SPEC CPU®2017 Floating Point Rate Result

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ASUSTeK Computer Inc.

ASUS RS720-E10-RS12(Z12PP-D32) Server System
(2.40 GHz, Intel Xeon Platinum 8351N)

$SPECrate®2017\_fp\_base = 274$
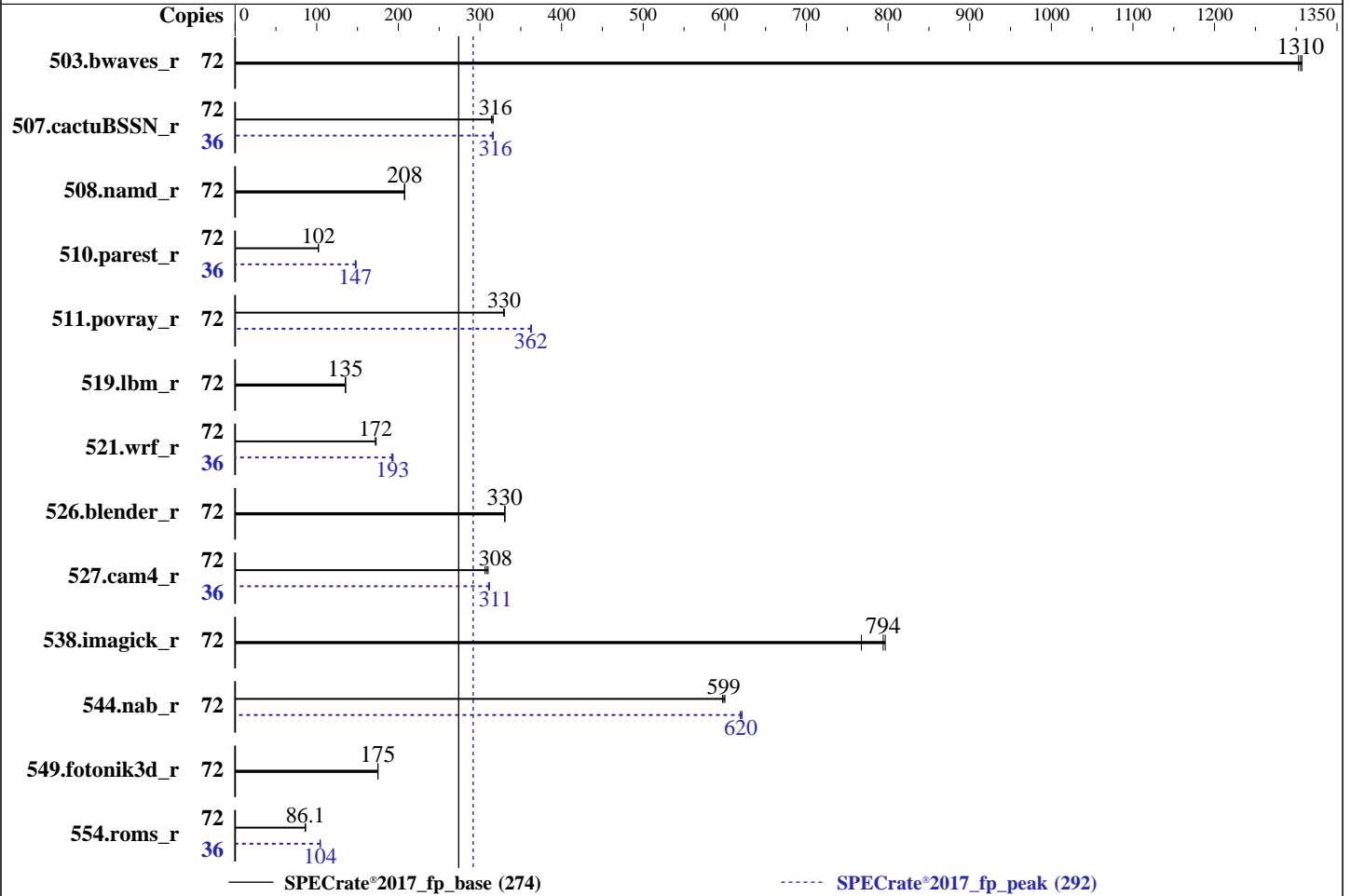
$SPECrate®2017\_fp\_peak = 292$

CPU2017 License: 9016　　　　　　　　　　　　　　　　**Test Date:** Mar-2023
Test Sponsor: ASUSTeK Computer Inc.　　　　　　　　**Hardware Availability:** Jul-2021
Tested by: ASUSTeK Computer Inc.　　　　　　　　　**Software Availability:** Dec-2022

Benchmark	Copies	Base	Peak
503.bwaves_r	72	1310	
507.cactuBSSN_r	72	316	
	36		316
508.namd_r	72	208	
510.parest_r	72	102	
	36		147
511.povray_r	72	330	
			362
519.lbm_r	72	135	
521.wrf_r	72	172	
	36		193
526.blender_r	72	330	
527.cam4_r	72	308	
	36		311
538.imagick_r	72	794	
544.nab_r	72	599	
			620
549.fotonik3d_r	72	175	
554.roms_r	72	86.1	
	36		104

SPECrate®2017_fp_base (274)　　　　　SPECrate®2017_fp_peak (292)

Hardware

CPU Name: Intel Xeon Platinum 8351N
　Max MHz: 3500
　Nominal: 2400
Enabled: 36 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 48 KB D on chip per core
　L2: 1.25 MB I+D on chip per core
　L3: 54 MB I+D on chip per chip
　Other: None
Memory: 512 GB (8 x 64 GB 2Rx4 PC4-3200AA-R,
　　　　　running at 2933)
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.

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	72	554	1300	552	1310	**553**	**1310**	72	554	1300	552	1310	**553**	**1310**
507.cactuBSSN_r	72	288	316	**289**	**316**	290	314	36	144	316	145	315	**144**	**316**
508.namd_r	72	329	208	330	207	**329**	**208**	72	329	208	330	207	**329**	**208**
510.parest_r	72	1848	102	1845	102	**1846**	**102**	36	**639**	**147**	635	148	640	147
511.povray_r	72	**510**	**330**	510	330	511	329	72	463	363	**464**	**362**	464	362
519.lbm_r	72	561	135	561	135	**561**	**135**	72	561	135	561	135	**561**	**135**
521.wrf_r	72	938	172	933	173	**937**	**172**	36	**417**	**193**	420	192	417	193
526.blender_r	72	332	330	**332**	**330**	332	331	72	332	330	**332**	**330**	332	331
527.cam4_r	72	**409**	**308**	411	306	406	310	36	**202**	**311**	202	312	203	310
538.imagick_r	72	233	767	**226**	**794**	225	797	72	233	767	**226**	**794**	225	797
544.nab_r	72	**202**	**599**	202	600	203	597	72	196	619	**196**	**620**	195	621
549.fotonik3d_r	72	1603	175	**1604**	**175**	1605	175	72	1603	175	**1604**	**175**	1605	175
554.roms_r	72	**1329**	**86.1**	1327	86.2	1331	85.9	36	**548**	**104**	547	105	550	104
SPECrate®2017_fp_base =	**274**													
SPECrate®2017_fp_peak =	**292**													

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
Filesystem page cache synced and cleared with:

(Continued on next page)

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General Notes (Continued)

```
 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
SNC = Enable SNC2 (2-clusters)
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 Thu Mar  9 15:58:48 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
```

(Continued on next page)

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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
   15:58:48 up 10:26,  1 user,  load average: 53.02, 67.66, 70.45
   USER      TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root      tty1     -                08:56    7:02m  1.08s  0.00s /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) 2062309
  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) 2062309
  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=72 -c
   ic2023.0-lin-core-avx512-rate-20221201.cfg --define smt-on --define cores=36 --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=72 --configfile
   ic2023.0-lin-core-avx512-rate-20221201.cfg --define smt-on --define cores=36 --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/CPU2017.053/templogs/preenv.fprate.053.0.log --lognum 053.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/ic23


------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Platinum 8351N CPU @ 2.40GHz
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 106
    stepping        : 6
    microcode       : 0xd000331
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 36
    siblings        : 72
    1 physical ids (chips)
    72 processors (hardware threads)
    physical id 0: core ids 0-35
    physical id 0: apicids 0-71
  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):              72
   On-line CPU(s) list: 0-71
   Thread(s) per core:  2
```

(Continued on next page)

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Platform Notes (Continued)

```
    Core(s) per socket:    36
    Socket(s):             1
    NUMA node(s):          2
    Vendor ID:             GenuineIntel
    BIOS Vendor ID:        Intel
    CPU family:            6
    Model:                 106
    Model name:            Intel(R) Xeon(R) Platinum 8351N CPU @ 2.40GHz
    BIOS Model name:       Intel(R) Xeon(R) Platinum 8351N CPU @ 2.40GHz
    Stepping:              6
    CPU MHz:               3485.677
    CPU max MHz:           3500.0000
    CPU min MHz:           800.0000
    BogoMIPS:              4800.00
    Virtualization:        VT-x
    L1d cache:             48K
    L1i cache:             32K
    L2 cache:              1280K
    L3 cache:              55296K
    NUMA node0 CPU(s):     0-17,36-53
    NUMA node1 CPU(s):     18-35,54-71
  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: 0-17,36-53
  node 0 size: 257616 MB
  node 0 free: 238617 MB
  node 1 cpus: 18-35,54-71
  node 1 size: 258000 MB
  node 1 free: 243152 MB
  node distances:
  node   0   1
```

(Continued on next page)

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Platform Notes (Continued)

```
     0:  10  11
     1:  11  10


   ------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       527992116 kB


   ------------------------------------------------------------
10. who -r
   run-level 3 Mar 9 05:32


   ------------------------------------------------------------
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


   ------------------------------------------------------------
14. cpupower frequency-info
   analyzing CPU 0:
```

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Platform Notes (Continued)

```
      current policy: frequency should be within 800 MHz and 3.50 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
  max_ptes_swap              64
  pages_to_scan            4096
```

(Continued on next page)

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Platform Notes (Continued)

```
   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  183G  695G  21% /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:
    8x Samsung M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2933


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

(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,
  Version 2023.0.0 Build 20221201
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```

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SPEC CPU®2017 Floating Point Rate Result

ASUSTeK Computer Inc.

ASUS RS720-E10-RS12(Z12PP-D32) Server System
(2.40 GHz, Intel Xeon Platinum 8351N)

SPECrate®2017_fp_base = 274

SPECrate®2017_fp_peak = 292

CPU2017 License: 9016

Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2023

Hardware Availability: Jul-2021

Software Availability: Dec-2022

Compiler Version Notes (Continued)

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


==============================================================================
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
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
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------------------------------------------------------------------------
```

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

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

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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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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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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:
`-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++:

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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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/ASUSTekPlatform-Settings-z12-V1.2.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-z12-V1.2.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml

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

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