SPEC® CPU2017 Integer Rate Result

Fujitsu

PRIMERGY RX4770 M5, Intel Xeon Gold 5220, 2.20 GHz

SPECrate2017_int_base =   382

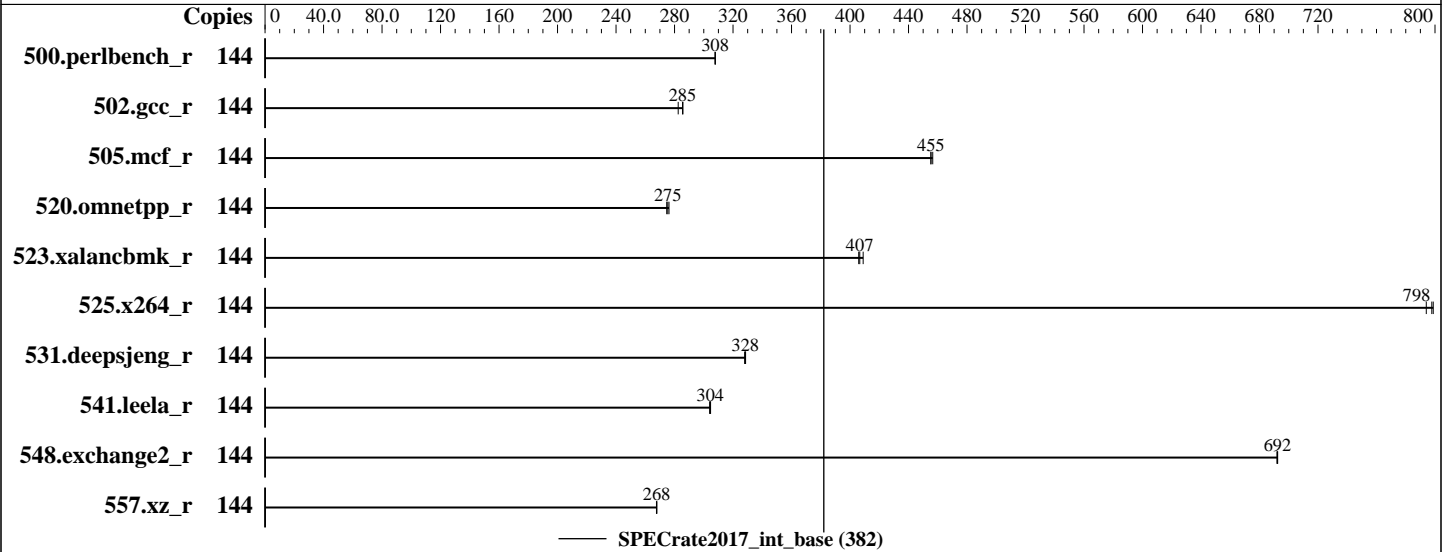SPECrate2017_int_peak = Not Run

CPU2017 License: 19

Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Apr-2019

Hardware Availability: May-2019

Software Availability: Feb-2019

Copies

Benchmark	Copies	Result
500.perlbench_r	144	308
502.gcc_r	144	285
505.mcf_r	144	455
520.omnetpp_r	144	275
523.xalancbmk_r	144	407
525.x264_r	144	798
531.deepsjeng_r	144	328
541.leela_r	144	304
548.exchange2_r	144	692
557.xz_r	144	268

SPECrate2017_int_base (382)

Hardware

CPU Name: Intel Xeon Gold 5220

 Max MHz.:   3900

 Nominal: 2200

Enabled: 72 cores, 4 chips, 2 threads/core

Orderable: 2,4 chips

Cache L1:   32 KB I + 32 KB D on chip per core

 L2:   1 MB I+D on chip per core

 L3:   24.75 MB I+D on chip per chip

 Other: None

Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)

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

Other: None

Software

OS: SUSE Linux Enterprise Server 15
4.12.14-25.28-default

Compiler: C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux;
Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux

Parallel: No

Firmware: Fujitsu BIOS Version V5.0.0.14 R1.8.0 for D3753-C1x. Released Jun-2019 tested as V5.0.0.14 R1.3.0 for D3753-C1x Mar-2019

File System: xfs

System State: Run level 3 (multi-user)

Base Pointers: 64-bit

Peak Pointers: Not Applicable

Other: None

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

SPEC CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Fujitsu

PRIMERGY RX4770 M5, Intel Xeon Gold 5220, 2.20 GHz

SPECrate2017_int_base =   382

SPECrate2017_int_peak =   Not Run

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

Test Date: Apr-2019
Hardware Availability: May-2019
Software Availability: Feb-2019

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	144	745	308	745	308	**745**	**308**							
502.gcc_r	144	714	286	**714**	**285**	722	283							
505.mcf_r	144	510	457	511	455	**511**	**455**							
520.omnetpp_r	144	684	276	688	275	**686**	**275**							
523.xalancbmk_r	144	375	406	372	409	**374**	**407**							
525.x264_r	144	**316**	**798**	316	799	318	794							
531.deepsjeng_r	144	503	328	502	329	**502**	**328**							
541.leela_r	144	784	304	**783**	**304**	783	305							
548.exchange2_r	144	545	692	**545**	**692**	545	692							
557.xz_r	144	**581**	**268**	581	268	580	268							
SPECrate2017_int_base =	**382**													
SPECrate2017_int_peak =	**Not Run**													

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"
Kernel Boot Parameter set with : nohz_full=1-143

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/Benchmark/speccpu2017-int/lib/intel64"

 Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.5
 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.

(Continued on next page)

Fujitsu

PRIMERGY RX4770 M5, Intel Xeon Gold 5220, 2.20 GHz

SPECrate2017_int_base =   382

SPECrate2017_int_peak = Not Run

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

Test Date: Apr-2019
Hardware Availability: May-2019
Software Availability: Feb-2019

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
Energy Performance = Performance
Hardware Prefetcher = Disabled
HWPM = Native Mode with no legacy
LLC Prefetcher = Enable
Override OS Energy Performance = Enable
Patrol Scrub  = Disabled
WR CRC feature Control = Disabled
XPT Prefetch = Enable
Fan Control = Full
Sysinfo program /home/Benchmark/speccpu2017-int/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on RX4770M5 Fri Apr 26 00:52:42 2019

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) Gold 5220 CPU @ 2.20GHz
      4  "physical id"s (chips)
      144 "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 : 18
      siblings  : 36
      physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
   Architecture:        x86_64
   CPU op-mode(s):      32-bit, 64-bit
   Byte Order:          Little Endian
   CPU(s):              144
   On-line CPU(s) list: 0-143
   Thread(s) per core:  2
   Core(s) per socket:  18
   Socket(s):           4
```

(Continued on next page)

Fujitsu

PRIMERGY RX4770 M5, Intel Xeon Gold 5220, 2.20 GHz

SPECrate2017_int_base =   382

SPECrate2017_int_peak =   Not Run

CPU2017 License: 19

Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Apr-2019

Hardware Availability: May-2019

Software Availability: Feb-2019

Platform Notes (Continued)

```
        NUMA node(s):          8
        Vendor ID:             GenuineIntel
        CPU family:            6
        Model:                 85
        Model name:            Intel(R) Xeon(R) Gold 5220 CPU @ 2.20GHz
        Stepping:              6
        CPU MHz:               2200.000
        CPU max MHz:           3900.0000
        CPU min MHz:           1000.0000
        BogoMIPS:              4400.00
        Virtualization:        VT-x
        L1d cache:             32K
        L1i cache:             32K
        L2 cache:              1024K
        L3 cache:              25344K
        NUMA node0 CPU(s):     0-2,5,6,9,10,14,15,72-74,77,78,81,82,86,87
        NUMA node1 CPU(s):     3,4,7,8,11-13,16,17,75,76,79,80,83-85,88,89
        NUMA node2 CPU(s):     18-20,23,24,27,28,32,33,90-92,95,96,99,100,104,105
        NUMA node3 CPU(s):     21,22,25,26,29-31,34,35,93,94,97,98,101-103,106,107
        NUMA node4 CPU(s):     36-38,41,42,45,46,50,51,108-110,113,114,117,118,122,123
        NUMA node5 CPU(s):     39,40,43,44,47-49,52,53,111,112,115,116,119-121,124,125
        NUMA node6 CPU(s):     54-56,59,60,63,64,68,69,126-128,131,132,135,136,140,141
        NUMA node7 CPU(s):     57,58,61,62,65-67,70,71,129,130,133,134,137-139,142,143
        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 cdp_l3
        invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority
        ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
        avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
        xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
        dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni
        flush_l1d arch_capabilities

    /proc/cpuinfo cache data
        cache size : 25344 KB

    From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
    physical chip.
        available: 8 nodes (0-7)
        node 0 cpus: 0 1 2 5 6 9 10 14 15 72 73 74 77 78 81 82 86 87
        node 0 size: 191961 MB
        node 0 free: 185858 MB
        node 1 cpus: 3 4 7 8 11 12 13 16 17 75 76 79 80 83 84 85 88 89
        node 1 size: 193532 MB
```

(Continued on next page)

Fujitsu

PRIMERGY RX4770 M5, Intel Xeon Gold 5220, 2.20 GHz

SPECrate2017_int_base =   382

SPECrate2017_int_peak = Not Run

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

Test Date: Apr-2019
Hardware Availability: May-2019
Software Availability: Feb-2019

Platform Notes (Continued)

```
   node 1 free: 193322 MB
   node 2 cpus: 18 19 20 23 24 27 28 32 33 90 91 92 95 96 99 100 104 105
   node 2 size: 193532 MB
   node 2 free: 193345 MB
   node 3 cpus: 21 22 25 26 29 30 31 34 35 93 94 97 98 101 102 103 106 107
   node 3 size: 193532 MB
   node 3 free: 192535 MB
   node 4 cpus: 36 37 38 41 42 45 46 50 51 108 109 110 113 114 117 118 122 123
   node 4 size: 193532 MB
   node 4 free: 193318 MB
   node 5 cpus: 39 40 43 44 47 48 49 52 53 111 112 115 116 119 120 121 124 125
   node 5 size: 193532 MB
   node 5 free: 193314 MB
   node 6 cpus: 54 55 56 59 60 63 64 68 69 126 127 128 131 132 135 136 140 141
   node 6 size: 193503 MB
   node 6 free: 193243 MB
   node 7 cpus: 57 58 61 62 65 66 67 70 71 129 130 133 134 137 138 139 142 143
   node 7 size: 193359 MB
   node 7 free: 193122 MB
   node distances:
   node   0   1   2   3   4   5   6   7
     0:  10  11  21  21  31  31  21  21
     1:  11  10  21  21  31  31  21  21
     2:  21  21  10  11  21  21  31  31
     3:  21  21  11  10  21  21  31  31
     4:  31  31  21  21  10  11  21  21
     5:  31  31  21  21  11  10  21  21
     6:  21  21  31  31  21  21  10  11
     7:  21  21  31  31  21  21  11  10

 From /proc/meminfo
    MemTotal:       1583602816 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

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

 uname -a:
```

(Continued on next page)

Fujitsu

PRIMERGY RX4770 M5, Intel Xeon Gold 5220, 2.20 GHz

SPECrate2017_int_base =   382

SPECrate2017_int_peak = Not Run

CPU2017 License:	19	**Test Date:**	Apr-2019
Test Sponsor:	Fujitsu	**Hardware Availability:**	May-2019
Tested by:	Fujitsu	**Software Availability:**	Feb-2019

Platform Notes (Continued)

```
   Linux RX4770M5 4.12.14-25.28-default #1 SMP Wed Jan 16 20:00:47 UTC 2019 (dd6077c)
   x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2017-5754 (Meltdown):           Not affected
 CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
 CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB
 filling

 run-level 3 Apr 26 00:48

 SPEC is set to: /home/Benchmark/speccpu2017-int
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda5       xfs   343G   36G  308G  11% /home

 Additional information from dmidecode 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.
   BIOS FUJITSU // American Megatrends Inc. V5.0.0.14 R1.3.0 for D3753-C1x
        03/15/2019
   Memory:
     48x Micron 36ASF4G72PZ-2G9E2 32 GB 2 rank 2933, configured at 2666

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
 CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)
     557.xz_r(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
      541.leela_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

(Continued on next page)

SPEC CPU2017 Integer Rate Result

Fujitsu

PRIMERGY RX4770 M5, Intel Xeon Gold 5220, 2.20 GHz

SPECrate2017_int_base = 382

SPECrate2017_int_peak = Not Run

CPU2017 License:	19	**Test Date:**	Apr-2019
Test Sponsor:	Fujitsu	**Hardware Availability:**	May-2019
Tested by:	Fujitsu	**Software Availability:**	Feb-2019

Compiler Version Notes (Continued)

```
==============================================================================
  FC  548.exchange2_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`icc -m64 -std=c11`

C++ benchmarks:
`icpc -m64`

Fortran benchmarks:
`ifort -m64`

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:
```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc
```

Fujitsu

PRIMERGY RX4770 M5, Intel Xeon Gold 5220, 2.20 GHz

SPECrate2017_int_base =   382

SPECrate2017_int_peak = Not Run

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

Test Date: Apr-2019
Hardware Availability: May-2019
Software Availability: Feb-2019

Base Optimization Flags (Continued)

C++ benchmarks:
```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc
```

Fortran benchmarks:
```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-02.html
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-CSL-RevC.2019-04-30.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-02.xml
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-CSL-RevC.2019-04-30.xml

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

Tested with SPEC CPU2017 v1.0.5 on 2019-04-25 11:52:41-0400.
Report generated on 2019-06-25 19:01:48 by CPU2017 PDF formatter v6067.
Originally published on 2019-06-25.