



# SPEC® CPU2017 Integer Rate Result

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## Huawei

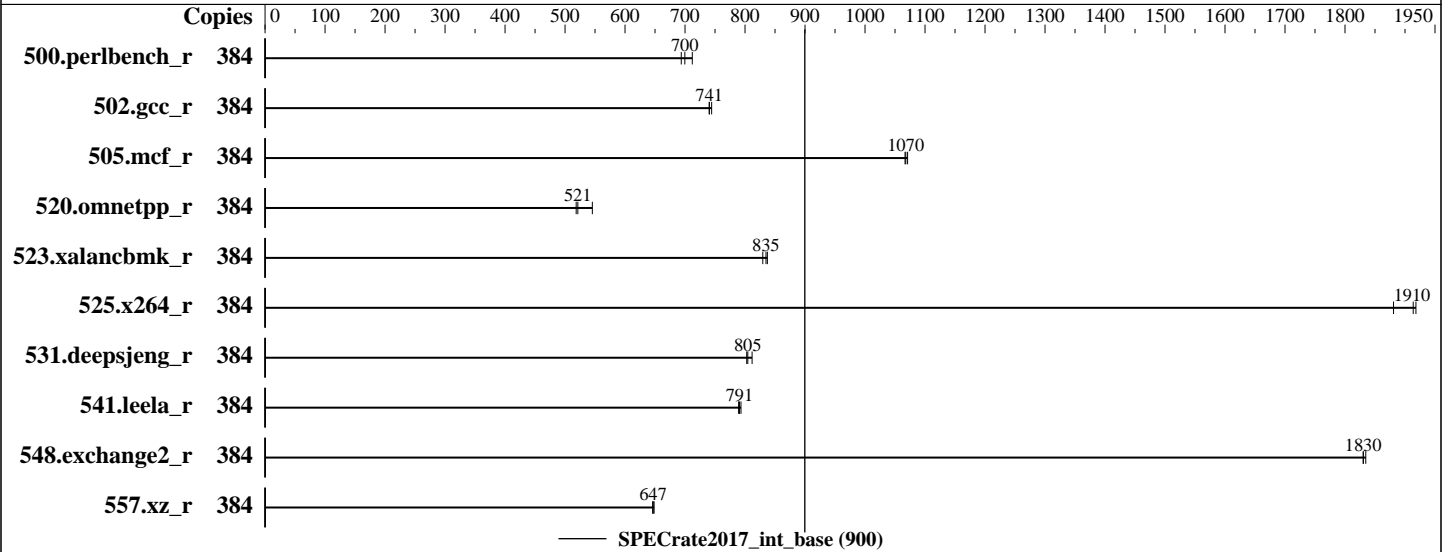
SPECrate2017\_int\_base = 900

### Huawei 8100 V5 (Intel Xeon Platinum 8160)

SPECrate2017\_int\_peak = Not Run

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

Test Date: Jun-2018  
Hardware Availability: Jul-2018  
Software Availability: Mar-2018



### Hardware

CPU Name: Intel Xeon Platinum 8160  
Max MHz.: 3700  
Nominal: 2100  
Enabled: 192 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: 33 MB I+D on chip per chip  
Other: None  
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)  
Storage: 2 x 900 GB SAS HDD 10K RPM, RAID 1  
Other: None

### Software

OS: SUSE Linux Enterprise Server for SAP Applications  
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 0.80 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	384	<b>874</b>	<b>700</b>	858	712	881	694							
502.gcc_r	384	734	740	731	744	<b>734</b>	<b>741</b>							
505.mcf_r	384	<b>581</b>	<b>1070</b>	579	1070	582	1070							
520.omnetpp_r	384	924	545	972	519	<b>966</b>	<b>521</b>							
523.xalancbmk_r	384	<b>486</b>	<b>835</b>	484	837	489	830							
525.x264_r	384	357	1880	351	1920	<b>351</b>	<b>1910</b>							
531.deepsjeng_r	384	542	812	548	803	<b>547</b>	<b>805</b>							
541.leela_r	384	<b>804</b>	<b>791</b>	806	789	802	793							
548.exchange2_r	384	550	1830	<b>550</b>	<b>1830</b>	548	1830							
557.xz_r	384	640	648	642	646	<b>641</b>	<b>647</b>							

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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,

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## General Notes (Continued)

and the system compiler gcc 4.8.5;  
jemalloc: sources available 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:  
Sub NUMA Cluster (SNC) set to enabled  
IMC (Integrated memory controller) Interleaving set to 1 way interleave  
Xtended Prediction Table (XPT) Prefetch set to Enable  
Memory Patrol Scrub set to Disable  
Last Level Cache (LLC) Prefetch set to Disable  
Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on linux-6n7q Fri Jun 1 20:40:07 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) Platinum 8160 CPU @ 2.10GHz  
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

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## Platform Notes (Continued)

```

Byte Order:                Little Endian
CPU(s):                    384
On-line CPU(s) list:      0-383
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 8160 CPU @ 2.10GHz
Stepping:                 4
CPU MHz:                  2100.026
BogoMIPS:                 4200.05
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 pbs rep_good nopl xtopology nonstop_tsc
aperfperf eagerfpu 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

```

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## Platform Notes (Continued)

avx f16c rdrand lahf\_lm abm 3dnowprefetch ida arat epb invpcid\_single pln pts dtherm intel\_pt rsb\_ctxsw spec\_ctrl stibp retpoline kaiser tpr\_shadow vnmi flexpriority ept vpid fsgsbase tsc\_adjust bml 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: 94994 MB
node 0 free: 94084 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: 96762 MB
node 1 free: 96259 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: 96762 MB
node 2 free: 96274 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: 96762 MB
node 3 free: 96254 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: 96762 MB
node 4 free: 96296 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: 96762 MB
node 5 free: 96303 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: 96762 MB
node 6 free: 96289 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: 96762 MB
node 7 free: 96308 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: 96762 MB
```

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## Platform Notes (Continued)

```

node 8 free: 96118 MB
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: 96762 MB
node 9 free: 96305 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: 96762 MB
node 10 free: 96286 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: 96762 MB
node 11 free: 96285 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: 96762 MB
node 12 free: 96274 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: 96762 MB
node 13 free: 96219 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: 96762 MB
node 14 free: 96205 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: 96605 MB
node 15 free: 96154 MB
node distances:
node 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
0: 10 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
1: 20 10 20 20 20 20 20 20 20 20 20 20 20 20 20 20
2: 20 20 10 20 20 20 20 20 20 20 20 20 20 20 20 20
3: 20 20 20 10 20 20 20 20 20 20 20 20 20 20 20 20
4: 20 20 20 20 10 20 20 20 20 20 20 20 20 20 20 20
5: 20 20 20 20 20 10 20 20 20 20 20 20 20 20 20 20
6: 20 20 20 20 20 20 10 20 20 20 20 20 20 20 20 20
7: 20 20 20 20 20 20 20 10 20 20 20 20 20 20 20 20
8: 20 20 20 20 20 20 20 20 10 20 20 20 20 20 20 20
9: 20 20 20 20 20 20 20 20 20 10 20 20 20 20 20 20
10: 20 20 20 20 20 20 20 20 20 20 10 20 20 20 20 20
11: 20 20 20 20 20 20 20 20 20 20 20 10 20 20 20 20
12: 20 20 20 20 20 20 20 20 20 20 20 20 10 20 20 20
13: 20 20 20 20 20 20 20 20 20 20 20 20 20 10 20 20
14: 20 20 20 20 20 20 20 20 20 20 20 20 20 20 10 20
15: 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 10

```

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### Platform Notes (Continued)

```

From /proc/meminfo
MemTotal:      1583378316 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

/usr/bin/lsb_release -d
    SUSE Linux Enterprise Server for SAP Applications 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_SAP"
    VERSION="12-SP2"
    VERSION_ID="12.2"
    PRETTY_NAME="SUSE Linux Enterprise Server for SAP Applications 12 SP2"
    ID="sles_sap"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles_sap:12:sp2"

uname -a:
    Linux linux-6n7q 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 Jun 1 02:24

SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4       ext4  745G  17G  728G   3% /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 INSYDE Corp. 0.80 02/24/2018
Memory:
  48x NO DIMM NO DIMM
  48x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)

```



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## 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-AVX512 -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-AVX512 -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-AVX512 -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-SKL-V1.7.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-SKL-V1.7.xml>



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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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