SPEC® OMPG2012 Result

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Lenovo Global Technology

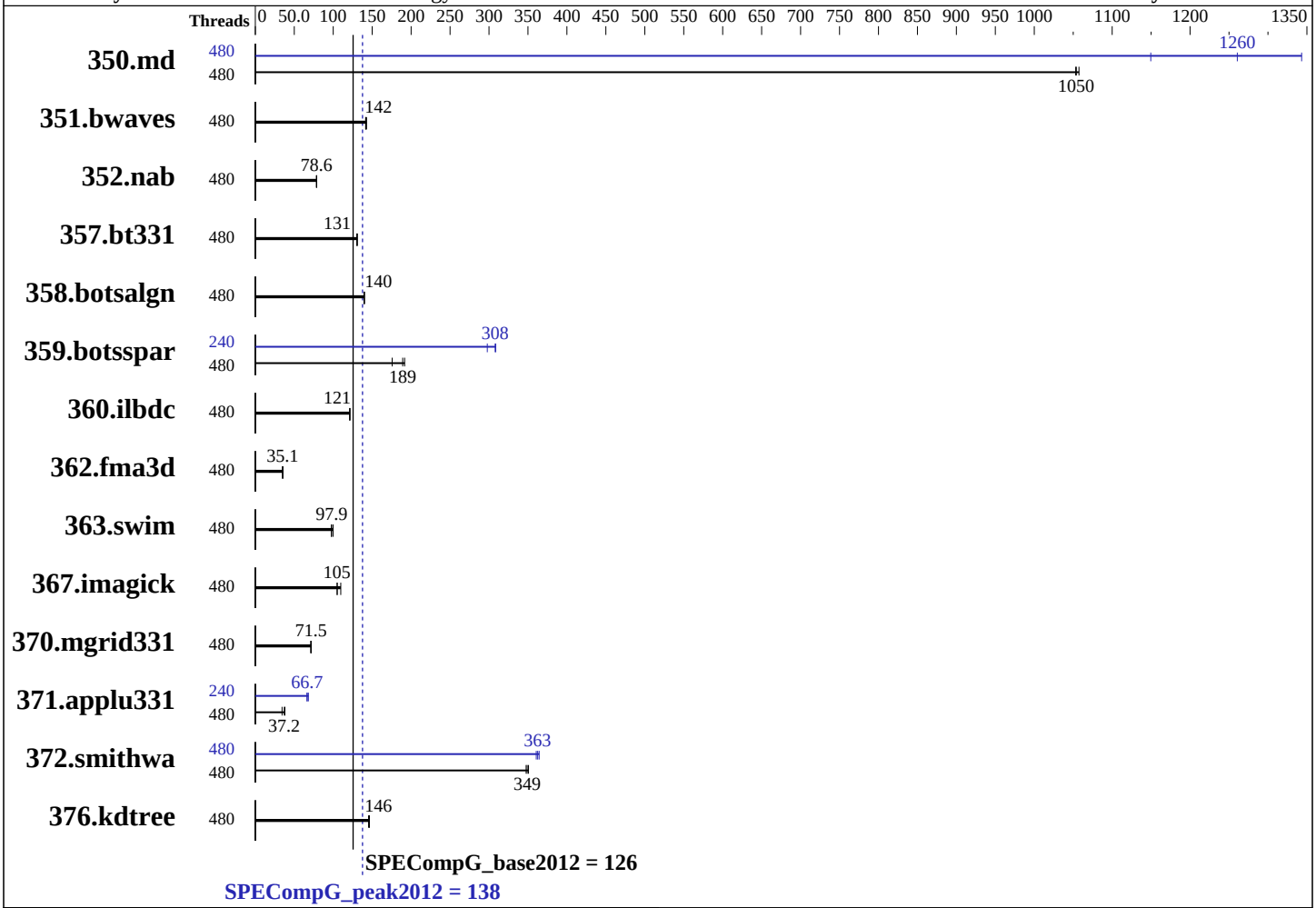
ThinkSystem SR950V3 (Intel Xeon Platinum 8490H, 1.90 GHz)

SPECompG_peak2012 = 138

SPECompG_base2012 = 126

OMP2012 license: 9017
Test sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test date: Aug-2024
Hardware Availability: Oct-2023
Software Availability: Jun-2024



Hardware

CPU Name:	Intel Xeon 8490H CPU @ 1.90GHz
CPU Characteristics:	Intel Turbo Boost Technology up to 3.50 GHz
CPU MHz:	1900
CPU MHz Maximum:	3500
FPU:	Integrated
CPU(s) enabled:	480 cores, 8 chips, 60 cores/chip
CPU(s) orderable:	2,4,8 chips
Primary Cache:	32 KB I + 48 KB D on chip per core
Secondary Cache:	2 MB I+D on chip per core
L3 Cache:	115200 KB I+D on chip per chip
Other Cache:	None
Memory:	4 TB (64 x 64 GB 2Rx4 PC4-4800V, ECC)
Disk Subsystem:	1 x 960GB M.2 NVME SSD
Other Hardware:	None
Base Threads Run:	480
Minimum Peak Threads:	240

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Software

Operating System:	Red Hat Enterprise Linux 9 (x86_64) ,Kernel 5.14.0-70.22.1.el9_0.x86_64
Compiler:	C/C++/Fortran: Version 2024.2.0.635 of Intel oneAPI DPC/C++
Auto Parallel:	No
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	64-bit
Other Software:	None

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Maximum Peak Threads: 480

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
350.md	480	4.38	1060	4.40	1050	**4.39**	**1050**	480	**3.67**	**1260**	3.45	1340	4.03	1150
351.bwaves	480	31.7	143	**31.9**	**142**	32.0	142	480	31.7	143	**31.9**	**142**	32.0	142
352.nab	480	49.5	78.5	49.4	78.8	**49.5**	**78.6**	480	49.5	78.5	49.4	78.8	**49.5**	**78.6**
357.bt331	480	36.2	131	36.4	130	**36.3**	**131**	480	36.2	131	36.4	130	**36.3**	**131**
358.botsalgn	480	31.2	140	31.0	140	**31.1**	**140**	480	31.2	140	31.0	140	**31.1**	**140**
359.botsspar	480	27.4	192	29.9	176	**27.7**	**189**	240	17.6	298	17.0	309	**17.1**	**308**
360.ilbdc	480	29.4	121	**29.4**	**121**	29.3	121	480	29.4	121	**29.4**	**121**	29.3	121
362.fma3d	480	**108**	**35.1**	109	35.0	108	35.3	480	**108**	**35.1**	109	35.0	108	35.3
363.swim	480	**46.3**	**97.9**	45.3	99.9	46.4	97.5	480	**46.3**	**97.9**	45.3	99.9	46.4	97.5
367.imagick	480	66.9	105	64.1	110	**66.9**	**105**	480	66.9	105	64.1	110	**66.9**	**105**
370.mgrid331	480	61.7	71.6	**61.8**	**71.5**	62.1	71.2	480	61.7	71.6	**61.8**	**71.5**	62.1	71.2
371.applu331	480	160	38.0	177	34.3	**163**	**37.2**	240	**90.9**	**66.7**	91.4	66.3	89.0	68.1
372.smithwa	480	15.3	351	**15.4**	**349**	15.4	348	480	14.7	364	14.9	361	**14.8**	**363**
376.kdtree	480	30.7	146	31.0	145	**30.8**	**146**	480	30.7	146	31.0	145	**30.8**	**146**

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 BLR Sun Aug  4 03:00:47 2024

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 : Intel(R) Xeon(R) Platinum 8490H
      8 "physical id"s (chips)
      480 "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 : 60
      siblings  : 60
      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
      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
```

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Platform Notes (Continued)

```
        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
        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
        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
        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
        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
        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
     cache size : 115200 KB

  From /proc/meminfo
     MemTotal:       4226678004 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  From /etc/*release* /etc/*version*
     os-release:
        NAME="Red Hat Enterprise Linux"
        VERSION="9.0 (Plow)"
        ID="rhel"
        ID_LIKE="fedora"
        VERSION_ID="9.0"
        PLATFORM_ID="platform:el9"
        PRETTY_NAME="Red Hat Enterprise Linux 9.0 (Plow)"
        ANSI_COLOR="0;31"
     redhat-release: Red Hat Enterprise Linux release 9.0 (Plow)
     system-release: Red Hat Enterprise Linux release 9.0 (Plow)
     system-release-cpe: cpe:/o:redhat:enterprise_linux:9::baseos

  uname -a:
     Linux BLR 5.14.0-70.22.1.el9_0.x86_64 #1 SMP PREEMPT Tue Aug 2 10:02:12 EDT
     2022 x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Aug 4 01:30

  SPEC is set to: /home/omp2012
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/nvme0n1p5 xfs   435G   79G  357G  18% /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
```

Continued on next page

Platform Notes (Continued)

```
     determined", but the intent may not be met, as there are frequent changes to
     hardware, firmware, and the "DMTF SMBIOS" standard.

    BIOS Lenovo EBE105F-2.10 01/31/2024
    Memory:
     18x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800 MT/s
     8x Samsung M321R8GA0BB0-CQKEG 64 GB 2 rank 4800 MT/s
     6x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800 MT/s
     32x Samsung M321R8GA0BB0-CQKZH 64 GB 2 rank 4800 MT/s

  (End of data from sysinfo program)
```

General Notes

```
 ------------------------------------------------------------------------
  General OMP Library Settings
    KMP_AFFINITY  = granularity=tile, proclist=[0-59,60-119,120-179,
      180-239,240-299,300-359,360-419,420-479],explicit
    KMP_LIBRARY  = turnaround
    KMP_BLOCKTIME = infinite
    KMP_SCHEDULE  = static,16
    KMP_DETERMINISTIC_REDUCTION= 1
    OMP_STACKSIZE  = 480M
    OMP_MAXACTIVE_LEVELS= 1
    OMP_NUM_THREADS = 480
    OMP_DYNAMIC  = FALSE
    OMP_PROC_BIND = close
    OMP_PLACES  = sockets
    OMP_DISPLAY  = verbose
 ------------------------------------------------------------------------
  BIOS Setting notes:
  Choose Operating Mode set to Maximum Performance, and change to Custom Mode.
  Below items also configured:
      Hyper-Threading  = Disabled
      Page Policy   = Adaptive
      Patrol Scrub   = Disabled
      Memory Data Scrambling = Disabled
      LLC Prefetch   = 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:
-Wno-implicit-function-declaration -O3 -qopenmp -xSAPPHIRERAPIDS -ipo -foptimize-sibling-calls -ffast-math -ljemalloc

C++ benchmarks:
-O3 -qopenmp -xSAPPHIRERAPIDS -ipo -foptimize-sibling-calls -ffast-math -ljemalloc

Fortran benchmarks:
-O3 -qopenmp -xSAPPHIRERAPIDS -ipo -foptimize-sibling-calls -align array128byte -fno-alias

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: `basepeak = yes`

358.botsalgn: `basepeak = yes`

359.botsspar: `-Wno-implicit-function-declaration -O3 -qopenmp -xSAPPHIRERAPIDS -ipo -foptimize-sibling-calls -qopt-zmm-usage=high -mprefer-vector-width=512 -ffast-math`

367.imagick: `basepeak = yes`

372.smithwa: `-Wno-implicit-function-declaration -O3 -qopenmp -xSAPPHIRERAPIDS -ipo -foptimize-sibling-calls -mprefer-vector-width=512 -ffast-math`

C++ benchmarks:

376.kdtree: `basepeak = yes`

Fortran benchmarks:

350.md: `-O3 -qopenmp -xSAPPHIRERAPIDS -ipo -foptimize-sibling-calls -mprefer-vector-width=512 -align array128byte -fno-alias`

351.bwaves: `basepeak = yes`

357.bt331: `basepeak = yes`

360.ilbdc: `basepeak = yes`

362.fma3d: `basepeak = yes`

363.swim: `basepeak = yes`

370.mgrid331: `basepeak = yes`

371.applu331: `-O3 -qopenmp -xSAPPHIRERAPIDS -ipo -foptimize-sibling-calls -qopt-zmm-usage=high -shared-intel -align array128byte -fno-alias`

The flags file that was used to format this result can be browsed at
http://www.spec.org/omp2012/flags/lenovo-omp2012-oneAPI.20240829.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/omp2012/flags/lenovo-omp2012-oneAPI.20240829.xml

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