SPEC CPU®2017 Floating Point Rate Result

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ASUSTeK Computer Inc.

ASUS RS720-E10-RS12(Z12PP-D32) Server System
(2.30 GHz, Intel Xeon Silver 4310T)

$SPECrate®2017\_fp\_base = 215$
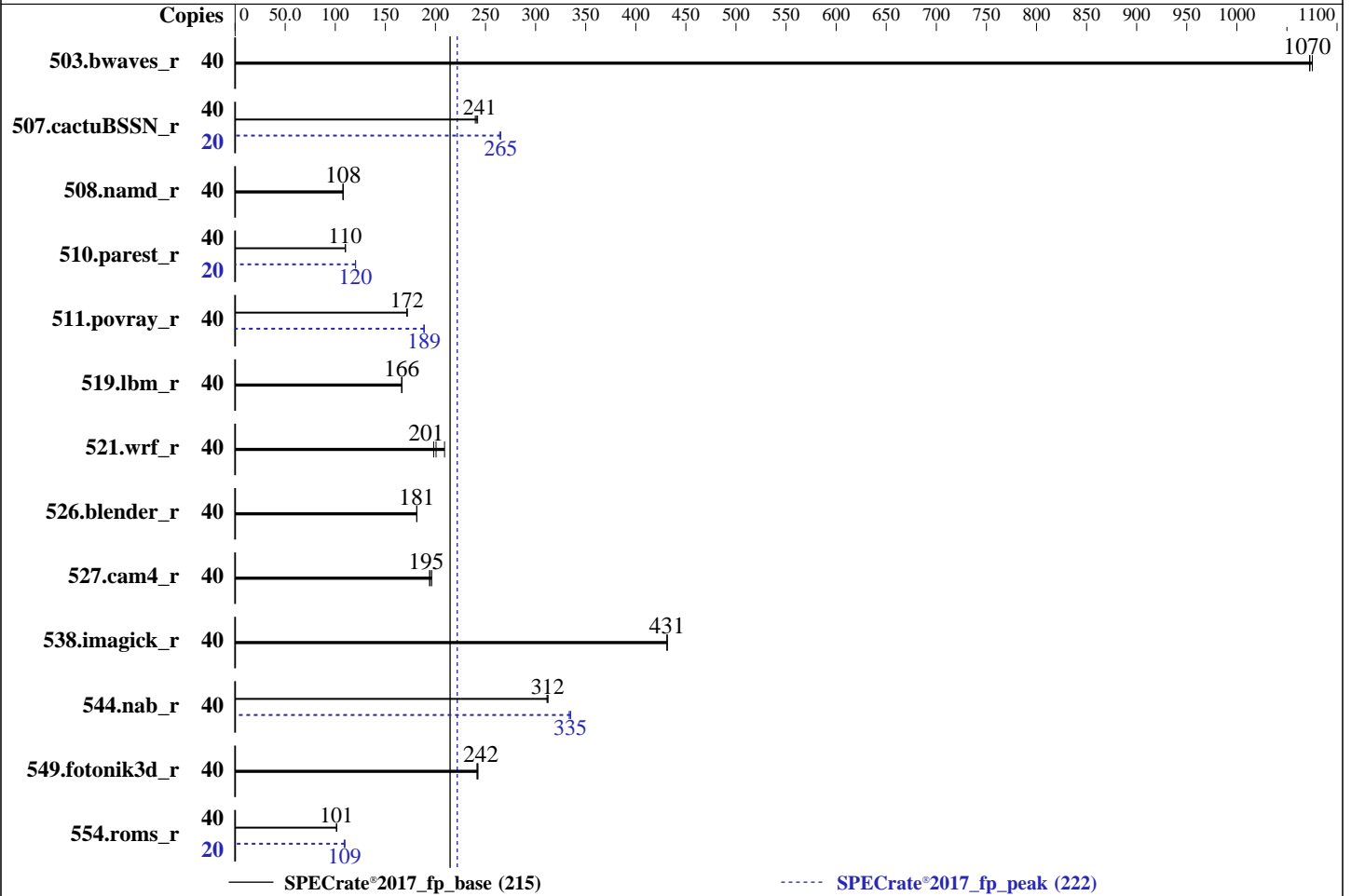
$SPECrate®2017\_fp\_peak = 222$

CPU2017 License: 9016

Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Feb-2023

Hardware Availability: Apr-2022

Software Availability: Dec-2022

Copies	
503.bwaves_r	40 — 1070
507.cactuBSSN_r	40 — 241 / 20 — 265
508.namd_r	40 — 108
510.parest_r	40 — 110 / 20 — 120
511.povray_r	40 — 172 / 189
519.lbm_r	40 — 166
521.wrf_r	40 — 201
526.blender_r	40 — 181
527.cam4_r	40 — 195
538.imagick_r	40 — 431
544.nab_r	40 — 312 / 335
549.fotonik3d_r	40 — 242
554.roms_r	40 — 101 / 20 — 109

SPECrate®2017_fp_base (215)   SPECrate®2017_fp_peak (222)

Hardware

CPU Name: Intel Xeon Silver 4310T
  Max MHz: 3400
  Nominal: 2300
Enabled: 20 cores, 2 chips, 2 threads/core
Orderable: 1, 2 chip(s)
Cache L1: 32 KB I + 48 KB D on chip per core
  L2: 1.25 MB I+D on chip per core
  L3: 15 MB I+D on chip per chip
  Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)
Storage: 1 x 1 TB SATA SSD
Other: None

Software

OS: Red Hat Enterprise Linux release 8.4 (Ootpa)
4.18.0-305.25.1.el8_4.x86_64
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 0802 released Apr-2022
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 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.

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

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Results Table

Benchmark	Base Copies	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Copies	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
503.bwaves_r	40	373	1080	**374**	**1070**	374	1070	40	373	1080	**374**	**1070**	374	1070
507.cactuBSSN_r	40	209	242	**210**	**241**	211	240	20	95.9	264	**95.5**	**265**	95.5	265
508.namd_r	40	**352**	**108**	353	108	352	108	40	**352**	**108**	353	108	352	108
510.parest_r	40	951	110	950	110	**951**	**110**	20	435	120	435	120	**435**	**120**
511.povray_r	40	**544**	**172**	545	171	544	172	40	**495**	**189**	495	189	495	189
519.lbm_r	40	**253**	**166**	253	166	253	167	40	**253**	**166**	253	166	253	167
521.wrf_r	40	**447**	**201**	452	198	429	209	40	**447**	**201**	452	198	429	209
526.blender_r	40	336	181	**336**	**181**	336	182	40	336	181	**336**	**181**	336	182
527.cam4_r	40	356	196	361	194	**359**	**195**	40	356	196	361	194	**359**	**195**
538.imagick_r	40	231	431	231	431	**231**	**431**	40	231	431	231	431	**231**	**431**
544.nab_r	40	216	312	**216**	**312**	216	311	40	201	335	202	334	**201**	**335**
549.fotonik3d_r	40	643	242	**645**	**242**	645	242	40	643	242	**645**	**242**	645	242
554.roms_r	40	626	102	**627**	**101**	628	101	20	**291**	**109**	290	110	292	109

SPECrate®2017_fp_base =	**215**
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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"
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 = "/home/ic23/lib/intel64:/home/ic23/je5.0.1-64"
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

(Continued on next page)

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General Notes (Continued)

```
 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.
 jemalloc, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Platform Notes

```
BIOS Configuration:
VT-d = Disabled
Patrol Scrub = Disabled
Engine Boost = Aggressive
SR-IOV Support = Disabled
BMC Configuration:
Fan mode = Full speed mode

 Sysinfo program /home/ic23/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Fri Feb 24 21:52:18 2023

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

 ------------------------------------------------------------
 Table of contents
 ------------------------------------------------------------
  1. uname -a
  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 239 (239-45.el8_4.3)
 12. Services, from systemctl list-unit-files
```

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Platform Notes (Continued)

```
 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. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
 21. Disk information
 22. /sys/devices/virtual/dmi/id
 23. dmidecode
 24. BIOS
    ----------------------------------------------------------


    ----------------------------------------------------------
 1. uname -a
   Linux localhost.localdomain 4.18.0-305.25.1.el8_4.x86_64 #1 SMP Mon Oct 18 14:34:11 EDT 2021 x86_64 x86_64
    x86_64 GNU/Linux


    ----------------------------------------------------------
 2. w
    21:52:18 up 1 day, 13:11,  1 user,  load average: 25.28, 36.39, 38.67
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1     -                Thu08   37:11m  1.24s  0.01s /bin/bash ./rate.sh


    ----------------------------------------------------------
 3. Username
   From environment variable $USER:  root


    ----------------------------------------------------------
 4. ulimit -a
   core file size          (blocks, -c) 0
   data seg size           (kbytes, -d) unlimited
   scheduling priority             (-e) 0
   file size               (blocks, -f) unlimited
   pending signals                 (-i) 4126718
   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) 4126718
   virtual memory          (kbytes, -v) unlimited
   file locks                      (-x) unlimited
```

(Continued on next page)

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Platform Notes (Continued)

```
   --------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize 18
 login -- root
 -bash
 /bin/bash ./rate.sh
 /bin/bash ./rate.sh
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=40 -c
   ic2023.0-lin-core-avx512-rate-20221201.cfg --define smt-on --define cores=20 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak -o all fprate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=40 --configfile
   ic2023.0-lin-core-avx512-rate-20221201.cfg --define smt-on --define cores=20 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --nopower
   --runmode rate --tune base:peak --size refrate fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.030/templogs/preenv.fprate.030.0.log --lognum 030.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/ic23


   --------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Silver 4310T CPU @ 2.30GHz
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 106
    stepping        : 6
    microcode       : 0xd000331
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 10
    siblings        : 20
    2 physical ids (chips)
    40 processors (hardware threads)
    physical id 0: core ids 0-9
    physical id 1: core ids 0-9
    physical id 0: apicids 0-19
    physical id 1: apicids 64-83
 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 2.32.1:
  Architecture:        x86_64
  CPU op-mode(s):      32-bit, 64-bit
  Byte Order:          Little Endian
  CPU(s):              40
```

(Continued on next page)

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Platform Notes (Continued)

```
    On-line CPU(s) list:  0-39
    Thread(s) per core:   2
    Core(s) per socket:   10
    Socket(s):            2
    NUMA node(s):         2
    Vendor ID:            GenuineIntel
    BIOS Vendor ID:       Intel
    CPU family:           6
    Model:                106
    Model name:           Intel(R) Xeon(R) Silver 4310T CPU @ 2.30GHz
    BIOS Model name:      Intel(R) Xeon(R) Silver 4310T CPU @ 2.30GHz
    Stepping:             6
    CPU MHz:              1001.707
    CPU max MHz:          3400.0000
    CPU min MHz:          800.0000
    BogoMIPS:             4600.00
    Virtualization:       VT-x
    L1d cache:            48K
    L1i cache:            32K
    L2 cache:             1280K
    L3 cache:             15360K
    NUMA node0 CPU(s):    0-9,20-29
    NUMA node1 CPU(s):    10-19,30-39
   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 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 invpcid_single intel_ppin ssbd mba ibrs ibpb
                         stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust
                         bmi1 hle 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
                         wbnoinvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vbmi
                         umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme
                         avx512_vpopcntdq la57 rdpid fsrm md_clear pconfig flush_l1d arch_capabilities


    --------------------------------------------------------------
 8. numactl --hardware
 NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 2 nodes (0-1)
    node 0 cpus: 0-9,20-29
    node 0 size: 515667 MB
    node 0 free: 501477 MB
    node 1 cpus: 10-19,30-39
    node 1 size: 516051 MB
    node 1 free: 506505 MB
```

(Continued on next page)

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Platform Notes (Continued)

```
  node distances:
  node   0   1
    0:  10  20
    1:  20  10


  ----------------------------------------------------------
9. /proc/meminfo
   MemTotal:        1056480752 kB


  ----------------------------------------------------------
10. who -r
   run-level 3 Feb 23 08:40


  ----------------------------------------------------------
11. Systemd service manager version: systemd 239 (239-45.el8_4.3)
   Default Target  Status
   multi-user      running


  ----------------------------------------------------------
12. Services, from systemctl list-unit-files
   STATE       UNIT FILES
  enabled    NetworkManager NetworkManager-dispatcher NetworkManager-wait-online atd auditd autovt@ chronyd
             crond firewalld getty@ import-state insights-client-boot irqbalance iscsi iscsi-onboot kdump
              libstoragemgmt lm_sensors loadmodules lvm2-monitor mcelog mdmonitor microcode multipathd
             nvmefc-boot-connections pmcd pmie pmlogger rhsmcertd rsyslog selinux-autorelabel-mark smartd sshd
                sssd syslog sysstat timedatex tuned udisks2 vdo
  disabled   arp-ethers blk-availability chrony-wait console-getty cpupower debug-shell ebtables fancontrol
             grafana-server iprdump iprinit iprupdate ipsec iscsid iscsiuio kpatch kvm_stat ledmon nftables
             nis-domainname nvmf-autoconnect oddjobd pmfind pmie_check pmlogger_check pmlogger_daily_report
              pmlogger_daily_report-poll pmproxy podman-auto-update postfix powertop psacct ras-mc-ctl
               rasdaemon rdisc rhcd rhsm rhsm-facts rrdcached saslauthd serial-getty@ sshd-keygen@
                systemd-resolved tcsd
   indirect   sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo
   masked     systemd-timedated


  ----------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=(hd0,gpt2)/vmlinuz-4.18.0-305.25.1.el8_4.x86_64
   root=/dev/mapper/rhel-root
   ro
   resume=/dev/mapper/rhel-swap
   rd.lvm.lv=rhel/root
   rd.lvm.lv=rhel/swap
   rhgb
   quiet


  ----------------------------------------------------------
```

(Continued on next page)

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Platform Notes (Continued)

```
 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. tuned-adm active
   Current active profile: throughput-performance


   -------------------------------------------------------------
 16. sysctl
   kernel.numa_balancing              1
   kernel.randomize_va_space          2
   vm.compaction_proactiveness        0
   vm.dirty_background_bytes          0
   vm.dirty_background_ratio         10
   vm.dirty_bytes                     0
   vm.dirty_expire_centisecs       3000
   vm.dirty_ratio                    40
   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
   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
```

(Continued on next page)

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Platform Notes (Continued)

```
   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 8.4 (Ootpa)
  redhat-release Red Hat Enterprise Linux release 8.4 (Ootpa)
  system-release Red Hat Enterprise Linux release 8.4 (Ootpa)


  ------------------------------------------------------------
20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
   itlb_multihit        Not affected
   l1tf                 Not affected
   mds                  Not affected
   meltdown             Not affected
   spec_store_bypass    Mitigation: Speculative Store Bypass disabled via prctl and seccomp
   spectre_v1           Mitigation: usercopy/swapgs barriers and __user pointer sanitization
   spectre_v2           Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
   srbds                Not affected
   tsx_async_abort      Not affected
For more information, see the Linux documentation on hardware vulnerabilities, for example
       https://www.kernel.org/doc/html/latest/admin-guide/hw-vuln/index.html


  ------------------------------------------------------------
21. Disk information
SPEC is set to: /home/ic23
  Filesystem             Type  Size  Used Avail Use% Mounted on
  /dev/mapper/rhel-home xfs   878G  144G  735G  17% /home


  ------------------------------------------------------------
22. /sys/devices/virtual/dmi/id
    Vendor:         ASUSTeK COMPUTER INC.
    Product:        RS720-E10-RS12
    Product Family: Server
    Serial:         012345678901


  ------------------------------------------------------------
23. 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 M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2666
```

(Continued on next page)

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Platform Notes (Continued)

```
  ----------------------------------------------------------------
  24. BIOS
  (This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:        American Megatrends Inc.
     BIOS Version:       0802
     BIOS Date:          04/29/2022
     BIOS Revision:      8.2
```

Compiler Version Notes

```
==============================================================================
C                   | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
                    | 544.nab_r(base, peak)
------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------


==============================================================================
C++                 | 508.namd_r(base, peak) 510.parest_r(base, peak)
------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------


==============================================================================
C++, C              | 511.povray_r(base, peak) 526.blender_r(base, peak)
------------------------------------------------------------------------------
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.
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.
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
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.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
```

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ASUSTeK Computer Inc.

ASUS RS720-E10-RS12(Z12PP-D32) Server System
(2.30 GHz, Intel Xeon Silver 4310T)

SPECrate®2017_fp_base = 215

SPECrate®2017_fp_peak = 222

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

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

Compiler Version Notes (Continued)

```
  Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
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.
------------------------------------------------------------------------


==============================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
                | 554.roms_r(base, peak)
------------------------------------------------------------------------
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.
------------------------------------------------------------------------


==============================================================================
Fortran, C      | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
------------------------------------------------------------------------
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.
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.
------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
icx
```

C++ benchmarks:
```
icpx
```

Fortran benchmarks:
```
ifx
```

Benchmarks using both Fortran and C:
```
ifx icx
```

Benchmarks using both C and C++:
```
icpx icx
```

Benchmarks using Fortran, C, and C++:
```
icpx icx ifx
```

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Base Portability Flags

503.bwaves_r: `-DSPEC_LP64`
507.cactuBSSN_r: `-DSPEC_LP64`
508.namd_r: `-DSPEC_LP64`
510.parest_r: `-DSPEC_LP64`
511.povray_r: `-DSPEC_LP64`
519.lbm_r: `-DSPEC_LP64`
521.wrf_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
526.blender_r: `-DSPEC_LP64 -DSPEC_LINUX -funsigned-char`
527.cam4_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG`
538.imagick_r: `-DSPEC_LP64`
544.nab_r: `-DSPEC_LP64`
549.fotonik3d_r: `-DSPEC_LP64`
554.roms_r: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
`-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
`-Wno-implicit-int -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

C++ benchmarks:
`-w -std=c++14 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

Fortran benchmarks:
`-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto`
`-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
`-nostandard-realloc-lhs -align array32byte -auto -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both Fortran and C:
`-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
`-Wno-implicit-int -nostandard-realloc-lhs -align array32byte -auto`
`-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both C and C++:
`-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -Wno-implicit-int -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

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SPEC CPU®2017 Floating Point Rate Result

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ASUSTeK Computer Inc.

ASUS RS720-E10-RS12(Z12PP-D32) Server System
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CPU2017 License: 9016

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Test Date: Feb-2023

Hardware Availability: Apr-2022

Software Availability: Dec-2022

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Peak Compiler Invocation

C benchmarks:
```
icx
```

C++ benchmarks:
```
icpx
```

Fortran benchmarks:
```
ifx
```

Benchmarks using both Fortran and C:
```
ifx icx
```

Benchmarks using both C and C++:
```
icpx icx
```

Benchmarks using Fortran, C, and C++:
```
icpx icx ifx
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

519.lbm_r: `basepeak = yes`

538.imagick_r: `basepeak = yes`

544.nab_r: `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`

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Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

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

Peak Optimization Flags (Continued)

544.nab_r (continued):
```
-qopt-mem-layout-trans=4 -Wno-implicit-int
-qopt-zmm-usage=high -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: `-w -std=c++14 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -nostandard-realloc-lhs`
`-align array32byte -auto -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: `-w -std=c++14 -m64 -std=c11 -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 -Wno-implicit-int`
`-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:
```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
```

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Software Availability: Dec-2022

Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
```
-qopt-mem-layout-trans=4 -Wno-implicit-int -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

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/ASUSTekPlatform-Settings-z12-V1.2.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/ASUSTekPlatform-Settings-z12-V1.2.xml

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

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