SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

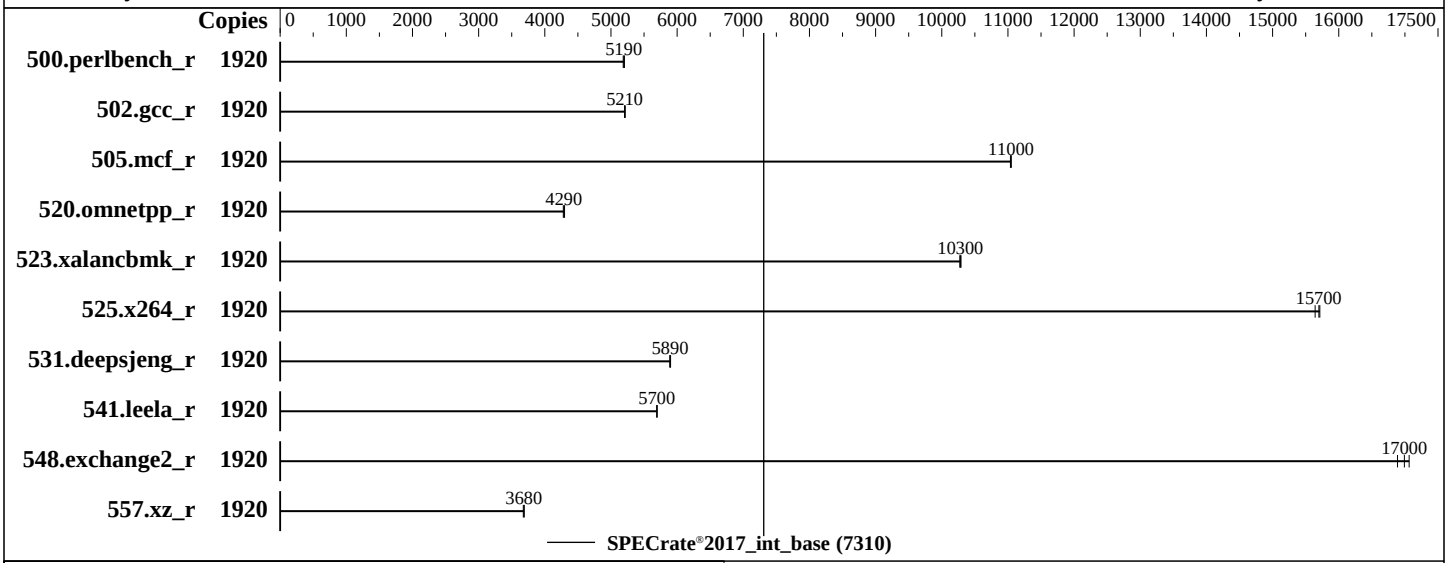
HPE Compute Scale-up Server 3200
(1.90 GHz, Intel Xeon Platinum 8490H)

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	**588**	**5190**							
502.gcc_r	1920	522	5210	**522**	**5210**	521	5220							
505.mcf_r	1920	**281**	**11000**	281	11000	281	11000							
520.omnetpp_r	1920	589	4280	**587**	**4290**	586	4300							
523.xalancbmk_r	1920	197	10300	197	10300	**197**	**10300**							
525.x264_r	1920	215	15600	214	15700	**214**	**15700**							
531.deepsjeng_r	1920	**373**	**5890**	373	5900	374	5890							
541.leela_r	1920	**558**	**5700**	558	5700	558	5690							
548.exchange2_r	1920	298	16900	295	17100	**296**	**17000**							
557.xz_r	1920	562	3690	**563**	**3680**	564	3670							

SPECrate®2017_int_base = 7310

SPECrate®2017_int_peak = Not Run

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
```

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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 abrtd 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 libvirtd lm_sensors
            loadmodules lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
            nvmefc-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 cgdcbxd
            chrony-wait cni-dhcp console-getty cpupower cups cups-browsed debug-shell dnf-system-upgrade
            dnsmasq dovecot ebtables fancontrol fcoe firewalld grafana-server gssproxy httpd httpd@ ibacm
            iprdump iprinit iprupdate ipsec irqbalance iscsid iscsiuio 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 nvmf-autoconnect oddjobd pmfind pmie_farm pmlogger_farm
            pmproxy 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 tcsd
            tog-pegasus trace-cmd upower virtinterfaced virtnetworkd virtnodedevd virtnwfilterd virtproxyd
            virtqemud virtsecretd virtstoraged wpa_supplicant ypbind
  indirect  pcscd 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-ecea-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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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+madvise [madvise] never
  enabled         [always] madvise 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
  l1tf                 Not affected
  mds                  Not affected
  meltdown             Not affected
  mmio_stale_data      Not affected
```

(Continued on next page)

Platform Notes (Continued)

```
   retbleed             Not affected
   spec_store_bypass    Mitigation: Speculative Store Bypass disabled via prctl
   spectre_v1           Mitigation: usercopy/swapgs barriers and __user pointer sanitization
   spectre_v2           Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling, PBRSB-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 xfs   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)

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 -xsapphirerapids -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 -xsapphirerapids -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

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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.

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