



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Dell Inc.

PowerEdge R6525 (AMD EPYC 7H12, 2.60 GHz)

SPECrate®2017\_int\_base = 689

SPECrate®2017\_int\_peak = 755

CPU2017 License: 55

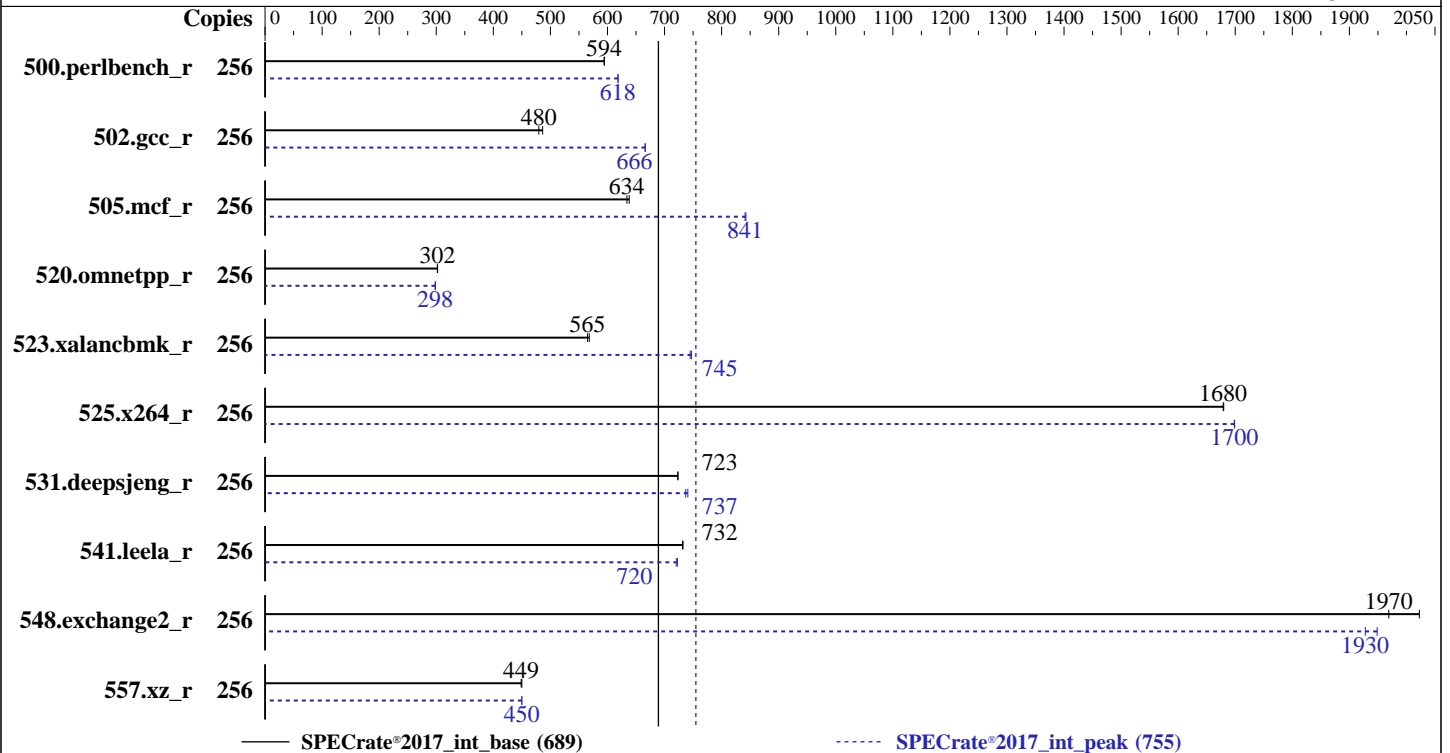
Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Dec-2019

Hardware Availability: Oct-2019

Software Availability: Aug-2019



### Hardware

CPU Name: AMD EPYC 7H12  
 Max MHz: 3300  
 Nominal: 2600  
 Enabled: 128 cores, 2 chips, 2 threads/core  
 Orderable: 1,2 chips  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 512 KB I+D on chip per core  
 L3: 256 MB I+D on chip per chip, 16 MB shared / 4 cores  
 Other: None  
 Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)  
 Storage: 1 x 1.6TB SAS SSD  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 15 SP1  
 kernel 4.12.14-195-default  
 4.12.14-195-default  
 Compiler: C/C++/Fortran: Version 2.0.0 of AOCC  
 Parallel: No  
 Firmware: Version 1.2.4 released Nov-2019  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit  
 Other: jemalloc: jemalloc memory allocator library v5.2.0  
 Power Management: BIOS set to prefer performance at the cost of additional power usage.



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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	685	595	<b>686</b>	<b>594</b>			256	659	619	<b>659</b>	<b>618</b>		
502.gcc_r	256	745	486	<b>756</b>	<b>480</b>			256	544	666	<b>544</b>	<b>666</b>		
505.mcf_r	256	<b>652</b>	<b>634</b>	648	638			256	<b>492</b>	<b>841</b>	491	843		
520.omnetpp_r	256	1111	302	<b>1113</b>	<b>302</b>			256	<b>1127</b>	<b>298</b>	1125	299		
523.xalancbmk_r	256	476	568	<b>478</b>	<b>565</b>			256	<b>363</b>	<b>745</b>	362	747		
525.x264_r	256	<b>267</b>	<b>1680</b>	267	1680			256	264	1700	<b>264</b>	<b>1700</b>		
531.deepsjeng_r	256	405	724	<b>406</b>	<b>723</b>			256	396	741	<b>398</b>	<b>737</b>		
541.leela_r	256	<b>579</b>	<b>732</b>	579	732			256	<b>588</b>	<b>720</b>	587	723		
548.exchange2_r	256	332	2020	<b>341</b>	<b>1970</b>			256	344	1950	<b>348</b>	<b>1930</b>		
557.xz_r	256	614	450	<b>616</b>	<b>449</b>			256	<b>615</b>	<b>450</b>	615	450		

SPECrate®2017\_int\_base = **689**

SPECrate®2017\_int\_peak = **755**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Compiler Notes

The AMD64 AOCC Compiler Suite is available at <http://developer.amd.com/amd-aocc/>

## Submit Notes

The config file option 'submit' was used.  
'numactl' was used to bind copies to the cores.  
See the configuration file for details.

## Operating System Notes

'ulimit -s unlimited' was used to set environment stack size  
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>

Set dirty\_ratio=8 to limit dirty cache to 8% of memory  
Set swappiness=1 to swap only if necessary  
Set zone\_reclaim\_mode=1 to free local node memory and avoid remote memory  
sync then drop\_caches=3 to reset caches before invoking runcpu

dirty\_ratio, swappiness, zone\_reclaim\_mode and drop\_caches were all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).

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## Operating System Notes (Continued)

Transparent huge pages set to 'always' for this run (OS default)

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH =  
    "/root/cpu2017-1.1.0/amd_rate_aocc200_rome_C_lib/64:/root/cpu2017-1.1.0/  
    amd_rate_aocc200_rome_C_lib/32:"  
MALLOCONF = "retain:true"
```

## General Notes

Binaries were compiled on a system with 2x AMD EPYC 7601 CPU + 512GB Memory using Fedora 26

NA: 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.

jemalloc: configured and built with GCC v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flt0  
jemalloc 5.2.0 is available here:

<https://github.com/jemalloc/jemalloc/releases/download/5.2.0/jemalloc-5.2.0.tar.bz2>

## Platform Notes

BIOS settings:

```
NUMA Nodes Per Socket set to 4  
CCX as NUMA Domain set to Enabled  
System Profile set to Custom  
CPU Power Management set to Maximum Performance  
Memory Frequency set to Maximum Performance  
Turbo Boost Enabled  
Cstates set to Enabled  
Memory Patrol Scrub Disabled  
Memory Refresh Rate set to 1x  
PCI ASPM L1 Link Power Management Disabled  
Determinism Slider set to Power Determinism  
Efficiency Optimized Mode Disabled  
Memory Interleaving set to Disabled
```

Sysinfo program /root/cpu2017-1.1.0/bin/sysinfo

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## Platform Notes (Continued)

Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011  
running on linux-g3ob Tue Dec 3 16:01:24 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 : AMD EPYC 7H12 64-Core Processor
 2 "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 : 64
siblings  : 128
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55 56 57 58 59 60 61 62 63
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55 56 57 58 59 60 61 62 63
```

From lscpu:

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
Address sizes:          43 bits physical, 48 bits virtual
CPU(s):                256
On-line CPU(s) list:  0-255
Thread(s) per core:    2
Core(s) per socket:    64
Socket(s):              2
NUMA node(s):          32
Vendor ID:              AuthenticAMD
CPU family:             23
Model:                  49
Model name:             AMD EPYC 7H12 64-Core Processor
Stepping:               0
CPU MHz:                2595.273
BogoMIPS:               5190.54
Virtualization:        AMD-V
L1d cache:              32K
L1i cache:              32K
L2 cache:               512K
L3 cache:               16384K
NUMA node0 CPU(s):     0-3,128-131
NUMA node1 CPU(s):     4-7,132-135
```

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### Platform Notes (Continued)

```

NUMA node2 CPU(s): 8-11,136-139
NUMA node3 CPU(s): 12-15,140-143
NUMA node4 CPU(s): 16-19,144-147
NUMA node5 CPU(s): 20-23,148-151
NUMA node6 CPU(s): 24-27,152-155
NUMA node7 CPU(s): 28-31,156-159
NUMA node8 CPU(s): 32-35,160-163
NUMA node9 CPU(s): 36-39,164-167
NUMA node10 CPU(s): 40-43,168-171
NUMA node11 CPU(s): 44-47,172-175
NUMA node12 CPU(s): 48-51,176-179
NUMA node13 CPU(s): 52-55,180-183
NUMA node14 CPU(s): 56-59,184-187
NUMA node15 CPU(s): 60-63,188-191
NUMA node16 CPU(s): 64-67,192-195
NUMA node17 CPU(s): 68-71,196-199
NUMA node18 CPU(s): 72-75,200-203
NUMA node19 CPU(s): 76-79,204-207
NUMA node20 CPU(s): 80-83,208-211
NUMA node21 CPU(s): 84-87,212-215
NUMA node22 CPU(s): 88-91,216-219
NUMA node23 CPU(s): 92-95,220-223
NUMA node24 CPU(s): 96-99,224-227
NUMA node25 CPU(s): 100-103,228-231
NUMA node26 CPU(s): 104-107,232-235
NUMA node27 CPU(s): 108-111,236-239
NUMA node28 CPU(s): 112-115,240-243
NUMA node29 CPU(s): 116-119,244-247
NUMA node30 CPU(s): 120-123,248-251
NUMA node31 CPU(s): 124-127,252-255

```

```

Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm
constant_tsc rep_good nopl xtopology nonstop_tsc cpuid extd_apicid aperfmperf pni
pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx
f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse
3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext
perfctr_l2 mwaitx cpb cat_l3 cdp_l3 hw_pstate sme ssbd sev ibrs ibpb stibp vmmcall
fsgsbase bmi1 avx2 smep bmi2 cqm rdt_a rdseed adx smap clflushopt clwb sha_ni
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
clzero irperf xsaveerptr arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean
flushbyasid decodeassists pausefilter pfthreshold avic v_vmsave_vmload vgif umip
rdpid overflow_recov succor smca

```

```

/proc/cpuinfo cache data
cache size : 512 KB

```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a

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## Platform Notes (Continued)

```

physical chip.
available: 32 nodes (0-31)
node 0 cpus: 0 1 2 3 128 129 130 131
node 0 size: 15548 MB
node 0 free: 15352 MB
node 1 cpus: 4 5 6 7 132 133 134 135
node 1 size: 16126 MB
node 1 free: 15896 MB
node 2 cpus: 8 9 10 11 136 137 138 139
node 2 size: 16126 MB
node 2 free: 16010 MB
node 3 cpus: 12 13 14 15 140 141 142 143
node 3 size: 16125 MB
node 3 free: 16040 MB
node 4 cpus: 16 17 18 19 144 145 146 147
node 4 size: 16126 MB
node 4 free: 16058 MB
node 5 cpus: 20 21 22 23 148 149 150 151
node 5 size: 16126 MB
node 5 free: 16061 MB
node 6 cpus: 24 25 26 27 152 153 154 155
node 6 size: 16126 MB
node 6 free: 16044 MB
node 7 cpus: 28 29 30 31 156 157 158 159
node 7 size: 16125 MB
node 7 free: 16049 MB
node 8 cpus: 32 33 34 35 160 161 162 163
node 8 size: 16126 MB
node 8 free: 15944 MB
node 9 cpus: 36 37 38 39 164 165 166 167
node 9 size: 16126 MB
node 9 free: 16050 MB
node 10 cpus: 40 41 42 43 168 169 170 171
node 10 size: 16126 MB
node 10 free: 16053 MB
node 11 cpus: 44 45 46 47 172 173 174 175
node 11 size: 16095 MB
node 11 free: 16025 MB
node 12 cpus: 48 49 50 51 176 177 178 179
node 12 size: 16126 MB
node 12 free: 16040 MB
node 13 cpus: 52 53 54 55 180 181 182 183
node 13 size: 16126 MB
node 13 free: 16058 MB
node 14 cpus: 56 57 58 59 184 185 186 187
node 14 size: 16126 MB
node 14 free: 16059 MB

```

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## Platform Notes (Continued)

```

node 15 cpus: 60 61 62 63 188 189 190 191
node 15 size: 16113 MB
node 15 free: 16042 MB
node 16 cpus: 64 65 66 67 192 193 194 195
node 16 size: 16126 MB
node 16 free: 16056 MB
node 17 cpus: 68 69 70 71 196 197 198 199
node 17 size: 16126 MB
node 17 free: 16074 MB
node 18 cpus: 72 73 74 75 200 201 202 203
node 18 size: 16126 MB
node 18 free: 16072 MB
node 19 cpus: 76 77 78 79 204 205 206 207
node 19 size: 16125 MB
node 19 free: 16067 MB
node 20 cpus: 80 81 82 83 208 209 210 211
node 20 size: 16126 MB
node 20 free: 16077 MB
node 21 cpus: 84 85 86 87 212 213 214 215
node 21 size: 16126 MB
node 21 free: 16055 MB
node 22 cpus: 88 89 90 91 216 217 218 219
node 22 size: 16126 MB
node 22 free: 16061 MB
node 23 cpus: 92 93 94 95 220 221 222 223
node 23 size: 16125 MB
node 23 free: 16055 MB
node 24 cpus: 96 97 98 99 224 225 226 227
node 24 size: 16126 MB
node 24 free: 16082 MB
node 25 cpus: 100 101 102 103 228 229 230 231
node 25 size: 16126 MB
node 25 free: 16043 MB
node 26 cpus: 104 105 106 107 232 233 234 235
node 26 size: 16126 MB
node 26 free: 16071 MB
node 27 cpus: 108 109 110 111 236 237 238 239
node 27 size: 16125 MB
node 27 free: 16009 MB
node 28 cpus: 112 113 114 115 240 241 242 243
node 28 size: 16126 MB
node 28 free: 16068 MB
node 29 cpus: 116 117 118 119 244 245 246 247
node 29 size: 16126 MB
node 29 free: 16074 MB
node 30 cpus: 120 121 122 123 248 249 250 251
node 30 size: 16126 MB

```

(Continued on next page)



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### Platform Notes (Continued)

```

node 30 free: 16073 MB
node 31 cpus: 124 125 126 127 252 253 254 255
node 31 size: 16122 MB
node 31 free: 16068 MB
node distances:
node 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29 30 31
0: 10 11 11 11 12 12 12 12 12 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32 32
1: 11 10 11 11 12 12 12 12 12 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
2: 11 11 10 11 12 12 12 12 12 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
3: 11 11 11 10 12 12 12 12 12 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
4: 12 12 12 12 10 11 11 11 12 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
5: 12 12 12 12 11 10 11 11 12 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
6: 12 12 12 12 11 11 11 10 12 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
7: 12 12 12 12 11 11 11 10 12 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
8: 12 12 12 12 12 12 12 12 10 11 11 11 11 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
9: 12 12 12 12 12 12 12 12 12 11 10 11 11 11 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
10: 12 12 12 12 12 12 12 12 12 11 11 10 11 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
11: 12 12 12 12 12 12 12 12 12 11 11 11 10 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
12: 12 12 12 12 12 12 12 12 12 12 12 12 12 12 10 11 11 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
13: 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 11 10 11 11 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
14: 12 12 12 12 12 12 12 12 12 12 12 12 12 12 11 11 10 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
15: 12 12 12 12 12 12 12 12 12 12 12 12 12 12 11 11 11 10 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
16: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 10 11 11 11
12 12 12 12 12 12 12 12 12 12 12 12 12
17: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 10 11 11
12 12 12 12 12 12 12 12 12 12 12 12 12
18: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 10 11
12 12 12 12 12 12 12 12 12 12 12 12 12
19: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 11 10
12 12 12 12 12 12 12 12 12 12 12 12

```

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## Platform Notes (Continued)

```

20: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12
10 11 11 11 12 12 12 12 12 12 12 12
21: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12
11 10 11 11 12 12 12 12 12 12 12 12
22: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12
11 11 10 11 12 12 12 12 12 12 12 12
23: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12
11 11 11 10 12 12 12 12 12 12 12 12
24: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12
12 12 12 12 10 11 11 11 12 12 12 12
25: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12
12 12 12 12 11 10 11 11 12 12 12 12
26: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12
12 12 12 12 11 11 10 11 12 12 12 12
27: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12
12 12 12 12 11 11 11 10 12 12 12 12
28: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12
12 12 12 12 12 12 12 12 10 11 11 11
29: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12
12 12 12 12 12 12 12 12 11 10 11 11
30: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12
12 12 12 12 12 12 12 12 11 11 10 11
31: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12
12 12 12 12 12 12 12 12 11 11 11 10

```

From /proc/meminfo

```

MemTotal:      527783148 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

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

```

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-g3ob 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:

(Continued on next page)



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## Platform Notes (Continued)

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: Full AMD retpoline, IBPB: conditional, IBRS\_FW, STIBP: conditional, RSB filling

run-level 3 Dec 3 15:57

SPEC is set to: /root/cpu2017-1.1.0

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda2	xfs	440G	41G	400G	10%	/

From /sys/devices/virtual/dmi/id

BIOS: Dell Inc. 1.2.4 11/05/2019  
 Vendor: Dell Inc.  
 Product: PowerEdge R6525  
 Product Family: PowerEdge  
 Serial: 1234567

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.

Memory:

5x 802C80B3802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200  
 2x 802C8632802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200  
 1x 802C869D802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200  
 8x 80AD863280AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200  
 16x Not Specified Not Specified

(End of data from sysinfo program)

## Compiler Version Notes

C | 502.gcc\_r(peak)

AOCC.LLVM.2.0.0.B191.2019\_07\_19 clang version 8.0.0 (CLANG: Jenkins  
 AOCC\_2\_0\_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019\_07\_19)  
 Target: i386-unknown-linux-gnu  
 Thread model: posix  
 InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

(Continued on next page)



# SPEC CPU®2017 Integer Rate Result

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**Dell Inc.**

PowerEdge R6525 (AMD EPYC 7H12, 2.60 GHz)

SPECrate®2017\_int\_base = 689

SPECrate®2017\_int\_peak = 755

**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test Date:** Dec-2019

**Hardware Availability:** Oct-2019

**Software Availability:** Aug-2019

## Compiler Version Notes (Continued)

```
=====
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)
-----
```

```
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----
```

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

```
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----
```

```
=====
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)
-----
```

```
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----
```

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

```
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----
```

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

(Continued on next page)



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PowerEdge R6525 (AMD EPYC 7H12, 2.60 GHz)

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**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test Date:** Dec-2019

**Hardware Availability:** Oct-2019

**Software Availability:** Aug-2019

## Compiler Version Notes (Continued)

```
-----
AOCCLLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCCLLVM.2.0.0.B191.2019_07_19) (based on LLVM AOCCLLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----
```

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

```
AOCCLLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCCLLVM.2.0.0.B191.2019_07_19) (based on LLVM AOCCLLVM.2.0.0.B191.2019_07_19)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----
```

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

```
AOCCLLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCCLLVM.2.0.0.B191.2019_07_19) (based on LLVM AOCCLLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----
```

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

```
AOCCLLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCCLLVM.2.0.0.B191.2019_07_19) (based on LLVM AOCCLLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----
```

## Base Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

(Continued on next page)



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## Base Compiler Invocation (Continued)

Fortran benchmarks:

flang

## Base Portability Flags

```
500.perlbench_r: -DSPEC_LINUX_X64 -DSPEC_LP64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LINUX -DSPEC_LP64
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:

```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-freemap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -z muldefs -lmvec -lamdlibm -ljemalloc
-lflang
```

C++ benchmarks:

```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
-mllvm -loop-unswitch-threshold=200000 -mllvm -vector-library=LIBMVEC
-mllvm -unroll-threshold=100 -flv-function-specialization
-mllvm -enable-partial-unswitch -z muldefs -lmvec -lamdlibm
-ljemalloc -lflang
```

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## Base Optimization Flags (Continued)

Fortran benchmarks:

```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -ffast-math
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver2 -funroll-loops
-Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
-mllvm -disable-indvar-simplify -mllvm -unroll-aggressive
-mllvm -unroll-threshold=150 -lmvec -lamdlibm -ljemalloc -lflang
```

## Peak Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

## Peak Portability Flags

```
500.perlbench_r: -DSPEC_LINUX_X64 -DSPEC_LP64
502.gcc_r: -D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LINUX -D_FILE_OFFSET_BITS=64
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: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
```

(Continued on next page)



# SPEC CPU®2017 Integer Rate Result

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**Software Availability:** Aug-2019

## Peak Optimization Flags (Continued)

500.perlbench\_r (continued):

```
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-fprofile-instr-generate(pass 1)
-fprofile-instr-use(pass 2) -Ofast -march=znver2
-mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -lmvec -lamdlibm -ljemalloc
-lflang
```

502.gcc\_r: -m32 -flto -Wl,-mllvm -Wl,-function-specialize

```
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -fgnu89-inline -ljemalloc
```

505.mcf\_r: -flto -Wl,-mllvm -Wl,-function-specialize

```
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -lmvec -lamdlibm -ljemalloc
-lflang
```

525.x264\_r: Same as 500.perlbench\_r

557.xz\_r: Same as 505.mcf\_r

(Continued on next page)



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Test Date: Dec-2019

Hardware Availability: Oct-2019

Software Availability: Aug-2019

## Peak Optimization Flags (Continued)

C++ benchmarks:

```
520.omnetpp_r: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -flv-function-specialization
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=1000 -lmvec -lamdlibm -ljemalloc
-lflang
```

```
523.xalancbmk_r: -m32 -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -flv-function-specialization
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=1000 -ljemalloc
```

531.deepsjeng\_r: Same as 520.omnetpp\_r

541.leela\_r: Same as 520.omnetpp\_r

Fortran benchmarks:

```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -ffast-math
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver2 -funroll-loops
-Mrecursive -mllvm -vector-library=LIBMVEC
-mllvm -disable-indvar-simplify -mllvm -unroll-aggressive
-mllvm -unroll-threshold=150 -lmvec -lamdlibm -ljemalloc -lflang
```

## Peak Other Flags

C benchmarks:

(Continued on next page)





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## Peak Other Flags (Continued)

502.gcc\_r: -L/sppo/dev/cpu2017/v110/amd\_rate\_aocc200\_rome\_C\_lib/32

C++ benchmarks:

523.xalancbmk\_r: -L/sppo/dev/cpu2017/v110/amd\_rate\_aocc200\_rome\_C\_lib/32

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/aocc200-flags-B1-speed-Dell.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE7.html>

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

<http://www.spec.org/cpu2017/flags/aocc200-flags-B1-speed-Dell.xml>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE7.xml>

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