Nettrix

R620 G50 (Intel Xeon Gold 6458Q, 3.10 GHz)

| SPECrate®2017_int_base = 730 |
| SPECrate®2017_int_peak = 755 |

CPU2017 License: 6138  
Test Sponsor: Nettrix  
Test Date: Mar-2023  
Hardware Availability: Jan-2023

Tested by: Nettrix  
Software Availability: Dec-2022

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**SPECrate®2017_int_base** (730)  
**SPECrate®2017_int_peak** (755)

**Hardware**

- **CPU Name:** Intel Xeon Gold 6458Q  
- **Max MHz:** 4000  
- **Nominal:** 3100  
- **Enabled:** 64 cores, 2 chips, 2 threads/core  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 48 KB D on chip per core  
- **L2:** 2 MB I+D on chip per core  
- **L3:** 60 MB I+D on chip per core  
- **Other:** None  
- **Memory:** 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)  
- **Storage:** 1 x 960 GB NVME SSD  
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 15 SP4 5.14.21-150400.22-default  
- **Compiler:** C/C++; Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;  
- **Parallel:** No  
- **Firmware:** Nettrix BIOS Version NNH1041018-U00-1 released Nov-2022  
- **File System:** btrfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 32/64-bit  
- **Other:** jemalloc memory allocator V5.0.1  
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
Results Table

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</table>

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

Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk_r / 623.xalanchmk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

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/lijq/lib/intel64:/home/lijq/lib/ia32:/home/lijq/je5.0.1-32"
MALLOC_CONF = "retain:true"
Nettrix

R620 G50 (Intel Xeon Gold 6458Q, 3.10 GHz)

SPECrate®2017_int_base = 730
SPECrate®2017_int_peak = 755

CPU2017 License: 6138
Test Sponsor: Nettrix
Tested by: Nettrix

General Notes
Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4
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.
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 numacl i.e.:
umactl --interleave=all runcpu <etc>
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes
BIOS Configuration:
  SNC (Sub NUMA) set to Enable SNC4 (4-clusters)
  Patrol Scrub set to Disabled
  LLC dead line alloc set to Disabled
  DCU Streamer Prefetcher set to Disabled
  Hardware P-States set to Native Mode

Sysinfo program /home/lijq/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Fri Mar 10 18:11:34 2023

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

(Continued on next page)
Platform Notes (Continued)

1. `uname -a`
   
   Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
   x86_64 x86_64 x86_64 GNU/Linux

2. `w`
   
   18:11:34 up 17 min, 1 user, load average: 0.00, 0.01, 0.04
   USER   TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root    tty1     -                18:07    6.00s  0.87s  0.00s -bash

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) 4125104
   max locked memory       (kbytes, -l) 64
   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) 4125104
   virtual memory         (kbytes, -v) unlimited
   file locks              (-x) unlimited

5. `sysinfo process ancestry`
   
   /usr/lib/systemd/systemd --switched-root --system --deserialize 32
   login -- root
   -bash
   runcpu --nobuild --reportable --iterations 3 --define default-platform-flags --define numcopies=128 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune_base,peak -o all intrate
   runcpu --nobuild --reportable --iterations 3 --define default-platform-flags --define numcopies=128
   --configfile ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune_base,peak --output_format all
   --nopower --runmode rate --tune_base,peak --size refrate intrate --nopreenv --note-prenv --logfile
   $SPEC/tmp/CPF2017.055/templogs/prenv.intrate.055.0.log --lognum 055.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/lijq

6. `/proc/cpuinfo`
   
   model name : Intel(R) Xeon(R) Gold 6458Q
   vendor_id : GenuineIntel
   cpu family : 6
   model : 143
   stepping : 8

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

Nettrix
R620 G50 (Intel Xeon Gold 6458Q, 3.10 GHz)

SPECratenettrixSPECrate®2017_int_base = 730 SPECratenettrixSPECrate®2017_int_peak = 755

CPU2017 License: 6138
Test Sponsor: Nettrix
Test Date: Mar-2023
Test Date: Mar-2023
Tested by: Nettrix
Software Availability: Dec-2022

Platform Notes (Continued)

- microcode : 0x2b000111
- bugs : spectre_v1 spectre_v2 spec_store_bypass swapgs
- cpu cores : 32
-siblings : 64
- 2 physical ids (chips)
- 128 processors (hardware threads)
- physical id 0: core ids 0-31
- physical id 1: core ids 0-31
- physical id 0: apicids 0-63
- physical id 1: apicids 128-191

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 2.37.2:

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): 128
On-line CPU(s) list: 0-127
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Gold 6458Q
CPU family: 6
Model: 143
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
Stepping: 8
CPU max MHz: 4000.0000
CPU min MHz: 800.0000
BogoMIPS: 6200.00
Flags:
    fpu vme de pae mce cx8 apic sep mtrr pge mca cmov pat pse36
    clflush dts acpi mmx fxsr asid sse sse2 mm 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 msr dtes32
    vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm cd cda sse4_1 sse4_2
    x2apic movbe popcnt ts tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm
    abm 3dnowprefetch cpuid_fault epb cat l3 cat l2 cdp l3 invpcid_single
    intel_pstate cpd l2 suid mb ibrs ibpb stibp ibrs Enhanced tmvmi
    flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
    erms invpcid rtm cmqm rt _a avx512f avx512dq rdseed adx smap avx512ifma
    clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaves opt xsave
    xgetbv1 xsaves cmqm lllc cmqm_occup llc cmqm_mbm_total cmqm_mbm_local
    split lock detect avx vnni avx512_bc16 vmbnoinvd dtherm ida rpin pts
    hwp hwp act_window hwp epp hwp pk_req avx512vbm umip pku ospke waitpkg
    avx512_vbmi2 gfn vaes vpcmlqd avx512_vnni avx512_bitalg tme
    avx512_vpopcntdq l57 rdip bus lock detect cldemote movdir movdir64b
    nempcm dsm md_clear serialize tsx牝trk pconfig arch lbr avx512_fp16
    amx_tile flush llid arch capabilities

Virtualization: VT-x
L1d cache: 3 MiB (64 instances)
L1i cache: 2 MiB (64 instances)
L2 cache: 128 MiB (64 instances)
L3 cache: 120 MiB (2 instances)
NUMA node(s): 4
NUMA node0 CPU(s): 0-15,64-79
NUMA node1 CPU(s): 16-31,80-95

(Continued on next page)
Nettrix
R620 G50 (Intel Xeon Gold 6458Q, 3.10 GHz)

SPEC CPU®2017 Integer Rate Result
Copyright 2017-2024 Standard Performance Evaluation Corporation

**SPECrate®2017_int_base** = 730
**SPECrate®2017_int_peak** = 755

CPU2017 License: 6138
Test Sponsor: Nettrix
Tested by: Nettrix

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<td>NUMA node3 CPU(s):</td>
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<tr>
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<td>Not affected</td>
</tr>
<tr>
<td>Vulnerability Mds:</td>
<td>Not affected</td>
</tr>
<tr>
<td>Vulnerability Meltdown:</td>
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<tr>
<td>Vulnerability Spec store bypass:</td>
<td>Mitigation; Speculative Store Bypass disabled via prctl and seccomp</td>
</tr>
<tr>
<td>Vulnerability Spectre v1:</td>
<td>Mitigation; usercopy/swapgs barriers and __user pointer sanitization</td>
</tr>
<tr>
<td>Vulnerability Spectre v2:</td>
<td>Mitigation; Enhanced IBRS, IBPB conditional, RSB filling</td>
</tr>
<tr>
<td>Vulnerability Srbdss:</td>
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<tr>
<td>Vulnerability Tax async abort:</td>
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From lscpu --cache:

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<th>ALL-SIZE</th>
<th>WAYS</th>
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8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.

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<th>NOTE: a numactl 'node' might or might not correspond to a physical chip.</th>
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<tr>
<td>available: 4 nodes (0-3)</td>
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<tr>
<td>node 0 cpus: 0-15, 64-79</td>
</tr>
<tr>
<td>node 0 size: 257560 MB</td>
</tr>
<tr>
<td>node 0 free: 256121 MB</td>
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<tr>
<td>node 1 cpus: 16-31, 80-95</td>
</tr>
<tr>
<td>node 1 size: 258039 MB</td>
</tr>
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<td>node 1 free: 257470 MB</td>
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<tr>
<td>node 2 cpus: 32-47, 96-111</td>
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<td>node 2 size: 258039 MB</td>
</tr>
<tr>
<td>node 2 free: 257587 MB</td>
</tr>
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</tr>
<tr>
<td>node 3 free: 256066 MB</td>
</tr>
<tr>
<td>node distances:</td>
</tr>
<tr>
<td>node 0 1 2 3</td>
</tr>
<tr>
<td>0: 10 12 21 21</td>
</tr>
<tr>
<td>1: 12 10 21 21</td>
</tr>
<tr>
<td>2: 21 21 10 12</td>
</tr>
<tr>
<td>3: 21 21 12 10</td>
</tr>
</tbody>
</table>

9. /proc/meminfo
MemTotal: 1056049320 kB

10. who -r
run-level 3 Mar 10 17:54

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
Default Target Status
multi-user running

12. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled apparmor auditd cron getty@ haviged irqbalance issue-generator kbdsettings kdump
kdump-early nvmeof-boot-connections postfix purge-kernels rollback ashd wicked

(Continued on next page)
### SPEC CPU®2017 Integer Rate Result

**Nettrix**

R620 G50 (Intel Xeon Gold 6458Q, 3.10 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
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<tbody>
<tr>
<td>730</td>
<td>755</td>
</tr>
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</table>

**CPU2017 License:** 6138  
**Test Date:** Mar-2023  
**Test Sponsor:** Nettrix  
**Tested by:** Nettrix  
**Hardware Availability:** Jan-2023  
**Software Availability:** Dec-2022

---

### Platform Notes (Continued)

- **wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny**
- **systemd-remount-fs**

---

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

```
BOOT_IMAGE="/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=9e7d079b-be10-4779-89e1-79f870e2ca09
splash=silent
mitigations=auto
quiet
security=apparmor
```

14. **cpupower frequency-info**

```
analyzing CPU 0:
current policy: frequency should be within 800 MHz and 4.00 GHz.
The governor "performance" may decide which speed to use within this range.
```

```
boost state support:
Supported: yes
Active: yes
```

---

15. **tuned-adm active**

Current active profile: throughput-performance

---

16. **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 10
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+madvise [madvise] never
enabled [always] madvise never
```

(Continued on next page)
Nettrix
R620 G50 (Intel Xeon Gold 6458Q, 3.10 GHz)

SPECRate®2017_int_base = 730
SPECRate®2017_int_peak = 755

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Platform Notes (Continued)

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 SP4

20. Disk information
 SPEC is set to: /home/lijq
 Filesystem     Type   Size  Used Avail Use% Mounted on
 /dev/nvme0n1p3 btrfs  854G  284G  570G  34% /home

21. /sys/devices/virtual/dmi/id
 Vendor:         Nettrix
 Product:        R620 G50
 Product Family: Rack
 Serial:         6101810603447822

22. dmidecode
 Additional information from dmidecode 3.2 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:
 16x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800

23. BIOS
 (This section combines info from /sys/devices and dmidecode.)
 BIOS Vendor:       American Megatrends International, LLC.
 BIOS Version:      NNM1041018-000-1
 BIOS Date:         11/01/2022
 BIOS Revision:     5.29

Compiler Version Notes

----------------------------------------------------------------------------------------------------------------------------
C  | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------------------------------------
(Continued on next page)
**SPEC CPU®2017 Integer Rate Result**

**Nettrix**

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**Compiler Version Notes (Continued)**

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<th>C</th>
<th>500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base, peak)</th>
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Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

<table>
<thead>
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<tbody>
<tr>
<td>C++</td>
<td>541.leela_r(base, peak)</td>
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</tbody>
</table>

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<table>
<thead>
<tr>
<th>Fortran</th>
<th>548.exchange2_r(base, peak)</th>
</tr>
</thead>
</table>

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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---

**Base Compiler Invocation**

C benchmarks:
- icx

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifx
Nettrix

R620 G50 (Intel Xeon Gold 6458Q, 3.10 GHz)

CPU2017 License: 6138
Test Sponsor: Nettrix
Tested by: Nettrix

Test Date: Mar-2023
Hardware Availability: Jan-2023
Software Availability: Dec-2022

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
-fflto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-fflto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

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/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx
Nettrix

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Test Sponsor: Nettrix
Test Date: Mar-2023

Tested by: Nettrix
Hardware Availability: Jan-2023
Software Availability: Dec-2022

Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
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

Peak Optimization Flags

C benchmarks:

500.perlbench_r: -w -std=c11 -m64 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)
-flto -ofast -xCORE-AVX512 -ffast-math -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-fno-strict-overflow
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)
-flto -ofast -xCORE-AVX512 -ffast-math -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: basepeak = yes

C++ benchmarks:

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

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Peak Optimization Flags (Continued)

520.omnetpp_r: basepeak = yes
523.xalancbmk_r: basepeak = yes
531.deepsjeng_r: basepeak = yes
541.leela_r: basepeak = yes

Fortran benchmarks:
548.exchange2_r: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html
http://www.spec.org/cpu2017/flags/Nettrix-Platform-Settings-V1.3-SPR-revA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml
http://www.spec.org/cpu2017/flags/Nettrix-Platform-Settings-V1.3-SPR-revA.xml

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