SPEC CPU®2017 Floating Point Rate Result

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ScaleMP

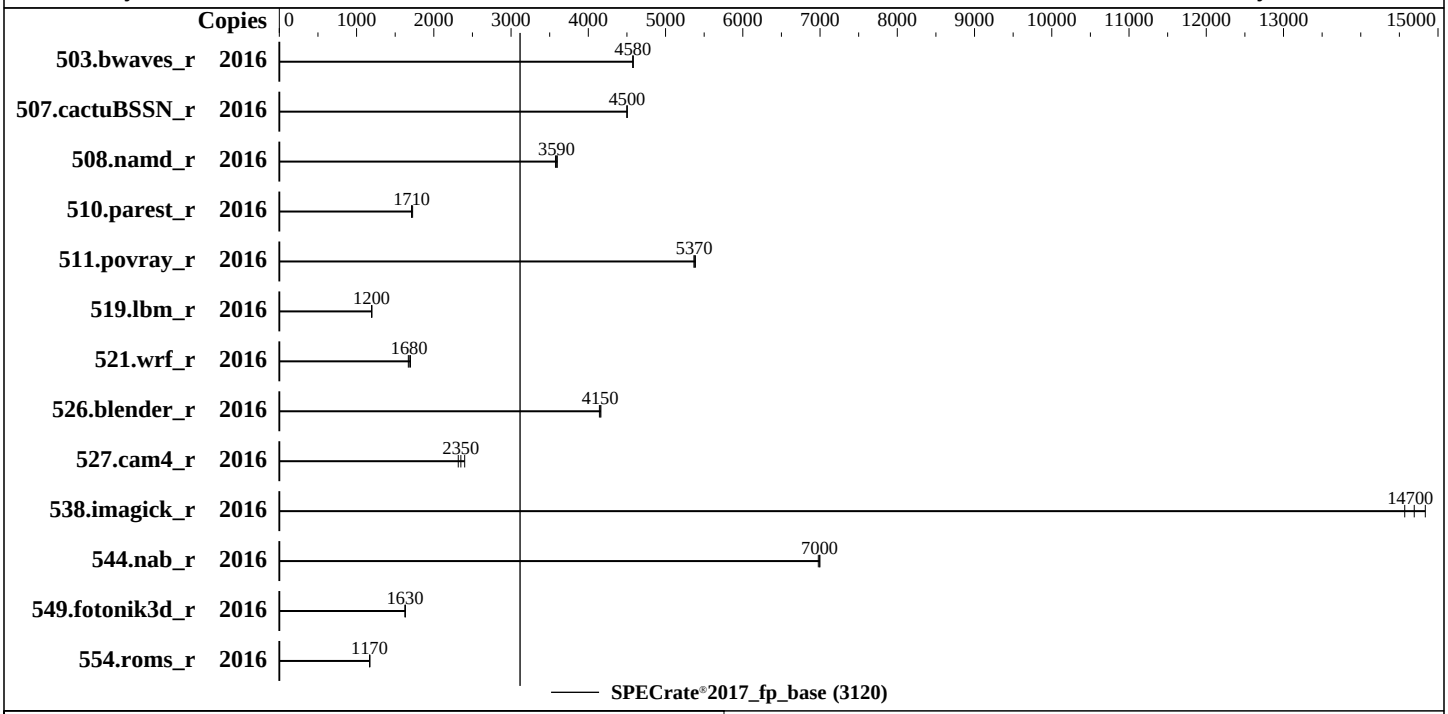
vSMP ServerONE
Supermicro A+ Server 2123BT-HNC0R (AMD EPYC 7702)

SPECrate®2017_fp_base = 3120

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 2929
Test Sponsor: ScaleMP
Tested by: ScaleMP

Test Date: Dec-2019
Hardware Availability: Nov-2019
Software Availability: Nov-2019



Hardware

CPU Name: AMD EPYC 7702
Max MHz: 3350
Nominal: 2000
Enabled: 1024 cores, 16 chips, 2 threads/core
Orderable: 1-16 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: 4 TB (128 x 32 GB 2Rx4 PC4-2667V-L)

Storage: 4 TB ramfs
Other: ScaleMP vSMP Foundation aggregates multiple servers into one shared-memory system.
Hardware Details:
vSMP System was aggregated using 8 units of Supermicro A+ Server 2123BT-HNC0R.
The servers were connected using Mellanox InfiniBand EDR fabric.

Software

OS: SUSE Linux Enterprise Server 15 SP1, kernel version 4.12.14-197.21.1.vSMP.2-default
Compiler: C/C++/Fortran: Version 2.0.0 of AOCC
Parallel: No
Firmware: ScaleMP vSMP Foundation version 9.5.195.12 released Nov-2019
File System: ramfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc: jemalloc memory allocator library v5.2.1
Power Management: --

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Software Availability: Nov-2019

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	2016	4412	4580	**4416**	**4580**	4418	4580							
507.cactuBSSN_r	2016	567	4500	567	4500	**567**	**4500**							
508.namd_r	2016	536	3580	532	3600	**534**	**3590**							
510.parest_r	2016	3056	1730	**3076**	**1710**	3081	1710							
511.povray_r	2016	874	5390	**876**	**5370**	877	5370							
519.lbm_r	2016	**1777**	**1200**	1776	1200	1777	1200							
521.wrf_r	2016	2660	1700	**2685**	**1680**	2704	1670							
526.blender_r	2016	741	4140	**739**	**4150**	738	4160							
527.cam4_r	2016	1469	2400	**1500**	**2350**	1522	2320							
538.imagick_r	2016	**341**	**14700**	338	14800	344	14600							
544.nab_r	2016	485	7000	486	6980	**485**	**7000**							
549.fotonik3d_r	2016	4816	1630	4826	1630	**4823**	**1630**							
554.roms_r	2016	2729	1170	**2743**	**1170**	2744	1170							

SPECrate®2017_fp_base = 3120

SPECrate®2017_fp_peak = Not Run

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
Set numa_stat=0 to improve page allocation performance
```

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Operating System Notes (Continued)

```
Set stat_interval=60 to reduce OS jitter

dirty_ratio, swappiness, zone_reclaim_mode, drop_caches, numa_stat and stat_interval were
all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).

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

Kernel Boot Parameter set with : nohz_full=!0
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/dev/shm/amd_rate_aocc200_rome_C_lib/64;/dev/shm/amd_rate_aocc200_rome_
     C_lib/32:/usr/local/lib:/usr/lib:/usr/lib64:/mnt/aocc-compiler-2.0.0/lib
     :/mnt/aocc-compiler-2.0.0/lib32:"
MALLOC_CONF = "retain:true,metadata_thp:always,thp:always"
```

General Notes

```
Environment variables set by runcpu before the start of the run:
 LD_LIBRARY_PATH=/usr/local/lib:$LD_LIBRARY_PATH
 LIBRARY_PATH=/usr/local/lib:$LIBRARY_PATH
 MALLOC_TOP_PAD_=$((16777216))
 MALLOC_TRIM_THRESHOLD_=$((16777216))

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 AMD64 AOCC v2.0.0 on this system with -Ofast -march=znver2
jemalloc 5.2.1 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.2.1/jemalloc-5.2.1.tar.bz2
```

Platform Notes

```
BIOS settings:
 Determinism Control = Manual
 Determinism Slider = Power
 cTDP Control = Manual
```

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Platform Notes (Continued)

```
cTDP = 180
Package Power Limit Control = Manual
Package Power Limit = 180
IOMMU = Enabled
APBDIS = 1
NUMA Nodes Per Socket = NPS4

Sysinfo program /dev/shm/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on 13d Fri Dec  6 03:32:31 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 7702 64-Core Processor
      16  "physical id"s (chips)
      2048 "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
      physical 2: 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 3: 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 4: 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 5: 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 6: 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 7: 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
```

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Platform Notes (Continued)

```
      physical 8: 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 9: 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 10: 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 11: 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 12: 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 13: 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 14: 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 15: 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:       47 bits physical, 48 bits virtual
      CPU(s):              2048
      On-line CPU(s) list: 0-2047
      Thread(s) per core:  2
      Core(s) per socket:  64
      Socket(s):           16
      NUMA node(s):        64
      Vendor ID:           AuthenticAMD
      CPU family:          23
      Model:               49
      Model name:          AMD EPYC 7702 64-Core Processor
      Stepping:            0
      CPU MHz:             2000.000
      CPU max MHz:         2000.0000
      CPU min MHz:         1800.0000
      BogoMIPS:            3999.79
      L1d cache:           32K
      L1i cache:           32K
```

(Continued on next page)

Platform Notes (Continued)

```
L2 cache:              512K
L3 cache:              16384K
NUMA node0 CPU(s):     0-15,1024-1039
NUMA node1 CPU(s):     16-31,1040-1055
NUMA node2 CPU(s):     32-47,1056-1071
NUMA node3 CPU(s):     48-63,1072-1087
NUMA node4 CPU(s):     64-79,1088-1103
NUMA node5 CPU(s):     80-95,1104-1119
NUMA node6 CPU(s):     96-111,1120-1135
NUMA node7 CPU(s):     112-127,1136-1151
NUMA node8 CPU(s):     128-143,1152-1167
NUMA node9 CPU(s):     144-159,1168-1183
NUMA node10 CPU(s):    160-175,1184-1199
NUMA node11 CPU(s):    176-191,1200-1215
NUMA node12 CPU(s):    192-207,1216-1231
NUMA node13 CPU(s):    208-223,1232-1247
NUMA node14 CPU(s):    224-239,1248-1263
NUMA node15 CPU(s):    240-255,1264-1279
NUMA node16 CPU(s):    256-271,1280-1295
NUMA node17 CPU(s):    272-287,1296-1311
NUMA node18 CPU(s):    288-303,1312-1327
NUMA node19 CPU(s):    304-319,1328-1343
NUMA node20 CPU(s):    320-335,1344-1359
NUMA node21 CPU(s):    336-351,1360-1375
NUMA node22 CPU(s):    352-367,1376-1391
NUMA node23 CPU(s):    368-383,1392-1407
NUMA node24 CPU(s):    384-399,1408-1423
NUMA node25 CPU(s):    400-415,1424-1439
NUMA node26 CPU(s):    416-431,1440-1455
NUMA node27 CPU(s):    432-447,1456-1471
NUMA node28 CPU(s):    448-463,1472-1487
NUMA node29 CPU(s):    464-479,1488-1503
NUMA node30 CPU(s):    480-495,1504-1519
NUMA node31 CPU(s):    496-511,1520-1535
NUMA node32 CPU(s):    512-527,1536-1551
NUMA node33 CPU(s):    528-543,1552-1567
NUMA node34 CPU(s):    544-559,1568-1583
NUMA node35 CPU(s):    560-575,1584-1599
NUMA node36 CPU(s):    576-591,1600-1615
NUMA node37 CPU(s):    592-607,1616-1631
NUMA node38 CPU(s):    608-623,1632-1647
NUMA node39 CPU(s):    624-639,1648-1663
NUMA node40 CPU(s):    640-655,1664-1679
NUMA node41 CPU(s):    656-671,1680-1695
NUMA node42 CPU(s):    672-687,1696-1711
NUMA node43 CPU(s):    688-703,1712-1727
NUMA node44 CPU(s):    704-719,1728-1743
```

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Platform Notes (Continued)

```
      NUMA node45 CPU(s):  720-735,1744-1759
      NUMA node46 CPU(s):  736-751,1760-1775
      NUMA node47 CPU(s):  752-767,1776-1791
      NUMA node48 CPU(s):  768-783,1792-1807
      NUMA node49 CPU(s):  784-799,1808-1823
      NUMA node50 CPU(s):  800-815,1824-1839
      NUMA node51 CPU(s):  816-831,1840-1855
      NUMA node52 CPU(s):  832-847,1856-1871
      NUMA node53 CPU(s):  848-863,1872-1887
      NUMA node54 CPU(s):  864-879,1888-1903
      NUMA node55 CPU(s):  880-895,1904-1919
      NUMA node56 CPU(s):  896-911,1920-1935
      NUMA node57 CPU(s):  912-927,1936-1951
      NUMA node58 CPU(s):  928-943,1952-1967
      NUMA node59 CPU(s):  944-959,1968-1983
      NUMA node60 CPU(s):  960-975,1984-1999
      NUMA node61 CPU(s):  976-991,2000-2015
      NUMA node62 CPU(s):  992-1007,2016-2031
      NUMA node63 CPU(s):  1008-1023,2032-2047
      Flags:               fpu vme de pse tsc msr pae 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 nonstop_tsc cpuid extd_apicid aperfmperf pni pclmulqdq
      ssse3 fma cx16 sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm
      cmp_legacy extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw skinit wdt
      tce topoext perfctr_core perfctr_nb bpext perfctr_l2 mwaitx cpb cat_l3 cdp_l3
      hw_pstate ssbd 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
  physical chip.
    available: 64 nodes (0-63)
    node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 1024 1025 1026 1027 1028 1029 1030
    1031 1032 1033 1034 1035 1036 1037 1038 1039
    node 0 size: 44600 MB
    node 0 free: 44117 MB
    node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1040 1041 1042 1043 1044
    1045 1046 1047 1048 1049 1050 1051 1052 1053 1054 1055
    node 1 size: 59461 MB
    node 1 free: 59220 MB
    node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 1056 1057 1058 1059 1060
    1061 1062 1063 1064 1065 1066 1067 1068 1069 1070 1071
```

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Platform Notes (Continued)

```
node 2 size: 59461 MB
node 2 free: 59114 MB
node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 1072 1073 1074 1075 1076
1077 1078 1079 1080 1081 1082 1083 1084 1085 1086 1087
node 3 size: 59461 MB
node 3 free: 59261 MB
node 4 cpus: 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 1088 1089 1090 1091 1092
1093 1094 1095 1096 1097 1098 1099 1100 1101 1102 1103
node 4 size: 59461 MB
node 4 free: 59345 MB
node 5 cpus: 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 1104 1105 1106 1107 1108
1109 1110 1111 1112 1113 1114 1115 1116 1117 1118 1119
node 5 size: 59461 MB
node 5 free: 59329 MB
node 6 cpus: 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 1120 1121 1122
1123 1124 1125 1126 1127 1128 1129 1130 1131 1132 1133 1134 1135
node 6 size: 59461 MB
node 6 free: 59334 MB
node 7 cpus: 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 1136 1137
1138 1139 1140 1141 1142 1143 1144 1145 1146 1147 1148 1149 1150 1151
node 7 size: 59461 MB
node 7 free: 59345 MB
node 8 cpus: 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 1152 1153
1154 1155 1156 1157 1158 1159 1160 1161 1162 1163 1164 1165 1166 1167
node 8 size: 45097 MB
node 8 free: 44978 MB
node 9 cpus: 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 1168 1169
1170 1171 1172 1173 1174 1175 1176 1177 1178 1179 1180 1181 1182 1183
node 9 size: 59461 MB
node 9 free: 59346 MB
node 10 cpus: 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 1184 1185
1186 1187 1188 1189 1190 1191 1192 1193 1194 1195 1196 1197 1198 1199
node 10 size: 59461 MB
node 10 free: 59346 MB
node 11 cpus: 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 1200 1201
1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215
node 11 size: 59461 MB
node 11 free: 59344 MB
node 12 cpus: 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 1216 1217
1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230 1231
node 12 size: 59461 MB
node 12 free: 59346 MB
node 13 cpus: 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 1232 1233
1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247
node 13 size: 59461 MB
node 13 free: 59344 MB
node 14 cpus: 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 1248 1249
```

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Platform Notes (Continued)

```
1250 1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263
node 14 size: 59461 MB
node 14 free: 59341 MB
node 15 cpus: 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 1264 1265
1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279
node 15 size: 59461 MB
node 15 free: 59343 MB
node 16 cpus: 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 1280 1281
1282 1283 1284 1285 1286 1287 1288 1289 1290 1291 1292 1293 1294 1295
node 16 size: 45097 MB
node 16 free: 44973 MB
node 17 cpus: 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 1296 1297
1298 1299 1300 1301 1302 1303 1304 1305 1306 1307 1308 1309 1310 1311
node 17 size: 59560 MB
node 17 free: 59441 MB
node 18 cpus: 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 1312 1313
1314 1315 1316 1317 1318 1319 1320 1321 1322 1323 1324 1325 1326 1327
node 18 size: 59461 MB
node 18 free: 59341 MB
node 19 cpus: 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 1328 1329
1330 1331 1332 1333 1334 1335 1336 1337 1338 1339 1340 1341 1342 1343
node 19 size: 59461 MB
node 19 free: 59340 MB
node 20 cpus: 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 1344 1345
1346 1347 1348 1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359
node 20 size: 59461 MB
node 20 free: 59346 MB
node 21 cpus: 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 1360 1361
1362 1363 1364 1365 1366 1367 1368 1369 1370 1371 1372 1373 1374 1375
node 21 size: 59461 MB
node 21 free: 59345 MB
node 22 cpus: 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 1376 1377
1378 1379 1380 1381 1382 1383 1384 1385 1386 1387 1388 1389 1390 1391
node 22 size: 59461 MB
node 22 free: 59342 MB
node 23 cpus: 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 1392 1393
1394 1395 1396 1397 1398 1399 1400 1401 1402 1403 1404 1405 1406 1407
node 23 size: 59461 MB
node 23 free: 59344 MB
node 24 cpus: 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 1408 1409
1410 1411 1412 1413 1414 1415 1416 1417 1418 1419 1420 1421 1422 1423
node 24 size: 45097 MB
node 24 free: 44980 MB
node 25 cpus: 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 1424 1425
1426 1427 1428 1429 1430 1431 1432 1433 1434 1435 1436 1437 1438 1439
node 25 size: 59461 MB
node 25 free: 59343 MB
```

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Platform Notes (Continued)

```
node 26 cpus: 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 1440 1441
1442 1443 1444 1445 1446 1447 1448 1449 1450 1451 1452 1453 1454 1455
node 26 size: 59461 MB
node 26 free: 59344 MB
node 27 cpus: 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 1456 1457
1458 1459 1460 1461 1462 1463 1464 1465 1466 1467 1468 1469 1470 1471
node 27 size: 59461 MB
node 27 free: 59342 MB
node 28 cpus: 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 1472 1473
1474 1475 1476 1477 1478 1479 1480 1481 1482 1483 1484 1485 1486 1487
node 28 size: 59461 MB
node 28 free: 59347 MB
node 29 cpus: 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 1488 1489
1490 1491 1492 1493 1494 1495 1496 1497 1498 1499 1500 1501 1502 1503
node 29 size: 59461 MB
node 29 free: 59346 MB
node 30 cpus: 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 1504 1505
1506 1507 1508 1509 1510 1511 1512 1513 1514 1515 1516 1517 1518 1519
node 30 size: 59461 MB
node 30 free: 59347 MB
node 31 cpus: 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 1520 1521
1522 1523 1524 1525 1526 1527 1528 1529 1530 1531 1532 1533 1534 1535
node 31 size: 59461 MB
node 31 free: 59347 MB
node 32 cpus: 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 1536 1537
1538 1539 1540 1541 1542 1543 1544 1545 1546 1547 1548 1549 1550 1551
node 32 size: 45097 MB
node 32 free: 44983 MB
node 33 cpus: 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 1552 1553
1554 1555 1556 1557 1558 1559 1560 1561 1562 1563 1564 1565 1566 1567
node 33 size: 59461 MB
node 33 free: 59341 MB
node 34 cpus: 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 1568 1569
1570 1571 1572 1573 1574 1575 1576 1577 1578 1579 1580 1581 1582 1583
node 34 size: 59461 MB
node 34 free: 59344 MB
node 35 cpus: 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 1584 1585
1586 1587 1588 1589 1590 1591 1592 1593 1594 1595 1596 1597 1598 1599
node 35 size: 59461 MB
node 35 free: 59341 MB
node 36 cpus: 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 1600 1601
1602 1603 1604 1605 1606 1607 1608 1609 1610 1611 1612 1613 1614 1615
node 36 size: 59461 MB
node 36 free: 59346 MB
node 37 cpus: 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 1616 1617
1618 1619 1620 1621 1622 1623 1624 1625 1626 1627 1628 1629 1630 1631
node 37 size: 59461 MB
```

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Platform Notes (Continued)

```
node 37 free: 59347 MB
node 38 cpus: 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 1632 1633
1634 1635 1636 1637 1638 1639 1640 1641 1642 1643 1644 1645 1646 1647
node 38 size: 59461 MB
node 38 free: 59340 MB
node 39 cpus: 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 1648 1649
1650 1651 1652 1653 1654 1655 1656 1657 1658 1659 1660 1661 1662 1663
node 39 size: 59461 MB
node 39 free: 59343 MB
node 40 cpus: 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 1664 1665
1666 1667 1668 1669 1670 1671 1672 1673 1674 1675 1676 1677 1678 1679
node 40 size: 45097 MB
node 40 free: 44979 MB
node 41 cpus: 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 1680 1681
1682 1683 1684 1685 1686 1687 1688 1689 1690 1691 1692 1693 1694 1695
node 41 size: 59461 MB
node 41 free: 59343 MB
node 42 cpus: 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 1696 1697
1698 1699 1700 1701 1702 1703 1704 1705 1706 1707 1708 1709 1710 1711
node 42 size: 59461 MB
node 42 free: 59347 MB
node 43 cpus: 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 1712 1713
1714 1715 1716 1717 1718 1719 1720 1721 1722 1723 1724 1725 1726 1727
node 43 size: 59461 MB
node 43 free: 59346 MB
node 44 cpus: 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 1728 1729
1730 1731 1732 1733 1734 1735 1736 1737 1738 1739 1740 1741 1742 1743
node 44 size: 59461 MB
node 44 free: 59350 MB
node 45 cpus: 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 1744 1745
1746 1747 1748 1749 1750 1751 1752 1753 1754 1755 1756 1757 1758 1759
node 45 size: 59461 MB
node 45 free: 59347 MB
node 46 cpus: 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 1760 1761
1762 1763 1764 1765 1766 1767 1768 1769 1770 1771 1772 1773 1774 1775
node 46 size: 59461 MB
node 46 free: 59347 MB
node 47 cpus: 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 1776 1777
1778 1779 1780 1781 1782 1783 1784 1785 1786 1787 1788 1789 1790 1791
node 47 size: 59461 MB
node 47 free: 59348 MB
node 48 cpus: 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 1792 1793
1794 1795 1796 1797 1798 1799 1800 1801 1802 1803 1804 1805 1806 1807
node 48 size: 45097 MB
node 48 free: 44980 MB
node 49 cpus: 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 1808 1809
1810 1811 1812 1813 1814 1815 1816 1817 1818 1819 1820 1821 1822 1823
```

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Platform Notes (Continued)

```
node 49 size: 59461 MB
node 49 free: 59344 MB
node 50 cpus: 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 1824 1825
1826 1827 1828 1829 1830 1831 1832 1833 1834 1835 1836 1837 1838 1839
node 50 size: 59461 MB
node 50 free: 59344 MB
node 51 cpus: 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 1840 1841
1842 1843 1844 1845 1846 1847 1848 1849 1850 1851 1852 1853 1854 1855
node 51 size: 59461 MB
node 51 free: 59347 MB
node 52 cpus: 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 1856 1857
1858 1859 1860 1861 1862 1863 1864 1865 1866 1867 1868 1869 1870 1871
node 52 size: 59461 MB
node 52 free: 59350 MB
node 53 cpus: 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 1872 1873
1874 1875 1876 1877 1878 1879 1880 1881 1882 1883 1884 1885 1886 1887
node 53 size: 59461 MB
node 53 free: 59349 MB
node 54 cpus: 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 1888 1889
1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903
node 54 size: 59461 MB
node 54 free: 59349 MB
node 55 cpus: 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 1904 1905
1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919
node 55 size: 59461 MB
node 55 free: 59350 MB
node 56 cpus: 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 1920 1921
1922 1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935
node 56 size: 45097 MB
node 56 free: 44949 MB
node 57 cpus: 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 1936 1937
1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951
node 57 size: 59461 MB
node 57 free: 59350 MB
node 58 cpus: 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 1952 1953
1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967
node 58 size: 59461 MB
node 58 free: 59350 MB
node 59 cpus: 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 1968 1969
1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983
node 59 size: 59461 MB
node 59 free: 59349 MB
node 60 cpus: 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 1984 1985
1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
node 60 size: 59461 MB
node 60 free: 59350 MB
node 61 cpus: 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 2000 2001
```

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Platform Notes (Continued)

```
2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
node 61 size: 59461 MB
node 61 free: 59351 MB
node 62 cpus: 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007
2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031
node 62 size: 59209 MB
node 62 free: 59098 MB
node 63 cpus: 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021
1022 1023 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046
2047
node 63 size: 58940 MB
node 63 free: 58829 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  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
  0:  10  12  12  12  32  32  32  32 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254
  1:  12  10  12  12  32  32  32  32 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254
  2:  12  12  10  12  32  32  32  32 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254
  3:  12  12  12  10  32  32  32  32 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254
  4:  32  32  32  32  10  12  12  12 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254
  5:  32  32  32  32  12  10  12  12 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254
  6:  32  32  32  32  12  12  10  12 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254
  7:  32  32  32  32  12  12  12  10 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254 254
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Platform Notes (Continued)

```
      254  254  254  254  254  254  254  254  254  254  254  254
      8:  254  254  254  254  254  254  254  254  10  12  12  12  32  32  32  32  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
      9:  254  254  254  254  254  254  254  254  12  10  12  12  32  32  32  32  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
     10:  254  254  254  254  254  254  254  254  12  12  10  12  32  32  32  32  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254
     11:  254  254  254  254  254  254  254  254  12  12  12  10  32  32  32  32  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254
     12:  254  254  254  254  254  254  254  254  32  32  32  32  10  12  12  12  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254
     13:  254  254  254  254  254  254  254  254  32  32  32  32  12  10  12  12  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254
     14:  254  254  254  254  254  254  254  254  32  32  32  32  12  12  10  12  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254
     15:  254  254  254  254  254  254  254  254  32  32  32  32  12  12  12  10  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254
     16:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     10  12  12  12  32  32  32  32  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254
     17:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     12  10  12  12  32  32  32  32  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254
     18:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     12  12  10  12  32  32  32  32  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     254  254  254  254  254  254  254  254  254  254  254  254
     19:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
     12  12  12  10  32  32  32  32  254  254  254  254  254  254  254  254  254  254  254
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Platform Notes (Continued)

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      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
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      20:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      32  32  32  32  10  12  12  12  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
      21:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      32  32  32  32  12  10  12  12  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
      22:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      32  32  32  32  12  12  10  12  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
      23:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      32  32  32  32  12  12  12  10  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
      24:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  10  12  12  12  32  32  32  32  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
      25:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  12  10  12  12  32  32  32  32  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
      26:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  12  12  10  12  32  32  32  32  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
      27:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  12  12  12  10  32  32  32  32  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
      28:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  32  32  32  32  10  12  12  12  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
      29:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  32  32  32  32  12  10  12  12  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
      30:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  32  32  32  32  12  12  10  12  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
      254  254  254  254  254  254  254  254  254  254  254  254
      31:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
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Platform Notes (Continued)

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254  254  254  254  254  254  254  254  32  32  32  32  12  12  12  10  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
32:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  10  12
 12  12  32  32  32  32  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
33:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  12  10
 12  12  32  32  32  32  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
34:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  12  12
 10  12  32  32  32  32  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
35:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  12  12
 12  10  32  32  32  32  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
36:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  32  32
 32  32  10  12  12  12  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
37:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  32  32
 32  32  12  10  12  12  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
38:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  32  32
 32  32  12  12  10  12  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
39:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  32  32
 32  32  12  12  12  10  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
40:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  10  12  12  12  32  32  32  32  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
41:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  12  10  12  12  32  32  32  32  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
42:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  12  12  10  12  32  32  32  32  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
```

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Platform Notes (Continued)

```
43:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  12  12  12  10  32  32  32  32  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
44:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  32  32  32  32  10  12  12  12  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
45:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  32  32  32  32  12  10  12  12  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
46:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  32  32  32  32  12  12  10  12  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
47:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  32  32  32  32  12  12  12  10  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254
48:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  10  12  12
12  32  32  32  32  254  254  254  254  254  254  254  254
49:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  12  10  12
12  32  32  32  32  254  254  254  254  254  254  254  254
50:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  12  12  10
12  32  32  32  32  254  254  254  254  254  254  254  254
51:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  12  12  12
10  32  32  32  32  254  254  254  254  254  254  254  254
52:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  32  32  32
32  10  12  12  12  254  254  254  254  254  254  254  254
53:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  32  32  32
32  12  10  12  12  254  254  254  254  254  254  254  254
54:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  32  32  32
```

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Platform Notes (Continued)

```
    32  12  12  10  12  254  254  254  254  254  254  254  254
    55:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  32  32  32
    32  12  12  12  10  254  254  254  254  254  254  254  254
    56:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  10  12  12  12  32  32  32  32
    57:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  12  10  12  12  32  32  32  32
    58:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  12  12  10  12  32  32  32  32
    59:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  12  12  12  10  32  32  32  32
    60:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  32  32  32  32  10  12  12  12
    61:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  32  32  32  32  12  10  12  12
    62:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  32  32  32  32  12  12  10  12
    63:  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254  254
    254  254  254  254  254  254  32  32  32  32  12  12  12  10

  From /proc/meminfo
     MemTotal:       3777981928 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  From /etc/*release* /etc/*version*
     os-release:
        NAME="SLES"
        VERSION="15-SP1"
```

(Continued on next page)

Platform Notes (Continued)

```
      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 13d 4.12.14-197.21.1.vSMP.2-default #1 SMP Mon Oct 7 08:41:58 EDT 2019 (8ef2efd)
   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: usercopy/swapgs barriers and __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 6 03:16

SPEC is set to: /dev/shm
   Filesystem     Type   Size  Used Avail Use% Mounted on
   ramfs          ramfs     0     0     0    - /dev/shm

From /sys/devices/virtual/dmi/id
    BIOS:    ScaleMP 9.5.195.12 11/26/2019
    Vendor:  ScaleMP
    Product: vSMP Foundation
    Serial:  1122334

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:
    4x Micron Technology 36ASF4G72PZ-2G6D1 32 kB 2 rank 2667
    28x Micron Technology 36ASF4G72PZ-2G6E1 32 kB 2 rank 2667
    96x SK Hynix HMA84GR7AFR4N-VK 32 kB 2 rank 2667

(End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
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: /mnt/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------

==============================================================================
C++             | 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
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: /mnt/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------

==============================================================================
C++, C          | 511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
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: /mnt/aocc-compiler-2.0.0/bin
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: /mnt/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base)
------------------------------------------------------------------------------
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: /mnt/aocc-compiler-2.0.0/bin
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
```

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Compiler Version Notes (Continued)

```
InstalledDir: /mnt/aocc-compiler-2.0.0/bin
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: /mnt/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------

==============================================================================
Fortran         | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------
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: /mnt/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------

==============================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------------
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: /mnt/aocc-compiler-2.0.0/bin
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: /mnt/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`clang`

C++ benchmarks:
`clang++`

Fortran benchmarks:
`flang`

Benchmarks using both Fortran and C:
`flang clang`

(Continued on next page)

Base Compiler Invocation (Continued)

Benchmarks using both C and C++:
clang++ clang

Benchmarks using Fortran, C, and C++:
clang++ clang flang

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
526.blender_r: -funsigned-char -D__BOOL_DEFINED -DSPEC_LP64
527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_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
-fremap-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:
-std=c++98 -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

(Continued on next page)

Base Optimization Flags (Continued)

C++ benchmarks (continued):
-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

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 -O3 -march=znver2
-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang

Benchmarks using both Fortran and C:
-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
-fremap-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 -funroll-loops -Mrecursive -z muldefs
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang

Benchmarks using both C and C++:
-std=c++98 -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
-fstruct-layout=3 -mllvm -unroll-threshold=50 -fremap-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 -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch -z muldefs
-lmvec -lamdlibm -ljemalloc -lflang

Benchmarks using Fortran, C, and C++:
-std=c++98 -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
-fstruct-layout=3 -mllvm -unroll-threshold=50 -fremap-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

(Continued on next page)

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch
-funroll-loops -Mrecursive -z muldefs -Kieee -fno-finite-math-only
-lmvec -lamdlibm -ljemalloc -lflang

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/aocc200-flags-B1.html
http://www.spec.org/cpu2017/flags/ScaleMP-Supermicro-Platform-Settings-V1.2-Rome-revA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/aocc200-flags-B1.xml
http://www.spec.org/cpu2017/flags/ScaleMP-Supermicro-Platform-Settings-V1.2-Rome-revA.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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