SPEC® OMPG2012 Result

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Lenovo Global Technology

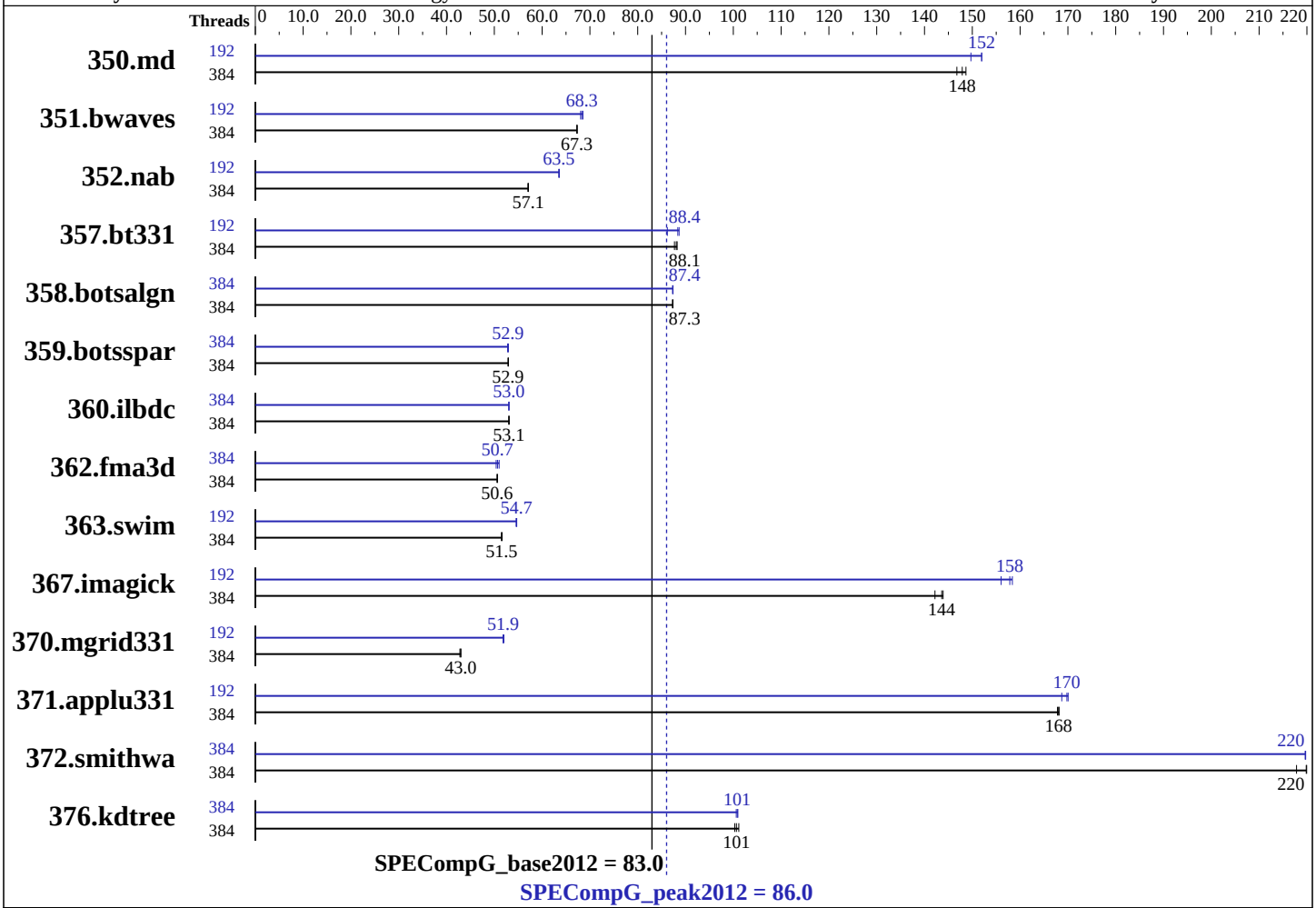
ThinkSystem SR665 V3 (AMD EPYC 9654)

SPECompG_peak2012 = 86.0

SPECompG_base2012 = 83.0

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

Test date: Oct-2022
Hardware Availability: Nov-2022
Software Availability: Nov-2022



Hardware

CPU Name:	AMD EPYC 9654
CPU Characteristics:	Max Boost Clock up to 3.7 GHz
CPU MHz:	2400
CPU MHz Maximum:	3700
FPU:	Integrated
CPU(s) enabled:	192 cores, 2 chips, 96 cores/chip, 2 threads/core
CPU(s) orderable:	1,2 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:	384 MB I+D on chip per chip, 32 MB shared / 8 cores
Other Cache:	None
Memory:	1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Disk Subsystem:	1 x 1 TB SATA Hard Drive
Other Hardware:	None
Base Threads Run:	384

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Software

Operating System:	Red Hat Enterprise Linux (x86_64) , Kernel 4.18.0-240.el8.x86_64
Compiler:	C/C++/Fortran: Version 2022.2.0.191 of Intel oneAPI DPC++/C++
Auto Parallel:	No
File System:	xfs
System State:	Multi-user, run level 3
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other Software:	None

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
350.md	384	31.1	149	**31.3**	**148**	31.5	147	192	30.9	150	30.5	152	**30.5**	**152**
351.bwaves	384	67.3	67.3	**67.3**	**67.3**	67.3	67.3	192	**66.3**	**68.3**	66.1	68.5	66.6	68.1
352.nab	384	68.2	57.0	68.1	57.1	**68.1**	**57.1**	192	**61.2**	**63.5**	61.3	63.5	61.2	63.6
357.bt331	384	54.1	87.7	**53.8**	**88.1**	53.7	88.3	192	**53.6**	**88.4**	53.5	88.7	55.0	86.2
358.botsalgn	384	49.8	87.3	**49.8**	**87.3**	49.8	87.3	384	**49.8**	**87.4**	49.8	87.3	49.8	87.4
359.botsspar	384	99.2	52.9	99.2	52.9	**99.2**	**52.9**	384	99.5	52.8	**99.3**	**52.9**	99.2	52.9
360.ilbdc	384	**67.1**	**53.1**	67.1	53.0	67.1	53.1	384	**67.1**	**53.0**	67.1	53.0	67.1	53.1
362.fma3d	384	**75.1**	**50.6**	75.0	50.7	75.1	50.6	384	**75.0**	**50.7**	74.5	51.0	75.4	50.4
363.swim	384	87.9	51.5	**87.9**	**51.5**	87.8	51.6	192	**82.9**	**54.7**	83.0	54.6	82.8	54.7
367.imagick	384	48.9	144	**49.0**	**144**	49.4	142	192	45.1	156	44.4	158	**44.5**	**158**
370.mgrid331	384	103	42.8	**103**	**43.0**	103	43.0	192	85.3	51.8	85.0	52.0	**85.2**	**51.9**
371.applu331	384	36.0	168	36.1	168	**36.1**	**168**	192	35.6	170	**35.7**	**170**	35.9	169
372.smithwa	384	**24.4**	**220**	24.4	220	24.6	218	384	24.4	220	24.4	220	**24.4**	**220**
376.kdtree	384	**44.7**	**101**	44.9	100	44.5	101	384	44.6	101	44.7	101	**44.6**	**101**

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 Genoa-OMP2012 Wed Oct 19 11:17:02 2022

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 9654 96-Core Processor
      2 "physical id"s (chips)
      384 "processors"
   cores, siblings (Caution: counting these is hw and system dependent.  The
   following excerpts from /proc/cpuinfo might not be reliable.  Use with
   caution.)
      cpu cores : 96
      siblings  : 192
      physical 0: cores 0 1 2 3 4 5 6 7 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 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
      physical 1: cores 0 1 2 3 4 5 6 7 10 11 12 13 14 15 16 17 18 19 20 21 22
```

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Platform Notes (Continued)

```
        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 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
     cache size : 1024 KB

  From /proc/meminfo
     MemTotal:       1584307428 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  From /etc/*release* /etc/*version*
     os-release:
        NAME="Red Hat Enterprise Linux"
        VERSION="8.6 (Ootpa)"
        ID="rhel"
        ID_LIKE="fedora"
        VERSION_ID="8.6"
        PLATFORM_ID="platform:el8"
        PRETTY_NAME="Red Hat Enterprise Linux 8.6 (Ootpa)"
        ANSI_COLOR="0;31"
     redhat-release: Red Hat Enterprise Linux release 8.6 (Ootpa)
     system-release: Red Hat Enterprise Linux release 8.6 (Ootpa)
     system-release-cpe: cpe:/o:redhat:enterprise_linux:8::baseos

  uname -a:
     Linux Genoa-OMP2012 4.18.0-372.9.1.el8.x86_64 #1 SMP Fri Apr 15 22:12:19 EDT
     2022 x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Oct 19 04:23

  SPEC is set to: /home/omp2012
     Filesystem            Type  Size  Used Avail Use% Mounted on
     /dev/mapper/rhel-home xfs   819G   70G  749G   9% /home
  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 KAE103A-1.10 09/26/2022
    Memory:
     4x SK Hynix HMCG94AEBQA109N 64 GB 2 rank 4800 MT/s
     10x SK Hynix HMCG94AEBRA102N 64 GB 2 rank 4800 MT/s
     2x SK Hynix HMCG94AEBRA109N 64 GB 2 rank 4800 MT/s
     8x SK Hynix HMCG94AEBRA123N 64 GB 2 rank 4800 MT/s

  (End of data from sysinfo program)
```

General Notes

```
==============================================
 General OMP Library Settings
 ENV_OMP_PROC_BIND    = close
 ENV_OMP_PLACES     = threads
 ENV_OMP_WAIT_POLICY    = PASSIVE
 ENV_OMP_MAX_ACTIVE_LEVELS  = 1
 ENV_OMP_THREADS     = 384
 ENV_OMP_STACKSIZE    = 256M
 ENV_OMP_SCHEDULE    = static
 ENV_OMP_DYNAMIC     = FALSE

==============================================
 BIOS Setting notes:
 -------------------
 Choose Operating Mode set to Maximum Performance and configured below settings:
 - CPPC set as Disable
 - ACPI SRAT L3 Cache as NUMA Domain set as Enabled
 - DRAM Scrub Time set as 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

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Base Portability Flags (Continued)

363.swim: `-mcmodel=medium`
367.imagick: `-std=c99`

Base Optimization Flags

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

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

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

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:

352.nab: -Ofast -fopenmp -march=core-avx2 -ipo -fma -ansi-alias
-fp-model fast=2 -qno-opt-multiple-gather-scatter-by-shuffles
-ffast-math -fstrict-enums -fstrict-vtable-pointers
-fvirtual-function-elimination -fno-signed-zeros

358.botsalgn: -Ofast -fopenmp -march=core-avx2 -ipo -fma -ansi-alias
-fp-model fast=2 -qno-opt-multiple-gather-scatter-by-shuffles
-ffast-math -fstrict-enums -fstrict-vtable-pointers
-fvirtual-function-elimination

359.botsspar: Same as 358.botsalgn

367.imagick: Same as 358.botsalgn

372.smithwa: Same as 358.botsalgn

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

Fortran benchmarks:

350.md: -Ofast -fopenmp -march=core-avx2 -ipo -fma -ansi-alias
-fp-model fast=2 -qno-opt-multiple-gather-scatter-by-shuffles
-align array128byte -ffinite-math-only
-fno-omit-frame-pointer -m64 -ipo1

351.bwaves: Same as 350.md

357.bt331: -Ofast -fopenmp -march=core-avx2 -ipo -fma -ansi-alias
-fp-model fast=2 -qno-opt-multiple-gather-scatter-by-shuffles
-align array128byte -ffinite-math-only
-fno-omit-frame-pointer -m64 -ipo1 -norecursive

360.ilbdc: Same as 350.md

362.fma3d: Same as 350.md

363.swim: Same as 350.md

370.mgrid331: Same as 350.md

371.applu331: Same as 350.md

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

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

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