SPEC® CPU2017 Integer Rate Result

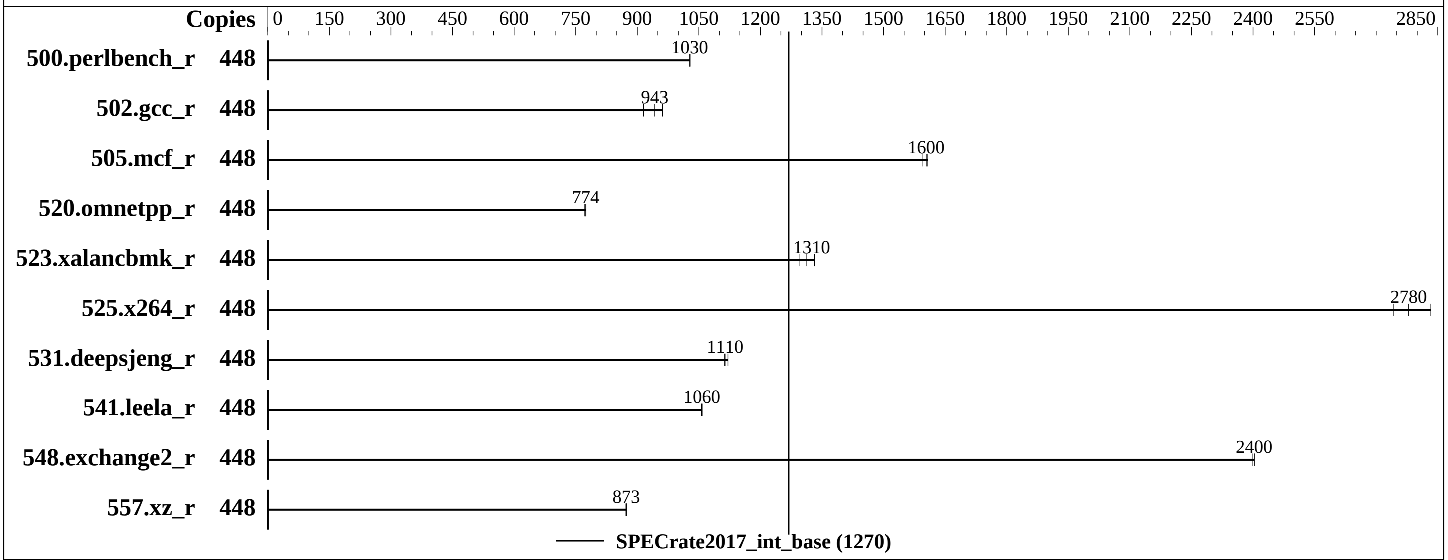
Supermicro

SuperServer 7089P-TR4T (X11OPi, Intel Xeon Platinum 8280)

SPECrate2017_int_base = 1270

SPECrate2017_int_peak = Not Run

CPU2017 License:	001176	**Test Date:**	Mar-2019
Test Sponsor:	Supermicro	**Hardware Availability:**	Apr-2019
Tested by:	Supermicro	**Software Availability:**	Feb-2019



Hardware

CPU Name:	Intel Xeon Platinum 8280
Max MHz.:	4000
Nominal:	2700
Enabled:	224 cores, 8 chips, 2 threads/core
Orderable:	2,4,8 Chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	1 MB I+D on chip per core
L3:	38.5 MB I+D on chip per chip
Other:	None
Memory:	3 TB (96 x 32 GB 2Rx4 PC4-2933Y-R)
Storage:	1x 2 TB SATA III SSD
Other:	None

Software

OS:	SUSE Linux Enterprise Server 12 SP4 4.12.14-94.41-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:	Supermicro BIOS version 3.0a released Mar-2019 tested as Feb-2019
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	None

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

Results Table

	Base							Peak						
Benchmark	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	448	693	1030	**694**	**1030**	694	1030							
502.gcc_r	448	**673**	**943**	693	915	660	961							
505.mcf_r	448	454	1600	**451**	**1600**	450	1610							
520.omnetpp_r	448	758	775	**759**	**774**	761	772							
523.xalancbmk_r	448	355	1330	366	1290	**361**	**1310**							
525.x264_r	448	286	2740	**282**	**2780**	277	2830							
531.deepsjeng_r	448	**461**	**1110**	462	1110	458	1120							
541.leela_r	448	702	1060	**702**	**1060**	701	1060							
548.exchange2_r	448	489	2400	**489**	**2400**	488	2400							
557.xz_r	448	**554**	**873**	554	873	555	872							

SPECrate2017_int_base = 1270

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"

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

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>

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.

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General Notes (Continued)

```
 Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
 is mitigated in the system as tested and documented.
```

Platform Notes

```
BIOS Settings:
SNC =  Enable
IMC Interleave = 1-Way
Monitor/Mwait = Disable
Power Technology = Custom
Power Performance Tuning = BIOS Control EPB
Energy PERF BIAS CFG mode = Performance
Hardware P-state = Native Mode
XPT Prefetch = Enable
KTI Prefetch = Disable
Stale AtoS = Disable
LLC dead line alloc = Disable
Local/Remote Threshold = Medium
Patrol Scrub  = Disable
 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on linux Fri Mar 15 11:03:08 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) Platinum 8280 CPU @ 2.70GHz
       8  "physical id"s (chips)
       448 "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 : 28
       siblings  : 56
       physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 4: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
```

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Platform Notes (Continued)

```
       physical 5: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
        28 29 30
       physical 6: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
        28 29 30
       physical 7: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
        28 29 30

 From lscpu:
      Architecture:          x86_64
      CPU op-mode(s):        32-bit, 64-bit
      Byte Order:            Little Endian
      CPU(s):                448
      On-line CPU(s) list:   0-447
      Thread(s) per core:    2
      Core(s) per socket:    28
      Socket(s):             8
      NUMA node(s):          16
      Vendor ID:             GenuineIntel
      CPU family:            6
      Model:                 85
      Model name:            Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
      Stepping:              6
      CPU MHz:               2700.000
      CPU max MHz:           4000.0000
      CPU min MHz:           1000.0000
      BogoMIPS:              5400.00
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              1024K
      L3 cache:              39424K
      NUMA node0 CPU(s):     0,225-231,238-243,252-259,266-271
      NUMA node1 CPU(s):     1-7,14-19,28-35,42-47,224
      NUMA node2 CPU(s):     8-13,20-27,36-41,48-55
      NUMA node3 CPU(s):     56-63,70-75,84-91,98-103
      NUMA node4 CPU(s):     64-69,76-83,92-97,104-111
      NUMA node5 CPU(s):     112-119,126-131,140-147,154-159
      NUMA node6 CPU(s):     120-125,132-139,148-153,160-167
      NUMA node7 CPU(s):     168-175,182-187,196-203,210-215
      NUMA node8 CPU(s):     176-181,188-195,204-209,216-223
      NUMA node9 CPU(s):     232-237,244-251,260-265,272-279
      NUMA node10 CPU(s):    280-287,294-299,308-315,322-327
      NUMA node11 CPU(s):    288-293,300-307,316-321,328-335
      NUMA node12 CPU(s):    336-343,350-355,364-371,378-383
      NUMA node13 CPU(s):    344-349,356-363,372-377,384-391
      NUMA node14 CPU(s):    392-399,406-411,420-427,434-439
      NUMA node15 CPU(s):    400-405,412-419,428-433,440-447
```

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Platform Notes (Continued)

```
      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 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 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 : 39424 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: 0 225 226 227 228 229 230 231 238 239 240 241 242 243 252 253 254 255 256
   257 258 259 266 267 268 269 270 271
   node 0 size: 193530 MB
   node 0 free: 193235 MB
   node 1 cpus: 1 2 3 4 5 6 7 14 15 16 17 18 19 28 29 30 31 32 33 34 35 42 43 44 45 46 47
   224
   node 1 size: 192095 MB
   node 1 free: 191374 MB
   node 2 cpus: 8 9 10 11 12 13 20 21 22 23 24 25 26 27 36 37 38 39 40 41 48 49 50 51 52
   53 54 55
   node 2 size: 193530 MB
   node 2 free: 193072 MB
   node 3 cpus: 56 57 58 59 60 61 62 63 70 71 72 73 74 75 84 85 86 87 88 89 90 91 98 99
   100 101 102 103
   node 3 size: 193530 MB
   node 3 free: 193302 MB
   node 4 cpus: 64 65 66 67 68 69 76 77 78 79 80 81 82 83 92 93 94 95 96 97 104 105 106
   107 108 109 110 111
   node 4 size: 193530 MB
   node 4 free: 193283 MB
   node 5 cpus: 112 113 114 115 116 117 118 119 126 127 128 129 130 131 140 141 142 143
   144 145 146 147 154 155 156 157 158 159
   node 5 size: 193530 MB
   node 5 free: 193301 MB
   node 6 cpus: 120 121 122 123 124 125 132 133 134 135 136 137 138 139 148 149 150 151
   152 153 160 161 162 163 164 165 166 167
   node 6 size: 193530 MB
   node 6 free: 193329 MB
   node 7 cpus: 168 169 170 171 172 173 174 175 182 183 184 185 186 187 196 197 198 199
```

(Continued on next page)

Platform Notes (Continued)

```
    200 201 202 203 210 211 212 213 214 215
    node 7 size: 193530 MB
    node 7 free: 193316 MB
    node 8 cpus: 176 177 178 179 180 181 188 189 190 191 192 193 194 195 204 205 206 207
    208 209 216 217 218 219 220 221 222 223
    node 8 size: 193501 MB
    node 8 free: 193079 MB
    node 9 cpus: 232 233 234 235 236 237 244 245 246 247 248 249 250 251 260 261 262 263
    264 265 272 273 274 275 276 277 278 279
    node 9 size: 193530 MB
    node 9 free: 193289 MB
    node 10 cpus: 280 281 282 283 284 285 286 287 294 295 296 297 298 299 308 309 310 311
    312 313 314 315 322 323 324 325 326 327
    node 10 size: 193530 MB
    node 10 free: 193385 MB
    node 11 cpus: 288 289 290 291 292 293 300 301 302 303 304 305 306 307 316 317 318 319
    320 321 328 329 330 331 332 333 334 335
    node 11 size: 193530 MB
    node 11 free: 193349 MB
    node 12 cpus: 336 337 338 339 340 341 342 343 350 351 352 353 354 355 364 365 366 367
    368 369 370 371 378 379 380 381 382 383
    node 12 size: 193530 MB
    node 12 free: 193349 MB
    node 13 cpus: 344 345 346 347 348 349 356 357 358 359 360 361 362 363 372 373 374 375
    376 377 384 385 386 387 388 389 390 391
    node 13 size: 193530 MB
    node 13 free: 193356 MB
    node 14 cpus: 392 393 394 395 396 397 398 399 406 407 408 409 410 411 420 421 422 423
    424 425 426 427 434 435 436 437 438 439
    node 14 size: 193530 MB
    node 14 free: 193344 MB
    node 15 cpus: 400 401 402 403 404 405 412 413 414 415 416 417 418 419 428 429 430 431
    432 433 440 441 442 443 444 445 446 447
    node 15 size: 193527 MB
    node 15 free: 193362 MB
    node distances:
    node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
      0:  10  21  21  31  31  31  31  31  31  11  21  21  31  31  21  21
      1:  21  10  11  21  21  21  21  31  31  21  31  31  31  31  31  31
      2:  21  11  10  21  21  21  21  31  31  21  31  31  31  31  31  31
      3:  31  21  21  10  11  31  31  21  21  31  21  21  31  31  31  31
      4:  31  21  21  11  10  31  31  21  21  31  21  21  31  31  31  31
      5:  31  21  21  31  31  10  11  21  21  31  31  31  21  21  31  31
      6:  31  21  21  31  31  11  10  21  21  31  31  31  21  21  31  31
      7:  31  31  31  21  21  21  21  10  11  31  31  31  31  31  21  21
      8:  31  31  31  21  21  21  21  11  10  31  31  31  31  31  21  21
      9:  11  21  21  31  31  31  31  31  31  10  21  21  31  31  21  21
```

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Platform Notes (Continued)

```
    10:  21  31  31  21  21  31  31  31  31  21  10  11  21  21  31  31
    11:  21  31  31  21  21  31  31  31  31  21  11  10  21  21  31  31
    12:  31  31  31  31  31  21  21  31  31  31  21  21  10  11  21  21
    13:  31  31  31  31  31  21  21  31  31  31  21  21  11  10  21  21
    14:  21  31  31  31  31  31  31  21  21  21  31  31  21  21  10  11
    15:  21  31  31  31  31  31  31  21  21  21  31  31  21  21  11  10

 From /proc/meminfo
    MemTotal:       3169303840 kB
    HugePages_Total:       0
    Hugepagesize:       2048 kB

 /usr/bin/lsb_release -d
    SUSE Linux Enterprise Server 12 SP4

 From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 4
       # 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-SP4"
       VERSION_ID="12.4"
       PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
       ID="sles"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:12:sp4"

 uname -a:
    Linux linux 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901) 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: Indirect Branch Restricted Speculation,
 IBPB, IBRS_FW

 run-level 3 Mar 15 11:02 last=5

 SPEC is set to: /home/cpu2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda3      xfs   1.8T  162G  1.6T  10% /home
```

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Platform Notes (Continued)

```
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 American Megatrends Inc. 3.0a 02/15/2019
  Memory:
   96x Hynix HMA84GR7CJR4N-WM 32 GB 2 rank 2933, configured at 2934

(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.
------------------------------------------------------------------------------

==============================================================================
 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`

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Base Compiler Invocation (Continued)

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
```

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/Supermicro-Platform-Settings-V1.2-SKL-revD.html
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-02.html

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

http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-SKL-revD.xml
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-02.xml

Tested with SPEC CPU2017 v1.0.5 on 2019-03-15 14:03:07-0400.
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