 rank	4800

### 24. BIOS

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

BIOS Vendor:	HPE
BIOS Version:	Bundle:1.10.342-20231206_161054 SFW:009.010.108.000.2312042027
BIOS Date:	12/04/2023

## Compiler Version Notes

C | 500.perlbench\_r(base) 502.gcc\_r(base) 505.mcf\_r(base) 525.x264\_r(base) 557.xz\_r(base)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x  
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

C++ | 520.omnetpp\_r(base) 523.xalancbmk\_r(base) 531.deepsjeng\_r(base) 541.leela\_r(base)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x  
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

Fortran | 548.exchange2\_r(base)

(Continued on next page)



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**Test Sponsor:** HPE

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**Test Date:** Jan-2024

**Hardware Availability:** Dec-2023

**Software Availability:** Dec-2023

## Compiler Version Notes (Continued)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x  
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

## Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

## Base Portability Flags

500.perlbench\_r: -DSPEC\_LP64 -DSPEC\_LINUX\_X64  
502.gcc\_r: -DSPEC\_LP64  
505.mcf\_r: -DSPEC\_LP64  
520.omnetpp\_r: -DSPEC\_LP64  
523.xalancbmk\_r: -DSPEC\_LP64 -DSPEC\_LINUX  
525.x264\_r: -DSPEC\_LP64  
531.deepsjeng\_r: -DSPEC\_LP64  
541.leela\_r: -DSPEC\_LP64  
548.exchange2\_r: -DSPEC\_LP64  
557.xz\_r: -DSPEC\_LP64

## Base Optimization Flags

C benchmarks:

-w -std=c11 -m64 -Wl,-z,muldefs -xsaphirerapids -O3 -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-L/home/specdev/new\_compilers/ic2023.2.3/compiler/lib/intel64\_lin  
-lqkmalloc

C++ benchmarks:

-w -std=c++14 -m64 -Wl,-z,muldefs -xsaphirerapids -O3 -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-L/home/specdev/new\_compilers/ic2023.2.3/compiler/lib/intel64\_lin  
-lqkmalloc

(Continued on next page)



# SPEC CPU®2017 Integer Rate Result

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## Base Optimization Flags (Continued)

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin
-lqkmalloc
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.html>

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SDSS-rev1.0.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml>

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SDSS-rev1.0.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

Tested with SPEC CPU®2017 v1.1.9 on 2024-01-19 14:14:34-0500.

Report generated on 2024-02-14 12:27:32 by CPU2017 PDF formatter v6716.

Originally published on 2024-02-14.