# SPEC CPU®2017 Integer Rate Result

**Fujitsu**

PRIMERGY CX2560 M7, Intel Xeon Silver 4410Y, 2.00GHz

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Jun-2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License:</td>
<td>19</td>
</tr>
<tr>
<td>Test Sponsor:</td>
<td>Fujitsu</td>
</tr>
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<td>Tested by:</td>
<td>Fujitsu</td>
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<tr>
<td>Test Date:</td>
<td>Jun-2023</td>
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<tr>
<td>Hardware Availability:</td>
<td>May-2023</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2022</td>
</tr>
</tbody>
</table>

## Hardware

- **CPU Name:** Intel Xeon Silver 4410Y
- **Max MHz:** 3900
- **Nominal:** 2000
- **Enabled:** 24 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:** 30 MB I+D on chip per chip
- **Other:** None
- **Memory:** 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R, running at 4000)
- **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 R1.1.0 for D3989-A1x Apr-2023
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage

### SPECrate®2017_int_base = 217

### SPECrate®2017_int_peak = Not Run

### SPECrate®2017_int_base

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<td>557.xz_r</td>
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### SPECrate®2017_int_base (217)
Fujitsu
PRIMERGY CX2560 M7, Intel Xeon Silver 4140Y, 2.00GHz

SPEC CPU®2017 Integer Rate Result

SPECrate®2017_int_base = 217
SPECrate®2017_int_peak = Not Run

Results Table

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<td>557.xz_r</td>
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<td>528</td>
<td>98.2</td>
<td>529</td>
<td>98.0</td>
</tr>
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</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk_r / 623.xalanchmk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4
https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

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/lib/ia32:/home/Benchmark/speccpu/je5.0.1-32"
MALLOCONF = "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
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>
NR: 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.

Platform Notes

BIOS configuration:
  DCU Streamer Prefetcher = Disabled
  Package C State limit = C0
  LLC Dead Line Alloc = Disabled
  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 Wed Jun 21 11:13:40 2023

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

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22. dmidecode
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Fujitsu
PRIMERGY CX2560 M7, Intel Xeon Silver 4410Y, 2.00GHz

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

Platform Notes (Continued)

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`
   11:13:40 up 1 min,  1 user,  load average: 0.79, 0.32, 0.11
   USER  TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root  tty1     -                11:13    8.00s  2.08s  0.15s -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         (-l) 4125397
   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) 4125397
   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=48 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=24 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base -o all intrate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=48 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=24 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base -o all intrate --tune base --size reframe intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.001/templogs/preenv.intrate.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) Silver 4410Y
   vendor_id       : GenuineIntel
   cpu family      : 6
   model           : 143
   stepping        : 8
   microcode       : 0x2b0001b0
   bugs            : spectre_v1 spectre_v2 spec_store_bypass swaps
   cpu cores       : 12

(Continued on next page)
Platform Notes (Continued)

siblings        : 24
  2 physical ids (chips)
  48 processors (hardware threads)
physical id 0: core ids 0-11
physical id 1: core ids 0-11
physical id 0: apic ids 0-23
physical id 1: apic ids 128-151
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):                          48
On-line CPU(s) list:             0-47
Vendor ID:                       GenuineIntel
Model name:                      Intel(R) Xeon(R) Silver 4410Y
CPU family:                      6
Model:                           143
Thread(s) per core:              2
Core(s) per socket:              12
Socket(s):                       2
Stepping:                        8
CPU max MHz:                     3900.000
CPU min MHz:                     800.000
BogoMIPS:                        4000.00
Flags:                           fpu vme de pse tsc msr pae mca cmov pat pse36 cli flush dtsc acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs ts 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 3nowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_13 invpcid_single intel_ppin cdp_12 ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmq rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaveopt xsaves xsavevc xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local split_lock_detect avx_vnni avx512_bf16 vbnoinvd dt尔ern ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512bw umip kpu ospke wai tkg avx512_vmbi2 gfnl vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq ia57 rdpid bus_lock_detect cldemote movdir mvdir64b enqcmd frm md_clear serialize ttsx dtrk pconfig arch_lbr avx512_fp16 amx_tile flush_ll1d arch_capabilities

Virtualization:                  VT-x
L1d cache:                       1.1 MiB (24 instances)
L1i cache:                       288 KiB (24 instances)
L2 cache:                        48 MiB (24 instances)
L3 cache:                        60 MiB (2 instances)
NUMA node(s):                    4
NUMA node0 CPU(s):               0-5,24-29
NUMA node1 CPU(s):               6-11,30-35
NUMA node2 CPU(s):               12-17,36-41
NUMA node3 CPU(s):               18-23,42-47
Vulnerability Itlb multithit:    Not affected

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SPEC CPU®2017 Integer Rate Result

Fujitsu
PRIMERGY CX2560 M7, Intel Xeon Silver 410Y, 2.00GHz

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

SPECrate®2017_int_base = 217
SPECrate®2017_int_peak = Not Run

Platform Notes (Continued)

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  1.1M  12 Data   1  64       1       64
L1i  32K  768K  8 Instruction 1  64       1       64
L2   2M   48M  16 Unified    2 2048       1       64
L3   30M  60M  15 Unified    3 32768       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: 0-5, 24-29
node 0 size: 257625 MB
node 0 free: 256907 MB
node 1 cpus: 6-11, 30-35
node 1 size: 258044 MB
node 1 free: 257688 MB
node 2 cpus: 12-17, 36-41
node 2 size: 258010 MB
node 2 free: 257589 MB
node 3 cpus: 18-23, 42-47
node 3 size: 257692 MB
node 3 free: 257371 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: 1056125936 kB

10. who -r
run-level 3 Jun 21 11:12

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

(Continued on next page)
Platform Notes (Continued)

enabled
YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager getty@ haveged
irqbalance issue-generator kbdsettings kdump kdump-early klog lvm2-monitor nsd cd postfix
purge-kernels rollback rsyslog sep5 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
crony console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
firewalld gpm grub2-once haveged-switch-root ipmi ipmielvd issue-add-ssh-keys kexec-load
lumask man-db-create multipathd nfs nfs-blkmap rdisc rpcbind rpmconfigcheck rsyncd
serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd udisks2
wicked

------------------------------------------------------------
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-b65cccff19e7
  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 3.90 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.dirty_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
  enabled [always] madvise never

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Platform Notes (Continued)

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 Server 15 SP4

20. Disk information
SPEC is set to: /home/Benchmark/speccpu

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 4000

23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:       FUJITSU
BIOS Version:      V1.0.0.0 R1.1.0 for D3989-A1x
BIOS Date:         04/07/2023
BIOS Revision:     1.1
Firmware Revision: 2.20

Compiler Version Notes
============================================================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_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.
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Compiler Version Notes (Continued)

C++ | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
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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.
-----------------------------------------------------------------------------------------------
Fortran | 548.exchange2_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.
-----------------------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xsaphirerapids -O3 -ffast-math
-ffto -mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin

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<th>Jun-2023</th>
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<td>May-2023</td>
</tr>
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<td>Software Availability:</td>
<td>Dec-2022</td>
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**Base Optimization Flags (Continued)**

C benchmarks (continued):
- `-Iqkmalloc`

C++ benchmarks:
- `-w` `-std=c++14` `-m64` `-Wl,-z,muldefs` `-xsapphirerapids` `-O3` `-ffast-math`
- `-flto` `-mfpmath=sse` `-funroll-loops` `-qopt-mem-layout-trans=4`
- `-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`
- `-Iqkmalloc`

Fortran benchmarks:
- `-w` `-m64` `-Wl,-z,muldefs` `-xsapphirerapids` `-O3` `-ffast-math` `-flto`
- `-mfpmath=sse` `-funroll-loops` `-qopt-mem-layout-trans=4`
- `-nostandard-realloc-lhs` `-align array32byte` `-auto`
- `-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`
- `-Iqkmalloc`

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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/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/Intel-ic2023-official-linux64.xml)

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

Tested with SPEC CPU®2017 v1.1.9 on 2023-06-20 22:13:39-04.00.  
Report generated on 2024-01-29 17:58:08 by CPU2017 PDF formatter v6716.  
Originally published on 2023-07-19.