SPEC CPU®2017 Floating Point Rate Result

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IEIT Systems Co., Ltd.

i24M7 (Intel Xeon Platinum 8490H)

$SPECrate^{®}2017\_fp\_base = 498$

$SPECrate^{®}2017\_fp\_peak = 532$
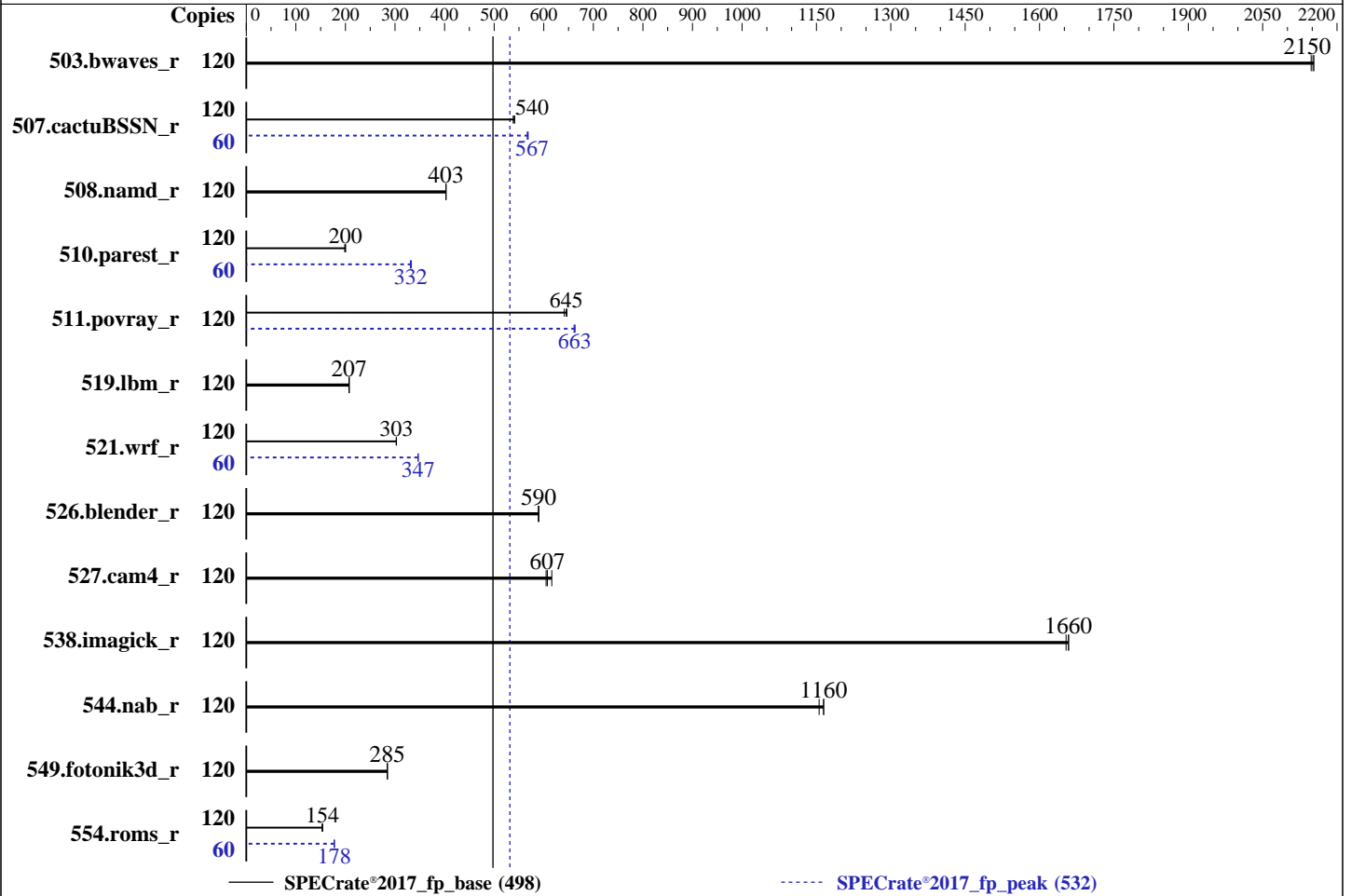
CPU2017 License: 3358

Test Sponsor: IEIT Systems Co., Ltd.

Tested by: IEIT Systems Co., Ltd.

Test Date: Oct-2023

Hardware Availability: Dec-2023

Software Availability: Dec-2022

Copies

Benchmark	Copies	base	peak
503.bwaves_r	120	2150	
507.cactuBSSN_r	120 / 60	540	567
508.namd_r	120	403	
510.parest_r	120 / 60	200	332
511.povray_r	120	645	663
519.lbm_r	120	207	
521.wrf_r	120 / 60	303	347
526.blender_r	120	590	
527.cam4_r	120	607	
538.imagick_r	120	1660	
544.nab_r	120	1160	
549.fotonik3d_r	120	285	
554.roms_r	120 / 60	154	178

—— SPECrate®2017_fp_base (498)   ----- SPECrate®2017_fp_peak (532)

Hardware

CPU Name: Intel Xeon Platinum 8490H
 Max MHz: 3500
 Nominal: 1900
Enabled: 60 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: 112.5 MB I+D on chip per chip
 Other: None
Memory: 512 GB (8 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 1 TB NVME SSD
Other: None

Software

OS: Red Hat Enterprise Linux 9.0 (Plow)
 5.14.0-70.22.1.el9_0.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 05.11.01 released Sep-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	120	560	2150	**559**	**2150**	559	2150	120	560	2150	**559**	**2150**	559	2150
507.cactuBSSN_r	120	282	538	281	541	**281**	**540**	60	134	569	134	567	**134**	**567**
508.namd_r	120	283	403	**283**	**403**	283	403	120	283	403	**283**	**403**	283	403
510.parest_r	120	1581	199	1569	200	**1569**	**200**	60	474	331	471	333	**473**	**332**
511.povray_r	120	433	647	**434**	**645**	437	641	120	**423**	**663**	424	661	423	663
519.lbm_r	120	**610**	**207**	610	207	610	207	120	**610**	**207**	610	207	610	207
521.wrf_r	120	887	303	889	302	**888**	**303**	60	388	346	388	347	**388**	**347**
526.blender_r	120	**310**	**590**	310	589	310	590	120	**310**	**590**	310	589	310	590
527.cam4_r	120	347	605	**346**	**607**	341	616	120	347	605	**346**	**607**	341	616
538.imagick_r	120	**180**	**1660**	180	1660	180	1650	120	**180**	**1660**	180	1660	180	1650
544.nab_r	120	**173**	**1160**	175	1160	173	1160	120	**173**	**1160**	175	1160	173	1160
549.fotonik3d_r	120	1643	285	1645	284	**1643**	**285**	120	1643	285	1645	284	**1643**	**285**
554.roms_r	120	**1241**	**154**	1247	153	1239	154	60	**537**	**178**	537	178	538	177
SPECrate®2017_fp_base =		**498**										
SPECrate®2017_fp_peak =		**532**										

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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/CPU2017/lib/intel64:/home/CPU2017/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>

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

(Continued on next page)

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General Notes (Continued)

```
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:
ENERGY_PERF_BIAS_CFG mode set to Performance
Hardware Prefetch set to Disable
VT Support set to Disable
Sub NUMA Cluster (SNC) set to SNC4

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Mon Oct 30 12:07:33 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 250 (250-6.el9_0)
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.localdomain 5.14.0-70.22.1.el9_0.x86_64 #1 SMP PREEMPT Tue Aug 2 10:02:12 EDT 2022 x86_64
  x86_64 x86_64 GNU/Linux


-----------------------------------------------------------
2. w
```

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Platform Notes (Continued)

```
   12:07:33 up  6:41,  1 user,  load average: 87.97, 112.45, 116.95
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1       05:26    6:40m 1.16s  0.01s sh
   reportable-ic2023.0-lin-sapphirerapids-rate-smt-on-20221201.sh

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

  ------------------------------------------------------------
  4. ulimit -a
    real-time non-blocking time  (microseconds, -R) unlimited
    core file size              (blocks, -c) 0
    data seg size               (kbytes, -d) unlimited
    scheduling priority             (-e) 0
    file size                   (blocks, -f) unlimited
    pending signals                 (-i) 2060061
    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) 2060061
    virtual memory              (kbytes, -v) unlimited
    file locks                      (-x) unlimited

  ------------------------------------------------------------
  5. sysinfo process ancestry
   /usr/lib/systemd/systemd rhgb --switched-root --system --deserialize 31
   login -- root
   -bash
   sh reportable-ic2023.0-lin-sapphirerapids-rate-smt-on-20221201.sh
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=120 -c
     ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=60 --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=120 --configfile
     ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=60 --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/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
  $SPEC = /home/CPU2017

  ------------------------------------------------------------
  6. /proc/cpuinfo
     model name      : Intel(R) Xeon(R) Platinum 8490H
     vendor_id       : GenuineIntel
     cpu family      : 6
     model           : 143
     stepping        : 6
     microcode       : 0x2b000461
     bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
     cpu cores       : 60
     siblings        : 120
     1 physical ids (chips)
     120 processors (hardware threads)
     physical id 0: core ids 0-59
```

(Continued on next page)

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Platform Notes (Continued)

```
    physical id 0: apicids 0-119
  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:            52 bits physical, 57 bits virtual
  Byte Order:               Little Endian
  CPU(s):                   120
  On-line CPU(s) list:      0-119
  Vendor ID:                GenuineIntel
  BIOS Vendor ID:           Intel(R) Corporation
  Model name:               Intel(R) Xeon(R) Platinum 8490H
  BIOS Model name:          Intel(R) Xeon(R) Platinum 8490H
  CPU family:               6
  Model:                    143
  Thread(s) per core:       2
  Core(s) per socket:       60
  Socket(s):                1
  Stepping:                 6
  Frequency boost:          enabled
  CPU max MHz:              1901.0000
  CPU min MHz:              800.0000
  BogoMIPS:                 3800.00
  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 ds_cpl
                            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
                            intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase
                            tsc_adjust bmi1 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 avx_vnni avx512_bf16
                            wbnoinvd dtherm ida arat pln pts 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
  L1d cache:                2.8 MiB (60 instances)
  L1i cache:                1.9 MiB (60 instances)
  L2 cache:                 120 MiB (60 instances)
  L3 cache:                 112.5 MiB (1 instance)
  NUMA node(s):             4
  NUMA node0 CPU(s):        0-14,60-74
  NUMA node1 CPU(s):        15-29,75-89
  NUMA node2 CPU(s):        30-44,90-104
  NUMA node3 CPU(s):        45-59,105-119
  Vulnerability Itlb multihit:     Not affected
  Vulnerability L1tf:              Not affected
  Vulnerability Mds:               Not affected
  Vulnerability Meltdown:          Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
  Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user pointer sanitization
```

(Continued on next page)

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Platform Notes (Continued)

```
  Vulnerability Spectre v2:        Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
  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     2.8M   12 Data             1      64        1             64
    L1i       32K     1.9M    8 Instruction      1      64        1             64
    L2         2M     120M   16 Unified          2    2048        1             64
    L3     112.5M   112.5M   15 Unified          3  122880        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: 0-14,60-74
  node 0 size: 128033 MB
  node 0 free: 111675 MB
  node 1 cpus: 15-29,75-89
  node 1 size: 129017 MB
  node 1 free: 116412 MB
  node 2 cpus: 30-44,90-104
  node 2 size: 129017 MB
  node 2 free: 116338 MB
  node 3 cpus: 45-59,105-119
  node 3 size: 129006 MB
  node 3 free: 116288 MB
  node distances:
  node   0   1   2   3
    0:  10  12  12  12
    1:  12  10  12  12
    2:  12  12  10  12
    3:  12  12  12  10

    --------------------------------------------------------------
9. /proc/meminfo
   MemTotal:      527437252 kB

    --------------------------------------------------------------
10. who -r
   run-level 3 Oct 30 05:26

    --------------------------------------------------------------
11. Systemd service manager version: systemd 250 (250-6.el9_0)
  Default Target  Status
  multi-user      running

    --------------------------------------------------------------
12. Services, from systemctl list-unit-files
   STATE            UNIT FILES
   enabled          ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
                    accounts-daemon atd auditd avahi-daemon bluetooth chronyd crond cups dbus-broker gdm
                    getty@tty1 insights-client-boot irqbalance iscsi iscsi-onboot kdump libstoragemgmt
                    low-memory-monitor lvm2-monitor mcelog mdmonitor microcode multipath nis-domainname
                    nvmefc-boot-connections ostree-remount power-profiles-daemon qemu-guest-agent rhsmcertd
                    rpcbind rsyslog rtkit-daemon selinux-autorelabel-mark smartd sshd sssd switcheroo-control
                    sysstat systemd-network-generator tuned udisks2 upower vgauthd vmtoolsd
   enabled-runtime  rc-local systemd-remount-fs
   disabled         arp-ethers blk-availability bmc-watchdog brltty canberra-system-bootup
                    canberra-system-shutdown canberra-system-shutdown-reboot chrony-wait cni-dhcp
```

(Continued on next page)

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Platform Notes (Continued)

```
                  console-getty cpupower cups-browsed dbus-daemon debug-shell dnsmasq firewalld getty@
                  gssproxy ipmi ipmidetectd iprdump iprinit iprupdate ipsec iscsid iscsiuio kpatch kvm_stat
                  ledmon libvirt-guests libvirtd man-db-restart-cache-update netserver nfs-blkmap nfs-server
                  nftables nm-cloud-setup numad nvmf-autoconnect podman podman-auto-update podman-restart
                  psacct ras-mc-ctl rasdaemon rdisc rhcd rhsm rhsm-facts rpmdb-rebuild saslauthd
                  serial-getty@ speech-dispatcherd sshd-keygen@ systemd-boot-check-no-failures
                  systemd-pstore systemd-sysext virtnetworkd virtproxyd vsftpd wpa_supplicant
  generated       jexec
  indirect        spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo tftp
                  virtlockd virtlogd vsftpd@

  ----------------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.22.1.el9_0.x86_64
    root=/dev/mapper/rhel00-root
    ro
    crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
    resume=/dev/mapper/rhel00-swap
    rd.lvm.lv=rhel00/root
    rd.lvm.lv=rhel00/swap
    rhgb
    quiet

  ----------------------------------------------------------------
  14. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 800 MHz and 1.90 GHz.
                      The governor "performance" may decide which speed to use
                      within this range.
      boost state support:
        Supported: yes
        Active: yes

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

  ----------------------------------------------------------------
  16. sysctl
    kernel.numa_balancing              1
    kernel.randomize_va_space          2
    vm.compaction_proactiveness       20
    vm.dirty_background_bytes          0
    vm.dirty_background_ratio         10
    vm.dirty_bytes                     0
    vm.dirty_expire_centisecs       3000
    vm.dirty_ratio                    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

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

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Platform Notes (Continued)

```
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_shared           256
   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 9.0 (Plow)
   redhat-release Red Hat Enterprise Linux release 9.0 (Plow)
   system-release Red Hat Enterprise Linux release 9.0 (Plow)

   -------------------------------------------------------------
20. Disk information
SPEC is set to: /home/CPU2017
   Filesystem             Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel00-home xfs   819G  177G  643G  22% /home

   -------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
     Vendor:        IEI
     Product:       NS3260M7
     Product Family: Not specified
     Serial:        111111111

   -------------------------------------------------------------
22. dmidecode
   Additional information from dmidecode 3.3 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 Micron MTC40F2046S1RC48BA1 64 GB 2 rank 4800


   -------------------------------------------------------------
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       American Megatrends International, LLC.
   BIOS Version:      05.11.01
   BIOS Date:         09/21/2023
```

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
```

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Compiler Version Notes (Continued)

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


==============================================================================
C++            | 508.namd_r(base, peak) 510.parest_r(base, peak)
------------------------------------------------------------------------------
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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)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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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
```

(Continued on next page)

IEIT Systems Co., Ltd.

SPECrate®2017_fp_base = 498

i24M7 (Intel Xeon Platinum 8490H)

SPECrate®2017_fp_peak = 532

CPU2017 License: 3358
Test Sponsor: IEIT Systems Co., Ltd.
Tested by: IEIT Systems Co., Ltd.

Test Date: Oct-2023
Hardware Availability: Dec-2023
Software Availability: Dec-2022

Base Compiler Invocation (Continued)

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`

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
```

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SPEC CPU®2017 Floating Point Rate Result

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IEIT Systems Co., Ltd.

i24M7 (Intel Xeon Platinum 8490H)

SPECrate®2017_fp_base = 498

SPECrate®2017_fp_peak = 532

CPU2017 License: 3358
Test Sponsor: IEIT Systems Co., Ltd.
Tested by: IEIT Systems Co., Ltd.

Test Date: Oct-2023
Hardware Availability: Dec-2023
Software Availability: Dec-2022

Base Optimization Flags (Continued)

Fortran benchmarks:
```
-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:
```
-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/

IEIT Systems Co., Ltd.

i24M7 (Intel Xeon Platinum 8490H)

SPECrate®2017_fp_base = 498

SPECrate®2017_fp_peak = 532

CPU2017 License: 3358
Test Sponsor: IEIT Systems Co., Ltd.
Tested by: IEIT Systems Co., Ltd.

Test Date: Oct-2023
Hardware Availability: Dec-2023
Software Availability: Dec-2022

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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i24M7 (Intel Xeon Platinum 8490H)

SPECrate®2017_fp_base = 498

SPECrate®2017_fp_peak = 532

CPU2017 License: 3358
Test Sponsor: IEIT Systems Co., Ltd.
Tested by: IEIT Systems Co., Ltd.

Test Date: Oct-2023
Hardware Availability: Dec-2023
Software Availability: Dec-2022

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/Intel-ic2023-official-linux64.html`
`http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-intel-V3.4.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/Inspur-Platform-Settings-intel-V3.4.xml`

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

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