Fujitsu
PRIMERGY CX2560 M7, Intel Xeon Gold 5418Y, 2.00GHz

CPU2017 License: 19
Test Sponsor: Fujitsu
Test Date: Jun-2023
Tested by: Fujitsu
Hardware Availability: May-2023
Software Availability: Dec-2022

SPECrate®2017_fp_base = 537
SPECrate®2017_fp_peak = Not Run

Hardware

CPU Name: Intel Xeon Gold 5418Y
Max MHz: 3800
Nominal: 2000
Enabled: 48 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 45 MB I+D on chip per core
Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R, running at 4400)
Storage: 1 x 480 GB M.2 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 D3989-A1x. Released May-2023 tested as V1.0.0.0 R0.32.0 for D3989-A1x Mar-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 and OS set to prefer performance at the cost of additional power usage
SPEC CPU®2017 Floating Point Rate Result

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Results Table

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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/spec/cpu/lib/intel64:/home/Benchmark/spec/cpu/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)
SPEC CPU®2017 Floating Point Rate Result

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SPEC CPU®2017 fp_base = 537
SPEC CPU®2017 fp_peak = Not Run

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Test Date: Jun-2023
Hardware Availability: May-2023
Software Availability: Dec-2022

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

Platform Notes

BIOS configuration:
Package C State limit = C0
CPU Performance Boost = Aggressive
SNC (Sub NUMA) = Enable SNC2

Sysinfo program /home/Benchmark/speccpu/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Thu Jun 8 11:26:34 2023

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

---------------------------------------------
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. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
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 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
x86_64 x86_64 x86_64 GNU/Linux

2. w
11:26:34 up 0 min, 1 user, load average: 5.16, 1.80, 0.64
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
root tty1 - 11:26 10.00s 2.02s 0.14s -bash

(Continued on next page)
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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) 4125313
   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) 4125313
   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
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=96 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=48 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base -o all fprate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=96 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=48 --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

   Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems. Use the above data carefully.
Platform Notes (Continued)

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): 96
On-line CPU(s) list: 0-95
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Gold 5418Y
CPU family: 6
Model: 143
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
Stepping: 8
CPU max MHz: 3800.0000
CPU min MHz: 800.0000
BogoMIPS: 4000.00
Flags:

Virtualization: VT-x
L1d cache: 2.3 MiB (48 instances)
L1i cache: 1.5 MiB (48 instances)
L2 cache: 96 MiB (48 instances)
L3 cache: 90 MiB (2 instances)
NUMA node(s): 4
NUMA node0 CPU(s): 0-11,48-59
NUMA node1 CPU(s): 12-23,60-71
NUMA node2 CPU(s): 24-35,72-83
NUMA node3 CPU(s): 36-47,84-95

Vulnerability L1f: 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/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbsds: Not affected
Vulnerability Tsx async abort: Not affected

(Continued on next page)
Platform Notes (Continued)

From lscpu --cache:

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<td>49152</td>
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8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0-11,48-59
node 0 size: 257622 MB
node 0 free: 256627 MB
node 1 cpus: 12-23,60-71
node 1 size: 258007 MB
node 1 free: 257533 MB
node 2 cpus: 24-35,72-83
node 2 size: 258041 MB
node 2 free: 257590 MB
node 3 cpus: 36-47,84-95
node 3 size: 257680 MB
node 3 free: 257098 MB
node distances:
node   0   1   2   3
0:  10  12  21  21
1:  12  10  21  21
2:  21  21  12  10
3:  21  21  12  10

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

9. /proc/meminfo

MemTotal: 1056104656 kB

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

10. who -r

run-level 3 Jun 8 11:26

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

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

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

12. Failed units, from systemctl list-units --state=failed
UNIT LOAD ACTIVE SUB DESCRIPTION
* sep5.service loaded failed failed systemd script to load sep5 driver at boot time

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

13. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled YaST2-Firstboot YaST2-Second-Stage apparmor auditd chrony display-manager getty@ havged
irqbalance issue-generator kbdsettings kdump kdump-early klog lvmd2-monitor nscd postfix
purge-kernels rollback rsyslog sep5 systemd smartd sshd wicked wickedd-auto4 wickedd-dhcp4
wicked-dhcp6 wickedd-nanny
enabled-runtime systemd-remount-fs
disabled autosysl autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
cron chronyd console-getty cups cups-browsed debug-shell ebtacles exchange-bmc-os-info
firewalld gpm grub2-once havedged-switch-root ipmi ipmiev kbd issue-ssh-keys kexec-load
lunmask man-db-create multipathd nfs nfs-bkmap rdisc rpcbind rpncfgcheck rsysncd

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Platform Notes (Continued)

14. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
   root=UUID=1877acc7-b872-4c2a-931f-b65cccf192e7
   splash=silent
   mitigations=auto
   quiet
   security=apparmor
   crashkernel=332M,high
   crashkernel=72M,low

15. 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

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.extr frag_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
    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

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SPEC CPU®2017 Floating Point Rate Result
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Platform Notes (Continued)

max_ptes_swap 64
pages_to_scan 4096
scan_sleep_millisecs 10000

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

20. Disk information
SPEC is set to: /home/Benchmark/speccpu
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 447G 56G 391G 13% /

21. /sys/devices/virtual/dmi/id
Vendor: FUJITSU
Product: PRIMERGY CX2560 M7
Product Family: SERVER
Serial: EWCDXXXXXX

22. dmidecode
Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
Memory:
16x Samsung M321R8GA0BB0-CQKMG 64 GB 2 rank 4800, configured at 4400

23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: FUJITSU
BIOS Version: V1.0.0.0 R0.32.0 for D3989-A1x
BIOS Date: 03/10/2023
BIOS Revision: 0.32
Firmware Revision: 2.20

Compiler Version Notes

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<table>
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<tr>
<th>Fortran, C</th>
<th>521.wrf_r(base) 527.cam4_r(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201</td>
<td></td>
</tr>
<tr>
<td>Copyright (C) 1985-2022 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
</tbody>
</table>

### 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
PRIMERGY CX2560 M7, Intel Xeon Gold 5418Y, 2.00GHz

SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2023 Standard Performance Evaluation Corporation

Fujitsu

SPECrate®2017_fp_base = 537
SPECrate®2017_fp_peak = Not Run

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

Test Date: Jun-2023
Hardware Availability: May-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

(Continued on next page)
Fujitsu
PRIMERGY CX2560 M7, Intel Xeon Gold 5418Y, 2.00GHz

| SPECrate®2017_fp_base | 537 |
| SPECrate®2017_fp_peak | Not Run |

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

Test Date: Jun-2023
Hardware Availability: May-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
- fffast-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

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

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

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