# SPEC® CPU2017 Integer Rate Result

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## Fujitsu

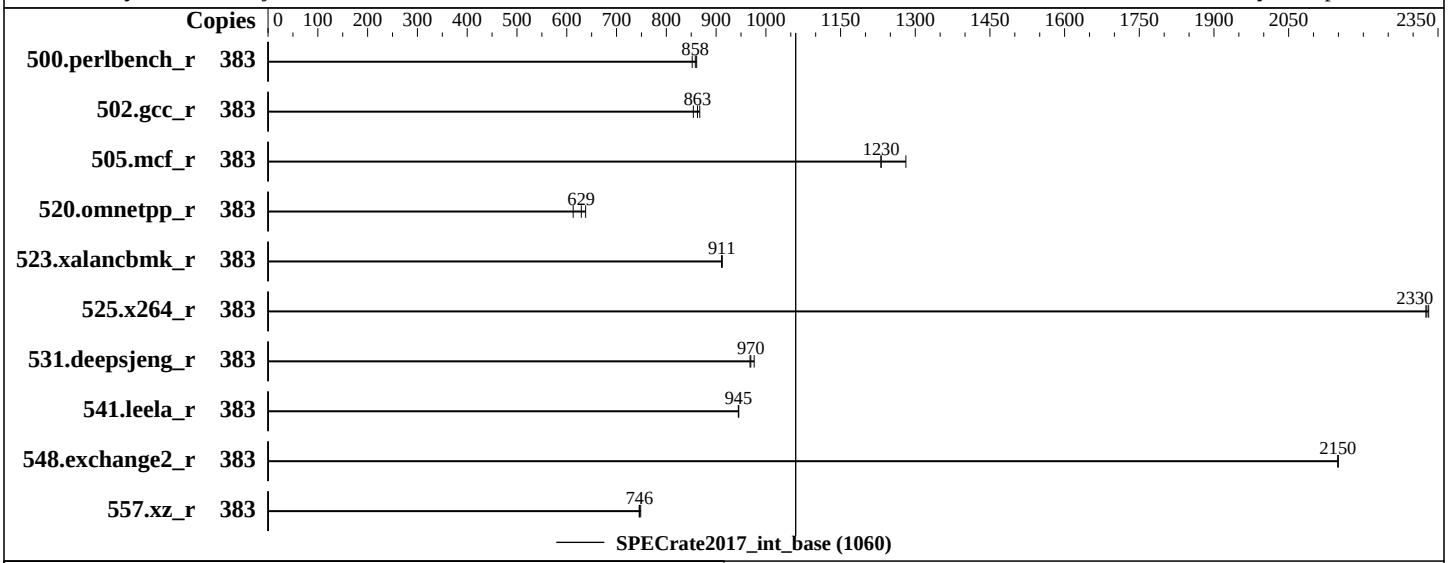
PRIMEQUEST 3800B, Intel Xeon Platinum 8168, 2.70GHz

SPECrate2017_int_base = 1060

SPECrate2017_int_peak = Not Run

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

**Test Date:** Nov-2017
**Hardware Availability:** Jul-2017
**Software Availability:** Sep-2017




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon Platinum 8168 |
| Max MHz.: | 3700 |
| Nominal: | 2700 |
| Enabled: | 192 cores, 8 chips, 2 threads/core |
| Orderable: | 2,4,6,8 chips |
| Cache L1: | 32 KB I + 32 KB D on chip per core |
| L2: | 1 MB I+D on chip per core |
| L3: | 33 MB I+D on chip per chip |
| Other: | None |
| Memory: | 1536 GB (96 x 16 GB 2Rx4 PC4-2666V-R) |
| Storage: | 768 GB tmpfs |
| Other: | 1 x SAS HDD, 600 GB, 10.5K RPM, used for swap |

## Software

| | |
|---|---|
| OS: | SUSE Linux Enterprise Server 12 SP2 4.4.21-69-default |
| Compiler: | C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux |
| Parallel: | No |
| Firmware: | Fujitsu BIOS Version V1.0.0.0 R1.21.0 for D3858-A1x. Released Dec-2017 |
| File System: | tmpfs |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 64-bit |
| Peak Pointers: | Not Applicable |
| Other: | jemalloc: jemalloc memory allocator library V5.0.1; jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets; jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5; jemalloc: sources available from jemalloc.net or releases |

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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 | 383 | **710** | **858** | 708 | 861 | 716 | 852 | | | | | | | |
| 502.gcc_r | 383 | 635 | 854 | 625 | 867 | **629** | **863** | | | | | | | |
| 505.mcf_r | 383 | 483 | 1280 | **503** | **1230** | 503 | 1230 | | | | | | | |
| 520.omnetpp_r | 383 | 788 | 638 | **799** | **629** | 820 | 613 | | | | | | | |
| 523.xalancbmk_r | 383 | 443 | 912 | **444** | **911** | 444 | 911 | | | | | | | |
| 525.x264_r | 383 | 288 | 2330 | **288** | **2330** | 288 | 2330 | | | | | | | |
| 531.deepsjeng_r | 383 | 450 | 976 | **453** | **970** | 453 | 968 | | | | | | | |
| 541.leela_r | 383 | **671** | **945** | 671 | 945 | 671 | 945 | | | | | | | |
| 548.exchange2_r | 383 | 467 | 2150 | **467** | **2150** | 467 | 2150 | | | | | | | |
| 557.xz_r | 383 | 553 | 748 | 555 | 746 | **554** | **746** | | | | | | | |

**SPECrate2017_int_base = 1060**

**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"
Set Kernel Boot Parameter : nohz_full=1-383 isolcpus=1-383
Set tmpfs filesystem with:
mkdir /home/memory
mount -t tmpfs -o size=768g,rw tmpfs /home/memory
Process tuning setting:
echo 0 > /proc/sys/kernel/numa_balancing
cpu idle state set with:
cpupower idle-set -d 1
cpupower idle-set -d 2
set affinity of rcu threads to the cpu0:
for i in 'pgrep rcu' ; do taskset -pc 0 $i ; done
```

## General Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/memory/speccpu/lib/ia32:/home/memory/speccpu/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/memory/speccpu/je5.0.1-32:/home/memory/speccpu/je5.0.1-64"
 Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.4
```

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## General Notes (Continued)

```
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>
```

## Platform Notes

```
BIOS configuration:
DCU Streamer Prefetcher = Disabled
Sub NUMA Clustering = Enabled
Stale AtoS = Enabled
LLC Dead Line Alloc = Disabled
Fan Control = Full
Sysinfo program /home/memory/speccpu/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-k55j Mon Nov 13 14:57:57 2017

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 8168 CPU @ 2.70GHz
      8  "physical id"s (chips)
      384 "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 : 24
      siblings  : 48
      physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
      physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
      physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
      physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
      physical 4: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
      physical 5: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
      physical 6: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
      physical 7: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     CPU(s):                384
     On-line CPU(s) list:   0-383
```

**(Continued on next page)**

## Platform Notes (Continued)

```
Thread(s) per core:    2
Core(s) per socket:    24
Socket(s):             8
NUMA node(s):          16
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Platinum 8168 CPU @ 2.70GHz
Stepping:              4
CPU MHz:               3052.245
CPU max MHz:           3700.0000
CPU min MHz:           1200.0000
BogoMIPS:              5400.27
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              33792K
NUMA node0 CPU(s):     0-2,6-8,12-14,18-20,192-194,198-200,204-206,210-212
NUMA node1 CPU(s):     3-5,9-11,15-17,21-23,195-197,201-203,207-209,213-215
NUMA node2 CPU(s):     24-26,30-32,36-38,42-44,216-218,222-224,228-230,234-236
NUMA node3 CPU(s):     27-29,33-35,39-41,45-47,219-221,225-227,231-233,237-239
NUMA node4 CPU(s):     48-50,54-56,60-62,66-68,240-242,246-248,252-254,258-260
NUMA node5 CPU(s):     51-53,57-59,63-65,69-71,243-245,249-251,255-257,261-263
NUMA node6 CPU(s):     72-74,78-80,84-86,90-92,264-266,270-272,276-278,282-284
NUMA node7 CPU(s):     75-77,81-83,87-89,93-95,267-269,273-275,279-281,285-287
NUMA node8 CPU(s):     96-98,102-104,108-110,114-116,288-290,294-296,300-302,306-308
NUMA node9 CPU(s):
99-101,105-107,111-113,117-119,291-293,297-299,303-305,309-311
NUMA node10 CPU(s):
120-122,126-128,132-134,138-140,312-314,318-320,324-326,330-332
NUMA node11 CPU(s):
123-125,129-131,135-137,141-143,315-317,321-323,327-329,333-335
NUMA node12 CPU(s):
144-146,150-152,156-158,162-164,336-338,342-344,348-350,354-356
NUMA node13 CPU(s):
147-149,153-155,159-161,165-167,339-341,345-347,351-353,357-359
NUMA node14 CPU(s):
168-170,174-176,180-182,186-188,360-362,366-368,372-374,378-380
NUMA node15 CPU(s):
171-173,177-179,183-185,189-191,363-365,369-371,375-377,381-383
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
aperfmperf eagerfpu 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 ida arat epb pln pts dtherm hwp
```

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## Platform Notes (Continued)

```
      hwp_act_window hwp_epp hwp_pkg_req intel_pt tpr_shadow vnmi flexpriority ept vpid
      fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f
      avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec
      xgetbv1 cqm_llc cqm_occup_llc

 /proc/cpuinfo cache data
    cache size : 33792 KB

 From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
 physical chip.
   available: 16 nodes (0-15)
   node 0 cpus: 0 1 2 6 7 8 12 13 14 18 19 20 192 193 194 198 199 200 204 205 206 210 211
   212
   node 0 size: 95377 MB
   node 0 free: 85634 MB
   node 1 cpus: 3 4 5 9 10 11 15 16 17 21 22 23 195 196 197 201 202 203 207 208 209 213
   214 215
   node 1 size: 96763 MB
   node 1 free: 96445 MB
   node 2 cpus: 24 25 26 30 31 32 36 37 38 42 43 44 216 217 218 222 223 224 228 229 230
   234 235 236
   node 2 size: 96763 MB
   node 2 free: 96444 MB
   node 3 cpus: 27 28 29 33 34 35 39 40 41 45 46 47 219 220 221 225 226 227 231 232 233
   237 238 239
   node 3 size: 96763 MB
   node 3 free: 96447 MB
   node 4 cpus: 48 49 50 54 55 56 60 61 62 66 67 68 240 241 242 246 247 248 252 253 254
   258 259 260
   node 4 size: 96763 MB
   node 4 free: 96443 MB
   node 5 cpus: 51 52 53 57 58 59 63 64 65 69 70 71 243 244 245 249 250 251 255 256 257
   261 262 263
   node 5 size: 96763 MB
   node 5 free: 96436 MB
   node 6 cpus: 72 73 74 78 79 80 84 85 86 90 91 92 264 265 266 270 271 272 276 277 278
   282 283 284
   node 6 size: 96763 MB
   node 6 free: 96447 MB
   node 7 cpus: 75 76 77 81 82 83 87 88 89 93 94 95 267 268 269 273 274 275 279 280 281
   285 286 287
   node 7 size: 96763 MB
   node 7 free: 96463 MB
   node 8 cpus: 96 97 98 102 103 104 108 109 110 114 115 116 288 289 290 294 295 296 300
   301 302 306 307 308
   node 8 size: 96763 MB
   node 8 free: 96449 MB
```

**(Continued on next page)**

## Platform Notes (Continued)

```
node 9 cpus: 99 100 101 105 106 107 111 112 113 117 118 119 291 292 293 297 298 299 303
304 305 309 310 311
node 9 size: 96763 MB
node 9 free: 96451 MB
node 10 cpus: 120 121 122 126 127 128 132 133 134 138 139 140 312 313 314 318 319 320
324 325 326 330 331 332
node 10 size: 96763 MB
node 10 free: 96431 MB
node 11 cpus: 123 124 125 129 130 131 135 136 137 141 142 143 315 316 317 321 322 323
327 328 329 333 334 335
node 11 size: 96763 MB
node 11 free: 96435 MB
node 12 cpus: 144 145 146 150 151 152 156 157 158 162 163 164 336 337 338 342 343 344
348 349 350 354 355 356
node 12 size: 96763 MB
node 12 free: 96442 MB
node 13 cpus: 147 148 149 153 154 155 159 160 161 165 166 167 339 340 341 345 346 347
351 352 353 357 358 359
node 13 size: 96763 MB
node 13 free: 96445 MB
node 14 cpus: 168 169 170 174 175 176 180 181 182 186 187 188 360 361 362 366 367 368
372 373 374 378 379 380
node 14 size: 96763 MB
node 14 free: 96420 MB
node 15 cpus: 171 172 173 177 178 179 183 184 185 189 190 191 363 364 365 369 370 371
375 376 377 381 382 383
node 15 size: 96613 MB
node 15 free: 96293 MB
node distances:
node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
  0:  10  11  35  35  35  35  40  40  40  40  40  40  35  35  40  40
  1:  11  10  35  35  35  35  40  40  40  40  40  40  35  35  40  40
  2:  35  35  10  11  40  40  35  35  40  40  35  35  40  40  40  40
  3:  35  35  11  10  40  40  35  35  40  40  35  35  40  40  40  40
  4:  35  35  40  40  10  11  35  35  35  35  40  40  40  40  40  40
  5:  35  35  40  40  11  10  35  35  35  35  40  40  40  40  40  40
  6:  40  40  35  35  35  35  10  11  40  40  40  40  40  40  35  35
  7:  40  40  35  35  35  35  11  10  40  40  40  40  40  40  35  35
  8:  40  40  40  40  35  35  40  40  10  11  35  35  35  35  40  40
  9:  40  40  40  40  35  35  40  40  11  10  35  35  35  35  40  40
 10:  40  40  35  35  40  40  40  40  35  35  10  11  40  40  35  35
 11:  40  40  35  35  40  40  40  40  35  35  11  10  40  40  35  35
 12:  35  35  40  40  40  40  40  40  35  35  40  40  10  11  35  35
 13:  35  35  40  40  40  40  40  40  35  35  40  40  11  10  35  35
 14:  40  40  40  40  40  40  35  35  40  40  35  35  35  35  10  11
 15:  40  40  40  40  40  40  35  35  40  40  35  35  35  35  11  10
```

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## Platform Notes (Continued)

```
From /proc/meminfo
   MemTotal:       1583801256 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 2
      # This file is deprecated and will be removed in a future service pack or release.
      # Please check /etc/os-release for details about this release.
   os-release:
      NAME="SLES"
      VERSION="12-SP2"
      VERSION_ID="12.2"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
   Linux linux-k55j 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 13 02:19

SPEC is set to: /home/memory/speccpu
   Filesystem     Type   Size  Used Avail Use% Mounted on
   tmpfs          tmpfs  768G  8.8G  760G   2% /home/memory

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 V1.0.0.0 R1.21.0 for D3858-A1x            09/15/2017
  Memory:
   46x Hynix HMA42GR7BJR4N-VK 16 GB 2 rank 2666
   50x Samsung M393A2G40EB2-CTD 16 GB 2 rank 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)
```

**(Continued on next page)**

## Compiler Version Notes (Continued)

```
      557.xz_r(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
      541.leela_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  548.exchange2_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

## 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

**(Continued on next page)**

## Base Portability Flags (Continued)

557.xz_r: -DSPEC_LP64

## Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

## Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.2-SKL-RevC.html
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-10-19.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.2-SKL-RevC.xml
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-10-19.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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