



SPEC CPU®2026 Floating Point 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_fp_base = 57.7

SPECrate®2026_fp_peak = 58.7

CPU2026 License: 3

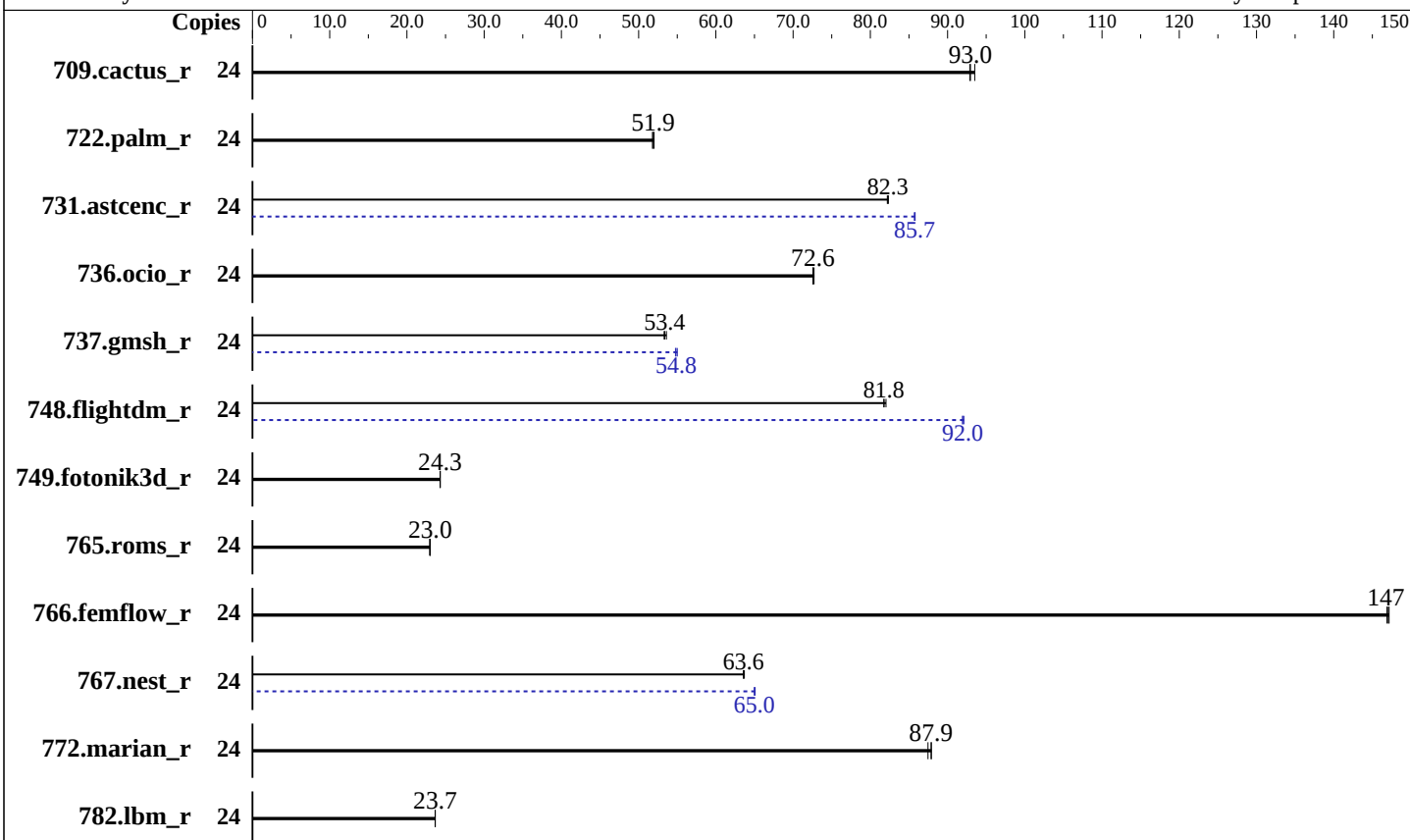
Test Sponsor: HPE

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



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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
709.cactus_r	24	220	93.5	<u>221</u>	93.0	222	92.9	24	220	93.5	<u>221</u>	93.0	222	92.9
722.palm_r	24	609	52.0	612	51.8	611	<u>51.9</u>	24	609	52.0	612	51.8	611	<u>51.9</u>
731.astcenc_r	24	245	82.2	245	82.3	245	82.3	24	235	85.7	235	85.8	235	85.7
736.ocio_r	24	289	72.7	289	72.6	289	72.6	24	289	72.7	289	72.6	289	72.6
737.gmsh_r	24	207	53.3	206	53.4	206	53.6	24	201	54.8	200	55.0	201	54.8
748.flightdm_r	24	209	82.0	210	81.8	210	81.8	24	187	91.9	187	92.1	187	92.0
749.fotonik3d_r	24	1142	24.3	1142	24.3	1141	24.3	24	1142	24.3	1142	24.3	1141	24.3
765.roms_r	24	1643	23.0	1648	22.9	1642	23.0	24	1643	23.0	1648	22.9	1642	23.0
766.femflow_r	24	239	147	240	147	239	147	24	239	147	240	147	239	147
767.nest_r	24	299	63.7	299	63.6	299	63.6	24	293	65.0	293	65.0	292	65.1
772.marian_r	24	433	87.5	431	87.9	431	87.9	24	433	87.5	431	87.9	431	87.9
782.lbm_r	24	581	23.6	581	23.7	581	23.7	24	581	23.6	581	23.7	581	23.7

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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"

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)

(Continued on next page)



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General Notes (Continued)

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 Sat Jul 11 05:49:19 2026

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

Table of contents

-
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
 17. /sys/kernel/mm/transparent_hugepage
 18. /sys/kernel/mm/transparent_hugepage/khugepaged
 19. OS release

(Continued on next page)



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Platform Notes (Continued)

20. Disk information

21. /sys/devices/virtual/dmi/id

22. dmidecode

23. BIOS

1. uname -srv

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

05:49:19 up 2 min, 5 users, load average: 0.08, 0.10, 0.04

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

bash -c cd \$SPEC/ && \$SPEC/fprate-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

(Continued on next page)



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Platform Notes (Continued)

```
--define cores=12 --define physicalfirst --define no-numa --tune base,peak -o all --define drop_caches
fprate
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 fprate --nopreenv --note-preenv
--logfile $SPEC/tmp/CPU2026.001/temlogs/preenv.fprate.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
Socket(s):              1
Stepping:               1
CPU(s) scaling MHz:     14%
```

(Continued on next page)



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Platform Notes (Continued)

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_l1d arch_capabilities

Virtualization: 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:

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

(Continued on next page)



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Platform Notes (Continued)

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: 63420 MB

node distances:

node 0

0: 10

9. /proc/meminfo

MemTotal: 65740908 kB

10. who -r

run-level 3 Jul 11 05:47

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 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 firewalld 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-dispatcher systemd-boot-check-no-failures systemd-confext systemd-network-generator systemd-sysextd systemd-time-wait-sync systemd-timesyncd udisks2 update-system-flatpaks upower vncserver@ wpa_supplicant@
indirect	pcscd saned@ systemd-userdbd wickedd

(Continued on next page)



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Platform Notes (Continued)

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 15:

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

17. /sys/kernel/mm/transparent_hugepage

(Continued on next page)



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Platform Notes (Continued)

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	159G	285G	36%	/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 HMC888AGBEA084N 32 GB 2 rank 5600, configured at 4400

23. BIOS

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

BIOS Vendor: HPE

(Continued on next page)



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Platform Notes (Continued)

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

Compiler Version Notes

=====
C | 782.lbm_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++ | 731.astcenc_r(base, peak) 736.ocio_r(base, peak)
| 748.flightdm_r(base, peak) 766.femflow_r(base, peak)
767.nest_r(base, peak) 772.marian_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 | 709.cactus_r(base, peak) 737.gmsh_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.

=====
Fortran | 722.palm_r(base, peak) 749.fotonik3d_r(base, peak) 765.roms_r(base,
peak)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2026.0.0 Build 20260331
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Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Benchmarks using both C and C++:

icpx icx

Base Portability Flags

737.gmsh_r: -fno-associative-math

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 -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

Fortran benchmarks:

-m64 -stand f18 -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 -nostandard-realloc-lhs -align array32byte
-auto -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
-L/usr/local/tcmalloc-2.18.1/lib -ltcmalloc_minimal



SPEC CPU®2026 Floating Point Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL20 Gen11

(3.10 GHz, Intel Xeon 6377P)

SPECrate®2026_fp_base = 57.7

SPECrate®2026_fp_peak = 58.7

CPU2026 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jul-2026

Hardware Availability: Sep-2026

Software Availability: Apr-2026

Peak Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Benchmarks using both C and C++:

icpx icx

Peak Portability Flags

737.gmsh_r: -fno-associative-math

Peak Optimization Flags

C benchmarks:

782.lbm_r: basepeak = yes

C++ benchmarks:

731.astcenc_r: -m64 -std=c++17 -Wl,-z,muldefs
-Wl,-plugin-opt=-inline-threshold=1500
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2
-ffp-model=fast -flt0 -qopt-mem-layout-trans=4 -O3
-mfpmath=sse -funroll-loops
-L/usr/local/tcmalloc-2.18.1/lib -ltcmalloc_minimal

736.ocio_r: basepeak = yes

748.flightdm_r: Same as 731.astcenc_r

766.femflow_r: basepeak = yes

767.nest_r: Same as 731.astcenc_r

772.marian_r: basepeak = yes

(Continued on next page)



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Peak Optimization Flags (Continued)

Fortran benchmarks:

722.palm_r: basepeak = yes

749.fotonik3d_r: basepeak = yes

765.roms_r: basepeak = yes

Benchmarks using both C and C++:

709.cactus_r: basepeak = yes

```
737.gmsh_r: -m64 -std=c++17 -std=c18 -Wl, -z, muldefs
-Wl, -plugin-opt=-inline-threshold=1500
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(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
```

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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