## SPEC CPU®2017 Integer Rate Result

**Fujitsu**

PRIMERGY RX2540 M7, Intel Xeon Platinum 8562Y+, 2.80GHz

### CPU2017 License: 19

- **Test Date:** Apr-2024
- **Hardware Availability:** Apr-2024
- **Software Availability:** Dec-2023

<table>
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<tr>
<th>SPECrate®2017_int_base = 676</th>
<th>SPECrate®2017_int_peak = Not Run</th>
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### Hardware

- **CPU Name:** Intel Xeon Platinum 8562Y+
- **Max MHz:** 4100
- **Nominal:** 2800
- **Enabled:** 64 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:** 60 MB I+D on chip per chip
- **Other:** None
- **Memory:** 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R)
- **Storage:** 1 x SATA M.2, 960GB
- **Other:** CPU Cooling: Air

### Software

- **OS:** SUSE Linux Enterprise Server 15 SP5 5.14.21-150500.53-default
- **Compiler:** C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;
- **Parallel:** No
- **File System:** btrfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage

---

**Fujitsu**

PRIMERGY RX2540 M7, Intel Xeon Platinum 8562Y+, 2.80GHz

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### Fujitsu

PRIMERGY RX2540 M7, Intel Xeon Platinum 8562Y+, 2.80GHz

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### 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-23.2/lib/intel64:/home/benchmark/speccpu-23.2/lib/ia32:/home/benchmark/speccpu-23.2/je5.0.1-32"
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.

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.
SPEC CPU®2017 Integer Rate Result

Fujitsu
PRIMERGY RX2540 M7, Intel Xeon Platinum 8562Y+, 2.80GHz

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

Test Date: Apr-2024
Hardware Availability: Apr-2024
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SPECrate®2017_int_base = 676
SPECrate®2017_int_peak = Not Run

General Notes (Continued)

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
UPI Link Frequency Select = 14.4GT/s
CPU Performance Boost = Aggressive
SNC (Sub NUMA) = Enable SNC2
Fan Control = Full
HWPM Support = Disabled

Sysinfo program /home/benchmark/speccpu-23.2/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92c097bec197
running on localhost Thu Apr 25 09:23:53 2024

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

Table of contents

1. uname -a
2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo
7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. sysctl
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/klugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

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

2. w
   09:23:53 up 1 min,  1 user, load average: 0.04, 0.03, 0.01
   USER    TTY          FROM     LOGIN@   IDLE   JCPU   PCPU WHAT
   root    tty1         -         09:23  9.00s  1.48s  0.14s  -bash

3. Username

(Continued on next page)
Platform Notes (Continued)

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) 4124936
   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) 4124936
   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=128 --c
   ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=64 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base -o all intrate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 --configfile
   ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=64 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
   rate --tune base --size refrain 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-23.2

------------------------------------------------------------
6. /proc/cpuinfo
   model name          : INTEL(R) XEON(R) PLATINUM 8562Y+
   vendor_id           : GenuineIntel
   cpu family          : 6
   model               : 207
   stepping            : 2
   microcode           : 0x210001a0
   bug                 : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
   cpu cores           : 32
   siblings           : 64
   2 physical ids (chips)
   128 processors (hardware threads)
   physical id 0: core ids 0-31
   physical id 1: core ids 0-31
   physical id 0: apicids 0-63
   physical id 1: apicids 128-191
   Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems. Use the above data carefully.

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7. lstcpu

(Continued on next page)
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Platform Notes (Continued)

From lscpu from util-linux 2.37.4:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Address sizes: 46 bits physical, 57 bits virtual
Byte Order: Little Endian
CPU(s): 128
On-line CPU(s) list: 0-127
Vendor ID: GenuineIntel
Model name: INTEL(R) XEON(R) PLATINUM 8562Y+
CPU family: 6
Model: 207
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
Stepping: 2
Frequency boost: enabled
CPU max MHz: 2801.000
CPU min MHz: 800.000
BogoMIPS: 5600.00

Flags: fpu vme de pse tsc msr pae mca cmov pat pse36
clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb dtes64 monitor
mtrr pse36 cpuid vm xsave lahf_lm abm mmxset mmxend mmxt mmx+mmx setmmx
x86-64 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
lahf_lm abm 3nowprefetch cpuid_fault epb cat_13 cat_12 cdp_13
invpcid_single cdp_12 ssbd mba ibrs ibpb ibrs-enhanced tpr_shadow
vmx flexpriority ept vpid ept_ad fsgsbase ts.c_adjust bmi1 hle avx2 smep
bm2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap
avx512ifma ciflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl
xsaveopt xsave xsetbv1 xsaves cqm_llc cqm_occupp_llc cqm_mbb_total
avx_mbb_local avx_vnni avx512_bf16 wbinvd dtherm ida arat pln pts hfi
avx512v bmi unip pkt ospe waitpkg avx512_v bmi1 gfi vaes vpcelmldq
avx512_vnni avx512_bitsalig tme avx512_vpopcntdq la57 rdpid bus_lock_detect
clidbte movdirl movdirl64b enqcmd farm md_clear serialize tsxidtrk pconf
arch ib v axv512_fp16 amx_tile flush_lld arch_capabilities

Virtualization: VT-x
L1d cache: 3 MiB (64 instances)
L1i cache: 2 MiB (64 instances)
L2 cache: 128 MiB (64 instances)
L3 cache: 120 MiB (2 instances)
NUMA node(s): 4
NUMA node0 CPU(s): 0-15,64-79
NUMA node1 CPU(s): 16-31,80-95
NUMA node2 CPU(s): 32-47,96-111
NUMA node3 CPU(s): 48-63,112-127
Vulnerability Itlb multihit: Not affected
Vulnerability Ltlf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Retbleed: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapsgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSB-eIBRS SW sequence
Vulnerability Srdbds: Not affected
Vulnerability Txs async abort: Not affected

(Continued on next page)
Platform Notes (Continued)

From lscpu --cache:

```
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d  48K    3M    12 Data 1  64    1   64
L1i  32K    2M     8 Instruction 1  64    1   64
L2   2M       128M  16 Unified 2 2048   1   64
L3   60M      120M  15 Unified 3 65536  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: 0-15,64-79
node 0 size: 257584 MB
node 0 free: 256911 MB
node 1 cpus: 16-31,80-95
node 1 size: 258039 MB
node 1 free: 257385 MB
node 2 cpus: 32-47,96-111
node 2 size: 258039 MB
node 2 free: 257257 MB
node 3 cpus: 48-63,112-127
node 3 size: 257599 MB
node 3 free: 256947 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: 1056014400 kB

10. who -r
run-level 3 Apr 25 09:22

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

12. Services, from systemctl list-unit-files
STATE   UNIT Files
enabled YaST2-Firstboot YaST2-Second-Stage apparmor appstream-sync-cache auditd bluetooth cron
display-manager getty@ irqbalance issue-generator kbdsettings kdump kdump-early klog
lv2-monitor nscd postfix purge-kernels rollback rsyslog rep5 smartd sshd systemd-psstore
wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny

disabled-runtime systemd-remount-fs

disabled accounts-daemon autofs autoyast-initscripts blk-availability bluetooth-mesh boot-sysct1
ca-certificates chrony-wait chronyd console-getty cups cups-browsed debug-shell ebttables
exchange-bmc-os-info firewalld gpm grub2-once havedged haviged-switch-root ipmi ipmijson
issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-bmap nmb
ostree-remount rpcbind rpmconfigcheck rsyncd rtkit-daemon serial-getty@
smartd_generate_opts smb snmpd snmptrapd speech-dispatcher systemd-boot-check-no-failures
systemd-network-generator systemd-sysct1 systemd-time-wait-sync systemd-timesyncd udisks2
update-system-flatpak upower vncserver@
indirect wickedd

(Continued on next page)
Fujitsu

PRIMERGY RX2540 M7, Intel Xeon Platinum 8562Y+, 2.80GHz

SPECrate®2017_int_base = 676
SPECrate®2017_int_peak = Not Run

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

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

Platform Notes (Continued)

13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
   root=UUID=d177d129-775e-44ff-bf2a-8f0e7a7a7b1b
   splash=silent
   quiet
   security=apparmor
   crashkernel=401M,high
   crashkernel=72M,low
   mitigations=auto

14. cpupower frequency-info
    analyzing CPU 0:
    current policy: frequency should be within 800 MHz and 2.80 GHz.
The governor "ondemand" 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
    pages_to_scan  4096
    scan_sleep_millisecs  10000

(Continued on next page)
platform notes (continued)

18. OS release
From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP5

19. Disk information
SPEC is set to: /home/benchmark/speccpu-23.2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 892G 68G 824G 8% /home

20. /sys/devices/virtual/dmi/id
Vendor: FUJITSU
Product: PRIMERGY RX2540 M7
Product Family: SERVER
Serial: EWCEXXXXX

21. dmidecode
Additional information from dmidecode 3.4 follows. WARNING: Use caution when you interpret this section.
The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
"DMTF SMBIOS" standard.
Memory:
16x Hynix HMCG94AGBRA181N 64 GB 2 rank 5600

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: FUJITSU
BIOS Version: V1.0.0.0 R2.1.2 for D3983-A1x
BIOS Date: 12/21/2023
BIOS Revision: 2.1
Firmware Revision: 2.36

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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

C++ | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
---|---------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

Fortran | 548.exchange2_r(base)
---|---------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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Fujitsu
PRIMERGY RX2540 M7, Intel Xeon Platinum 8562Y+, 2.80GHz

SPECrate®2017_int_base = 676
SPECrate®2017_int_peak = Not Run

CPU2017 License: 19
Test Sponsor: Fujitsu
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Tested by: Fujitsu
Hardware Availability: Apr-2024
Software Availability: Dec-2023

Compiler Version Notes (Continued)

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 -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin
-lqkmalloc

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/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

Fujitsu
PRIMERGY RX2540 M7, Intel Xeon Platinum 8562Y+, 2.80GHz

SPECr®2017_int_base = 676
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Test Date: Apr-2024
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Software Availability: Dec-2023

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-real-loc-lhs -align array32byte -auto
-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin
-lqkmalloc

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-EMR-RevD.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.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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