# SPEC CPU®2017 Integer Rate Result

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## Fujitsu

PRIMERGY RX2540 M6, Intel Xeon Platinum 8362, 2.80GHz

$SPECrate^{®}2017\_int\_base$ = 484

$SPECrate^{®}2017\_int\_peak$ = Not Run

**CPU2017 License:** 19

**Test Sponsor:** Fujitsu

**Tested by:** Fujitsu

**Test Date:** Nov-2022

**Hardware Availability:** Aug-2021

**Software Availability:** Jul-2022

Copies

| Benchmark | Copies | Result |
|---|---|---|
| 500.perlbench_r | 128 | 329 |
| 502.gcc_r | 128 | 355 |
| 505.mcf_r | 128 | 762 |
| 520.omnetpp_r | 128 | 281 |
| 523.xalancbmk_r | 128 | 749 |
| 525.x264_r | 128 | 983 |
| 531.deepsjeng_r | 128 | 376 |
| 541.leela_r | 128 | 371 |
| 548.exchange2_r | 128 | 1090 |
| 557.xz_r | 128 | 251 |

—— $SPECrate^{®}2017\_int\_base$ (484)

## Hardware

CPU Name: Intel Xeon Platinum 8362

 Max MHz: 3600

 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: 1.25 MB I+D on chip per core

 L3: 48 MB I+D on chip per chip

 Other: None

Memory: 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R)

Storage: 1 x SATA M.2 SSD, 480GB

Other: None

## Software

OS: SUSE Linux Enterprise Server 15 SP4
5.14.21-150400.22-default

Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;

Parallel: No

Firmware: Fujitsu BIOS Version V1.0.0.0 R1.16.0 for D3891-A1x. Released Aug-2022

File System: btrfs

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

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SPECrate®2017_int_base = 484

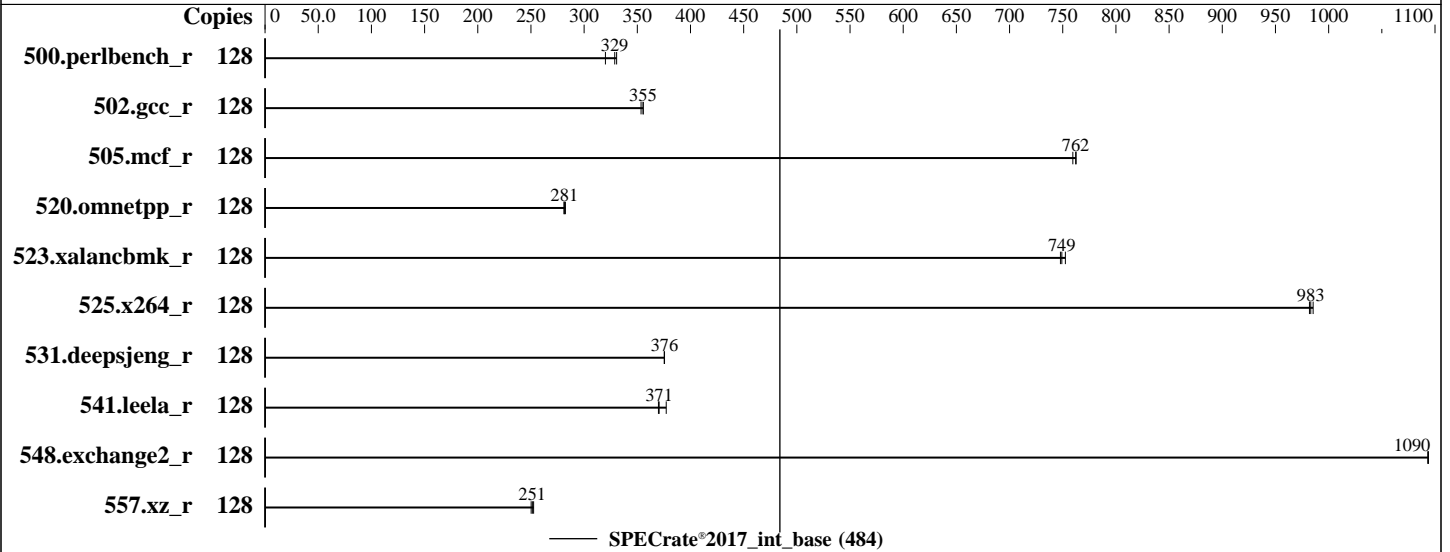SPECrate®2017_int_peak = Not Run

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## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 500.perlbench_r | 128 | **620** | **329** | 616 | 331 | 637 | 320 | | | | | | | |
| 502.gcc_r | 128 | 510 | 356 | 513 | 354 | **510** | **355** | | | | | | | |
| 505.mcf_r | 128 | 271 | 763 | **271** | **762** | 272 | 759 | | | | | | | |
| 520.omnetpp_r | 128 | **597** | **281** | 595 | 282 | 598 | 281 | | | | | | | |
| 523.xalancbmk_r | 128 | 180 | 752 | 181 | 748 | **180** | **749** | | | | | | | |
| 525.x264_r | 128 | 227 | 985 | **228** | **983** | 228 | 982 | | | | | | | |
| 531.deepsjeng_r | 128 | 391 | 375 | **391** | **376** | 391 | 376 | | | | | | | |
| 541.leela_r | 128 | **572** | **371** | 573 | 370 | 562 | 377 | | | | | | | |
| 548.exchange2_r | 128 | 307 | 1090 | 307 | 1090 | **307** | **1090** | | | | | | | |
| 557.xz_r | 128 | 553 | 250 | 547 | 253 | **550** | **251** | | | | | | | |
| **SPECrate®2017_int_base =** | | **484** | | | | | | | | | | | | |
| **SPECrate®2017_int_peak =** | | **Not Run** | | | | | | | | | | | | |

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.xalancbmk_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"
  cpupower -c all frequency-set -g performance
```

## 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"
MALLOC_CONF = "retain:true"
```

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|---|---|---|
| **Test Sponsor:** | Fujitsu | **Hardware Availability:** Aug-2021 |
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## 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.
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
CPU C1E Support = Disabled
Package C State Limit = C2
UPI Link Frequency Select = 10.4 GT/s
XPT Prefetch = Enabled
XPT Remote Prefetch = Enabled
LLC Prefetch = Enabled
LLC Dead Line Alloc = Disabled
UPI Prefetch = Disabled
FAN Control = Full

Sysinfo program /home/Benchmark/speccpu/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost Wed Nov  2 17:08:31 2022

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
   https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) Platinum 8362 CPU @ 2.80GHz
     2  "physical id"s (chips)
     128 "processors"
   cores, siblings (Caution: counting these is hw and system dependent. The following
   excerpts from /proc/cpuinfo might not be reliable.  Use with caution.)
     cpu cores : 32
     siblings  : 64
     physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
     25 26 27 28 29 30 31
     physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
     25 26 27 28 29 30 31

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):                       128
     On-line CPU(s) list:          0-127
     Vendor ID:                    GenuineIntel
     Model name:                   Intel(R) Xeon(R) Platinum 8362 CPU @ 2.80GHz
```

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## Platform Notes (Continued)

```
        CPU family:                     6
        Model:                          106
        Thread(s) per core:             2
        Core(s) per socket:             32
        Socket(s):                      2
        Stepping:                       6
        CPU max MHz:                    3600.0000
        CPU min MHz:                    800.0000
        BogoMIPS:                       5600.00
        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 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 invpcid_single intel_ppin 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 wbnoinvd
        dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku
        ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme
        avx512_vpopcntdq la57 rdpid fsrm md_clear pconfig flush_l1d arch_capabilities
        Virtualization:                 VT-x
        L1d cache:                      3 MiB (64 instances)
        L1i cache:                      2 MiB (64 instances)
        L2 cache:                       80 MiB (64 instances)
        L3 cache:                       96 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 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       3M  12 Data             1    64        1             64
        L1i      32K       2M   8 Instruction      1    64        1             64
        L2      1.3M      80M  20 Unified          2  1024        1             64
        L3       48M      96M  12 Unified          3 65536        1             64

    /proc/cpuinfo cache data
        cache size : 49152 KB

    From numactl --hardware
    WARNING: a numactl 'node' might or might not correspond to a physical chip.
        available: 4 nodes (0-3)
        node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 64 65 66 67 68 69 70 71 72 73 74 75
```

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| | |
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## Platform Notes (Continued)

```
   76 77 78 79
   node 0 size: 257643 MB
   node 0 free: 256303 MB
   node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 80 81 82 83 84 85 86 87 88
   89 90 91 92 93 94 95
   node 1 size: 258039 MB
   node 1 free: 257434 MB
   node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 96 97 98 99 100 101 102
   103 104 105 106 107 108 109 110 111
   node 2 size: 258005 MB
   node 2 free: 257512 MB
   node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 112 113 114 115 116 117
   118 119 120 121 122 123 124 125 126 127
   node 3 size: 257672 MB
   node 3 free: 257233 MB
   node distances:
   node   0   1   2   3
     0:  10  11  20  20
     1:  11  10  20  20
     2:  20  20  10  11
     3:  20  20  11  10

 From /proc/meminfo
    MemTotal:       1056114700 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
    performance

 From /etc/*release* /etc/*version*
    os-release:
       NAME="SLES"
       VERSION="15-SP4"
       VERSION_ID="15.4"
       PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
       ID="sles"
       ID_LIKE="suse"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:15:sp4"

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

 Kernel self-reported vulnerability status:

 CVE-2018-12207 (iTLB Multihit):                  Not affected
 CVE-2018-3620 (L1 Terminal Fault):               Not affected
 Microarchitectural Data Sampling:                Not affected
 CVE-2017-5754 (Meltdown):                        Not affected
 CVE-2018-3639 (Speculative Store Bypass):        Mitigation: Speculative Store
                                                  Bypass disabled via prctl and
                                                  seccomp
 CVE-2017-5753 (Spectre variant 1):               Mitigation: usercopy/swapgs
                                                  barriers and __user pointer
                                                  sanitization
 CVE-2017-5715 (Spectre variant 2):               Mitigation: Enhanced IBRS, IBPB:
                                                  conditional, RSB filling
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
```

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## Platform Notes (Continued)

```
 CVE-2019-11135 (TSX Asynchronous Abort):           Not affected


 run-level 3 Nov 2 17:03

 SPEC is set to: /home/Benchmark/speccpu
   Filesystem      Type   Size  Used Avail Use% Mounted on
   /dev/sda2       btrfs  445G   77G  367G  18% /home

 From /sys/devices/virtual/dmi/id
   Vendor:           FUJITSU
   Product:          PRIMERGY RX2540 M6
   Product Family:   SERVER
   Serial:           EWAAxxxxxx

 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:
     32x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200

 BIOS:
   BIOS Vendor:      FUJITSU
   BIOS Version:     V1.0.0.0 R1.16.0 for D3891-A1x
   BIOS Date:        07/19/2022
   BIOS Revision:    1.16
   Firmware Revision: 3.40

 (End of data from sysinfo program)
```

## 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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 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 2022.1.0 Build 20220316
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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------
```

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# 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 -xCORE-AVX2 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

C++ benchmarks:
```
-w -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

Fortran benchmarks:
```
-w -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

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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-ic2022-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-ICL-RevC.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-ICL-RevC.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 v1.1.8 on 2022-11-02 04:08:31-0400.
Report generated on 2024-01-29 17:10:01 by CPU2017 PDF formatter v6716.
Originally published on 2022-11-22.