SPEC CPU®2017 Floating Point Rate Result

ASUSTeK Computer Inc.

ASUS RS720-E11-RS12U
(2.70 GHz, Intel Xeon Platinum 8558P)

$SPECrate®2017\_fp\_base = 1140$

$SPECrate®2017\_fp\_peak = 1170$
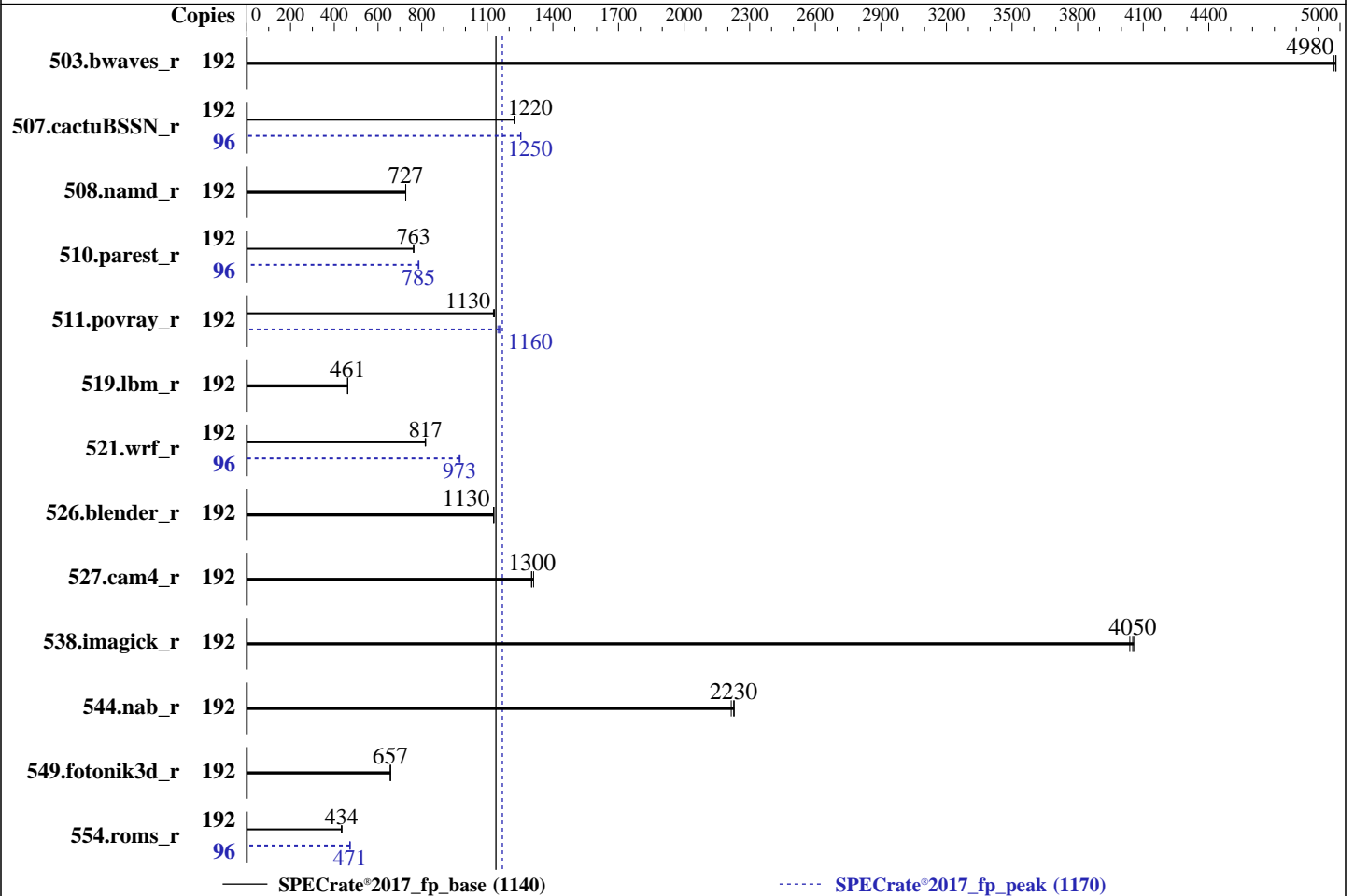
CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2024
Hardware Availability: Dec-2023
Software Availability: Dec-2023

Copies	Benchmark	Base	Peak
192	503.bwaves_r	4980	
192	507.cactuBSSN_r	1220	
96	507.cactuBSSN_r		1250
192	508.namd_r	727	
192	510.parest_r	763	
96	510.parest_r		785
192	511.povray_r	1130	
192	511.povray_r		1160
192	519.lbm_r	461	
192	521.wrf_r	817	
96	521.wrf_r		973
192	526.blender_r	1130	
192	527.cam4_r	1300	
192	538.imagick_r	4050	
192	544.nab_r	2230	
192	549.fotonik3d_r	657	
192	554.roms_r	434	
96	554.roms_r		471

—— SPECrate®2017_fp_base (1140)
····· SPECrate®2017_fp_peak (1170)

Hardware

CPU Name: Intel Xeon Platinum 8558P
 Max MHz: 4000
 Nominal: 2700
Enabled: 96 cores, 2 chips, 2 threads/core
Orderable: 1, 2 chip(s)
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 260 MB I+D on chip per chip
 Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R)
Storage: 1 x 1.6 TB PCIe NVMe SSD
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise High Performance Computing 15 SP5 (x86_64)
Kernel 5.14.21-150500.53-default
Compiler: C/C++: Version 2024.0.2 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2024.0.2 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Version 2201 released Dec-2023
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	192	386	4980	**387**	**4980**	387	4970	192	386	4980	**387**	**4980**	387	4970
507.cactuBSSN_r	192	**199**	**1220**	199	1220	199	1220	96	97.0	1250	97.0	1250	**97.0**	**1250**
508.namd_r	192	251	727	251	727	**251**	**727**	192	251	727	251	727	**251**	**727**
510.parest_r	192	659	763	**658**	**763**	658	764	96	319	787	**320**	**785**	320	785
511.povray_r	192	397	1130	396	1130	**396**	**1130**	192	**388**	**1160**	390	1150	388	1160
519.lbm_r	192	439	461	**439**	**461**	439	461	192	439	461	**439**	**461**	439	461
521.wrf_r	192	526	818	527	816	**526**	**817**	96	220	975	**221**	**973**	221	972
526.blender_r	192	**259**	**1130**	259	1130	259	1130	192	**259**	**1130**	259	1130	259	1130
527.cam4_r	192	258	1300	256	1310	**258**	**1300**	192	258	1300	256	1310	**258**	**1300**
538.imagick_r	192	**118**	**4050**	118	4040	118	4060	192	**118**	**4050**	118	4040	118	4060
544.nab_r	192	145	2230	146	2220	**145**	**2230**	192	145	2230	146	2220	**145**	**2230**
549.fotonik3d_r	192	**1139**	**657**	1139	657	1140	657	192	**1139**	**657**	1139	657	1140	657
554.roms_r	192	705	433	702	435	**703**	**434**	96	**324**	**471**	324	471	323	473

SPECrate®2017_fp_base =	**1140**
SPECrate®2017_fp_peak =	**1170**

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 = "/ic24u0/lib/intel64:/ic24u0/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:
sync; echo 3>   /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

(Continued on next page)

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

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General Notes (Continued)

```
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:
Patrol Scrub = Disabled
SNC = Enable SNC2 (2-clusters)
Engine Boost = Aggressive
SR-IOV Support = Disabled
BMC Configuration:
Fan mode = Full speed mode

Sysinfo program /ic24u0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Tue Mar 12 05:38:22 2024

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 249 (249.16+suse.171.gdad0071f15)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. tuned-adm active
 16. sysctl
 17. /sys/kernel/mm/transparent_hugepage
 18. /sys/kernel/mm/transparent_hugepage/khugepaged
 19. OS release
 20. Disk information
 21. /sys/devices/virtual/dmi/id
 22. dmidecode
 23. BIOS
-----------------------------------------------------------

-----------------------------------------------------------
  1. uname -a
    Linux localhost 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
    x86_64 x86_64 x86_64 GNU/Linux
```

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Platform Notes (Continued)

```
    -----------------------------------------------------------
    2. w
       05:38:22 up 19:26,  2 users,  load average: 131.05, 176.62, 184.87
       USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
       root     tty1     -                Mon10   19:25m  0.91s  0.00s /bin/bash ./rate.sh
       root     tty2     -                Mon15   13:43m  0.11s  0.11s -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) 4126713
       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) 4126713
       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
     /bin/bash ./rate.sh
     /bin/bash ./rate.sh
     runcpu --nobuild --action validate --define default-platform-flags --define numcopies=192 -c
        ic2024.0.2-lin-sapphirerapids-rate-20231213.cfg --define smt-on --define cores=96 --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=192 --configfile
        ic2024.0.2-lin-sapphirerapids-rate-20231213.cfg --define smt-on --define cores=96 --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/CPU2017.004/templogs/preenv.fprate.004.0.log --lognum 004.0 --from_runcpu 2
     specperl $SPEC/bin/sysinfo
    $SPEC = /ic24u0


    -----------------------------------------------------------
    6. /proc/cpuinfo
       model name      : INTEL(R) XEON(R) PLATINUM 8558P
       vendor_id       : GenuineIntel
       cpu family      : 6
       model           : 207
       stepping        : 2
       microcode       : 0x21000200
       bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
       cpu cores       : 48
       siblings        : 96
       2 physical ids (chips)
```

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Platform Notes (Continued)

```
    192 processors (hardware threads)
    physical id 0: core ids 0-47
    physical id 1: core ids 0-47
    physical id 0: apicids 0-95
    physical id 1: apicids 128-223
  Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
  virtualized systems.  Use the above data carefully.


  ------------------------------------------------------------
7. lscpu

From lscpu from util-linux 2.37.4:
  Architecture:              x86_64
  CPU op-mode(s):            32-bit, 64-bit
  Address sizes:             46 bits physical, 57 bits virtual
  Byte Order:                Little Endian
  CPU(s):                    192
  On-line CPU(s) list:       0-191
  Vendor ID:                 GenuineIntel
  Model name:                INTEL(R) XEON(R) PLATINUM 8558P
  CPU family:                6
  Model:                     207
  Thread(s) per core:        2
  Core(s) per socket:        48
  Socket(s):                 2
  Stepping:                  2
  CPU max MHz:               4000.0000
  CPU min MHz:               800.0000
  BogoMIPS:                  5400.00
  Flags:                     fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                             clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                             lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                             nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                             ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1
                             sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
                             lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3
                             invpcid_single cdp_l2 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 rtm 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 avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp
                             hwp_act_window hwp_epp hwp_pkg_req hfi avx512vbmi umip pku ospke waitpkg
                             avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme
                             avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri movdir64b
                             enqcmd fsrm md_clear serialize tsxldtrk pconfig arch_lbr avx512_fp16
                             amx_tile flush_l1d arch_capabilities
  Virtualization:            VT-x
  L1d cache:                 4.5 MiB (96 instances)
  L1i cache:                 3 MiB (96 instances)
  L2 cache:                  192 MiB (96 instances)
  L3 cache:                  520 MiB (2 instances)
  NUMA node(s):              4
  NUMA node0 CPU(s):         0-23,96-119
  NUMA node1 CPU(s):         24-47,120-143
  NUMA node2 CPU(s):         48-71,144-167
  NUMA node3 CPU(s):         72-95,168-191
  Vulnerability Itlb multihit: Not affected
  Vulnerability L1tf:          Not affected
  Vulnerability Mds:           Not affected
```

(Continued on next page)

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Platform Notes (Continued)

```
  Vulnerability Meltdown:          Not affected
  Vulnerability Mmio stale data:   Not affected
  Vulnerability Retbleed:          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, PBRSB-eIBRS SW
                                   sequence
  Vulnerability Srbds:             Not affected
  Vulnerability Tsx async abort:   Not affected

From lscpu --cache:
    NAME ONE-SIZE ALL-SIZE WAYS TYPE          LEVEL   SETS PHY-LINE COHERENCY-SIZE
    L1d       48K     4.5M  12 Data               1     64        1             64
    L1i       32K       3M   8 Instruction        1     64        1             64
    L2         2M     192M  16 Unified            2   2048        1             64
    L3       260M     520M  20 Unified            3 212992        1             64

--------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0-23,96-119
  node 0 size: 257674 MB
  node 0 free: 234042 MB
  node 1 cpus: 24-47,120-143
  node 1 size: 258001 MB
  node 1 free: 238796 MB
  node 2 cpus: 48-71,144-167
  node 2 size: 258035 MB
  node 2 free: 238600 MB
  node 3 cpus: 72-95,168-191
  node 3 size: 257996 MB
  node 3 free: 238692 MB
  node distances:
  node   0   1   2   3
    0:  10  12  21  21
    1:  12  10  21  21
    2:  21  21  10  12
    3:  21  21  12  10

--------------------------------------------------------------
9. /proc/meminfo
   MemTotal:      1056469476 kB

--------------------------------------------------------------
10. who -r
  run-level 3 Mar 11 10:12

--------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
  Default Target  Status
  multi-user      running

--------------------------------------------------------------
12. Services, from systemctl list-unit-files
   STATE           UNIT FILES
   enabled         YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager getty@ haveged
                   irqbalance issue-generator kbdsettings klog lvm2-monitor nscd nvmefc-boot-connections
                   postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore wicked wickedd-auto4
                   wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
```

(Continued on next page)

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Platform Notes (Continued)

```
   enabled-runtime  systemd-remount-fs
   disabled         autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                    chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
                    firewalld gpm grub2-once haveged-switch-root hwloc-dump-hwdata ipmi ipmievd
                    issue-add-ssh-keys kexec-load lunmask man-db-create multipathd ndctl-monitor nfs
                    nfs-blkmap nvmf-autoconnect rpcbind rpmconfigcheck rsyncd serial-getty@
                    smartd_generate_opts snmpd snmptrapd svnserve systemd-boot-check-no-failures
                    systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd tuned
                    udisks2 vncserver@
   indirect         wickedd

  ----------------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-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 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
    It seems that tuned daemon is not running, preset profile is not activated.
    Preset profile: latency-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                     60
    vm.watermark_boost_factor      15000
    vm.watermark_scale_factor         10
    vm.zone_reclaim_mode               0

  ----------------------------------------------------------------
  17. /sys/kernel/mm/transparent_hugepage
    defrag           always defer defer+madvise [madvise] never
```

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Platform Notes (Continued)

```
    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_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 High Performance Computing 15 SP5


  ----------------------------------------------------------------
20. Disk information
SPEC is set to: /ic24u0
  Filesystem    Type  Size  Used Avail Use% Mounted on
  /dev/nvme0n1p8 xfs   1.3T  174G  1.1T  14% /


  ----------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:          ASUSTeK COMPUTER INC.
    Product:         RS720-E11-RS12U
    Product Family:  Server
    Serial:          R1S0MD000002


  ----------------------------------------------------------------
22. dmidecode
  Additional information from dmidecode 3.4 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 M321R8GA0PB0-CWMXJ 64 GB 2 rank 5600



  ----------------------------------------------------------------
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
  BIOS Vendor:       American Megatrends Inc.
  BIOS Version:      2201
  BIOS Date:         12/22/2023
  BIOS Revision:     22.1
```

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 2024.0.2 Build 20231213
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
==============================================================================
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 2024.0.2 Build 20231213
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------------------------------------------------------------------------------


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


==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
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------------------------------------------------------------------------------


==============================================================================
Fortran       | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
------------------------------------------------------------------------------
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==============================================================================
Fortran, C    | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
------------------------------------------------------------------------------
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------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`icx`

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifx`

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ASUSTeK Computer Inc.

ASUS RS720-E11-RS12U
(2.70 GHz, Intel Xeon Platinum 8558P)

SPECrate®2017_fp_base = 1140

SPECrate®2017_fp_peak = 1170

CPU2017 License: 9016		**Test Date:**	Mar-2024
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Dec-2023
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Dec-2023

Base Compiler Invocation (Continued)

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`

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 -xsapphirerapids -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
`-Wno-implicit-int -mprefer-vector-width=512 -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

C++ benchmarks:
`-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

Fortran benchmarks:
`-w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto`
`-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`

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SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720-E11-RS12U
(2.70 GHz, Intel Xeon Platinum 8558P)

SPECrate®2017_fp_base = 1140

SPECrate®2017_fp_peak = 1170

CPU2017 License: 9016		**Test Date:**	Mar-2024
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Dec-2023
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Dec-2023

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-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 -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -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 -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:
```
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-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
```

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

SPEC CPU®2017 Floating Point Rate Result

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ASUSTeK Computer Inc.

ASUS RS720-E11-RS12U
(2.70 GHz, Intel Xeon Platinum 8558P)

SPECrate®2017_fp_base = 1140

SPECrate®2017_fp_peak = 1170

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

Test Date: Mar-2024
Hardware Availability: Dec-2023
Software Availability: Dec-2023

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: basepeak = yes

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: -w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids
-Ofast -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mprefer-vector-width=512
-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 -xsapphirerapids -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: -w -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int
-mprefer-vector-width=512 -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

527.cam4_r: basepeak = yes

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ASUSTeK Computer Inc.

ASUS RS720-E11-RS12U
(2.70 GHz, Intel Xeon Platinum 8558P)

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SPECrate®2017_fp_peak = 1170

CPU2017 License:	9016	**Test Date:**	Mar-2024
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Dec-2023
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Dec-2023

Peak Optimization Flags (Continued)

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`
`-mprefer-vector-width=512 -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

526.blender_r: `basepeak = yes`

Benchmarks using Fortran, C, and C++:
`-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512`
`-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-z13-V1.3.html
http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z13-V1.3.xml
http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml

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

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