SPEC® CPU2017 Integer Rate Result

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Huawei

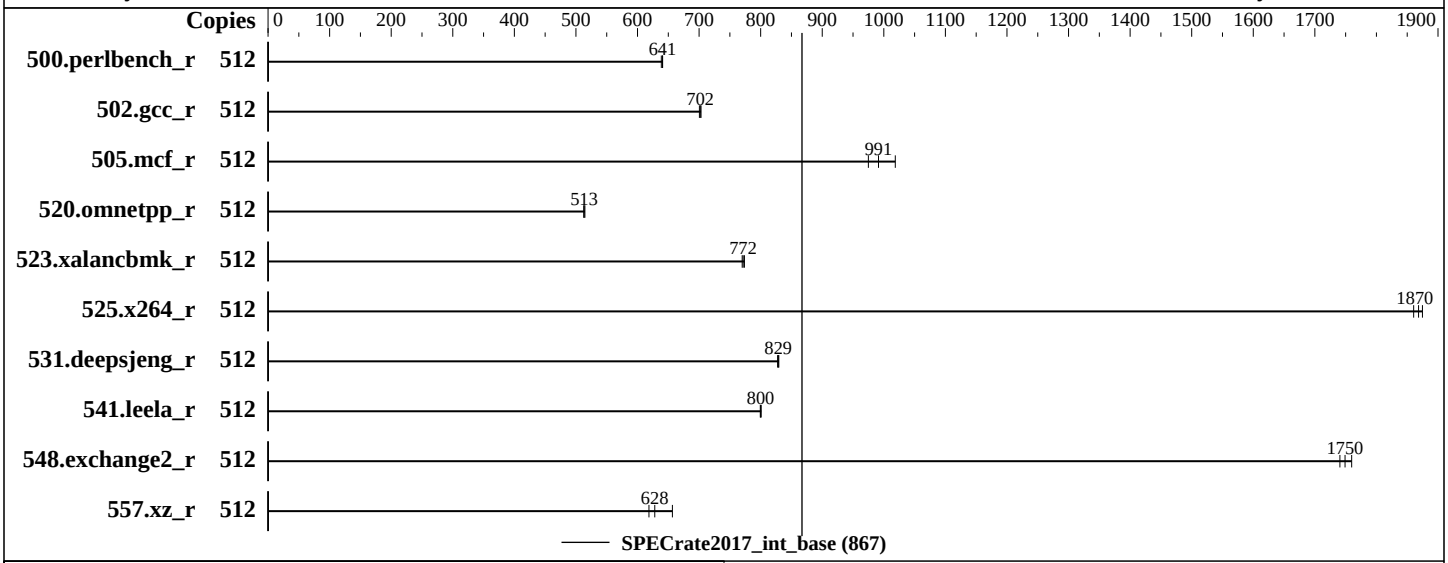
KunLun 9016 (Intel Xeon E7-4850 v4)

SPECrate2017_int_base = 867

SPECrate2017_int_peak = Not Run

CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

Test Date: May-2018
Hardware Availability: Mar-2018
Software Availability: Mar-2018



Hardware

CPU Name:	Intel Xeon E7-4850 v4
Max MHz.:	2800
Nominal:	2100
Enabled:	256 cores, 16 chips, 2 threads/core
Orderable:	4,8,16 chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	256 KB I+D on chip per core
L3:	40 MB I+D on chip per chip
Other:	None
Memory:	4 TB (128 x 32 GB 2Rx4 PC4-2400T-R, running at 1333)
Storage:	3 x 900 GB SAS HDD 10K RPM, RAID 0
Other:	None

Software

OS:	SUSE Linux Enterprise Server 12 SP2 4.4.120-92.70-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:	Version BLXSV320 released Feb-2018
File System:	ext4
System State:	Run level 5 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	jemalloc: jemalloc memory allocator library V5.0.1

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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	512	1276	639	**1272**	**641**	1272	641							
502.gcc_r	512	**1033**	**702**	1031	703	1035	701							
505.mcf_r	512	812	1020	**835**	**991**	849	975							
520.omnetpp_r	512	**1308**	**513**	1310	513	1305	515							
523.xalancbmk_r	512	699	774	**701**	**772**	702	770							
525.x264_r	512	478	1870	**480**	**1870**	482	1860							
531.deepsjeng_r	512	709	827	**708**	**829**	707	829							
541.leela_r	512	**1060**	**800**	1061	799	1059	801							
548.exchange2_r	512	762	1760	771	1740	**767**	**1750**							
557.xz_r	512	842	657	**880**	**628**	894	619							

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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"
Numa balancing was disabled using "echo 0 > /proc/sys/kernel/numa_balancing"
```

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 i7-4790 CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.4
 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>

jemalloc: configured and built at default for
32bit (i686) and 64bit (x86_64) targets;
jemalloc: built with the RedHat Enterprise 7.4,
```

(Continued on next page)

General Notes (Continued)

```
and the system compiler gcc 4.8.5;
jemalloc: sources avilable from jemalloc.net or
https://github.com/jemalloc/jemalloc/releases;
Yes: 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:
 Set Power Efficiency Mode to Performance
 Memory Patrol Scrub set to Disable
 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
 running on linux-i5c0 Mon Jul  2 16:35:27 2018

 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) CPU E7-4850 v4 @ 2.10GHz
       16  "physical id"s (chips)
       512 "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 : 16
       siblings  : 32
       physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 4: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 5: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 6: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 7: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 8: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 9: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 10: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 11: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 12: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 13: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 14: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

(Continued on next page)

Platform Notes (Continued)

```
      physical 15: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

 From lscpu:
      Architecture:          x86_64
      CPU op-mode(s):        32-bit, 64-bit
      Byte Order:            Little Endian
      CPU(s):                512
      On-line CPU(s) list:   0-511
      Thread(s) per core:    2
      Core(s) per socket:    16
      Socket(s):             16
      NUMA node(s):          16
      Vendor ID:             GenuineIntel
      CPU family:            6
      Model:                 79
      Model name:            Intel(R) Xeon(R) CPU E7-4850 v4 @ 2.10GHz
      Stepping:              1
      CPU MHz:               2100.043
      CPU max MHz:           2800.0000
      CPU min MHz:           1200.0000
      BogoMIPS:              4200.05
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              256K
      L3 cache:              40960K
      NUMA node0 CPU(s):     0-15,256-271
      NUMA node1 CPU(s):     16-31,272-287
      NUMA node2 CPU(s):     32-47,288-303
      NUMA node3 CPU(s):     48-63,304-319
      NUMA node4 CPU(s):     64-79,320-335
      NUMA node5 CPU(s):     80-95,336-351
      NUMA node6 CPU(s):     96-111,352-367
      NUMA node7 CPU(s):     112-127,368-383
      NUMA node8 CPU(s):     128-143,384-399
      NUMA node9 CPU(s):     144-159,400-415
      NUMA node10 CPU(s):    160-175,416-431
      NUMA node11 CPU(s):    176-191,432-447
      NUMA node12 CPU(s):    192-207,448-463
      NUMA node13 CPU(s):    208-223,464-479
      NUMA node14 CPU(s):    224-239,480-495
      NUMA node15 CPU(s):    240-255,496-511
      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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf
      eagerfpu mce_recovery 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
```

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Platform Notes (Continued)

```
      xsave avx f16c rdrand lahf_lm abm 3dnowprefetch arat epb invpcid_single pln pts
      dtherm intel_pt spec_ctrl stibp retpoline kaiser tpr_shadow vnmi flexpriority ept
      vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdseed adx
      smap xsaveopt cqm_llc cqm_occup_llc

 /proc/cpuinfo cache data
    cache size : 40960 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 3 4 5 6 7 8 9 10 11 12 13 14 15 256 257 258 259 260 261 262 263 264
   265 266 267 268 269 270 271
   node 0 size: 257423 MB
   node 0 free: 257081 MB
   node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 272 273 274 275 276 277
   278 279 280 281 282 283 284 285 286 287
   node 1 size: 258024 MB
   node 1 free: 257755 MB
   node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 288 289 290 291 292 293
   294 295 296 297 298 299 300 301 302 303
   node 2 size: 258024 MB
   node 2 free: 257678 MB
   node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 304 305 306 307 308 309
   310 311 312 313 314 315 316 317 318 319
   node 3 size: 258024 MB
   node 3 free: 257784 MB
   node 4 cpus: 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 320 321 322 323 324 325
   326 327 328 329 330 331 332 333 334 335
   node 4 size: 258024 MB
   node 4 free: 257738 MB
   node 5 cpus: 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 336 337 338 339 340 341
   342 343 344 345 346 347 348 349 350 351
   node 5 size: 258024 MB
   node 5 free: 257797 MB
   node 6 cpus: 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 352 353 354
   355 356 357 358 359 360 361 362 363 364 365 366 367
   node 6 size: 258024 MB
   node 6 free: 257709 MB
   node 7 cpus: 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 368 369
   370 371 372 373 374 375 376 377 378 379 380 381 382 383
   node 7 size: 258024 MB
   node 7 free: 257706 MB
   node 8 cpus: 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 384 385
   386 387 388 389 390 391 392 393 394 395 396 397 398 399
   node 8 size: 258024 MB
   node 8 free: 257813 MB
```

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Platform Notes (Continued)

```
node 9 cpus: 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 400 401
402 403 404 405 406 407 408 409 410 411 412 413 414 415
node 9 size: 258024 MB
node 9 free: 257841 MB
node 10 cpus: 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 416 417
418 419 420 421 422 423 424 425 426 427 428 429 430 431
node 10 size: 258024 MB
node 10 free: 257811 MB
node 11 cpus: 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 432 433
434 435 436 437 438 439 440 441 442 443 444 445 446 447
node 11 size: 258024 MB
node 11 free: 257776 MB
node 12 cpus: 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 448 449
450 451 452 453 454 455 456 457 458 459 460 461 462 463
node 12 size: 258024 MB
node 12 free: 257840 MB
node 13 cpus: 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 464 465
466 467 468 469 470 471 472 473 474 475 476 477 478 479
node 13 size: 258024 MB
node 13 free: 257860 MB
node 14 cpus: 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 480 481
482 483 484 485 486 487 488 489 490 491 492 493 494 495
node 14 size: 258024 MB
node 14 free: 257860 MB
node 15 cpus: 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 496 497
498 499 500 501 502 503 504 505 506 507 508 509 510 511
node 15 size: 257856 MB
node 15 free: 257699 MB
node distances:
node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
  0:  10  21  31  21  41  41  51  51  61  61  71  71  61  61  71  71
  1:  21  10  21  31  41  41  51  51  61  61  71  71  61  61  71  71
  2:  31  21  10  21  51  51  41  41  71  71  61  61  71  71  61  61
  3:  21  31  21  10  51  51  41  41  71  71  61  61  71  71  61  61
  4:  41  41  51  51  10  21  31  21  61  61  71  71  61  61  71  71
  5:  41  41  51  51  21  10  21  31  61  61  71  71  61  61  71  71
  6:  51  51  41  41  31  21  10  21  71  71  61  61  71  71  61  61
  7:  51  51  41  41  21  31  21  10  71  71  61  61  71  71  61  61
  8:  61  61  71  71  61  61  71  71  10  21  31  21  41  41  51  51
  9:  61  61  71  71  61  61  71  71  21  10  21  31  41  41  51  51
 10:  71  71  61  61  71  71  61  61  31  21  10  21  51  51  41  41
 11:  71  71  61  61  71  71  61  61  21  31  21  10  51  51  41  41
 12:  61  61  71  71  61  61  71  71  41  41  51  51  10  21  31  21
 13:  61  61  71  71  61  61  71  71  41  41  51  51  21  10  21  31
 14:  71  71  61  61  71  71  61  61  51  51  41  41  31  21  10  21
 15:  71  71  61  61  71  71  61  61  51  51  41  41  21  31  21  10
```

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Platform Notes (Continued)

```
From /proc/meminfo
   MemTotal:       4226684040 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12 SP2

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-i5c0 4.4.120-92.70-default #1 SMP Wed Mar 14 15:59:43 UTC 2018 (52a83de)
   x86_64 x86_64 x86_64 GNU/Linux

run-level 5 Jul 2 16:29

SPEC is set to: /home/cpu2017
   Filesystem     Type   Size  Used Avail Use% Mounted on
   /dev/sda4      btrfs  2.4T  208G  2.2T   9% /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 American Megatrends Inc. BLXSV320 2/23/2018
  Memory:
   70x Hynix HMA84GR7MFR4N-UH 32 GB 2 rank 2400, configured at 1333
   15x Micron 36ASF4G72PZ-2G3B1 32 GB 2 rank 2400, configured at 1333
   256x NO DIMM NO DIMM
   43x Samsung M393A4K40BB1-CRC 32 GB 2 rank 2400, configured at 1333

(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)
------------------------------------------------------------------------------
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

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Base Portability Flags (Continued)

541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
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/Intel-ic18.0-official-linux64.html
http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-V1.2-BDW-RevG.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.xml
http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-V1.2-BDW-RevG.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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