SPEC CPU®2017 Floating Point Rate Result

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Fujitsu

PRIMEQUEST 4400E, Intel Xeon Platinum 8460H, 2.20GHz

$SPECrate®2017\_fp\_base =$ 1640

$SPECrate®2017\_fp\_peak =$ Not Run

CPU2017 License: 19	**Test Date:** Jul-2023
Test Sponsor: Fujitsu	**Hardware Availability:** Sep-2023
Tested by: Fujitsu	**Software Availability:** Dec-2022

Copies

Benchmark	Copies	Value
503.bwaves_r	320	8110
507.cactuBSSN_r	320	1800
508.namd_r	320	1140
510.parest_r	320	846
511.povray_r	320	1810
519.lbm_r	320	573
521.wrf_r	320	1210
526.blender_r	320	1660
527.cam4_r	320	1830
538.imagick_r	320	4920
544.nab_r	320	3450
549.fotonik3d_r	320	1080
554.roms_r	320	611

SPECrate®2017_fp_base (1640)

Hardware

CPU Name: Intel Xeon Platinum 8460H
 Max MHz: 3800
 Nominal: 2200
Enabled: 160 cores, 4 chips, 2 threads/core
Orderable: 2,4 chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 105 MB I+D on chip per chip
 Other: None
Memory: 2 TB (32 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 1.92 TB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
 5.14.21-150400.22-default
Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++
 Compiler for Linux;
 Fortran: Version 2023.0 of Intel Fortran Compiler
 for Linux;
Parallel: No
Firmware: Fujitsu BIOS Version V1.0.0.0 R1.10.0 for
 D3986-A1x. Released Sep-2023
 tested as V1.0.0.0 R1.0.0 for D3986-A1x May-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS set to prefer performance at
 the cost of additional power usage

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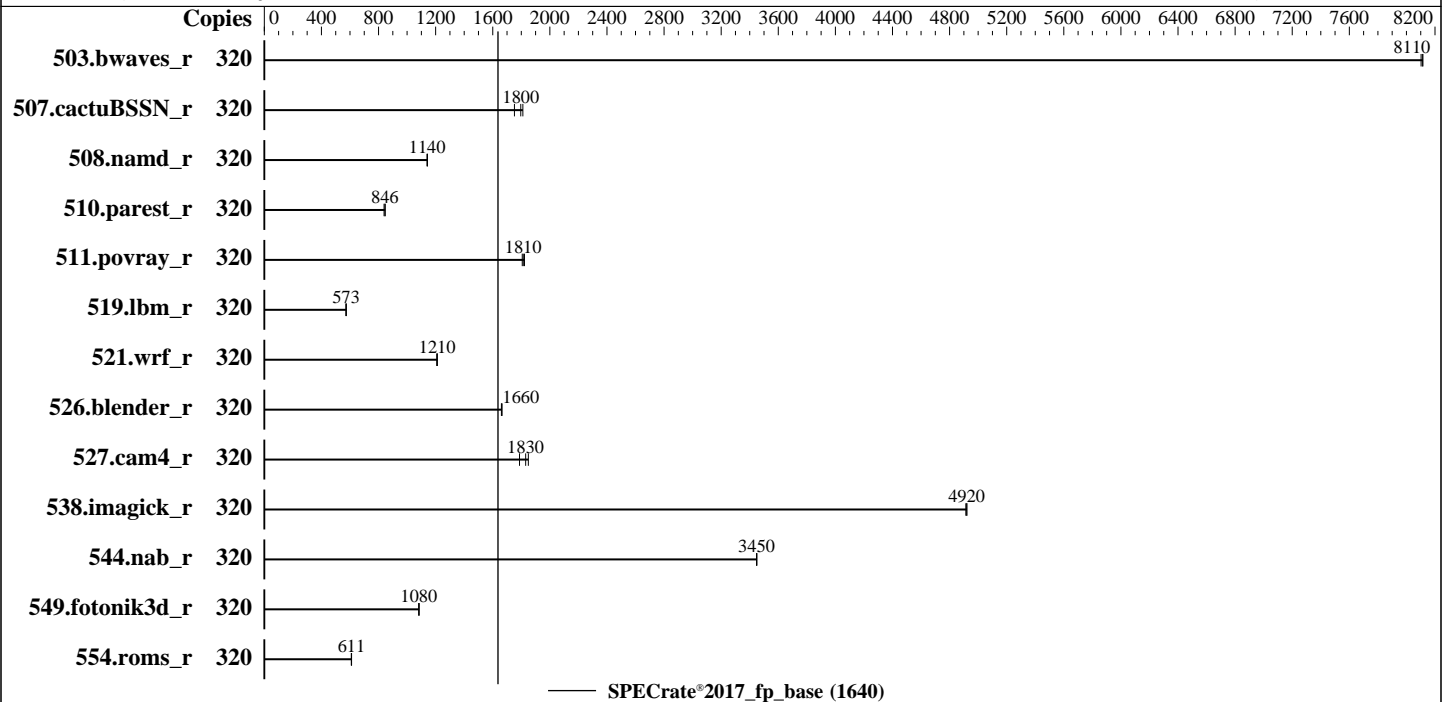
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Hardware Availability: Sep-2023
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Results Table

Benchmark	Copies	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Copies	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
503.bwaves_r	320	395	8120	396	8100	**396**	**8110**							
507.cactuBSSN_r	320	231	1750	224	1810	**226**	**1800**							
508.namd_r	320	267	1140	266	1140	**266**	**1140**							
510.parest_r	320	989	846	**990**	**846**	998	839							
511.povray_r	320	**412**	**1810**	410	1820	414	1810							
519.lbm_r	320	589	573	**589**	**573**	589	573							
521.wrf_r	320	593	1210	**592**	**1210**	592	1210							
526.blender_r	320	293	1660	293	1660	**293**	**1660**							
527.cam4_r	320	303	1850	313	1790	**306**	**1830**							
538.imagick_r	320	162	4910	**162**	**4920**	162	4920							
544.nab_r	320	**156**	**3450**	156	3450	156	3450							
549.fotonik3d_r	320	1151	1080	**1152**	**1080**	1152	1080							
554.roms_r	320	**832**	**611**	832	611	835	609							

SPECrate®2017_fp_base = **1640**

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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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/Benchmark/speccpu/lib/intel64:/home/Benchmark/speccpu/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)
is mitigated in the system as tested and documented.

(Continued on next page)

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Test Sponsor: Fujitsu	**Hardware Availability:** Sep-2023
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General Notes (Continued)

```
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:
Package C State limit = C0
CPU Performance Boost = Aggressive
SNC (Sub NUMA) = Enable SNC4
FAN Control = Full

Sysinfo program /home/Benchmark/speccpu/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Tue Jul  4 18:13:01 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 249 (249.11+suse.124.g2bc0b2c447)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. sysctl
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS
------------------------------------------------------------


------------------------------------------------------------
1. uname -a
  Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
  x86_64 x86_64 x86_64 GNU/Linux


------------------------------------------------------------
2. w
   18:13:01 up 3 min,  1 user,  load average: 4.08, 10.81, 5.42
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                18:11   13.00s  2.34s  0.31s -bash
```

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Platform Notes (Continued)

```
     ----------------------------------------------------------
     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) 8253657
       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) 8253657
       virtual memory          (kbytes, -v) unlimited
       file locks                      (-x) unlimited

     ----------------------------------------------------------
     5. sysinfo process ancestry
      /usr/lib/systemd/systemd --switched-root --system --deserialize 30
      login -- root
      -bash
      -bash
      runcpu --nobuild --action validate --define default-platform-flags --define numcopies=320 -c
        ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=160 --define physicalfirst
        --define invoke_with_interleave --define drop_caches --tune base -o all fprate
      runcpu --nobuild --action validate --define default-platform-flags --define numcopies=320 --configfile
        ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=160 --define physicalfirst
        --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
        rate --tune base --size refrate fprate --nopreenv --note-preenv --logfile
        $SPEC/tmp/CPU2017.001/templogs/preenv.fprate.001.0.log --lognum 001.0 --from_runcpu 2
      specperl $SPEC/bin/sysinfo
     $SPEC = /home/Benchmark/speccpu


     ----------------------------------------------------------
     6. /proc/cpuinfo
        model name      : Intel(R) Xeon(R) Platinum 8460H
        vendor_id       : GenuineIntel
        cpu family      : 6
        model           : 143
        stepping        : 6
        microcode       : 0x2b0001b0
        bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
        cpu cores       : 40
        siblings        : 80
        4 physical ids (chips)
        320 processors (hardware threads)
        physical id 0: core ids 0-39
        physical id 1: core ids 0-39
        physical id 2: core ids 0-39
        physical id 3: core ids 0-39
        physical id 0: apicids 0-79
        physical id 1: apicids 128-207
```

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Platform Notes (Continued)

```
      physical id 2: apicids 256-335
      physical id 3: apicids 384-463
   Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems.  Use the above data carefully.


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

From lscpu from util-linux 2.37.2:
   Architecture:                 x86_64
   CPU op-mode(s):               32-bit, 64-bit
   Address sizes:                46 bits physical, 57 bits virtual
   Byte Order:                   Little Endian
   CPU(s):                       320
   On-line CPU(s) list:          0-319
   Vendor ID:                    GenuineIntel
   Model name:                   Intel(R) Xeon(R) Platinum 8460H
   CPU family:                   6
   Model:                        143
   Thread(s) per core:           2
   Core(s) per socket:           40
   Socket(s):                    4
   Stepping:                     6
   CPU max MHz:                  3800.0000
   CPU min MHz:                  800.0000
   BogoMIPS:                     4400.00
   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 intel_ppin 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 split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida
                                 arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req 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:                    7.5 MiB (160 instances)
   L1i cache:                    5 MiB (160 instances)
   L2 cache:                     320 MiB (160 instances)
   L3 cache:                     420 MiB (4 instances)
   NUMA node(s):                 16
   NUMA node0 CPU(s):            0-9,160-169
   NUMA node1 CPU(s):            10-19,170-179
   NUMA node2 CPU(s):            20-29,180-189
   NUMA node3 CPU(s):            30-39,190-199
   NUMA node4 CPU(s):            40-49,200-209
   NUMA node5 CPU(s):            50-59,210-219
   NUMA node6 CPU(s):            60-69,220-229
   NUMA node7 CPU(s):            70-79,230-239
   NUMA node8 CPU(s):            80-89,240-249
   NUMA node9 CPU(s):            90-99,250-259
```

(Continued on next page)

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Platform Notes (Continued)

```
  NUMA node10 CPU(s):         100-109,260-269
  NUMA node11 CPU(s):         110-119,270-279
  NUMA node12 CPU(s):         120-129,280-289
  NUMA node13 CPU(s):         130-139,290-299
  NUMA node14 CPU(s):         140-149,300-309
  NUMA node15 CPU(s):         150-159,310-319
  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 and seccomp
  Vulnerability Spectre v1:       Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:       Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
  Vulnerability Srbds:            Not affected
  Vulnerability Tsx async abort:  Not affected

  From lscpu --cache:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL    SETS PHY-LINE COHERENCY-SIZE
      L1d      48K      7.5M  12 Data             1      64       1             64
      L1i      32K        5M   8 Instruction      1      64       1             64
      L2        2M      320M  16 Unified          2    2048       1             64
      L3      105M      420M  15 Unified          3  114688       1             64

  ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 16 nodes (0-15)
    node 0 cpus: 0-9,160-169
    node 0 size: 128598 MB
    node 0 free: 127815 MB
    node 1 cpus: 10-19,170-179
    node 1 size: 129018 MB
    node 1 free: 128811 MB
    node 2 cpus: 20-29,180-189
    node 2 size: 129018 MB
    node 2 free: 128828 MB
    node 3 cpus: 30-39,190-199
    node 3 size: 129018 MB
    node 3 free: 128826 MB
    node 4 cpus: 40-49,200-209
    node 4 size: 129018 MB
    node 4 free: 128677 MB
    node 5 cpus: 50-59,210-219
    node 5 size: 129018 MB
    node 5 free: 128657 MB
    node 6 cpus: 60-69,220-229
    node 6 size: 129018 MB
    node 6 free: 128694 MB
    node 7 cpus: 70-79,230-239
    node 7 size: 129018 MB
    node 7 free: 128701 MB
    node 8 cpus: 80-89,240-249
    node 8 size: 129018 MB
    node 8 free: 128505 MB
    node 9 cpus: 90-99,250-259
    node 9 size: 129018 MB
    node 9 free: 128663 MB
    node 10 cpus: 100-109,260-269
    node 10 size: 129018 MB
    node 10 free: 128687 MB
```

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Platform Notes (Continued)

```
   node 11 cpus: 110-119,270-279
   node 11 size: 128984 MB
   node 11 free: 128619 MB
   node 12 cpus: 120-129,280-289
   node 12 size: 129018 MB
   node 12 free: 128295 MB
   node 13 cpus: 130-139,290-299
   node 13 size: 129018 MB
   node 13 free: 128477 MB
   node 14 cpus: 140-149,300-309
   node 14 size: 129018 MB
   node 14 free: 128467 MB
   node 15 cpus: 150-159,310-319
   node 15 size: 128610 MB
   node 15 free: 127932 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
     0:  10  12  12  12  21  21  21  21  21  21  21  21  31  31  31  31
     1:  12  10  12  12  21  21  21  21  21  21  21  21  31  31  31  31
     2:  12  12  10  12  21  21  21  21  21  21  21  21  31  31  31  31
     3:  12  12  12  10  21  21  21  21  21  21  21  21  31  31  31  31
     4:  21  21  21  21  10  12  12  12  31  31  31  31  21  21  21  21
     5:  21  21  21  21  12  10  12  12  31  31  31  31  21  21  21  21
     6:  21  21  21  21  12  12  10  12  31  31  31  31  21  21  21  21
     7:  21  21  21  21  12  12  12  10  31  31  31  31  21  21  21  21
     8:  21  21  21  21  31  31  31  31  10  12  12  12  21  21  21  21
     9:  21  21  21  21  31  31  31  31  12  10  12  12  21  21  21  21
    10:  21  21  21  21  31  31  31  31  12  12  10  12  21  21  21  21
    11:  21  21  21  21  31  31  31  31  12  12  12  10  21  21  21  21
    12:  31  31  31  31  21  21  21  21  21  21  21  21  10  12  12  12
    13:  31  31  31  31  21  21  21  21  21  21  21  21  12  10  12  12
    14:  31  31  31  31  21  21  21  21  21  21  21  21  12  12  10  12
    15:  31  31  31  31  21  21  21  21  21  21  21  21  12  12  12  10

  -----------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       2112960780 kB


  -----------------------------------------------------------
  10. who -r
    run-level 3 Jul 4 18:10


  -----------------------------------------------------------
  11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
    Default Target  Status
    multi-user      running

  -----------------------------------------------------------
  12. Services, from systemctl list-unit-files
    STATE           UNIT FILES
    enabled         YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager getty@ haveged
                    irqbalance issue-generator kbdsettings kdump kdump-early klog lvm2-monitor nscd postfix
                    purge-kernels rollback rsyslog smartd sshd wicked wickedd-auto4 wickedd-dhcp4
                    wickedd-dhcp6 wickedd-nanny
    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 ipmi ipmievd issue-add-ssh-keys kexec-load
                    lunmask man-db-create multipathd nfs nfs-blkmap rdisc rpcbind rpmconfigcheck rsyncd
                    serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
```

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Platform Notes (Continued)

```
                     systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd udisks2
    indirect         wickedd


  ------------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=1e79ef75-7aac-47dd-b0b3-7222e12a3a30
    splash=silent
    mitigations=auto
    quiet
    security=apparmor
    crashkernel=325M,high
    crashkernel=72M,low


  ------------------------------------------------------------
  14. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 800 MHz and 3.80 GHz.
                      The governor "powersave" may decide which speed to use
                      within this range.
      boost state support:
        Supported: yes
        Active: yes


  ------------------------------------------------------------
  15. sysctl
    kernel.numa_balancing            1
    kernel.randomize_va_space        2
    vm.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


  ------------------------------------------------------------
  16. /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


  ------------------------------------------------------------
  17. /sys/kernel/mm/transparent_hugepage/khugepaged
    alloc_sleep_millisecs   60000
    defrag                      1
    max_ptes_none             511
    max_ptes_shared           256
    max_ptes_swap              64
```

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Fujitsu

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Platform Notes (Continued)

```
    pages_to_scan           4096
    scan_sleep_millisecs    10000


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


    ------------------------------------------------------------
19. Disk information
SPEC is set to: /home/Benchmark/speccpu
  Filesystem      Type  Size  Used Avail Use% Mounted on
  /dev/sda2       xfs   1.8T   32G  1.8T   2% /


    ------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:        FUJITSU


    ------------------------------------------------------------
21. dmidecode
  Additional information from dmidecode 3.2 follows.  WARNING: Use caution when you interpret this section.
  The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
  determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
  "DMTF SMBIOS" standard.
  Memory:
    9x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800
    4x Samsung M321R8GA0BB0-CQKEG 64 GB 2 rank 4800
    1x Samsung M321R8GA0BB0-CQKMG 64 GB 2 rank 4800
    18x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800


    ------------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       FUJITSU
    BIOS Version:      V1.0.0.0 R1.0.0 for D3986-A1
    BIOS Date:         05/27/2023
    BIOS Revision:     1.0
    Firmware Revision: 2.6
```

Compiler Version Notes

```
==============================================================================================
C            | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
----------------------------------------------------------------------------------------------
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) 510.parest_r(base)
----------------------------------------------------------------------------------------------
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) 526.blender_r(base)
----------------------------------------------------------------------------------------------
```

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Fujitsu

PRIMEQUEST 4400E, Intel Xeon Platinum 8460H, 2.20GHz

SPECrate®2017_fp_base =   1640

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 19		**Test Date:**	Jul-2023
Test Sponsor:	Fujitsu	**Hardware Availability:**	Sep-2023
Tested by:	Fujitsu	**Software Availability:**	Dec-2022

Compiler Version Notes (Continued)

```
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
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)
--------------------------------------------------------------------------------------------------------------
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.
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) 549.fotonik3d_r(base) 554.roms_r(base)
--------------------------------------------------------------------------------------------------------------
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) 527.cam4_r(base)
--------------------------------------------------------------------------------------------------------------
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
```

Fujitsu

PRIMEQUEST 4400E, Intel Xeon Platinum 8460H, 2.20GHz

SPECrate®2017_fp_base = 1640

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

Test Date: Jul-2023
Hardware Availability: Sep-2023
Software Availability: Dec-2022

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`
`-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`

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Fujitsu
PRIMEQUEST 4400E, Intel Xeon Platinum 8460H, 2.20GHz

SPECrate®2017_fp_base = 1640

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

Test Date: Jul-2023
Hardware Availability: Sep-2023
Software Availability: Dec-2022

Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):
```
-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
```

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/Fujitsu-Platform-Settings-V1.0-SPR-RevB.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/Fujitsu-Platform-Settings-V1.0-SPR-RevB.xml
```

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

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