



SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL340 Gen12

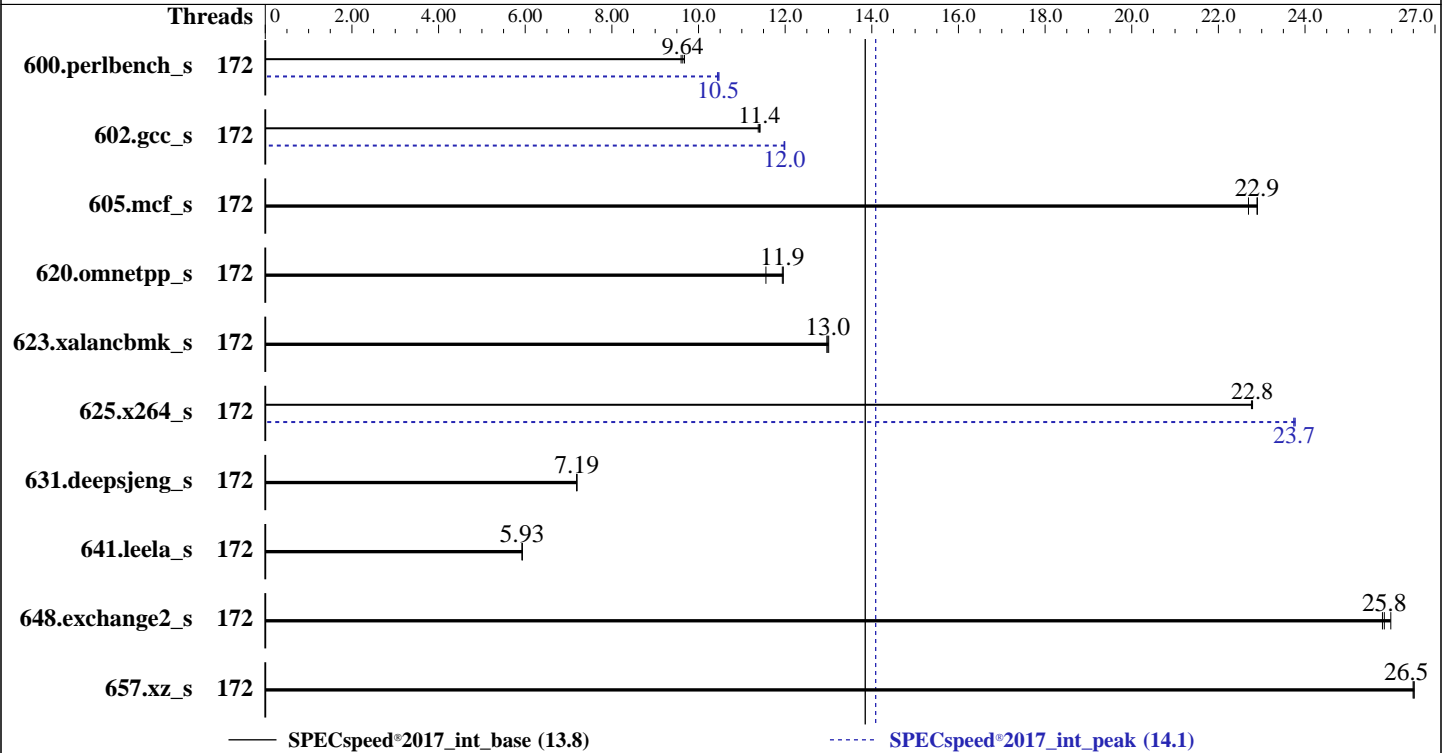
(2.00 GHz, Intel Xeon 6787P)

SPECspeed®2017_int_base = 13.8

SPECspeed®2017_int_peak = 14.1

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

Test Date: Feb-2025
Hardware Availability: Mar-2025
Software Availability: Jun-2024



Hardware

CPU Name: Intel Xeon 6787P
 Max MHz: 3800
 Nominal: 2000
 Enabled: 86 cores, 1 chip, 2 threads/core
 Orderable: 1 chip
 Cache L1: 64 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 336 MB I+D on chip per chip
 Other: None
 Memory: 256 GB (8 x 32 GB 2Rx8 PC5-6400B-R)
 Storage: 1 x 1.2 TB NVMe SSD
 Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP6
 Kernel 6.4.0-150600.21-default
 Compiler: C/C++: Version 2024.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2024.1 of Intel Fortran Compiler for Linux;
 Parallel: Yes
 Firmware: HPE BIOS Version v1.22 02/07/2025 released Feb-2025
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 Other: jemalloc memory allocator V5.0.1
 Power Management: BIOS 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	172	184	9.64	183	9.68	185	9.60	172	169	10.5	170	10.5	170	10.4
602.gcc_s	172	349	11.4	349	11.4	350	11.4	172	332	12.0	333	12.0	332	12.0
605.mcf_s	172	206	22.9	208	22.7	206	22.9	172	206	22.9	208	22.7	206	22.9
620.omnetpp_s	172	136	12.0	137	11.9	141	11.6	172	136	12.0	137	11.9	141	11.6
623.xalancbmk_s	172	109	13.0	109	13.0	109	13.0	172	109	13.0	109	13.0	109	13.0
625.x264_s	172	77.4	22.8	77.4	22.8	77.5	22.8	172	74.3	23.7	74.3	23.7	74.2	23.8
631.deepsjeng_s	172	199	7.19	199	7.19	199	7.19	172	199	7.19	199	7.19	199	7.19
641.leela_s	172	288	5.93	288	5.93	288	5.93	172	288	5.93	288	5.93	288	5.93
648.exchange2_s	172	114	25.8	114	25.8	113	26.0	172	114	25.8	114	25.8	113	26.0
657.xz_s	172	233	26.5	233	26.5	233	26.5	172	233	26.5	233	26.5	233	26.5

SPECspeed®2017_int_base = **13.8**

SPECspeed®2017_int_peak = **14.1**

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

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
```

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"
MALLOCONF = "retain:true"
OMP_STACKSIZE = "192M"
```

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
```



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Platform Notes

BIOS Configuration:

Workload Profile set to General Peak Frequency Compute
 Memory Patrol Scrubbing set to Disabled
 Thermal Configuration set to Maximum Cooling
 Enhanced Processor Performance Profile set to Aggressive
 Sub-NUMA Clustering (SNC) set to Enabled
 Last Level Cache (LLC) Prefetch set to Enabled
 Minimum Processor Idle Power Core C-State set to C6 as ACPI C3 State
 Workload Profile set to Custom
 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 Sat Feb 8 11:49:33 2025

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

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1. uname -a
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9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. sysctl
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

```
1. uname -a
Linux localhost 6.4.0-150600.21-default #1 SMP PREEMPT_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09)
x86_64 x86_64 x86_64 GNU/Linux
```

```
2. w
11:49:33 up 58 min, 8 users, load average: 60.77, 74.09, 74.13
USER      TTY      FROM          LOGIN@      IDLE        JCPU        PCPU        WHAT
root     pts/0    172.17.1.13   10:54       53:25      0.02s      0.02s      -bash
```

```
3. Username
From environment variable $USER: root
```

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Platform Notes (Continued)

```

4. ulimit -a
   core file size          (blocks, -c) unlimited
   data seg size          (kbytes, -d) unlimited
   scheduling priority     (-e) 0
   file size              (blocks, -f) unlimited
   pending signals        (-i) 1030504
   max locked memory      (kbytes, -l) 8192
   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) 1030504
   virtual memory        (kbytes, -v) unlimited
   file locks            (-x) unlimited

```

```

-----
5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize=31
   sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
   sshd: root [priv]
   sshd: root@notty
   bash -c cd $SPEC/ && $SPEC/intspeedsproff.sh
   runcpu --nobuild --action validate --define default-platform-flags -c
     ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=172 --tune base,peak -o all --define
     intspeedaffinity --define drop_caches intspeed
   runcpu --nobuild --action validate --define default-platform-flags --configfile
     ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=172 --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/CPU2017.002/templogs/preenv.intspeed.002.0.log
     --lognum 002.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/cpu2017

```

```

-----
6. /proc/cpuinfo
   model name      : Intel(R) Xeon(R) 6787P
   vendor_id      : GenuineIntel
   cpu family     : 6
   model          : 173
   stepping       : 1
   microcode      : 0x1000380
   bugs           : spectre_v1 spectre_v2 spec_store_bypass swapsg bhi
   cpu cores      : 86
   siblings       : 172
   1 physical ids (chips)
   172 processors (hardware threads)
   physical id 0: core ids 0-42,64-106
   physical id 0: apicids 0-85,128-213
   Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems. Use the above data carefully.

```

```

-----
7. lscpu

From lscpu from util-linux 2.39.3:
  Architecture:          x86_64
  CPU op-mode(s):        32-bit, 64-bit

```

(Continued on next page)



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Platform Notes (Continued)

```

Address sizes:                46 bits physical, 57 bits virtual
Byte Order:                   Little Endian
CPU(s):                        172
On-line CPU(s) list:         0-171
Vendor ID:                    GenuineIntel
BIOS Vendor ID:              Intel(R) Corporation
Model name:                   Intel(R) Xeon(R) 6787P
BIOS Model name:             Intel(R) Xeon(R) 6787P  CPU @ 2.0GHz
BIOS CPU family:             179
CPU family:                   6
Model:                        173
Thread(s) per core:          2
Core(s) per socket:          86
Socket(s):                    1
Stepping:                     1
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 intel_ppin cdp_l2
                               ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow flexpriority ept
                               vpid ept_ad fsgsbase tsc_adjust bmil hle avx2 smep bmi2 erms invpcid
                               rtm 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 user_shstk avx_vnni avx512_bf16 wbnoinvd dtherm ida
                               arat pln pts vnni avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni
                               vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpoperdq la57
                               rdpid bus_lock_detect cldemote movdiri movdir64b enqcmd fsrm md_clear
                               serialize tsxldtrk pconfig arch_lbr ibt amx_bf16 avx512_fp16 amx_tile
                               amx_int8 flush_lld arch_capabilities
Virtualization:               VT-x
L1d cache:                    4 MiB (86 instances)
L1i cache:                    5.4 MiB (86 instances)
L2 cache:                     172 MiB (86 instances)
L3 cache:                     336 MiB (1 instance)
NUMA node(s):                 2
NUMA node0 CPU(s):           0-42,86-128
NUMA node1 CPU(s):           43-85,129-171
Vulnerability Gather data sampling: Not affected
Vulnerability Itlb multihit:  Not affected
Vulnerability L1tf:           Not affected
Vulnerability Mds:            Not affected
Vulnerability Meltdown:       Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Reg file data sampling: Not affected
Vulnerability Retbleed:       Not affected
Vulnerability Spec rstack overflow: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1:      Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2:      Mitigation; Enhanced / Automatic IBRS; IBPB conditional; RSB filling;
                               PBRSE-eIBRS Not affected; BHI BHI_DIS_S
Vulnerability Srbds:          Not affected
Vulnerability Tsx async abort: Not affected

```

From lscpu --cache:

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Platform Notes (Continued)

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	4M	12	Data	1	64	1	64
L1i	64K	5.4M	16	Instruction	1	64	1	64
L2	2M	172M	16	Unified	2	2048	1	64
L3	336M	336M	16	Unified	3	344064	1	64

8. numactl --hardware

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

```

available: 2 nodes (0-1)
node 0 cpus: 0-42,86-128
node 0 size: 128690 MB
node 0 free: 125505 MB
node 1 cpus: 43-85,129-171
node 1 size: 128960 MB
node 1 free: 122938 MB
node distances:
node  0  1
  0: 10 12
  1: 12 10

```

9. /proc/meminfo

MemTotal: 263834444 kB

10. who -r

run-level 3 Feb 8 10:52

11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)

```

Default Target Status
multi-user      running

```

12. Services, from systemctl list-unit-files

```

STATE          UNIT FILES
enabled        apparmor auditd cron getty@ irqbalance issue-generator kbdsettings nvme-fc-boot-connections
                nvmmf-autoconnect postfix purge-kernels rollback sshd systemd-pstore wicked wickedd-auto4
                wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
enabled-runtime systemd-remount-fs
disabled       boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell grub2-once
                haveged hwloc-dump-hwdata issue-add-ssh-keys kexec-load rpmconfigcheck serial-getty@
                systemd-boot-check-no-failures systemd-confext systemd-network-generator systemd-sysex
                systemd-time-wait-sync systemd-timesyncd
indirect       systemd-userdbd wickedd

```

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

```

BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
root=UUID=eab0ed4d-682e-4710-8733-c28bac484a35
splash=silent
resume=/dev/disk/by-uuid/aeed0eb8-1155-47a5-869c-f7c223bb00af
mitigations=auto
quiet
security=apparmor

```

14. cpupower frequency-info

analyzing CPU 32:

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Platform Notes (Continued)

Unable to determine current policy
boost state support:
Supported: yes
Active: yes

```
-----
15. sysctl
kernel.numa_balancing          1
kernel.randomize_va_space     2
vm.compaction_proactiveness   20
vm.dirty_background_bytes     0
vm.dirty_background_ratio     10
vm.dirty_bytes                0
vm.dirty_expire_centisecs     3000
vm.dirty_ratio                20
vm.dirty_writeback_centisecs  500
vm.dirtytime_expire_seconds   43200
vm.extfrag_threshold          500
vm.min_unmapped_ratio         1
vm.nr_hugepages               0
vm.nr_hugepages_mempolicy     0
vm.nr_overcommit_hugepages    0
vm.swappiness                  60
vm.watermark_boost_factor     15000
vm.watermark_scale_factor     10
vm.zone_reclaim_mode          0
-----
```

```
-----
16. /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
-----
```

```
-----
17. /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
-----
```

```
-----
18. OS release
From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP6
-----
```

```
-----
19. Disk information
SPEC is set to: /home/cpu2017
Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/nvme1nlp3 xfs   1.2T 151G 1.1T  13% /home
-----
```

```
-----
20. /sys/devices/virtual/dmi/id
Vendor:      HPE
Product:     HPE ProLiant Compute DL340 Gen12
Product Family: ProLiant
-----
```

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Platform Notes (Continued)

Serial: C2X2NWX69B

21. dmidecode

Additional information from dmidecode 3.4 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:

8x Micron MTC20F2085S1RC64BD2 QSFF 32 GB 2 rank 6400

22. BIOS

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

BIOS Vendor: HPE
BIOS Version: 1.22
BIOS Date: 02/07/2025
BIOS Revision: 1.22
Firmware Revision: 1.1

Compiler Version Notes

C | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak)
| 657.xz_s(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.

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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.

Fortran | 648.exchange2_s(base, peak)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

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Base Compiler Invocation (Continued)

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

```

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

```

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

```

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

```

Peak Compiler Invocation

C benchmarks:

icx

(Continued on next page)



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Peak Compiler Invocation (Continued)

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

```

600.perlbench_s: -w -m64 -std=c11 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(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
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL340 Gen12

(2.00 GHz, Intel Xeon 6787P)

SPECspeed®2017_int_base = 13.8

SPECspeed®2017_int_peak = 14.1

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Feb-2025

Hardware Availability: Mar-2025

Software Availability: Jun-2024

Peak Optimization Flags (Continued)

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-GNR-rev1.1.html>

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

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-GNR-rev1.1.xml>

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