SPEC® CINT2006 Result

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Lenovo Global Technology

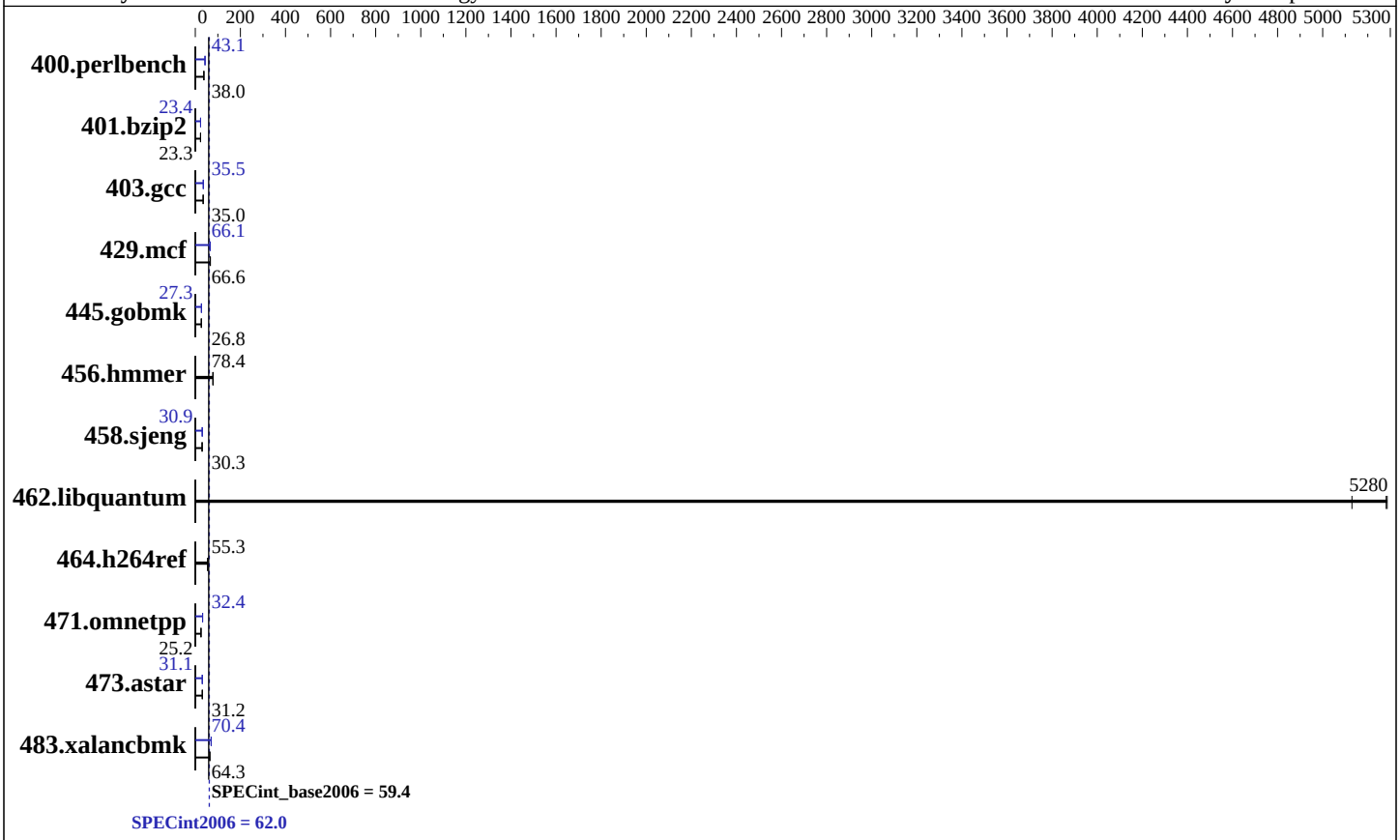
ThinkSystem SN550
(2.20 GHz, Intel Xeon Silver 4114)

SPECint®2006 = 62.0

SPECint_base2006 = 59.4

CPU2006 license: 9017
Test sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test date: Jul-2017
Hardware Availability: Aug-2017
Software Availability: Apr-2017



Hardware

CPU Name:	Intel Xeon Silver 4114
CPU Characteristics:	Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	20 cores, 2 chips, 10 cores/chip
CPU(s) orderable:	1,2 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core
L3 Cache:	13.75 MB I+D on chip per chip
Other Cache:	None
Memory:	768 GB (24 x 32 GB 2Rx4 PC4-2666V-R, running at 2400 MHz)
Disk Subsystem:	1 x 480 GB SATA SSD
Other Hardware:	None

Software

Operating System:	Red Hat Enterprise Linux Server release 7.3 (Maipo) Kernel 3.10.0-514.el7.x86_64
Compiler:	C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux
Auto Parallel:	Yes
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	Microquill SmartHeap V10.2

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Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	256	38.1	257	38.0	**257**	**38.0**	226	43.2	**227**	**43.1**	227	43.1
401.bzip2	415	23.3	414	23.3	**414**	**23.3**	412	23.4	**412**	**23.4**	412	23.4
403.gcc	229	35.1	**230**	**35.0**	230	35.0	226	35.6	227	35.5	**227**	**35.5**
429.mcf	**137**	**66.6**	136	67.0	137	66.3	**138**	**66.1**	141	64.6	137	66.6
445.gobmk	391	26.8	**391**	**26.8**	391	26.8	**385**	**27.3**	385	27.3	384	27.3
456.hmmer	119	78.4	119	78.5	**119**	**78.4**	119	78.4	119	78.5	**119**	**78.4**
458.sjeng	399	30.3	**399**	**30.3**	399	30.3	**392**	**30.9**	392	30.8	392	30.9
462.libquantum	3.92	5290	**3.92**	**5280**	4.04	5130	3.92	5290	**3.92**	**5280**	4.04	5130
464.h264ref	**400**	**55.3**	400	55.3	401	55.2	**400**	**55.3**	400	55.3	401	55.2
471.omnetpp	**248**	**25.2**	247	25.3	248	25.2	192	32.5	**193**	**32.4**	193	32.4
473.astar	226	31.1	225	31.2	**225**	**31.2**	**226**	**31.1**	226	31.0	225	31.1
483.xalancbmk	107	64.3	107	64.2	**107**	**64.3**	**98.0**	**70.4**	97.5	70.8	98.2	70.3

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

Submit Notes

```
The config file option 'submit' was used.
```

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
```

Platform Notes

```
BIOS configuration:
 Choose Operating Mode set to Maximum Performance
 Hyper-Threading set to Disable
 LLC dead line alloc set to Disable
Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on SN550 Mon Jul 24 10:29:21 2017

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/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) Silver 4114 CPU @ 2.20GHz
      2 "physical id"s (chips)
      20 "processors"
   cores, siblings (Caution: counting these is hw and system dependent.  The
   following excerpts from /proc/cpuinfo might not be reliable.  Use with
   caution.)
```

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Platform Notes (Continued)

```
        cpu cores : 10
        siblings  : 10
        physical 0: cores 0 1 2 3 4 8 9 10 11 12
        physical 1: cores 0 1 2 3 4 8 9 10 11 12
     cache size : 14080 KB

  From /proc/meminfo
     MemTotal:       792248484 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  From /etc/*release* /etc/*version*
     os-release:
        NAME="Red Hat Enterprise Linux Server"
        VERSION="7.3 (Maipo)"
        ID="rhel"
        ID_LIKE="fedora"
        VERSION_ID="7.3"
        PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
        ANSI_COLOR="0;31"
        CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
     redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
     system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
     system-release-cpe: cpe:/o:redhat:enterprise_linux:7.3:ga:server

  uname -a:
     Linux SN550 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13 EDT 2016 x86_64
     x86_64 x86_64 GNU/Linux

  run-level 3 Jul 24 10:28

  SPEC is set to: /home/cpu2006-1.2-ic17.0u3
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/sda4      xfs   389G  5.4G  384G   2% /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 -[IVE109A-1.00]- 04/27/2017
    Memory:
     24x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666 MHz, configured at 2400 MHz

  (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,0,3"
LD_LIBRARY_PATH = "/home/cpu2006-1.2-ic17.0u3/lib/ia32:/home/cpu2006-1.2-ic17.0u3/lib/intel64:/home/cpu2006-1.2-ic17.0u3/sh10.2"
OMP_NUM_THREADS = "20"

 Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.2
 Transparent Huge Pages enabled by default.
 Filesystem page cache cleared with:
 shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
```

Base Compiler Invocation

C benchmarks:
```
icc -m64
```

C++ benchmarks:
```
icpc -m64
```

Base Portability Flags

```
400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
  401.bzip2: -DSPEC_CPU_LP64
    403.gcc: -DSPEC_CPU_LP64
    429.mcf: -DSPEC_CPU_LP64
  445.gobmk: -DSPEC_CPU_LP64
  456.hmmer: -DSPEC_CPU_LP64
  458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
  464.h264ref: -DSPEC_CPU_LP64
  471.omnetpp: -DSPEC_CPU_LP64
    473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
```

Base Optimization Flags

C benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
-auto-p32
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh10.2 -lsmartheap64
```

Base Other Flags

C benchmarks:

403.gcc: `-Dalloca=_alloca`

Peak Compiler Invocation

C benchmarks (except as noted below):
`icc -m64`

400.perlbench: `icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

445.gobmk: `icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

C++ benchmarks (except as noted below):
`icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

473.astar: `icpc -m64`

Peak Portability Flags

400.perlbench: `-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32`
401.bzip2: `-DSPEC_CPU_LP64`
403.gcc: `-DSPEC_CPU_LP64`
429.mcf: `-DSPEC_CPU_LP64`
445.gobmk: `-D_FILE_OFFSET_BITS=64`
456.hmmer: `-DSPEC_CPU_LP64`
458.sjeng: `-DSPEC_CPU_LP64`
462.libquantum: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX`
464.h264ref: `-DSPEC_CPU_LP64`
471.omnetpp: `-D_FILE_OFFSET_BITS=64`
473.astar: `-DSPEC_CPU_LP64`
483.xalancbmk: `-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX`

Peak Optimization Flags

C benchmarks:

400.perlbench: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-xCORE-AVX2`(pass 2)
`-par-num-threads=1`(pass 1) `-ipo`(pass 2) `-O3`(pass 2)
`-no-prec-div`(pass 2) `-qopt-prefetch`

401.bzip2: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-xCORE-AVX2`(pass 2)
`-par-num-threads=1`(pass 1) `-ipo`(pass 2) `-O3`(pass 2)
`-no-prec-div -auto-ilp32 -qopt-prefetch`

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Peak Optimization Flags (Continued)

403.gcc: `-xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc -qopt-malloc-options=3 -auto-ilp32`

429.mcf: `-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch -auto-p32`

445.gobmk: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-xCORE-AVX2`(pass 2) `-par-num-threads=1`(pass 1) `-ipo`(pass 2) `-O3`(pass 2) `-no-prec-div`(pass 2)

456.hmmer: `basepeak = yes`

458.sjeng: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-xCORE-AVX2`(pass 2) `-par-num-threads=1`(pass 1) `-ipo`(pass 2) `-O3`(pass 2) `-no-prec-div`(pass 2) `-unroll4`

462.libquantum: `basepeak = yes`

464.h264ref: `basepeak = yes`

C++ benchmarks:

471.omnetpp: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-xCORE-AVX2`(pass 2) `-par-num-threads=1`(pass 1) `-ipo`(pass 2) `-O3`(pass 2) `-no-prec-div`(pass 2) `-qopt-ra-region-strategy=block -Wl,-z,muldefs -L/sh10.2 -lsmartheap`

473.astar: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32 -Wl,-z,muldefs -L/sh10.2 -lsmartheap64`

483.xalancbmk: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -Wl,-z,muldefs -L/sh10.2 -lsmartheap`

Peak Other Flags

C benchmarks:

403.gcc: `-Dalloca=_alloca`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.html`
`http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.20171004.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml`
`http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.20171004.xml`

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