



SPEC CPU®2017 Integer Rate Result

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Bull SAS

SPECrate®2017_int_base = 3070

BullSequana SH41 (Intel Xeon 6788P)

SPECrate®2017_int_peak = Not Run

CPU2017 License: 20

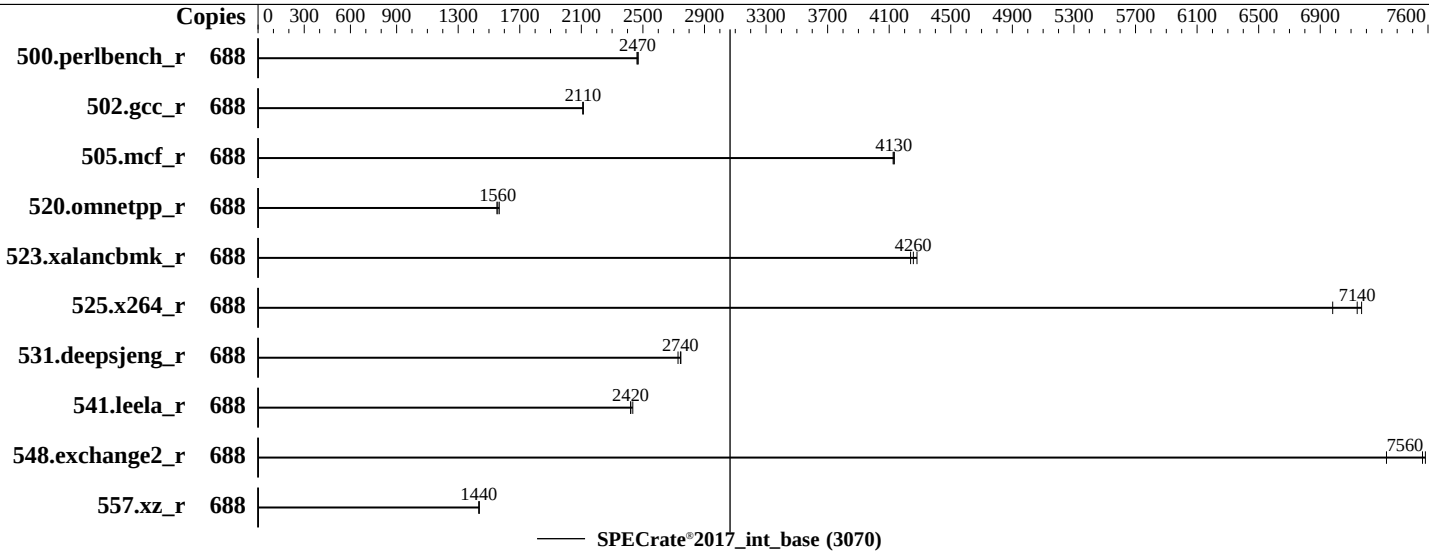
Test Sponsor: Bull SAS

Tested by: Bull SAS

Test Date: Sep-2025

Hardware Availability: Nov-2025

Software Availability: Jul-2025



Hardware

CPU Name: Intel Xeon 6788P
Max MHz: 3800
Nominal: 2000
Enabled: 344 cores, 4 chips, 2 threads/core
Orderable: 4 chips
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: 2 TB (32 x 64 GB 2Rx4 PC5-6400B-R)
Storage: 1920 GB Micron 7450 NVMe SSD
Other: CPU Cooling: Air

Software

OS: Red Hat Enterprise Linux 9.6 (Plow)
5.14.0-570.12.1.el9_6.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: No
Firmware: Version BIOS_BHS123.80.02.004 51.80 released Jul-2025
File System: xfs
System State: Run level 5 (graphical)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	688	444	2470	444	2470	445	2460							
502.gcc_r	688	461	2110	462	2110	461	2110							
505.mcf_r	688	269	4130	269	4130	269	4130							
520.omnetpp_r	688	582	1550	580	1560	576	1570							
523.xalancbmk_r	688	171	4260	171	4240	170	4280							
525.x264_r	688	169	7140	168	7170	173	6980							
531.deepsjeng_r	688	287	2740	287	2750	289	2730							
541.leela_r	688	468	2430	471	2420	471	2420							
548.exchange2_r	688	238	7580	246	7330	238	7560							
557.xz_r	688	518	1440	517	1440	518	1440							

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/spec/lib/intel64:/home/spec/lib/ia32:/home/spec/je5.0.1-32"
MALLOC_CONF = "retain:true"

General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4
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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

Platform Notes

BIOS Configuration:
DCU Streamer Prefetcher = Disabled

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Platform Notes (Continued)

SNC = Enabled

Power Performance Tuning = BIOS controls EPB

ENERGY_PERF_BIAS_CFG mode = Hyper Performance

Sysinfo program /home/spec/bin/sysinfo

Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197

running on cheops Tue Sep 16 04:12:23 2025

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
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7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 252 (252-51.el9)
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
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS

```
1. uname -a
Linux cheops 5.14.0-570.12.1.el9_6.x86_64 #1 SMP PREEMPT_DYNAMIC Fri Apr 4 10:41:31 EDT 2025 x86_64 x86_64
x86_64 GNU/Linux
```

```
2. w
04:12:23 up 4 days, 20:10,  0 users,  load average: 3.08, 192.18, 447.36
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) unlimited
data seg size               (kbytes, -d) unlimited
scheduling priority         (-e) 0
file size                   (blocks, -f) unlimited
pending signals              (-i) 8251135
```

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Platform Notes (Continued)

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)	8251135
virtual memory	(kbytes, -v)	unlimited
file locks	(-x)	unlimited

```
-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd rhgb --switched-root --system --deserialize 31
bash tasks.sh
bash run_one_rate.sh 3 intrate
runcpu --copies 688 --configfile Mesca6_4S --define smt-on --define numactl --define cores=344 --define
  invoke_with_interleave --define drop_caches --iterations=3 --reportable --size=ref --tune base -o all
  intrate
runcpu --copies 688 --configfile Mesca6_4S --define smt-on --define numactl --define cores=344 --define
  invoke_with_interleave --define drop_caches --iterations 3 --reportable --size ref --tune base
  --output_format all --nopower --runmode rate --tune base --size refrate intrate --nopreenv --note-preenv
  --logfile $SPEC/tmp/CPU2017.080/temlogs/preenv.intrate.080.0.log --lognum 080.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/spec
```

```
-----
6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) 6788P
vendor_id       : GenuineIntel
cpu family      : 6
model           : 173
stepping        : 1
microcode       : 0x10003c2
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
cpu cores       : 86
siblings        : 172
4 physical ids (chips)
688 processors (hardware threads)
physical id 0:  core ids 0-42,64-106
physical id 1:  core ids 0-42,64-106
physical id 2:  core ids 0-42,64-106
physical id 3:  core ids 0-42,64-106
physical id 0:  apicids 0-85,128-213
physical id 1:  apicids 256-341,384-469
physical id 2:  apicids 512-597,640-725
physical id 3:  apicids 768-853,896-981
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:	52 bits physical, 57 bits virtual
Byte Order:	Little Endian
CPU(s):	688

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Platform Notes (Continued)

On-line CPU(s) list: 0-687
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
Model name: Intel(R) Xeon(R) 6788P
BIOS Model name: Intel(R) Xeon(R) 6788P
CPU family: 6
Model: 173
Thread(s) per core: 2
Core(s) per socket: 86
Socket(s): 4
Stepping: 1
CPU(s) scaling MHz: 22%
CPU max MHz: 3800.0000
CPU min MHz: 800.0000
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 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 hwp hwp_act_window hwp_epp hwp_pkg_req vnmi avx512vbmi umip pku
ospke waitpkg avx512_vbmi2 gfni vaes vpcmlmulqdq avx512_vnni
avx512_bitalg tme avx512_vpopcntdq 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_l1d
arch_capabilities
Virtualization: VT-x
L1d cache: 16.1 MiB (344 instances)
L1i cache: 21.5 MiB (344 instances)
L2 cache: 688 MiB (344 instances)
L3 cache: 1.3 GiB (4 instances)
NUMA node(s): 8
NUMA node0 CPU(s): 0-42,344-386
NUMA node1 CPU(s): 43-85,387-429
NUMA node2 CPU(s): 86-128,430-472
NUMA node3 CPU(s): 129-171,473-515
NUMA node4 CPU(s): 172-214,516-558
NUMA node5 CPU(s): 215-257,559-601
NUMA node6 CPU(s): 258-300,602-644
NUMA node7 CPU(s): 301-343,645-687
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

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Platform Notes (Continued)

Vulnerability Spectre v2: Mitigation; Enhanced / Automatic IBRS; IBPB conditional; RSB filling; PBRSE-eIBRS Not affected; BHI BHI_DIS_S
Vulnerability Smbds: 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	16.1M	12	Data	1	64	1	64
L1i	64K	21.5M	16	Instruction	1	64	1	64
L2	2M	688M	16	Unified	2	2048	1	64
L3	336M	1.3G	16	Unified	3	344064	1	64

8. numactl --hardware

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

available: 8 nodes (0-7)
node 0 cpus: 0-42,344-386
node 0 size: 256741 MB
node 0 free: 254449 MB
node 1 cpus: 43-85,387-429
node 1 size: 258026 MB
node 1 free: 256362 MB
node 2 cpus: 86-128,430-472
node 2 size: 258026 MB
node 2 free: 256509 MB
node 3 cpus: 129-171,473-515
node 3 size: 258026 MB
node 3 free: 256512 MB
node 4 cpus: 172-214,516-558
node 4 size: 258026 MB
node 4 free: 256602 MB
node 5 cpus: 215-257,559-601
node 5 size: 258026 MB
node 5 free: 256544 MB
node 6 cpus: 258-300,602-644
node 6 size: 258026 MB
node 6 free: 256341 MB
node 7 cpus: 301-343,645-687
node 7 size: 257950 MB
node 7 free: 256450 MB

node distances:

node	0	1	2	3	4	5	6	7
0:	10	12	21	21	21	21	21	21
1:	12	10	21	21	21	21	21	21
2:	21	21	10	12	21	21	21	21
3:	21	21	12	10	21	21	21	21
4:	21	21	21	21	10	12	21	21
5:	21	21	21	21	12	10	21	21
6:	21	21	21	21	21	21	10	12
7:	21	21	21	21	21	21	12	10

9. /proc/meminfo

MemTotal: 2112358020 kB

10. who -r

run-level 5 Sep 11 08:03

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Platform Notes (Continued)

11. Systemd service manager version: systemd 252 (252-51.el9)

Default Target Status
graphical running

12. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon atd auditd avahi-daemon bluetooth chronyd crond cups dbus-broker firewallld gdm getty@ insights-client-boot irqbalance iscsi-onboot iscsi-starter kdump libstoragemgmt lm_sensors low-memory-monitor lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname nvme-fc-boot-connections ostree-remount pmcd pmie pmlogger power-profiles-daemon qemu-guest-agent rhsmcertd rsyslog rtkit-daemon selinux-autorelabel-mark smartd sshd sssd switcheroo-control sysstat systemd-boot-update systemd-network-generator tuned udisks2 upower vgauthd vmtoolsd
enabled-runtime	systemd-remount-fs
disabled	arp-ethers blk-availability brltty canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot chrony-wait chronyd-restricted cni-dhcp console-getty cpupower cups-browsed dbus-daemon debug-shell dnf-system-upgrade dnsmasq fancontrol grafana-server iprdump iprinit iprupdate iscsi-init iscsid iscsiuiop kpatch kvm_stat ledmon lvm-devices-import man-db-restart-cache-update netavark-dhcp-proxy netavark-firewalld-reload nftables nvme-fc-autoconnect ostree-readonly-sysroot-migration ostree-state-overlay@ pcp-geolocate pmfind pmie_farm pmlogger_farm pmproxy podman podman-auto-update podman-clean-transient podman-kube@ podman-restart postfix powertop psacct ras-mc-ctl rasdaemon rdisc rhcd rhsm rhsm-facts rpmbd-rebuild rrdcached saslauthd selinux-check-proper-disable serial-getty@ speech-dispatcherd sshd-keygen@ systemd-boot-check-no-failures systemd-pstore systemd-sysextr wpa_supplicant
indirect	iscsi spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo systemd-sysupdate systemd-sysupdate-reboot

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

```
BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-570.12.1.el9_6.x86_64  
root=/dev/mapper/rhel-root  
ro  
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M  
resume=/dev/mapper/rhel-swap  
rd.lvm.lv=rhel/root  
rd.lvm.lv=rhel/swap  
rhgb  
quiet
```

14. cpupower frequency-info

analyzing CPU 606:
current policy: frequency should be within 800 MHz and 3.80 GHz.
The governor "performance" may decide which speed to use
within this range.
boost state support:
Supported: yes
Active: yes

15. tuned-adm active

It seems that tuned daemon is not running, preset profile is not activated.
Preset profile: throughput-performance

16. sysctl

kernel.numa_balancing 0

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Platform Notes (Continued)

```
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
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      Red Hat Enterprise Linux 9.6 (Plow)
redhat-release  Red Hat Enterprise Linux release 9.6 (Plow)
system-release  Red Hat Enterprise Linux release 9.6 (Plow)
```

```
-----
20. Disk information
SPEC is set to: /home/spec
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   372G  8.9G  363G   3% /home
```

```
-----
21. /sys/devices/virtual/dmi/id
Vendor:      BULL
Product:     BullSequana SH series
Product Family: -
Serial:      XAN-S60-00048
```

```
-----
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
```

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Platform Notes (Continued)

determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:

16x Micron MTC40F2046S1RC64BD2 MXCC 64 GB 2 rank 6400

13x Samsung M321R8GA0EB2-CCPKC 64 GB 2 rank 6400

3x Samsung M321R8GA0EB2-CCPWC 64 GB 2 rank 6400

23. BIOS

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

BIOS Vendor: BULL

BIOS Version: BIOS_BHS123.80.02.004

BIOS Date: 07/25/2025

BIOS Revision: 51.80

Compiler Version Notes

=====

C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)

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++ | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)

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 | 548.exchange2_r(base)

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

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -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
-L/opt/intel/oneapi/compiler/2024.1/lib -lqkmallo

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/opt/intel/oneapi/compiler/2024.1/lib -lqkmallo

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 -auto
-L/opt/intel/oneapi/compiler/2024.1/lib -lqkmallo

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

<http://www.spec.org/cpu2017/flags/BullSequanaSH-Flags-V1.7.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/BullSequanaSH-Flags-V1.7.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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