



SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

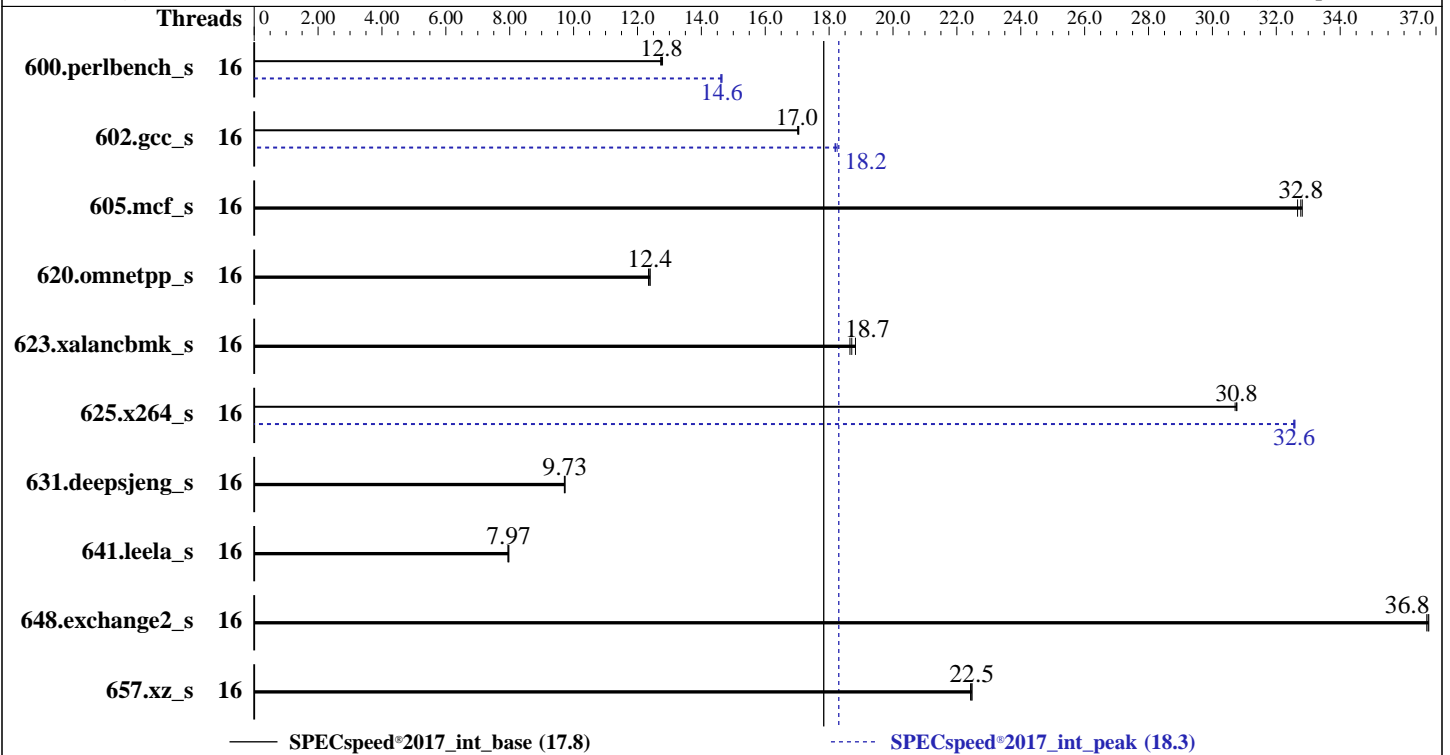
ProLiant MicroServer Gen11
(2.70 GHz, Intel Xeon 6353P)

SPECspeed®2017_int_base = 17.8

SPECspeed®2017_int_peak = 18.3

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

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



Hardware

CPU Name: Intel Xeon 6353P
 Max MHz: 5400
 Nominal: 2700
 Enabled: 8 cores, 1 chip, 2 threads/core
 Orderable: 1 chip
 Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 24 MB I+D on chip per chip
 Other: None
 Memory: 64 GB (2 x 32 GB 2Rx8 PC5-5600B-E, running at 4400, orderable using HPE part# P64339-B21)
 Storage: 1 x 1 TB 7.2 K SATA HDD
 Other: CPU Cooling: Air

Software

OS: Red Hat Enterprise Linux 9.4 (Plow)
 Kernel 5.14.0-427.13.1.el9_4.x86_64
 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 v2.10 12/06/2024 released Dec-2024
 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	16	139	12.7	<u>139</u>	<u>12.8</u>	139	12.8	16	122	14.6	<u>121</u>	<u>14.6</u>	121	14.6
602.gcc_s	16	234	17.1	<u>234</u>	<u>17.0</u>	234	17.0	16	219	18.2	<u>219</u>	<u>18.2</u>	218	18.3
605.mcf_s	16	144	32.8	145	32.7	<u>144</u>	<u>32.8</u>	16	144	32.8	145	32.7	<u>144</u>	<u>32.8</u>
620.omnetpp_s	16	132	12.4	<u>132</u>	<u>12.4</u>	132	12.3	16	132	12.4	<u>132</u>	<u>12.4</u>	132	12.3
623.xalancbmk_s	16	<u>75.7</u>	<u>18.7</u>	75.3	18.8	76.0	18.7	16	<u>75.7</u>	<u>18.7</u>	75.3	18.8	76.0	18.7
625.x264_s	16	57.4	30.7	<u>57.4</u>	<u>30.8</u>	57.3	30.8	16	54.1	32.6	54.2	32.5	<u>54.2</u>	<u>32.6</u>
631.deepsjeng_s	16	148	9.71	<u>147</u>	<u>9.73</u>	147	9.73	16	148	9.71	<u>147</u>	<u>9.73</u>	147	9.73
641.leela_s	16	215	7.94	214	7.97	<u>214</u>	<u>7.97</u>	16	215	7.94	214	7.97	<u>214</u>	<u>7.97</u>
648.exchange2_s	16	79.9	36.8	80.1	36.7	<u>80.0</u>	<u>36.8</u>	16	79.9	36.8	80.1	36.7	<u>80.0</u>	<u>36.8</u>
657.xz_s	16	276	22.4	275	22.5	<u>275</u>	<u>22.5</u>	16	276	22.4	275	22.5	<u>275</u>	<u>22.5</u>

SPECspeed®2017_int_base = **17.8**

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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"

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"

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

BIOS Configuration:
Workload Profile set to General Peak Frequency Compute
Thermal Configuration set to Maximum Cooling
Enhanced Processor Performance Profile set to Enabled
Workload Profile set to Custom

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Platform Notes (Continued)

Power Regulator set to Dynamic Power Savings Mode

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Mon Feb 24 22:25:00 2025

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

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10. who -r
11. Systemd service manager version: systemd 252 (252-32.el9_4)
12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
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18. /sys/kernel/mm/transparent_hugepage/khugepaged
19. OS release
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21. /sys/devices/virtual/dmi/id
22. dmidecode
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```
1. uname -a
Linux localhost.localdomain 5.14.0-427.13.1.el9_4.x86_64 #1 SMP PREEMPT_DYNAMIC Wed Apr 10 10:29:16 EDT
2024 x86_64 x86_64 x86_64 GNU/Linux
```

```
2. w
22:25:00 up 1 min, 0 users, load average: 0.63, 0.42, 0.17
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) 256639
max locked memory (kbytes, -l) 8192
max memory size (kbytes, -m) unlimited
```

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Platform Notes (Continued)

```

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) 256639
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/intspeed.sh
runcpu --nobuild --action validate --define default-platform-flags -c
  ic2024.1-lin-core-avx2-speed-20240308.cfg --define cores=16 --tune base,peak -o all --define
  intspeedaffinity --define drop_caches intspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
  ic2024.1-lin-core-avx2-speed-20240308.cfg --define cores=16 --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/CPU2017.004/templogs/preenv.intspeed.004.0.log --lognum 004.0
  --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

```

6. /proc/cpuinfo

```

model name      : Intel(R) Xeon(R) 6353P
vendor_id      : GenuineIntel
cpu family     : 6
model          : 183
stepping       : 1
microcode      : 0x12c
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
cpu cores      : 8
siblings       : 16
1 physical ids (chips)
16 processors (hardware threads)
physical id 0: core ids 0-7
physical id 0: apicids 0-15

```

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, 48 bits virtual
Byte Order:             Little Endian
CPU(s):                 16
On-line CPU(s) list:   0-15
Vendor ID:              GenuineIntel
BIOS Vendor ID:        Intel(R) Corporation
Model name:             Intel(R) Xeon(R) 6353P
BIOS Model name:       Intel(R) Xeon(R) 6353P

```

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Platform Notes (Continued)

```

CPU family:          6
Model:              183
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s):          1
Stepping:           1
CPU(s) scaling MHz: 24%
CPU max MHz:        6900.0000
CPU min MHz:        800.0000
BogoMIPS:           5376.00
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
                   sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c
                   rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb ssbd ibrs ibpb stibp
                   ibrs_enhanced tpr_shadow flexpriority ept vpid ept_ad fsgsbase
                   tsc_adjust bmi1 avx2 smep bmi2 erms invpcid rdseed adx smap clflushopt
                   clwb intel_pt sha_ni xsaveopt xsavec xgetbv1 xsaves split_lock_detect
                   avx_vnni dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp
                   hwp_pkg_req hfi vnmi umip pku ospke waitpkg gfni vaes vpclmulqdq tme
                   rdpid movdiri movdir64b fsrm md_clear serialize pconfig arch_lbr ibt
                   flush_lld arch_capabilities
Virtualization:     VT-x
L1d cache:          384 KiB (8 instances)
L1i cache:          256 KiB (8 instances)
L2 cache:           16 MiB (8 instances)
L3 cache:           24 MiB (1 instance)
NUMA node(s):       1
NUMA node0 CPU(s): 0-15
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 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/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2:           Mitigation; Enhanced / Automatic IBRS, IBPB conditional, RSB filling,
                                     PBR SB-eIBRS SW sequence
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	384K	12	Data	1	64	1	64
L1i	32K	256K	8	Instruction	1	64	1	64
L2	2M	16M	16	Unified	2	2048	1	64
L3	24M	24M	12	Unified	3	32768	1	64

8. numactl --hardware

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

```

available: 1 nodes (0)
node 0 cpus: 0-15
node 0 size: 64201 MB
node 0 free: 63551 MB

```

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Platform Notes (Continued)

node distances:

```
node 0
0: 10
```

9. /proc/meminfo
MemTotal: 65742636 kB

10. who -r
run-level 3 Feb 24 22:24

11. Systemd service manager version: systemd 252 (252-32.el9_4)
Default Target Status
multi-user degraded

12. Failed units, from systemctl list-units --state=failed
UNIT LOAD ACTIVE SUB DESCRIPTION
* NetworkManager-wait-online.service loaded failed failed Network Manager Wait Online

13. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd crond
dbus-broker firewalld getty@ insights-client-boot irqbalance kdump lvm2-monitor mdmonitor
microcode nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sshd sssd
systemd-boot-update systemd-network-generator udisks2
enabled-runtime systemd-remount-fs
disabled blk-availability console-getty cpupower debug-shell dnf-system-upgrade hwloc-dump-hwdata
kvm_stat man-db-restart-cache-update nftables rdisc rhcd rhsm-facts rpmdb-rebuild
selinux-check-proper-disable serial-getty@ sshd-keygen@ systemd-boot-check-no-failures
systemd-pstore systemd-sysex
indirect sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo systemd-sysupdate
systemd-sysupdate-reboot

14. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-427.13.1.el9_4.x86_64
root=/dev/mapper/rhel00-root
ro
resume=/dev/mapper/rhel00-swap
rd.lvm.lv=rhel00/root
rd.lvm.lv=rhel00/swap

15. cpupower frequency-info
analyzing CPU 1:
current policy: frequency should be within 800 MHz and 6.80 GHz.
The governor "performance" may decide which speed to use
within this range.
boost state support:
Supported: yes
Active: yes

16. sysctl
kernel.numa_balancing 0
kernel.randomize_va_space 2

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Platform Notes (Continued)

```

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

```

```

-----
17. /sys/kernel/mm/transparent_hugepage
defrag          always 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_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 9.4 (Plow)
redhat-release  Red Hat Enterprise Linux release 9.4 (Plow)
system-release  Red Hat Enterprise Linux release 9.4 (Plow)

```

```

-----
20. Disk information
SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel00-home xfs   829G  62G  767G  8% /home

```

```

-----
21. /sys/devices/virtual/dmi/id
Vendor:      HPE
Product:     ProLiant MicroServer Gen11
Product Family: ProLiant
Serial:      91ZV86L0HM

```

```

-----
22. dmidecode
Additional information from dmidecode 3.5 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

```

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Platform Notes (Continued)

"DMTF SMBIOS" standard.

Memory:

2x Hynix HMC88AGBEA084N 32 GB 2 rank 5600, configured at 4400

23. BIOS

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

BIOS Vendor: HPE
BIOS Version: 2.10
BIOS Date: 12/06/2024
BIOS Revision: 2.10
Firmware Revision: 1.67

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

Fortran benchmarks:

ifx



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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 -xCORE-AVX2 -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 -xCORE-AVX2 -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 -xCORE-AVX2 -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



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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 -flto
-Ofast(pass 1) -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 -flto
-Ofast(pass 1) -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 -xCORE-AVX2 -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
```



SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant MicroServer Gen11
(2.70 GHz, Intel Xeon 6353P)

SPECspeed®2017_int_base = 17.8

SPECspeed®2017_int_peak = 18.3

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Feb-2025

Hardware Availability: Mar-2025

Software Availability: Apr-2024

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

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

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

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