



SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL380a Gen11

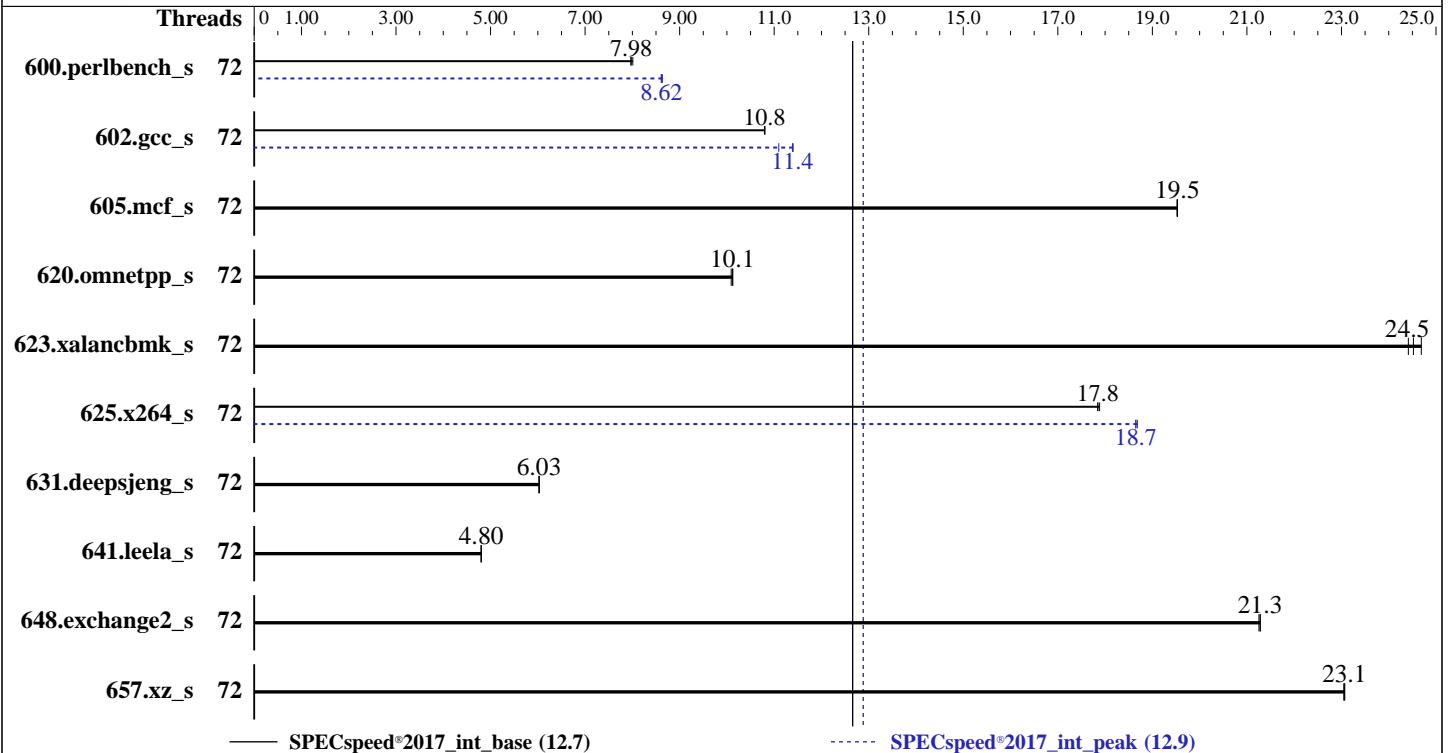
(2.00 GHz, Intel Xeon Platinum 8452Y)

SPECspeed®2017_int_base = 12.7

SPECspeed®2017_int_peak = 12.9

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

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



Hardware

CPU Name: Intel Xeon Platinum 8452Y
Max MHz: 3200
Nominal: 2000
Enabled: 72 cores, 2 chips
Orderable: 1, 2 chip(s)
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 67.5 MB I+D on chip per chip
Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 1.6 TB NVMe SSD
Other: None

Software

OS: Red Hat Enterprise Linux 9.0 (Plow)
Kernel 5.14.0-70.13.1.el9_0.x86_64
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: Yes
Firmware: HPE BIOS Version v1.22 01/18/2023 released Jan-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage



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Results Table

| Benchmark | Base | | | | | | Peak | | | | | | | |
|-----------------|---------|-------------|-------------|-------------|-------------|------------|-------------|---------|-------------|-------------|------------|-------------|------------|-------------|
| | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 600.perlbench_s | 72 | 223 | 7.97 | 222 | 8.01 | <u>223</u> | <u>7.98</u> | 72 | <u>206</u> | <u>8.62</u> | 206 | 8.61 | 206 | 8.63 |
| 602.gcc_s | 72 | 368 | 10.8 | 369 | 10.8 | <u>369</u> | <u>10.8</u> | 72 | <u>350</u> | <u>11.4</u> | 359 | 11.1 | 349 | 11.4 |
| 605.mcf_s | 72 | 242 | 19.5 | <u>242</u> | <u>19.5</u> | 242 | 19.5 | 72 | 242 | 19.5 | <u>242</u> | <u>19.5</u> | 242 | 19.5 |
| 620.omnetpp_s | 72 | 161 | 10.1 | 162 | 10.1 | <u>161</u> | <u>10.1</u> | 72 | 161 | 10.1 | 162 | 10.1 | <u>161</u> | <u>10.1</u> |
| 623.xalancbmk_s | 72 | <u>57.8</u> | <u>24.5</u> | 57.4 | 24.7 | 58.0 | 24.4 | 72 | <u>57.8</u> | <u>24.5</u> | 57.4 | 24.7 | 58.0 | 24.4 |
| 625.x264_s | 72 | 98.6 | 17.9 | <u>98.8</u> | <u>17.8</u> | 98.9 | 17.8 | 72 | <u>94.6</u> | <u>18.7</u> | 94.6 | 18.6 | 94.4 | 18.7 |
| 631.deepsjeng_s | 72 | 238 | 6.03 | <u>238</u> | <u>6.03</u> | 238 | 6.02 | 72 | 238 | 6.03 | <u>238</u> | <u>6.03</u> | 238 | 6.02 |
| 641.leela_s | 72 | 355 | 4.80 | 355 | 4.80 | <u>355</u> | <u>4.80</u> | 72 | 355 | 4.80 | 355 | 4.80 | <u>355</u> | <u>4.80</u> |
| 648.exchange2_s | 72 | 138 | 21.3 | 138 | 21.3 | <u>138</u> | <u>21.3</u> | 72 | 138 | 21.3 | 138 | 21.3 | <u>138</u> | <u>21.3</u> |
| 657.xz_s | 72 | 268 | 23.1 | 268 | 23.1 | <u>268</u> | <u>23.1</u> | 72 | 268 | 23.1 | 268 | 23.1 | <u>268</u> | <u>23.1</u> |

SPECspeed®2017_int_base = **12.7**

SPECspeed®2017_int_peak = **12.9**

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.xalancbmk_r / 623.xalancbmk_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.

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

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```



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General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Redhat Enterprise Linux 8.0

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

jemalloc, a general purpose malloc implementation

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

Platform Notes

The system ROM used for this result contains Intel microcode version 0x2b000161 for the Intel Xeon Platinum 8452Y Processor

BIOS Configuration:

Workload Profile set to General Peak Frequency Compute

Thermal Configuration set to Maximum Cooling

Intel Hyper-Threading set to Disabled

Memory Patrol Scrubbing set to Disabled

Last Level Cache (LLC) Prefetch set to Enabled

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

Enhanced Processor Performance Profile set to Aggressive

Dead Block Predictor set to Enabled

Sub-NUMA Clustering set to Enabled SNC2(2-clusters)

Workload Profile set to Custom

Adjacent Sector Prefetch set to Disabled

Minimum Processor Idle Power Package C-State set to No Package State

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197

running on localhost.localdomain Wed May 24 03:48:51 2023

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

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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 250 (250-6.el9_0)
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
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19. OS release
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Platform Notes (Continued)

21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS

1. uname -a
Linux localhost.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64 x86_64 x86_64 GNU/Linux

2. w
03:48:51 up 0 min, 0 users, load average: 0.61, 0.22, 0.08
USER TTY LOGIN@ IDLE JCPU PCPU WHAT

3. Username
From environment variable \$USER: root

4. ulimit -a
real-time non-blocking time (microseconds, -R) unlimited
core file size (blocks, -c) 0
data seg size (kbytes, -d) unlimited
scheduling priority (-e) 0
file size (blocks, -f) unlimited
pending signals (-i) 2062824
max locked memory (kbytes, -l) 64
max memory size (kbytes, -m) unlimited
open files (-n) 1024
pipe size (512 bytes, -p) 8
POSIX message queues (bytes, -q) 819200
real-time priority (-r) 0
stack size (kbytes, -s) unlimited
cpu time (seconds, -t) unlimited
max user processes (-u) 2062824
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited

5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 28
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@notty
bash -c cd \$SPEC/ && \$SPEC/intspeed.sh
runcpu --nobuild --action validate --define default-platform-flags -c
ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=72 --tune base,peak -o all --define
intspeedaffinity --define drop_caches intspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=72 --tune base,peak --output_format all
--define intspeedaffinity --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed
intspeed --nopreenv --note-preenv --logfile \$SPEC/tmp/CPU2017.003/templogs/preenv.intspeed.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 8452Y

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Platform Notes (Continued)

```

vendor_id      : GenuineIntel
cpu family    : 6
model         : 143
stepping     : 6
microcode    : 0x2b000161
bugs         : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores    : 36
siblings     : 36
2 physical ids (chips)
72 processors (hardware threads)
physical id 0: core ids 0-35
physical id 1: core ids 0-35
physical id 0: apicids
0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70
physical id 1: apicids
128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,180,182,184,186,188,190,192,194,196,198

```

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

7. lscpu

From lscpu from util-linux 2.37.4:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:         46 bits physical, 57 bits virtual
Byte Order:            Little Endian
CPU(s):                72
On-line CPU(s) list:  0-71
Vendor ID:             GenuineIntel
BIOS Vendor ID:       Intel(R) Corporation
Model name:            Intel(R) Xeon(R) Platinum 8452Y
BIOS Model name:      Intel(R) Xeon(R) Platinum 8452Y
CPU family:            6
Model:                 143
Thread(s) per core:   1
Core(s) per socket:   36
Socket(s):             2
Stepping:              6
BogoMIPS:              4000.00
Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                      clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                      lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                      nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                      ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1
                      sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
                      lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3
                      invpcid_single cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow
                      vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2
                      erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
                      clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec
                      xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
                      split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts
                      avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq
                      avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect
                      cldemote movdiri movdir64b enqcmd fsrm md_clear serialize tsxldtrk pconfig
                      arch_lbr avx512_fp16 amx_tile flush_lld arch_capabilities

Virtualization:        VT-x
Lld cache:             3.4 MiB (72 instances)

```

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Platform Notes (Continued)

```

L1i cache:                2.3 MiB (72 instances)
L2 cache:                 144 MiB (72 instances)
L3 cache:                 135 MiB (2 instances)
NUMA node(s):             4
NUMA node0 CPU(s):       0-8,36-44
NUMA node1 CPU(s):       9-17,45-53
NUMA node2 CPU(s):       18-26,54-62
NUMA node3 CPU(s):       27-35,63-71
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:       Not affected
Vulnerability Mds:        Not affected
Vulnerability Meltdown:   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 IBRS, IBPB conditional, RSB filling
Vulnerability Srbds:      Not affected
Vulnerability Tsx async abort: Not affected

```

From lscpu --cache:

| NAME | ONE-SIZE | ALL-SIZE | WAYS | TYPE | LEVEL | SETS | PHY-LINE | COHERENCY-SIZE |
|------|----------|----------|------|-------------|-------|-------|----------|----------------|
| L1d | 48K | 3.4M | 12 | Data | 1 | 64 | 1 | 64 |
| L1i | 32K | 2.3M | 8 | Instruction | 1 | 64 | 1 | 64 |
| L2 | 2M | 144M | 16 | Unified | 2 | 2048 | 1 | 64 |
| L3 | 67.5M | 135M | 15 | Unified | 3 | 73728 | 1 | 64 |

8. numactl --hardware

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

```

available: 4 nodes (0-3)
node 0 cpus: 0-8,36-44
node 0 size: 128696 MB
node 0 free: 127703 MB
node 1 cpus: 9-17,45-53
node 1 size: 129020 MB
node 1 free: 128616 MB
node 2 cpus: 18-26,54-62
node 2 size: 129020 MB
node 2 free: 128615 MB
node 3 cpus: 27-35,63-71
node 3 size: 129009 MB
node 3 free: 128587 MB
node distances:
node  0  1  2  3
 0:  10  20  30  30
 1:  20  10  30  30
 2:  30  30  10  20
 3:  30  30  20  10

```

9. /proc/meminfo

MemTotal: 528123908 kB

10. who -r

run-level 3 May 24 03:48

11. Systemd service manager version: systemd 250 (250-6.e19_0)

```

Default Target Status
multi-user      running

```

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Platform Notes (Continued)

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

| STATE | UNIT FILES |
|-----------------|---|
| enabled | NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd crond dbus-broker firewalld getty@ irqbalance kdump lvm2-monitor mdmonitor microcode nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sshd sssd systemd-network-generator tuned udisks2 |
| enabled-runtime | systemd-remount-fs |
| disabled | blk-availability chrony-wait chronyd console-getty cpupower debug-shell kvm_stat man-db-restart-cache-update nftables powertop rdisc rhsm rhsm-facts rpmdb-rebuild serial-getty@ sshd-keygen@ systemd-boot-check-no-failures systemd-pstore systemd-sysex sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo |
| indirect | |

13. Linux kernel boot-time arguments, from `/proc/cmdline`
`BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64`
`root=/dev/mapper/rhel-root`
`ro`
`resume=/dev/mapper/rhel-swap`
`rd.lvm.lv=rhel/root`
`rd.lvm.lv=rhel/swap`

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

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

16. `sysctl`

| | |
|---|-------|
| <code>kernel.numa_balancing</code> | 1 |
| <code>kernel.randomize_va_space</code> | 2 |
| <code>vm.compaction_proactiveness</code> | 20 |
| <code>vm.dirty_background_bytes</code> | 0 |
| <code>vm.dirty_background_ratio</code> | 10 |
| <code>vm.dirty_bytes</code> | 0 |
| <code>vm.dirty_expire_centisecs</code> | 3000 |
| <code>vm.dirty_ratio</code> | 40 |
| <code>vm.dirty_writeback_centisecs</code> | 500 |
| <code>vm.dirtytime_expire_seconds</code> | 43200 |
| <code>vm.extfrag_threshold</code> | 500 |
| <code>vm.min_unmapped_ratio</code> | 1 |
| <code>vm.nr_hugepages</code> | 0 |
| <code>vm.nr_hugepages_mempolicy</code> | 0 |
| <code>vm.nr_overcommit_hugepages</code> | 0 |
| <code>vm.swappiness</code> | 10 |
| <code>vm.watermark_boost_factor</code> | 15000 |
| <code>vm.watermark_scale_factor</code> | 10 |
| <code>vm.zone_reclaim_mode</code> | 0 |

17. `/sys/kernel/mm/transparent_hugepage`
`defrag` always defer defer+madvice [madvice] never

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Platform Notes (Continued)

```

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_shared        256
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 9.0 (Plow)
redhat-release  Red Hat Enterprise Linux release 9.0 (Plow)
system-release  Red Hat Enterprise Linux release 9.0 (Plow)

```

```

-----
20. Disk information
SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   1.4T  156G  1.3T  12% /home

```

```

-----
21. /sys/devices/virtual/dmi/id
Vendor:          HPE
Product:         ProLiant DL380a Gen11
Product Family:  ProLiant
Serial:          CNX22602MZ

```

```

-----
22. 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:
  7x Hynix HMC88AEBRA168N 32 GB 2 rank 4800
  6x Hynix HMC88MEBRA113N 32 GB 2 rank 4800
  3x Hynix HMC88MEBRA115N 32 GB 2 rank 4800

```

```

-----
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:      HPE
BIOS Version:     1.22
BIOS Date:        01/18/2023
BIOS Revision:    1.22
Firmware Revision: 1.30

```

Compiler Version Notes

```

=====
C | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak)

```

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Compiler Version Notes (Continued)

| 657.xz_s(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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=====
C++ | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak)
| 641.leela_s(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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=====
Fortran | 648.exchange2_s(base, peak)

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Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64

602.gcc_s: -DSPEC_LP64

605.mcf_s: -DSPEC_LP64

620.omnetpp_s: -DSPEC_LP64

623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX

625.x264_s: -DSPEC_LP64

631.deepsjeng_s: -DSPEC_LP64

641.leela_s: -DSPEC_LP64

648.exchange2_s: -DSPEC_LP64

657.xz_s: -DSPEC_LP64



SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL380a Gen11

(2.00 GHz, Intel Xeon Platinum 8452Y)

SPECspeed®2017_int_base = 12.7

SPECspeed®2017_int_peak = 12.9

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: May-2023

Hardware Availability: Mar-2023

Software Availability: Dec-2022

Base Optimization Flags

C benchmarks:

```
-m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

C++ benchmarks:

```
-m64 -std=c++14 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Fortran benchmarks:

```
-m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Peak Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profddata(pass 2) -xCORE-AVX2(pass 1)
-flto -Ofast(pass 1) -xCORE-AVX512 -O3 -ffast-math
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-fiopenmp -DSPEC_OPENMP -fno-strict-overflow
```

(Continued on next page)



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Peak Optimization Flags (Continued)

600.perlbench_s (continued):

```
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

602.gcc_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)

```
-fprofile-use=default.profddata(pass 2) -xCORE-AVX2(pass 1)
```

```
-flto -Ofast(pass 1) -xCORE-AVX512 -O3 -ffast-math
```

```
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
```

```
-fiopenmp -DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib
```

```
-ljemalloc
```

605.mcf_s: basepeak = yes

625.x264_s: -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -O3

```
-ffast-math -flto -mfpmath=sse -funroll-loops
```

```
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
```

```
-fno-alias -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s: 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-rev2.1.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-rev2.1.xml>

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml>



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