SPEC CPU®2017 Integer Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen11
(2.90 GHz, Intel Xeon Platinum 8444H)

SPECraten®2017_int_base = 651
SPECraten®2017_int_peak = 669

Copyright 2017-2024 Standard Performance Evaluation Corporation

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

Test Date: May-2023
Hardware Availability: May-2023
Software Availability: Dec-2022

Cycles

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>128</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>128</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>128</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>128</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>128</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>128</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>128</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>128</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>128</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>128</td>
</tr>
</tbody>
</table>

SPECraten®2017_int_base (651)
SPECraten®2017_int_peak (669)

Hardware

CPU Name: Intel Xeon Platinum 8444H
Max MHz: 4000
Nominal: 2900
Enabled: 64 cores, 4 chips, 2 threads/core
Orderable: 1, 2, 4 chip(s)
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 45 MB I+D on chip per chip
Other: None
Memory: 1 TB (32 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 480 GB SATA SSD
Other: None

Software

OS: Ubuntu 22.04.1 LTS
Kernel 5.15.0-43-generic
Compiler: C/C++, Version 2023.0 of Intel oneAPI DPC++/C++
Compiler for Linux;
Fortran: Version 2023.0 of Intel Fortran Compiler
for Linux;
Parallel: No
Firmware: HPE BIOS Version v1.30 03/01/2023 released
Mar-2023
File System: ext4
System State: Run level 5 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS and OS set to prefer performance at
the cost of additional power usage
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL560 Gen11  
(2.90 GHz, Intel Xeon Platinum 8444H)  

SPEC CPU®2017 Integer Rate Result  

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL560 Gen11  
(2.90 GHz, Intel Xeon Platinum 8444H)  

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

SPECrate®2017_int_base = 651  
SPECrate®2017_int_peak = 669  

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>128</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>464</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>128</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>464</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>128</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>464</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>128</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>464</td>
</tr>
<tr>
<td>523.xalanchbk_r</td>
<td>128</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>464</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>128</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>464</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>128</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>464</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>128</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>464</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>128</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>464</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>128</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>465</td>
<td>439</td>
<td>464</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalanchbk_r / 623.xalanchbk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

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 Accelerator-Performance using "tuned-adm profile accelerator-performance"  
perf-bias for all the CPUs is set using "cpupower set -b 0"
SPEC CPU®2017 Integer Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen11
(2.90 GHz, Intel Xeon Platinum 8444H)

SPECrate®2017_int_base = 651
SPECrate®2017_int_peak = 669

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

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) is mitigated in the system as tested and documented.

Platform Notes

The system ROM used for this result contains Intel microcode version 0x2b0001b0 for the Intel Xeon Platinum 8444H Processor
BIOS Configuration
- Workload Profile set to General Throughput Compute
- Memory Patrol Scrubbing set to Disabled
- Last Level Cache (LLC) Dead Line Allocation set to Disabled
- Enhanced Processor Performance Profile set to Aggressive
- Thermal Configuration set to Maximum Cooling
- Workload Profile set to Custom
- Adjacent Sector Prefetch set to Disabled
- DCU Stream Prefetcher set to Disabled
- Intel UPI Link Power Management set to Enabled
- Minimum Processor Idle Power Package C-State set to Package C6 (non-retention) State

The reported date by sysinfo is incorrect due to computer clock being not set correctly.
The correct test date is: May-2023

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on admin1 Mon Jun 27 18:38:17 2022

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. numacl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.4)
12. Failed units, from systemctl list-units --state=failed

(Continued on next page)
### Platform Notes (Continued)

13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
16. tuned-adm active
17. systemctl
18. /sys/kernel/mm/transparent_hugepage
19. /sys/kernel/mm/transparent_hugepage/kruegern
20. OS release
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS

-------------------------------------------------------------------------------------------------------------------

1. `uname -a`
   Linux admin1 5.15.0-43-generic #46-Ubuntu SMP Tue Jul 12 10:30:17 UTC 2022 x86_64 x86_64 x86_64 GNU/Linux

-------------------------------------------------------------------------------------------------------------------

2. `w`

   18:38:17 up 9 min, 3 users, load average: 0.00, 0.02, 0.00

   USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
   admin1 tty1 - 18:35 3:02 0.03s 0.00s -bash
   admin1 pts/0 172.16.0.100 18:36 1:53 0.05s 0.01s sshd: admin1 [priv]
   admin1 pts/1 172.16.0.100 18:36 9.00s 0.92s 0.04s sudo -i

-------------------------------------------------------------------------------------------------------------------

3. Username
   From environment variable $USER: root
   From the command 'logname': admin1

-------------------------------------------------------------------------------------------------------------------

4. `ulimit --a`

   time(seconds) unlimited
   file(blocks) unlimited
   data(kbytes) unlimited
   stack(kbytes) unlimited
   coredump(blocks) 0
   memory(kbytes) unlimited
   locked memory(kbytes) 132058320
   process 4126384
   nofiles 1024
   vmemory(kbytes) unlimited
   locks unlimited
   rtprio 0

-------------------------------------------------------------------------------------------------------------------

5. `sysinfo process ancestry`
   /sbin/init
   sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
   sshd: admin1 [priv]
   sshd: admin1@pts/0
   -bash
   sudo -i
   sudo -i
   -bash
   -bash
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 --c
   ic2023.0-lin-saphirerapids-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak -o all intrate

(Continued on next page)
Platform Notes (Continued)

runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 --configfile ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=64 --define physicalsecond --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --nopower --runmode rate --tune base:peak --size rate:intrate --nopreenv --note-preenv --logfile $SPEC/tmp/CPU2017.007/templogs/preenv.intrate.007.0.log --lognum 007.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

6. /proc/cpuinfo
model name : Intel(R) Xeon(R) Platinum 8444H
vendor_id : GenuineIntel
cpu family : 6
model : 143
stepping : 6
microcode : 0x2b0001b0
bugs : spec_store_bypass spectre_v1 spectre_v2
cpu cores : 16
siblings : 32
4 physical ids (chips)
128 processors (hardware threads)
physical id 0: core ids 0-15
physical id 1: core ids 0-15
physical id 2: core ids 0-15
physical id 3: core ids 0-15
physical id 0: apicids 0-31
physical id 1: apicids 128-159
physical id 2: apicids 256-287
physical id 3: apicids 384-415
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 2.37.2:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Address sizes: 46 bits physical, 57 bits virtual
Byte Order: Little Endian
CPU(s): 128
On-line CPU(s) list: 0-127
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Platinum 8444H
CPU family: 6
Model: 143
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 4
Stepping: 6
BogoMIPS: 5800.00
Flags:
  fpu vme de pse焓 mce 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 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 ebpx cat_13 cat_12 cdp_13
  invpcid_single cdp_d1 ssbd mba ibrs ibpb ibrs_enabled tpr_shadow
  vmx fexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen11
(2.90 GHz, Intel Xeon Platinum 8444H)

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

SPEC CPU®2017 Integer Rate Result

HPE
ProLiant DL560 Gen11
(2.90 GHz, Intel Xeon Platinum 8444H)

SPECrate®2017_int_base = 651
SPECrate®2017_int_peak = 669

Test Date: May-2023
Hardware Availability: May-2023
Software Availability: Dec-2022

Platform Notes (Continued)

erms invpcid qcm rdt_a avx512f avx512dq rseed adx smap avx512sfma
ciflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsave
xgetbv1 xsaveas qcm_llc qcm_occup_llc qcm_mbm_total qcm_mbm_local
split_lock_detect avx_vnni avx512_bf16 wbinvd dtherm ida arat pin pts
avx512v bmi umip pku ospke waitpkg avx512_v bmi2 qfni vaes vpcmmlqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect
cldemote movdiri movdir64b enqcmd md_clear serialize tsxldrtrk pconfig
arch_lbr amx_bf16 avx512_fp16 amx_tile amx_int8 flush_l1d
arch_capabilities

Virtualization: VT-x
L1d cache: 3 MiB (64 instances)
L1i cache: 2 MiB (64 instances)
L2 cache: 128 MiB (64 instances)
L3 cache: 180 MiB (4 instances)
NUMA node(s): 16
NUMA node0 CPU(s): 0-3, 64-67
NUMA node1 CPU(s): 4-7, 68-71
NUMA node2 CPU(s): 8-11, 72-75
NUMA node3 CPU(s): 12-15, 76-79
NUMA node4 CPU(s): 16-19, 80-83
NUMA node5 CPU(s): 20-23, 84-87
NUMA node6 CPU(s): 24-27, 88-91
NUMA node7 CPU(s): 28-31, 92-95
NUMA node8 CPU(s): 32-35, 96-99
NUMA node9 CPU(s): 36-39, 100-103
NUMA node10 CPU(s): 40-43, 104-107
NUMA node11 CPU(s): 44-47, 108-111
NUMA node12 CPU(s): 48-51, 112-115
NUMA node13 CPU(s): 52-55, 116-119
NUMA node14 CPU(s): 56-59, 120-123
NUMA node15 CPU(s): 60-63, 124-127
Vulnerability Itlb multihit: Not affected
Vulnerability Llft: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbdss: Not affected
Vulnerability Tax async abort: Not affected

From lscpu --cache:

<table>
<thead>
<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>3M</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>Ll1</td>
<td>32K</td>
<td>2M</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L2</td>
<td>2M</td>
<td>128M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L3</td>
<td>45M</td>
<td>180M</td>
<td>15</td>
<td>Unified</td>
<td>3</td>
<td>49152</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 16 nodes (0-15)
node 0 cpus: 0-3, 64-67
node 0 size: 64096 MB
node 0 free: 63831 MB
node 1 cpus: 4-7, 68-71
node 1 size: 64509 MB
node 1 free: 64340 MB
node 2 cpus: 8-11, 72-75

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen11
(2.90 GHz, Intel Xeon Platinum 8444H)

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

SPECrates®2017_int_base = 651
SPECrates®2017_int_peak = 669

CPU2017 License: 3
Test Date: May-2023
Test Sponsor: HPE
Hardware Availability: May-2023
Tested by: HPE
Software Availability: Dec-2022

Platform Notes (Continued)

node 2 size: 64509 MB
node 2 free: 64329 MB
node 3 cpus: 12-15,76-79
node 3 size: 64509 MB
node 3 free: 64270 MB
node 4 cpus: 16-19,80-83
node 4 size: 64509 MB
node 4 free: 64362 MB
node 5 cpus: 20-23,84-87
node 5 size: 64509 MB
node 5 free: 64373 MB
node 6 cpus: 24-27,88-91
node 6 size: 64509 MB
node 6 free: 64356 MB
node 7 cpus: 28-31,92-95
node 7 size: 64509 MB
node 7 free: 64373 MB
node 8 cpus: 32-35,96-99
node 8 size: 64476 MB
node 8 free: 64315 MB
node 9 cpus: 36-39,100-103
node 9 size: 64509 MB
node 9 free: 64320 MB
node 10 cpus: 40-43,104-107
node 10 size: 64509 MB
node 10 free: 64379 MB
node 11 cpus: 44-47,108-111
node 11 size: 64509 MB
node 11 free: 64328 MB
node 12 cpus: 48-51,112-115
node 12 size: 64509 MB
node 12 free: 64316 MB
node 13 cpus: 52-55,116-119
node 13 size: 64509 MB
node 13 free: 64331 MB
node 14 cpus: 56-59,120-123
node 14 size: 64509 MB
node 14 free: 64316 MB
node 15 cpus: 60-63,124-127
node 15 size: 64503 MB
node 15 free: 64250 MB
node distances:

node 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
0: 10 20 30 30 30 30 30 30 30 30 30 30 30 30 30 30
1: 20 10 30 30 30 30 30 30 30 30 30 30 30 30 30 30
2: 30 30 10 20 30 30 30 30 30 30 30 30 30 30 30 30
3: 30 30 20 10 30 30 30 30 30 30 30 30 30 30 30 30
4: 30 30 30 30 10 20 30 30 30 30 30 30 30 30 30 30
5: 30 30 30 30 30 30 10 20 30 30 30 30 30 30 30 30
6: 30 30 30 30 30 30 30 30 10 20 30 30 30 30 30 30
7: 30 30 30 30 30 30 30 30 20 10 30 30 30 30 30 30
8: 30 30 30 30 30 30 30 30 30 30 20 10 30 30 30 30
9: 30 30 30 30 30 30 30 30 30 30 20 10 30 30 30 30
10: 30 30 30 30 30 30 30 30 30 30 20 10 30 30 30 30
11: 30 30 30 30 30 30 30 30 30 30 20 10 30 30 30 30
12: 30 30 30 30 30 30 30 30 30 30 20 10 30 30 30 30
13: 30 30 30 30 30 30 30 30 30 30 20 10 30 30 30 30
14: 30 30 30 30 30 30 30 30 30 30 20 10 30 30 30 30
15: 30 30 30 30 30 30 30 30 30 30 20 10 30 30 30 30

(Continued on next page)
### Platform Notes (Continued)

9. `/proc/meminfo`
   - MemTotal: 1056466568 kB

10. `who -r`
    - run-level 5 Jun 27 18:30

11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.4)
    - Default Target: graphical
    - Status: degraded

12. Failed units, from `systemctl list-units --state=failed`
    * systemd-networkd-wait-online.service loaded failed failed Wait for Network to be Configured

13. Services, from `systemctl list-unit-files`
    - STATE   UNIT FILES
    - enabled  ModemManager apparmor blk-availability cloud-config cloud-final cloud-init cloud-init-local console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager grub-common grub-initrd-fallback irqbalance keyboard-setup lvm2-monitor lxd-agent multipathd networkd-dispatcher open-iscsi open-vm-tools pollinate rsyslog secureboot-db setvtrgb snadp ssh systemd-networkd systemd-networkd-wait-online systemd-pstore systemd-resolved systemd-timesyncd thermald tuned ua-reboot-cmds ubuntu-advantage udisks2 ufw unattended-upgrades vgauth
    - enabled-runtime netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
    - disabled  console-getty debug-shell iscsid nftables powertop rsyslog serial-getty@ systemd-boot-check-no-failures systemd-network-generator systemd-sysext systemd-time-wait-sync upower
    - generated  apport
    - indirect  uidd
    - masked  cryptdisks cryptdisks-early hwclock lvm2 multipath-tools-boot rc rcS screen-cleanup sudo x11-common

14. Linux kernel boot-time arguments, from `/proc/cmdline`
   - BOOT_IMAGE=/vmlinuz-5.15.0-43-generic
   - root=/dev/mapper/ubuntu--vg-ubuntu--lv
   - ro

15. `cpupower frequency-info`
    - analyzing CPU 0:
      - Unable to determine current policy
      - boost state support:
        - Supported: yes
        - Active: yes

16. `tuned-adm active`
    - Current active profile: accelerator-performance

17. `sysctl`
    - kernel.numa_balancing 1
    - kernel.randomize_va_space 2
    - vm.compaction_proactiveness 20

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
Copyright 2017-2024 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen11
(2.90 GHz, Intel Xeon Platinum 8444H)

SPECrate®2017_int_base = 651
SPECrate®2017_int_peak = 669

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

Test Date: May-2023
Hardware Availability: May-2023
Software Availability: Dec-2022

Platform Notes (Continued)

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

18. /sys/kernel/mm/transparent_hugepage
defrag        defer defer defer+madvise [madvise] never enabled
              always [madvise] never
hpage_pmd_size 2097152
shmem_enabled  never

19. /sys/kernel/mm/transparent_hugepage/hugepaged
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

20. OS release
From /etc/*-release /etc/*-version
os-release Ubuntu 22.04.1 LTS

21. Disk information
SPEC is set to: /home/cpu2017
/dev/mapper/ubuntu--vg-ubuntu--lv ext4 437G 210G 209G 51% /

22. /sys/devices/virtual/dmi/id
Vendor: HPE
Product: ProLiant DL560 Gen11
Product Family: ProLiant
Serial: CNX22605RZ

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:
28x Hynix HMCG88AEBRA168N 32 GB 2 rank 4800

(Continued on next page)
**SPECCPU®2017 Integer Rate Result**

Copyright 2017-2024 Standard Performance Evaluation Corporation

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL560 Gen11  
(2.90 GHz, Intel Xeon Platinum 8444H)  

**SPECrate®2017_int_base = 651**  
**SPECrate®2017_int_peak = 669**

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

**Platform Notes (Continued)**

3x Hynix HMCGB8MEBRA113N 32 GB 2 rank 4800  
1x Hynix HMCGB8MEBRA115N 32 GB 2 rank 4800  
32x UNKNOWN NOT AVAILABLE

24. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: HPE  
BIOS Version: 1.30  
BIOS Date: 03/01/2023  
BIOS Revision: 1.30  
Firmware Revision: 1.20

**Compiler Version Notes**

```
C       | 502.gcc_r(peak)
---------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
      | 557.xz_r(base, peak)
---------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

C       | 502.gcc_r(peak)
---------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
      | 557.xz_r(base, peak)
---------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
      | 541.leela_r(base, peak)
---------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Fortran | 548.exchange2_r(base, peak)
---------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
```

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen11
(2.90 GHz, Intel Xeon Platinum 8444H)

SPECrate®2017_int_base = 651
SPECrate®2017_int_peak = 669

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

Test Date: May-2023
Hardware Availability: May-2023
Software Availability: Dec-2022

Compiler Version Notes (Continued)

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
-fflto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-fflto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -fflto

(Continued on next page)
Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- nostandard-realloc-lhs -align array32byte -auto
- L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
- lqkmalloc

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
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

Peak Optimization Flags

C benchmarks:
500.perlbench_r: -w -std=c11 -m64 -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
- fno-strict-overflow

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen11
(2.90 GHz, Intel Xeon Platinum 8444H)

| SPECrate®2017_int_base = 651 |
| SPECrate®2017_int_peak = 669 |

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

| Test Date: May-2023 | Hardware Availability: May-2023 |
| Software Availability: Dec-2022 |

Peak Optimization Flags (Continued)

500.perlbench_r (continued):
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)
-ffast-math -fno-alias
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes

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-rev1.2.html
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SPR-rev1.2.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL560 Gen11  
(2.90 GHz, Intel Xeon Platinum 8444H)  

<table>
<thead>
<tr>
<th></th>
<th>SPECrate®2017_int_base = 651</th>
<th>SPECrate®2017_int_peak = 669</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU2017 License:</td>
<td>3</td>
<td>Test Date: May-2023</td>
</tr>
<tr>
<td>Test Sponsor:</td>
<td>HPE</td>
<td>Hardware Availability: May-2023</td>
</tr>
<tr>
<td>Tested by:</td>
<td>HPE</td>
<td>Software Availability: Dec-2022</td>
</tr>
</tbody>
</table>

SPEC CPU and SPECrate are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.9 on 2022-06-27 14:38:17-0400.  
Originally published on 2023-05-23.