ASUSTeK Computer Inc.
ASUS RS720-E11-RO12U
(2.00 GHz, Intel Xeon Gold 6414U)

**SPECrater®2017_int_base = 268**
**SPECrate®2017_int_peak = 276**

---

**Hardware**

- **CPU Name:** Intel Xeon Gold 6414U
- **Max MHz:** 3400
- **Nominal:** 2000
- **Enabled:** 32 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:** 60 MB I+D on chip per chip
- **Other:** None
- **Memory:** 512 GB (8 x 64 GB 2Rx4 PC5-4800B-R)
- **Storage:** 1 x 1.6 TB PCIe NVMe SSD
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 15 SP4 (x86_64)
  Kernel 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:** Version 0503 released Feb-2023
- **File System:** xfs
- **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.
SPECCPU®2017 Integer Rate Result

ASUSTeK Computer Inc.
ASUS RS720-E11-RS12U
(2.00 GHz, Intel Xeon Gold 6414U)

SPECrate®2017_int_base = 268
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>531.deepsjeng_r</td>
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<td>541.leela_r</td>
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<tr>
<td>548.exchange2_r</td>
<td>64</td>
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<td>524</td>
<td>132</td>
<td>525</td>
<td>132</td>
</tr>
</tbody>
</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"
OS set to performance mode via cpupower frequency-set -g performance

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "*/cpu119/lib/intel64:/cpu119/lib/ia32:/cpu119/je5.0.1-32"
MALLOC_CONF = "retain:true"
SPEC CPU®2017 Integer Rate Result

ASUSTeK Computer Inc.

ASUS RS720-E11-RS12U
(2.00 GHz, Intel Xeon Gold 6414U)

SPECrate®2017_int_base = 268
SPECrate®2017_int_peak = 276

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Apr-2023
Hardware Availability: Feb-2023
Software Availability: Dec-2022

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>

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.

ejemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS Configuration:
VT-d = Disabled
Patrol Scrub = Disabled
SNC = Enable SNC4 (4-clusters)
Engine Boost = Aggressive
SR-IOV Support = Disabled

BMC Configuration:
Fan mode = Full speed mode

Sysinfo program /cpu119/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Sat Apr 22 14:28:38 2023

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

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2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo
7. lacpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. sysctl
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id

(Continued on next page)
Platform Notes (Continued)

21. dmidecode
22. BIOS

------------------------------------------------------------
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
   14:28:38 up 1 day, 21:26,  2 users, load average: 15.59, 36.80, 49.68
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                Thu17   45:24m  0.97s  0.01s -bash
   root     tty2     -                Thu17   28:54m  0.04s  0.04s -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) 2062537
   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) 2062537
   virtual memory          (kbytes, -v) unlimited
   file locks                      (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 30
   login -- root
   -bash
   -bash
   -bash
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=64 --c
   ic2023.0-lin-core-avx512-rate-20221201.cfg --define smt-on --define cores=32 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak -o all intrate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=64 --configfile
   ic2023.0-lin-core-avx512-rate-20221201.cfg --define smt-on --define cores=32 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --nopower
   --runmode rate --tune base:peak --size redefine intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.296/templogs/preenv.intrate.296.0.log --lognum 296.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /cpu119

------------------------------------------------------------
6. /proc/cpuinfo
   model name      : Intel(R) Xeon(R) Gold 6414U

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

ASUSTeK Computer Inc.
ASUS RS720-E11-RS12U
(2.00 GHz, Intel Xeon Gold 6414U)

Copyright 2017-2024 Standard Performance Evaluation Corporation

SPECrate®2017_int_base = 268
SPECrate®2017_int_peak = 276

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Test Date: Apr-2023
Tested by: ASUSTeK Computer Inc.
Hardware Availability: Feb-2023
Software Availability: Dec-2022

Platform Notes (Continued)

```
vendor_id       : GenuineIntel
cpu family      : 6
model           : 143
stepping        : 8
microcode       : 0x2b000161
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores       : 32
siblings        : 64
1 physical ids (chips)
64 processors (hardware threads)
physical id 0: core ids 0-31
physical id 0: apicids 0-63
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:                   46 bits physical, 57 bits virtual
Byte Order:                      Little Endian
CPU(s):                          64
On-line CPU(s) list:             0-63
Vendor ID:                       GenuineIntel
Model name:                      Intel(R) Xeon(R) Gold 6414U
CPU family:                      6
Model:                           143
Thread(s) per core:              2
Core(s) per socket:              32
Socket(s):                       1
Stepping:                        8
CPU max MHz:                     3400.000
CPU min MHz:                     800.000
BogoMIPS:                        4000.00
Flags:                           fpu vme de pse move pdcm cmov st8273 shrcr cmov mca cmov pxrd
rdr0001 rdr0002 smbd bts rdtsc mtown msr movmdafs cmov setc omw pmoviso pmovmsk rcx
rdx
```

Virtualization: VT-x
L1d cache: 1.5 MiB (32 instances)
L1i cache: 1 MiB (32 instances)
L2 cache: 64 MiB (32 instances)
L3 cache: 60 MiB (1 instance)
NUMA node(s): 4

(Continued on next page)
Platform Notes (Continued)

NUMA node0 CPU(s): 0-7,32-39
NUMA node1 CPU(s): 8-15,40-47
NUMA node2 CPU(s): 16-23,48-55
NUMA node3 CPU(s): 24-31,56-63
Vulnerability Itlb multihit: Not affected
Vulnerability L1t: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tax async abort: Not affected

From lscpu --cache:

---

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

node 0 cpus: 0-7,32-39
node 0 size: 128662 MB
node 0 free: 127405 MB
node 1 cpus: 8-15,40-47
node 1 size: 128985 MB
node 1 free: 128008 MB
node 2 cpus: 16-23,48-55
node 2 size: 129019 MB
node 2 free: 128059 MB
node 3 cpus: 24-31,56-63
node 3 size: 128991 MB
node 3 free: 127988 MB
node distances:
  0:  10  12  12  12
  1:  12 10 12 12
  2:  12 12 10 12
  3:  12 12 12 10
---

9. /proc/meminfo
    MemTotal: 528034108 kB
---

10. who -r
    run-level 3 Apr 20 17:02
---

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

(Continued on next page)
**Platform Notes (Continued)**

<table>
<thead>
<tr>
<th>Enabled</th>
<th>YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager getty@ haveged irqbalance issue-generator kbdsettings lkm2-monitor nscd nvme-fc-boot-connections postfix purge-rollback rsyslog smartd sshd wicked wicked++-auto4 wicked++-dhcp4 wicked++-dhcpc6 wicked++-nanny</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled-runtime</td>
<td>systemd-remount-fs</td>
</tr>
<tr>
<td>Indirect</td>
<td>wicked</td>
</tr>
</tbody>
</table>

---

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

```
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=1821a225-9785-4821-9a33-99bd3ded8cae
splash=silent
mitigations=auto
quiet
security=apparmor
```

---

14. cpupower frequency-info

```
analyzing CPU 0:
  current policy: frequency should be within 800 MHz and 3.40 GHz.
  The governor "performance" may decide which speed to use within this range.
boost state support:
  Supported: yes
  Active: yes
```

---

15. sysctl

```
kernel.numa_balancing             1
kernel.randomize_va_space         2
vm.compartment_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
```

---

16. /sys/kernel/mm/transparent_hugepage

```
defrag        always defer defer+madvice [madvice] never
enabled       [always] madvice never
hpage_pmd_size 2097152
```

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

ASUSTeK Computer Inc.
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(2.00 GHz, Intel Xeon Gold 6414U)

SPECrate®2017_int_base = 268
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CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Platform Notes (Continued)

shmem_enabled always within_size advise [never] deny force

17. /sys/kernel/mm/transparent_hugepage/khugepaged
alloc_sleep_milliseconds 60000
defrag 1
max_ptes_none 511
max_ptes_shared 256
max_ptes_swap 64
pages_to_scan 4096
scan_sleep_milliseconds 10000

18. OS release
From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP4

19. Disk information
SPEC is set to: /cpu119
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme0n1p8 xfs 1.3T 22G 1.2T 2% /

20. /sys/devices/virtual/dmi/id
Vendor: ASUSTeK COMPUTER INC.
Product: RS720-E11-RS12U
Product Family: Server

21. 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:
8x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: American Megatrends Inc.
BIOS Version: 0503
BIOS Date: 01/31/2023
BIOS Revision: 5.3

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.

C | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base, peak)
---|----------------------------------------------------------
(Continued on next page)
ASUSTeK Computer Inc.
ASUS RS720-E11-RS12U (2.00 GHz, Intel Xeon Gold 6414U)

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Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

<table>
<thead>
<tr>
<th>C</th>
<th>502.gcc_r(peak)</th>
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</thead>
</table>

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.

<table>
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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<th>C++</th>
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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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
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64

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

**ASUSTeK Computer Inc.**

ASUS RS720-E11-RS12U (2.00 GHz, Intel Xeon Gold 6414U)

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**CPU2017 License:** 9016  
**Test Date:** Apr-2023  
**Test Sponsor:** ASUSTeK Computer Inc.  
**Tested by:** ASUSTeK Computer Inc.  
**Hardware Availability:** Feb-2023  
**Software Availability:** Dec-2022  

### Base Portability Flags (Continued)

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<td>-DSPEC_LP64</td>
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<td>520.omnetpp_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>-DSPEC_LP64 -DSPEC_LINUX</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
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</tr>
<tr>
<td>557.xz_r</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

### Base Optimization Flags

**C benchmarks:**

```bash
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -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:**

```bash
-w -std=c++14 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -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:**

```bash
```

### Peak Compiler Invocation

**C benchmarks:**

`icx`

**C++ benchmarks:**

`icpx`

**Fortran benchmarks:**

`ifx`
SPEC CPU®2017 Integer Rate Result

ASUSTeK Computer Inc.
ASUS RS720-E11-RS12U
(2.00 GHz, Intel Xeon Gold 6414U)

SPECrate®2017_int_base = 268
SPECrate®2017_int_peak = 276

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.
Test Date: Apr-2023
Hardware Availability: Feb-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 -xCORE-AVX512 -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)
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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/ASUSTekPlatform-Settings-z13-V1.0.html
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z13-V1.0.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.9 on 2023-04-22 02:28:37-0400.
Report generated on 2024-01-29 17:47:00 by CPU2017 PDF formatter v6716.
Originally published on 2023-06-06.