# SPEC® OMPG2012 Result



## Lenovo Global Technology

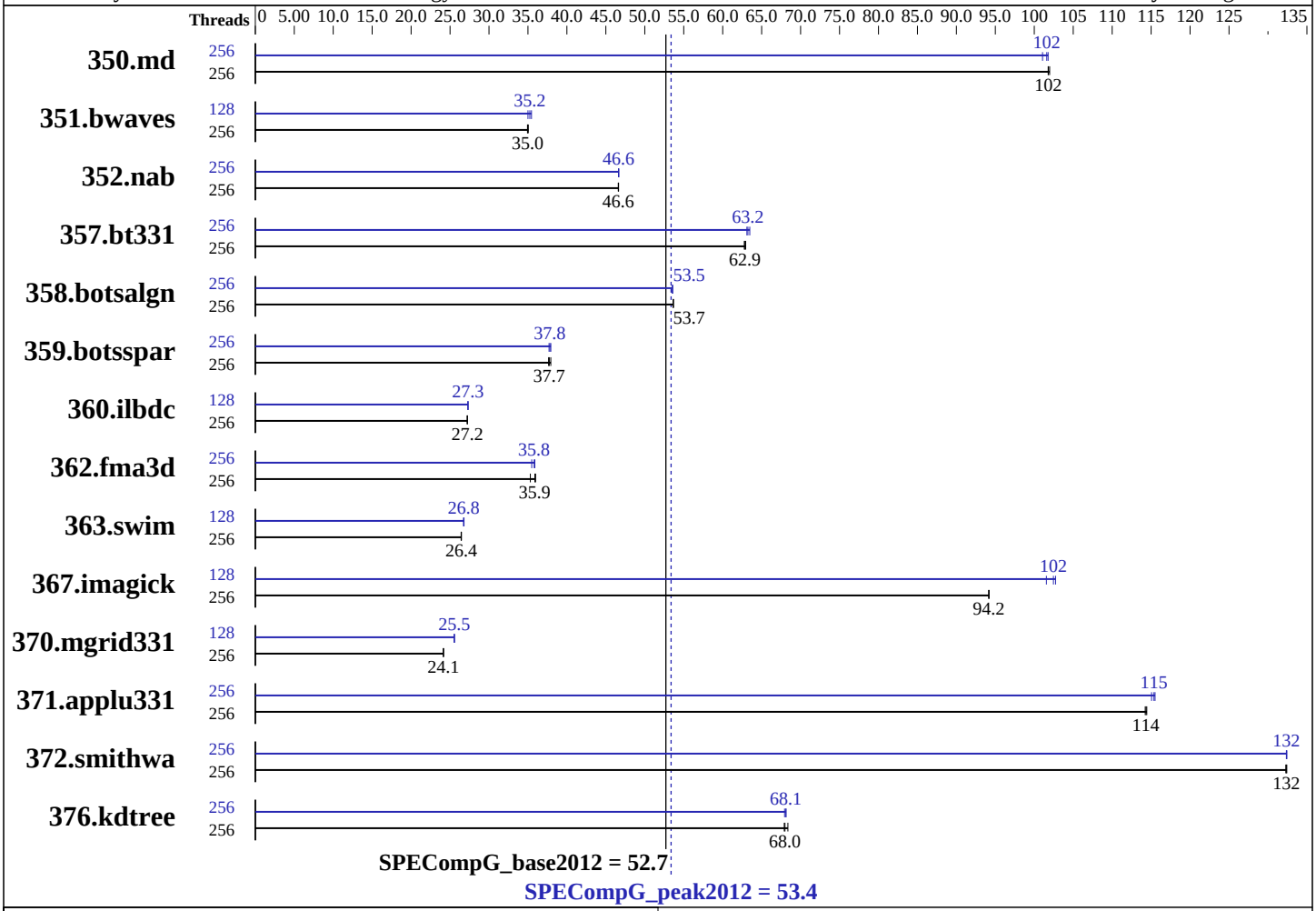
ThinkSystem SR655V3(AMD EPYC 9754, 2.25GHz)

SPECompG_peak2012 = 53.4

SPECompG_base2012 = 52.7

**OMP2012 license:**28
**Test sponsor:** Lenovo Global Technology
**Tested by:** Lenovo Global Technology

**Test date:** May-2023
**Hardware Availability:** Aug-2023
**Software Availability:** Aug-2023




## Hardware

| | |
|---|---|
| CPU Name: | AMD EPYC 9754 |
| CPU Characteristics: | Max Boost Clock up to 3.1 GHz |
| CPU MHz: | 2250 |
| CPU MHz Maximum: | 3100 |
| FPU: | Integrated |
| CPU(s) enabled: | 128 cores, 1 chip, 128 cores/chip, 2 threads/core |
| CPU(s) orderable: | 1 chip |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 1 MB I+D on chip per core |
| L3 Cache: | 256 MB I+D on chip per chip, 32 MB shared 8 cores |
| Other Cache: | None |
| Memory: | 768 GB ( 12 x 64 GB 2Rx4 PC5-4800B-R) |
| Disk Subsystem: | 1 x 1 TB SATA Hard Drive |
| Other Hardware: | None |
| Base Threads Run: | 256 |
| Minimum Peak Threads: | 128 |

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## Software

| | |
|---|---|
| Operating System: | SUSE Linux Enterprise for High-Performance Computing 15 SP4 (x86_64), Kernel 5.14.21-150400.22-default |
| Compiler: | C/C++/Fortran: Version 2022.2.0.191 of Intel oneAPI oneAPI DPC/C++ |
| Auto Parallel: | No |
| File System: | xfs |
| System State: | Multi-user, run level 3 |
| Base Pointers: | 64-bit |
| Peak Pointers: | 64-bit |
| Other Software: | None |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 350.md | 256 | **45.5** | **102** | 45.4 | 102 | 45.5 | 102 | 256 | **45.6** | **102** | 45.8 | 101 | 45.5 | 102 |
| 351.bwaves | 256 | **130** | **35.0** | 130 | 34.9 | 129 | 35.0 | 128 | **129** | **35.2** | 128 | 35.5 | 129 | 35.0 |
| 352.nab | 256 | 83.4 | 46.6 | **83.5** | **46.6** | 83.5 | 46.6 | 256 | **83.4** | **46.6** | 83.4 | 46.6 | 83.4 | 46.7 |
| 357.bt331 | 256 | 75.3 | 62.9 | **75.4** | **62.9** | 75.5 | 62.8 | 256 | 74.7 | 63.5 | 75.1 | 63.1 | **75.0** | **63.2** |
| 358.botsalgn | 256 | 81.1 | 53.7 | 81.1 | 53.6 | **81.1** | **53.7** | 256 | **81.2** | **53.5** | 81.2 | 53.6 | 81.2 | 53.5 |
| 359.botsspar | 256 | 138 | 37.9 | 139 | 37.6 | **139** | **37.7** | 256 | 139 | 37.7 | 138 | 37.9 | **139** | **37.8** |
| 360.ilbdc | 256 | **131** | **27.2** | 131 | 27.2 | 131 | 27.2 | 128 | 130 | 27.3 | 130 | 27.3 | **130** | **27.3** |
| 362.fma3d | 256 | 106 | 36.0 | **106** | **35.9** | 108 | 35.3 | 256 | **106** | **35.8** | 106 | 35.9 | 107 | 35.5 |
| 363.swim | 256 | 171 | 26.4 | 171 | 26.5 | **171** | **26.4** | 128 | **169** | **26.8** | 169 | 26.7 | 169 | 26.8 |
| 367.imagick | 256 | 74.6 | 94.2 | **74.6** | **94.2** | 74.7 | 94.2 | 128 | **68.6** | **102** | 69.2 | 102 | 68.4 | 103 |
| 370.mgrid331 | 256 | **183** | **24.1** | 183 | 24.1 | 183 | 24.2 | 128 | **173** | **25.5** | 173 | 25.5 | 173 | 25.6 |
| 371.applu331 | 256 | 53.0 | 114 | 53.0 | 114 | **53.0** | **114** | 256 | **52.5** | **115** | 52.7 | 115 | 52.5 | 116 |
| 372.smithwa | 256 | 40.5 | 132 | **40.5** | **132** | 40.5 | 132 | 256 | 40.5 | 132 | 40.5 | 132 | **40.5** | **132** |
| 376.kdtree | 256 | 65.8 | 68.4 | **66.2** | **68.0** | 66.3 | 67.9 | 256 | 66.2 | 67.9 | **66.1** | **68.1** | 66.1 | 68.1 |

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

## Platform Notes

```
Sysinfo program /home/omp2012/Docs/sysinfo
Revision 563 of 2016-06-10 (097295389cf6073d8c3b03fa376740a5)
running on bergamoA21P Tue May 16 11:01:37 2023

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
  http://www.spec.org/omp2012/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : AMD EPYC 9754 128-Core Processor
      1 "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 : 128
      siblings  : 256
      physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 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 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83
      84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105
      106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123
      124 125 126 127
```

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## Platform Notes (Continued)

```
      cache size : 1024 KB

   From /proc/meminfo
      MemTotal:       792101276 kB
      HugePages_Total:       0
      Hugepagesize:       2048 kB

   From /etc/*release* /etc/*version*
      os-release:
         NAME="SLE_HPC"
         VERSION="15-SP4"
         VERSION_ID="15.4"
         PRETTY_NAME="SUSE Linux Enterprise High Performance Computing 15 SP4"
         ID="sle_hpc"
         ID_LIKE="suse"
         ANSI_COLOR="0;32"
         CPE_NAME="cpe:/o:suse:sle_hpc:15:sp4"

   uname -a:
      Linux bergamoA21P 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11
      06:57:18 UTC 2022 (49db222) x86_64 x86_64 x86_64 GNU/Linux

   run-level 3 May 16 00:45

   SPEC is set to: /home/omp2012
      Filesystem     Type  Size  Used Avail Use% Mounted on
      /dev/sda3      xfs   413G  325G   89G  79% /var/tmp
   Additional information from dmidecode:

      Warning: Use caution when you interpret this section. The 'dmidecode' program
      reads system data which is "intended to allow hardware to be accurately
      determined", but the intent may not be met, as there are frequent changes to
      hardware, firmware, and the "DMTF SMBIOS" standard.

     BIOS Lenovo KAE111I-2.10 05/06/2023
     Memory:
      12x Samsung M321R8GA0BB0-CQKEG 64 GB 2 rank 4800 MT/s

   (End of data from sysinfo program)
```

## General Notes

```
 ------------------------------------------------------------------------
  General OMP Library Settings
    OMP_DYNAMIC  = FALSE
    OMP_THREADS  = 256
    KMP_SCHEDULE = static
    KMP_LIBRARY  = turnaround
    KMP_STACKSIZE = 768M
    KMP_BLOCKTIME = infinite
    KMP_AFFINITY = granularity=fine,proclist=[0-7,8-15,16-23,24-31,32-39,
```

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## General Notes (Continued)

```
    40-47,48-55,56-63,64-71,72-79,80-87,88-95,96-103,104-111,112-119,120-127,
    128-135,136-143,144-151,152-159,160-167,168-175,176-183,184-191,192-199,
    200-207,208-215,216-223,224-231,232-239,240-247,248-255],explicit
================================================================================
 uEFI Setting notes:
  Choose "Maximum Performance" operating mode and changed to "Custom" operating mode.
  Below items also configured:
    -
    - NUMA Nodes per Socket = NPS2
    - CPPC  = Disabled
    - DRAM Scrub Time = Disabled
    -
    -
    -

==========================================
 Yes: The test sponsor attests, as of date of publication, the CVE-2017-5754 (Meltdown)
 is mitigated in the system as tested and documented.

 Yes: The test sponsor attests, as of date of publication, the 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-2017-5754 (Spectre variant 2)
 is mitigated in the system as tested and documented.
==========================================
 OS tunning:
 ulimit -s unlimited
```

## Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

## Base Portability Flags

350.md: -FR
357.bt331: -mcmodel=medium
363.swim: -mcmodel=medium
367.imagick: -std=c99

## Base Optimization Flags

C benchmarks:
```
-Ofast -fopenmp -march=core-avx2 -fma -ipo  -ansi-alias
-fp-model fast=2 -qno-opt-multiple-gather-scatter-by-shuffles
-qopt-zmm-usage=high -ffast-math -fstrict-enums
-fstrict-vtable-pointers -fvirtual-function-elimination
```

C++ benchmarks:
```
-Ofast -fopenmp -march=core-avx2 -fma -ipo  -ansi-alias
-fp-model fast=2 -qno-opt-multiple-gather-scatter-by-shuffles
-qopt-zmm-usage=high -ffast-math -fstrict-enums
-fstrict-vtable-pointers
```

Fortran benchmarks:
```
-Ofast -fopenmp -march=core-avx2 -fma -ipo  -ansi-alias
-fp-model fast=2 -qno-opt-multiple-gather-scatter-by-shuffles
-qopt-zmm-usage=high -align array128byte -ffinite-math-only
-fno-omit-frame-pointer -m64 -ipo1 -foptimize-sibling-calls -vec
```

## Peak Compiler Invocation

C benchmarks:
```
icx
```

C++ benchmarks:
```
icpx
```

Fortran benchmarks:
```
ifx
```

## Peak Portability Flags

350.md: `-FR`
357.bt331: `-mcmodel=medium`
363.swim: `-mcmodel=medium`
367.imagick: `-std=c99`

## Peak Optimization Flags

C benchmarks:
```
-Ofast -fopenmp -march=core-avx2 -fma -ipo  -ansi-alias
-fp-model fast=2 -qno-opt-multiple-gather-scatter-by-shuffles
-qopt-zmm-usage=high -ffast-math -fstrict-enums
-fstrict-vtable-pointers -fvirtual-function-elimination
```

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## Peak Optimization Flags (Continued)

C++ benchmarks:
```
-Ofast -fopenmp -march=core-avx2 -fma -ipo  -ansi-alias
-fp-model fast=2 -qno-opt-multiple-gather-scatter-by-shuffles
-qopt-zmm-usage=high -ffast-math -fstrict-enums
-fstrict-vtable-pointers
```

Fortran benchmarks:
```
-Ofast -fopenmp -march=core-avx2 -fma -ipo  -ansi-alias
-fp-model fast=2 -qno-opt-multiple-gather-scatter-by-shuffles
-qopt-zmm-usage=high -align array128byte -ffinite-math-only
-fno-omit-frame-pointer -m64 -ipo1 -foptimize-sibling-calls -vec
```

The flags file that was used to format this result can be browsed at
http://www.spec.org/omp2012/flags/lenovo-omp2012-oneAPI.20230222.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/omp2012/flags/lenovo-omp2012-oneAPI.20230222.xml



For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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