



SPEC CPU®2017 Integer Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

Superdome Flex

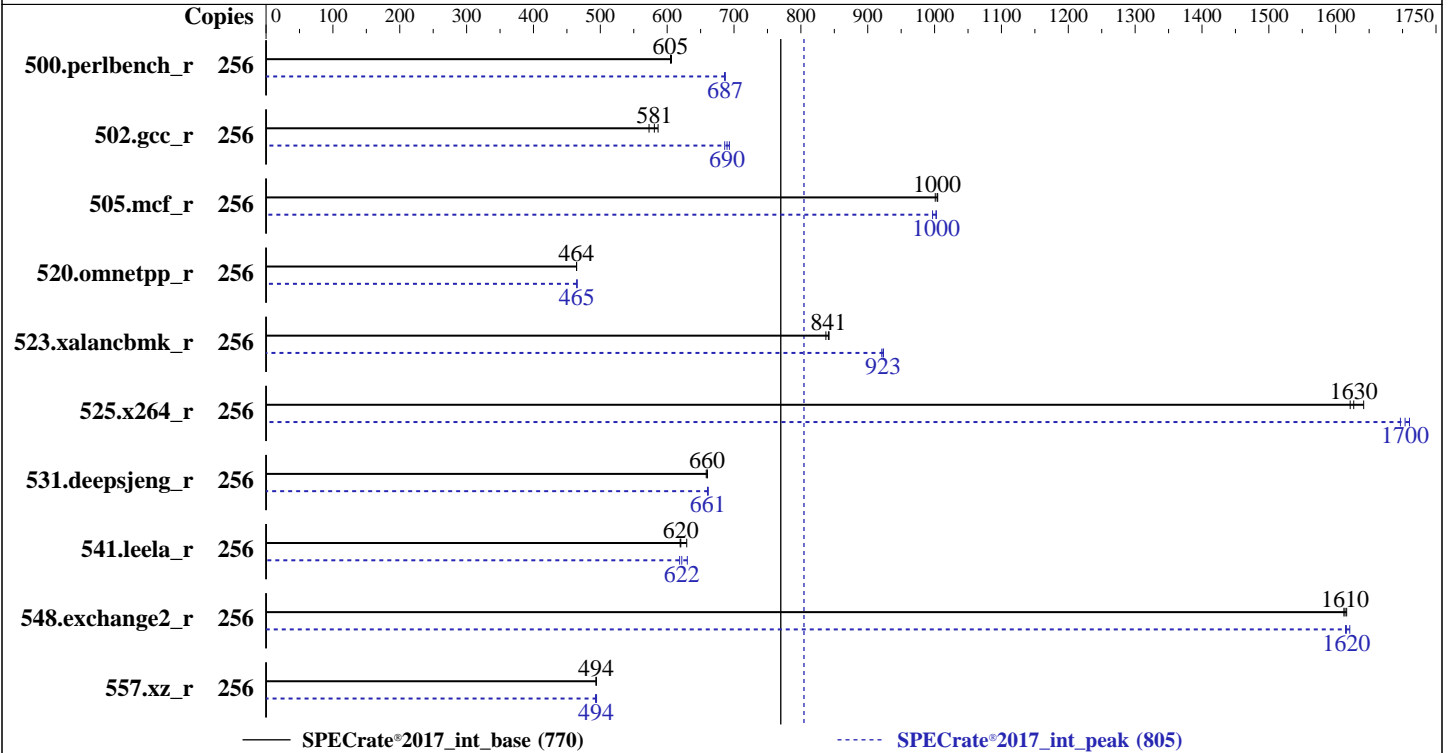
(2.80 GHz, Intel Xeon Gold 6242)

SPECrate®2017_int_base = 770

SPECrate®2017_int_peak = 805

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Nov-2019
Hardware Availability: Jun-2019
Software Availability: Sep-2019



Hardware

CPU Name: Intel Xeon Gold 6242
Max MHz: 3900
Nominal: 2800
Enabled: 128 cores, 8 chips, 2 threads/core
Orderable: 4 to 32 chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 22 MB I+D on chip per chip
Other: None
Memory: 6 TB (96 x 64 GB 4Rx4 PC4-2933Y-L)
Storage: 2 x 600 GB 10K SAS, RAID1
Other: None

Software

OS: SUSE Linux Enterprise Server 15 (x86_64) SP1
Kernel 4.12.14-195-default
Compiler: C/C++: Version 19.0.4.227 of Intel C/C++
Compiler Build 20190416 for Linux;
Fortran: Version 19.0.4.227 of Intel Fortran
Compiler Build 20190416 for Linux
Parallel: No
Firmware: HPE Firmware Bundle Version 3.0.542 released Jun-2019
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: HPE Foundation Software 2.1,
Build 731r76.sles15sp1hpe-1908061512
jemalloc memory allocator V5.0.1
Power Management: None



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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	256	672	606	674	605	674	605	256	593	687	594	686	594	687
502.gcc_r	256	633	573	618	586	624	581	256	523	693	526	690	528	686
505.mcf_r	256	412	1000	412	1000	413	1000	256	415	997	413	1000	413	1000
520.omnetpp_r	256	723	464	723	465	723	464	256	722	465	722	465	722	465
523.xalancbmk_r	256	323	837	321	841	321	842	256	294	921	293	923	293	923
525.x264_r	256	276	1630	276	1620	273	1640	256	263	1700	262	1710	264	1700
531.deepsjeng_r	256	446	658	444	660	445	660	256	444	661	444	661	444	661
541.leela_r	256	684	619	683	620	674	629	256	682	622	685	619	673	630
548.exchange2_r	256	415	1620	416	1610	416	1610	256	415	1610	414	1620	415	1620
557.xz_r	256	560	494	560	494	560	494	256	561	493	560	494	559	494

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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"
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>

Environment Variables Notes

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

General Notes

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

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

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General Notes (Continued)

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.

jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

Submitted_by: "Bucek, James" <james.bucek@hpe.com>

Submitted: Wed Dec 4 17:42:25 EST 2019

Submission: cpu2017-20191112-19858.sub

Platform Notes

Rack Management Controller setting:

```
modify npar pnun=0 ras=hpc
```

Sysinfo program /cpu2017/bin/sysinfo

Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011

running on linux-9joh Fri Nov 8 14:41:02 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 6242 CPU @ 2.80GHz
```

```
8 "physical id"s (chips)
```

```
256 "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
```

From lscpu:

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Platform Notes (Continued)

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:             Little Endian
Address sizes:          46 bits physical, 48 bits virtual
CPU(s):                 256
On-line CPU(s) list:   0-255
Thread(s) per core:    2
Core(s) per socket:    16
Socket(s):              8
NUMA node(s):          8
Vendor ID:              GenuineIntel
CPU family:             6
Model:                  85
Model name:             Intel(R) Xeon(R) Gold 6242 CPU @ 2.80GHz
Stepping:               7
CPU MHz:                2800.000
CPU max MHz:            3900.0000
CPU min MHz:            1200.0000
BogoMIPS:               5600.00
Virtualization:         VT-x
L1d cache:              32K
L1i cache:              32K
L2 cache:               1024K
L3 cache:               22528K
NUMA node0 CPU(s):     0-15,128-143
NUMA node1 CPU(s):     16-31,144-159
NUMA node2 CPU(s):     32-47,160-175
NUMA node3 CPU(s):     48-63,176-191
NUMA node4 CPU(s):     64-79,192-207
NUMA node5 CPU(s):     80-95,208-223
NUMA node6 CPU(s):     96-111,224-239
NUMA node7 CPU(s):     112-127,240-255
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 cpuid
aperfmpperf 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 intel_ppin 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_pkg_req pku ospke
avx512_vnni md_clear flush_lld arch_capabilities

```

/proc/cpuinfo cache data
cache size : 22528 KB

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Platform Notes (Continued)

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 3 4 5 6 7 8 9 10 11 12 13 14 15 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143

node 0 size: 749453 MB

node 0 free: 748397 MB

node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159

node 1 size: 750575 MB

node 1 free: 750131 MB

node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175

node 2 size: 750575 MB

node 2 free: 750180 MB

node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191

node 3 size: 750546 MB

node 3 free: 747758 MB

node 4 cpus: 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207

node 4 size: 750575 MB

node 4 free: 750239 MB

node 5 cpus: 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223

node 5 size: 750575 MB

node 5 free: 750237 MB

node 6 cpus: 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239

node 6 size: 750575 MB

node 6 free: 750217 MB

node 7 cpus: 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255

node 7 size: 750353 MB

node 7 free: 750022 MB

node distances:

node	0	1	2	3	4	5	6	7
0:	10	16	43	43	43	43	43	43
1:	16	10	43	43	43	43	43	43
2:	43	43	10	16	43	43	43	43
3:	43	43	16	10	43	43	43	43
4:	43	43	43	43	10	16	43	43
5:	43	43	43	43	16	10	43	43
6:	43	43	43	43	43	43	10	16
7:	43	43	43	43	43	43	16	10

(Continued on next page)



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Platform Notes (Continued)

From /proc/meminfo

MemTotal: 6147309148 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

hpe-foundation-release: HPE Foundation Software 2.1, Build
731r76.sles15splhpe-1908061512
os-release:
NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:

Linux linux-9joh 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
via prctl and seccomp
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 Nov 8 14:18

SPEC is set to: /cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda4	btrfs	557G	8.9G	547G	2%	/

From /sys/devices/virtual/dmi/id

BIOS: HPE Bundle:3.0.542 SFW:IP147.007.000.193.000.1906061247 06/06/2019
Vendor: HPE
Product: Superdome Flex
Product Family: 1590PID03020102
Serial: 5UF9269RNV

Additional information from dmidecode follows. WARNING: Use caution when you interpret

(Continued on next page)



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Platform Notes (Continued)

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.

Memory:

96x Hynix HMAA8GL7CPR4N-WM 64 GB 4 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

=====
C | 502.gcc_r(peak)

Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=====
C | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
| 525.x264_r(base, peak) 557.xz_r(base, peak)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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=====
C | 502.gcc_r(peak)

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=====
C | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
| 525.x264_r(base, peak) 557.xz_r(base, peak)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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=====
C++ | 523.xalanbmk_r(peak)

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Compiler Version Notes (Continued)

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.4.227 Build 20190416

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=====
C++ | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
531.deepsjeng_r(base, peak) 541.leela_r(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=====
C++ | 523.xalancbmk_r(peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.4.227 Build 20190416

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=====
C++ | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
531.deepsjeng_r(base, peak) 541.leela_r(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=====
Fortran | 548.exchange2_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.4.227 Build 20190416

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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_2019.4.227/linux/compiler/lib/intel64

-lqkmallo

C++ benchmarks:

-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div

-qopt-mem-layout-trans=4

-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64

-lqkmallo

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_2019.4.227/linux/compiler/lib/intel64

-lqkmallo



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Peak Compiler Invocation

C benchmarks (except as noted below):

```
icc -m64 -std=c11
```

```
502 gcc_r: icc -m32 -std=c11 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin
```

C++ benchmarks (except as noted below):

```
icpc -m64
```

```
523.xalancbmk_r: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin
```

Fortran benchmarks:

```
ifort -m64
```

Peak Portability Flags

```
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
```

```
502 gcc_r: -D_FILE_OFFSET_BITS=64
```

```
505.mcf_r: -DSPEC_LP64
```

```
520.omnetpp_r: -DSPEC_LP64
```

```
523.xalancbmk_r: -D_FILE_OFFSET_BITS=64 -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
```

Peak Optimization Flags

C benchmarks:

```
500.perlbench_r: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
```

```
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
```

```
-fno-strict-overflow
```

```
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
```

```
-lqkmalloc
```

```
502 gcc_r: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
```

```
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
```

```
-L/usr/local/je5.0.1-32/lib -ljemalloc
```

```
505.mcf_r: -w1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
```

```
-qopt-mem-layout-trans=4
```

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Peak Optimization Flags (Continued)

505.mcf_r (continued):

```
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
-lqkmallocc
```

525.x264_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div

```
-qopt-mem-layout-trans=4 -fno-alias
```

```
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
-lqkmallocc
```

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div

```
-qopt-mem-layout-trans=4
```

```
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
-lqkmallocc
```

523.xalancbmk_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo

```
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
```

```
-L/usr/local/je5.0.1-32/lib -ljemallocc
```

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

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_2019.4.227/linux/compiler/lib/intel64  
-lqkmallocc
```

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/HPE-Superdome_Flex-RevB-2.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/HPE-Superdome_Flex-RevB-2.xml



SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

Superdome Flex

(2.80 GHz, Intel Xeon Gold 6242)

SPECrate®2017_int_base = 770

SPECrate®2017_int_peak = 805

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Nov-2019

Hardware Availability: Jun-2019

Software Availability: Sep-2019

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Tested with SPEC CPU®2017 v1.1.0 on 2019-11-08 08:41:01-0500.

Report generated on 2020-06-08 13:36:07 by CPU2017 PDF formatter v6255.

Originally published on 2019-12-10.