



SPEC CPU®2026 Integer Rate Result

Copyright 2026 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL20 Gen11

(3.10 GHz, Intel Xeon 6377P)

SPECrate®2026_int_base = 57.7

SPECrate®2026_int_peak = 60.6

CPU2026 License: 3

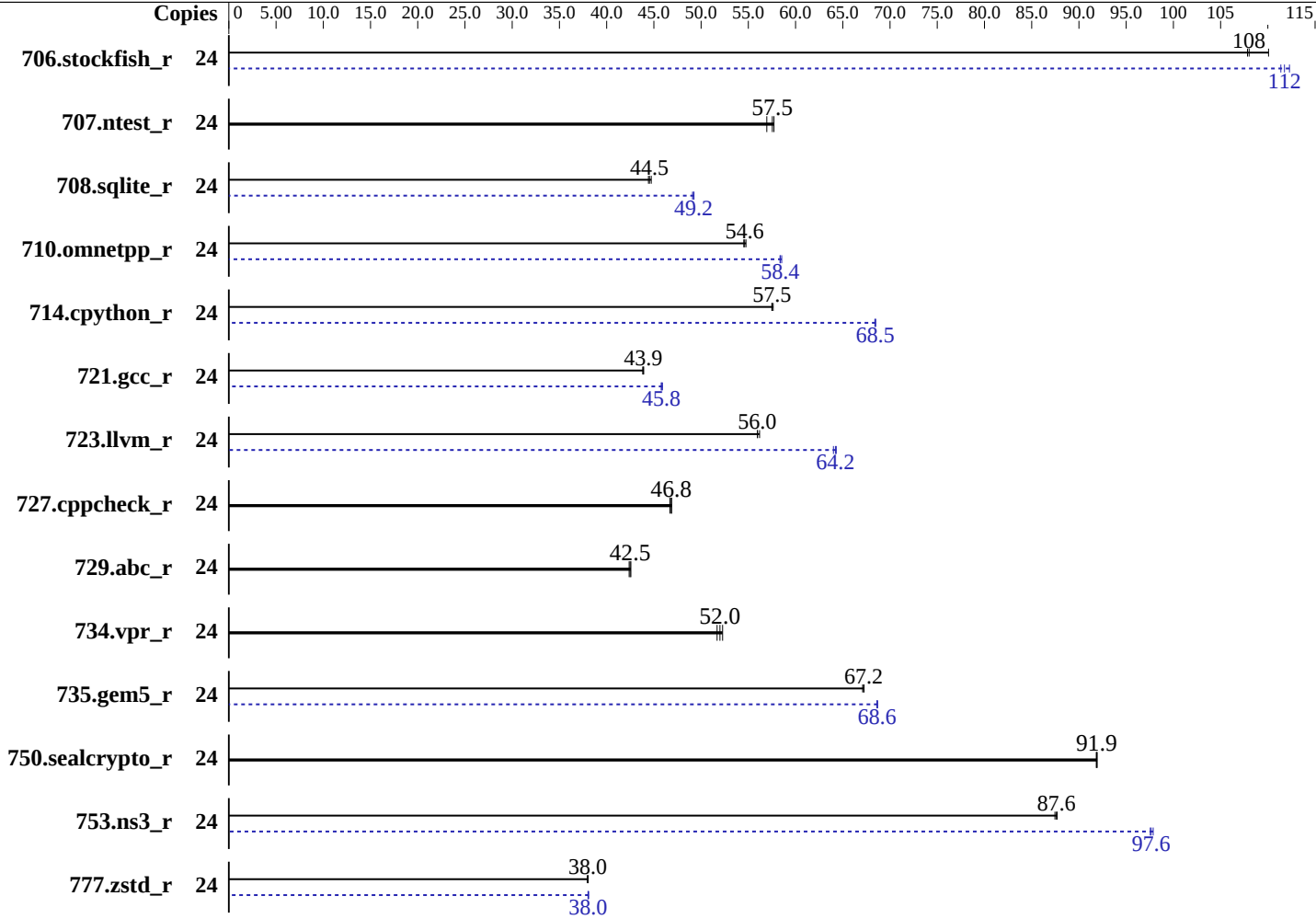
Test Sponsor: HPE

Tested by: HPE

Test Date: Jul-2026

Hardware Availability: Sep-2026

Software Availability: Apr-2026



Hardware

CPU Name: Intel Xeon 6377P
Max MHz: 5700
Nominal: 3100
Enabled: 12 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: 36 MB I+D on chip per chip
Other: None
Memory: 64 GB (2 x 32 GB 2Rx8 PC5-5600B-E, running at 4400)
Storage: 1 x 480 GB NVMe SSD
Cooling: Air
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP7
Kernel 6.4.0-150700.53.6-default
Compiler: C/C++: Version 2026.0 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2026.0 of Intel Fortran Compiler for Linux
Compiler Category: Vendor
Firmware: HPE BIOS Version v2.50 06/25/2026 released Jun-2026
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: tcmalloc memory allocator v2.18.1

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Software (Continued)

Power Management: BIOS set to prefer performance at the cost of additional power usage

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
706.stockfish_r	24	275	110	280	108	280	108	24	271	112	269	112	272	111
707.ntest_r	24	249	57.0	247	57.5	246	57.7	24	249	57.0	247	57.5	246	57.7
708.sqlite_r	24	283	44.7	285	44.4	285	44.5	24	257	49.2	258	49.1	258	49.2
710.omnetpp_r	24	213	54.7	214	54.5	214	54.6	24	200	58.4	199	58.5	200	58.4
714.cpython_r	24	199	57.6	200	57.5	200	57.5	24	168	68.4	168	68.5	168	68.5
721.gcc_r	24	375	43.9	375	43.9	376	43.8	24	359	45.9	360	45.8	359	45.8
723.llvm_r	24	217	56.2	217	56.0	217	56.0	24	190	64.0	189	64.2	189	64.3
727.cppcheck_r	24	184	46.7	184	46.9	184	46.8	24	184	46.7	184	46.9	184	46.8
729.abc_r	24	260	42.4	259	42.5	259	42.6	24	260	42.4	259	42.5	259	42.6
734.vpr_r	24	213	52.0	212	52.3	214	51.7	24	213	52.0	212	52.3	214	51.7
735.gem5_r	24	174	67.3	174	67.1	174	67.2	24	170	68.6	170	68.7	170	68.6
750.sealcrypto_r	24	140	91.9	140	91.8	140	91.9	24	140	91.9	140	91.8	140	91.9
753.ns3_r	24	168	87.5	168	87.6	168	87.7	24	151	97.6	150	97.9	151	97.6
777.zstd_r	24	406	38.0	407	38.0	407	37.9	24	406	38.0	406	38.1	406	38.0

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

Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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
tuned-adm profile was set to balanced using 'tuned-adm profile balanced'

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2026/lib"



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General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using CentOS Stream 9.

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.

tcmalloc, a fast, multithreaded malloc implementation
built with the CentOS Stream 9, and the system compiler gcc 11.5.0
sources available from github.com/gperftools/gperftools

Platform Notes

BIOS Configurations : Parameters are selected in the order shown below

Workload Profile set to General Throughput Compute

Thermal Configuration set to Maximum Cooling

Enhanced Processor Performance Profile set to Enabled

Workload Profile set to Custom

Power Regulator set to Dynamic Power Savings Mode

Sysinfo program /home/cpu2026/bin/sysinfo

Rev: 779ab21020787073335a329f3a45e2cd

running on localhost Tue Jul 14 02:34:20 2026

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

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-
1. `uname -srv`
 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 254 (254.27+suse.167.g130293e510)`
 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`

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Platform Notes (Continued)

```
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS
```

```
1. uname -srvm
```

```
Linux 6.4.0-150700.53.6-default #1 SMP PREEMPT_DYNAMIC Tue Jul 1 14:54:47 UTC 2025 (8ab7501) x86_64
```

```
2. w
```

```
02:34:20 up 2 min, 5 users, load average: 0.24, 0.13, 0.05
USER      TTY      FROM          LOGIN@   IDLE   JCPU   PCPU   WHAT
```

```
3. Username
```

```
From environment variable $USER: root
```

```
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) 256683
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) 256683
virtual memory          (kbytes, -v) unlimited
file locks              (-x) unlimited
```

```
5. sysinfo process ancestry
```

```
/usr/lib/systemd/systemd --switched-root --system --deserialize=42
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@notty
```

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Platform Notes (Continued)

```
bash -c cd $SPEC/ && $SPEC/intrate-avx2.sh
runcpu --nobuild --reportable --action validate --define default-platform-flags --copies 24 -c
ic2026.0-core-avx2-cpu2026-1.0.1-rate-20260429_revB.cfg --iterations=3 --reportable --define smt-on
--define cores=12 --define physicalfirst --define no-numa --tune base,peak -o all --define drop_caches
intrate
runcpu --nobuild --reportable --action validate --define default-platform-flags --copies 24 --configfile
ic2026.0-core-avx2-cpu2026-1.0.1-rate-20260429_revB.cfg --iterations 3 --reportable --define smt-on
--define cores=12 --define physicalfirst --define no-numa --tune base,peak --output_format all --define
drop_caches --nopower --runmode rate --tune base:peak --size refrate intrate --nopreenv --note-preenv
--logfile $SPEC/tmp/CPU2026.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2026
```

6. /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) 6377P
vendor_id       : GenuineIntel
cpu family      : 6
model           : 183
stepping        : 1
microcode       : 0x137
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb bhi
cpu cores       : 12
siblings        : 24
1 physical ids (chips)
24 processors (hardware threads)
physical id 0:  core ids 0-11
physical id 0:  apicids 0-23
```

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 2.40.4:

```
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):                24
On-line CPU(s) list:   0-23
Vendor ID:             GenuineIntel
Model name:            Intel(R) Xeon(R) 6377P
CPU family:            6
Model:                 183
Thread(s) per core:    2
Core(s) per socket:    12
```

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Platform Notes (Continued)

Socket(s): 1
Stepping: 1
CPU(s) scaling MHz: 14%
CPU max MHz: 5700.0000
CPU min MHz: 800.0000
BogoMIPS: 6220.80
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
user_shstk 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
VT-x
L1d cache: 576 KiB (12 instances)
L1i cache: 384 KiB (12 instances)
L2 cache: 24 MiB (12 instances)
L3 cache: 36 MiB (1 instance)
NUMA node(s): 1
NUMA node0 CPU(s): 0-23
Vulnerability Gather data sampling: Not affected
Vulnerability Indirect target selection: 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;
PBRSE-eIBRS SW sequence; 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	576K	12	Data	1	64	1	64
L1i	32K	384K	8	Instruction	1	64	1	64
L2	2M	24M	16	Unified	2	2048	1	64
L3	36M	36M	12	Unified	3	49152	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: 0-23

node 0 size: 64200 MB

node 0 free: 63439 MB

node distances:

node 0
0: 10

9. /proc/meminfo

MemTotal: 65740916 kB

10. who -r

run-level 3 Jul 14 02:32

11. Systemd service manager version: systemd 254 (254.27+suse.167.g130293e510)

Default Target Status

multi-user running

12. Services, from systemctl list-unit-files

STATE UNIT FILES

enabled ModemManager YaST2-Firstboot YaST2-Second-Stage apparmor appstream-sync-cache auditd
bluetooth cron display-manager getty@ irqbalance issue-generator kbdsettings klog
lvm2-monitor nsd postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore tuned
wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny wpa_supplicant

enabled-runtime systemd-remount-fs

disabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon autofs
autoyast-initscripts blk-availability bluetooth-mesh boot-sysctl ca-certificates
chrony-wait chronyd console-getty cups cups-browsed debug-shell dnsmasq ebttables
exchange-bmc-os-info firewallld fsidd gnome-remote-desktop gpm grub2-once haveged
hwloc-dump-hwdata ipmi ipmievd issue-add-ssh-keys kexec-load lunmask man-db-create
multipathd nfs nfs-blkmap nmb openvpn@ ostree-remount ostree-state-overlay@ rpcbind
rpmconfigcheck rsyncd rtkit-daemon samba-bgqd serial-getty@ smartd_generate_opts smb snmpd
snmptrapd speech-dispatcherd systemd-boot-check-no-failures systemd-confext
systemd-network-generator systemd-sysexit systemd-time-wait-sync systemd-timesyncd udisks2

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Platform Notes (Continued)

indirect update-system-flatpaks upower vncserver@ wpa_supplicant@
pcscd saned@ systemd-userdbd wickedd

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

BOOT_IMAGE=/boot/vmlinuz-6.4.0-150700.53.6-default
root=UUID=8714f750-931d-4b7f-a3d7-1d76d6688658
splash=silent
mitigations=auto
quiet
security=apparmor

14. cpupower frequency-info

analyzing CPU 14:

current policy: frequency should be within 800 MHz and 5.70 GHz.
The governor "powersave" may decide which speed to use
within this range.

boost state support:

Supported: yes

Active: yes

15. tuned-adm active

Current active profile: balanced

16. sysctl

kernel.numa_balancing	0
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

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Platform Notes (Continued)

17. /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

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 SUSE Linux Enterprise Server 15 SP7

20. Disk information
SPEC is set to: /home/cpu2026
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 447G 196G 248G 45% /home

21. /sys/devices/virtual/dmi/id
Vendor: HPE
Product: ProLiant DL20 Gen11
Product Family: ProLiant
Serial: DA2G93DK88

22. dmidecode
Additional information from dmidecode 3.6 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:
2x Hynix HMC88AGBEA084N 32 GB 2 rank 5600, configured at 4400

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Platform Notes (Continued)

23. BIOS

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

BIOS Vendor: HPE
BIOS Version: 2.50
BIOS Date: 06/25/2026
BIOS Revision: 2.50
Firmware Revision: 1.62

Compiler Version Notes

```
=====
C      | 708.sqlite_r(base, peak) 714.cpython_r(base, peak) 777.zstd_r(base,
      | peak)
-----
```

```
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2026.0.0 Build 20260331
Copyright (C) 1985-2026 Intel Corporation. All rights reserved.
-----
```

```
=====
C++    | 706.stockfish_r(base, peak) 707.ntest_r(base, peak)
      | 727.cppcheck_r(base, peak) 753.ns3_r(base, peak)
-----
```

```
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2026.0.0 Build 20260331
Copyright (C) 1985-2026 Intel Corporation. All rights reserved.
-----
```

```
=====
C++, C | 710.omnetpp_r(base, peak) 721.gcc_r(base, peak) 723.llvm_r(base,
      | peak) 729.abc_r(base, peak) 734.vpr_r(base, peak) 735.gem5_r(base,
      | peak) 750.sealcrypto_r(base, peak)
-----
```

```
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-----
```

Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

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Base Compiler Invocation (Continued)

Benchmarks using both C and C++:

icpx icx

Base Optimization Flags

C benchmarks:

```
-m64 -std=c18 -Wl,-z,muldefs -Wl,-plugin-opt=-inline-threshold=1500  
-xCORE-AVX2 -O3 -ffp-model=fast -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -fno-strict-aliasing  
-L/usr/local/tcmalloc-2.18.1/lib -ltcmalloc_minimal
```

C++ benchmarks:

```
-m64 -std=c++17 -Wl,-z,muldefs -Wl,-plugin-opt=-inline-threshold=1500  
-xCORE-AVX2 -O3 -ffp-model=fast -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -L/usr/local/tcmalloc-2.18.1/lib  
-ltcmalloc_minimal
```

Benchmarks using both C and C++:

```
-m64 -std=c++17 -std=c18 -Wl,-z,muldefs  
-Wl,-plugin-opt=-inline-threshold=1500 -xCORE-AVX2 -O3 -ffp-model=fast  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-fno-strict-aliasing -L/usr/local/tcmalloc-2.18.1/lib  
-ltcmalloc_minimal
```

Peak Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Benchmarks using both C and C++:

icpx icx



SPEC CPU®2026 Integer Rate Result

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(Test Sponsor: HPE)

ProLiant DL20 Gen11

(3.10 GHz, Intel Xeon 6377P)

SPECrate®2026_int_base = 57.7

SPECrate®2026_int_peak = 60.6

CPU2026 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jul-2026

Hardware Availability: Sep-2026

Software Availability: Apr-2026

Peak Optimization Flags

C benchmarks:

```
-m64 -std=c18 -Wl,-z,muldefs -Wl,-plugin-opt=-inline-threshold=1500  
-fprofile-generate(pass 1) -fprofile-use=default.profddata(pass 2)  
-xCORE-AVX2 -ffp-model=fast -flto -qopt-mem-layout-trans=4 -O3  
-mfpmath=sse -funroll-loops -fno-strict-aliasing  
-L/usr/local/tcmalloc-2.18.1/lib -ltcmalloc_minimal
```

C++ benchmarks:

```
706.stockfish_r: -m64 -std=c++17 -Wl,-z,muldefs  
-Wl,-plugin-opt=-inline-threshold=1500  
-fprofile-generate(pass 1)  
-fprofile-use=default.profddata(pass 2) -xCORE-AVX2  
-ffp-model=fast -flto -qopt-mem-layout-trans=4 -O3  
-mfpmath=sse -funroll-loops  
-L/usr/local/tcmalloc-2.18.1/lib -ltcmalloc_minimal
```

707.ntest_r: basepeak = yes

727.cppcheck_r: basepeak = yes

753.ns3_r: Same as 706.stockfish_r

Benchmarks using both C and C++:

```
710.omnetpp_r: -m64 -std=c++17 -std=c18 -Wl,-z,muldefs  
-Wl,-plugin-opt=-inline-threshold=1500  
-fprofile-generate(pass 1)  
-fprofile-use=default.profddata(pass 2) -xCORE-AVX2  
-ffp-model=fast -flto -qopt-mem-layout-trans=4 -O3  
-mfpmath=sse -funroll-loops -fno-strict-aliasing  
-L/usr/local/tcmalloc-2.18.1/lib -ltcmalloc_minimal
```

```
721.gcc_r: -m64 -std=c++17 -std=c18 -Wl,-z,muldefs  
-fprofile-generate(pass 1)  
-fprofile-use=default.profddata(pass 2) -xCORE-AVX2  
-ffp-model=fast -flto -qopt-mem-layout-trans=4 -O3  
-mfpmath=sse -funroll-loops -fno-strict-aliasing  
-L/usr/local/tcmalloc-2.18.1/lib -ltcmalloc_minimal
```

723.llvm_r: Same as 721.gcc_r

729.abc_r: basepeak = yes

734.vpr_r: basepeak = yes

(Continued on next page)



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Peak Optimization Flags (Continued)

735.gem5_r: Same as 710.omnetpp_r

750.sealcrypto_r: basepeak = yes

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

<http://www.spec.org/cpu2026/results/flags/Intel-ic2026-official-linux64-v1.1.html>

<http://www.spec.org/cpu2026/results/flags/HPE-Platform-Flags-Intel-CatlowRefresh-rev1.0.html>

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

<http://www.spec.org/cpu2026/results/flags/Intel-ic2026-official-linux64-v1.1.xml>

<http://www.spec.org/cpu2026/results/flags/HPE-Platform-Flags-Intel-CatlowRefresh-rev1.0.xml>

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