



# SPEC® CINT2006 Result

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## Lenovo Global Technology

**SPECint®2006 = 73.0**

ThinkSystem SD530  
(3.60 GHz, Intel Xeon Gold 5122)

**SPECint\_base2006 = 70.0**

CPU2006 license: 9017

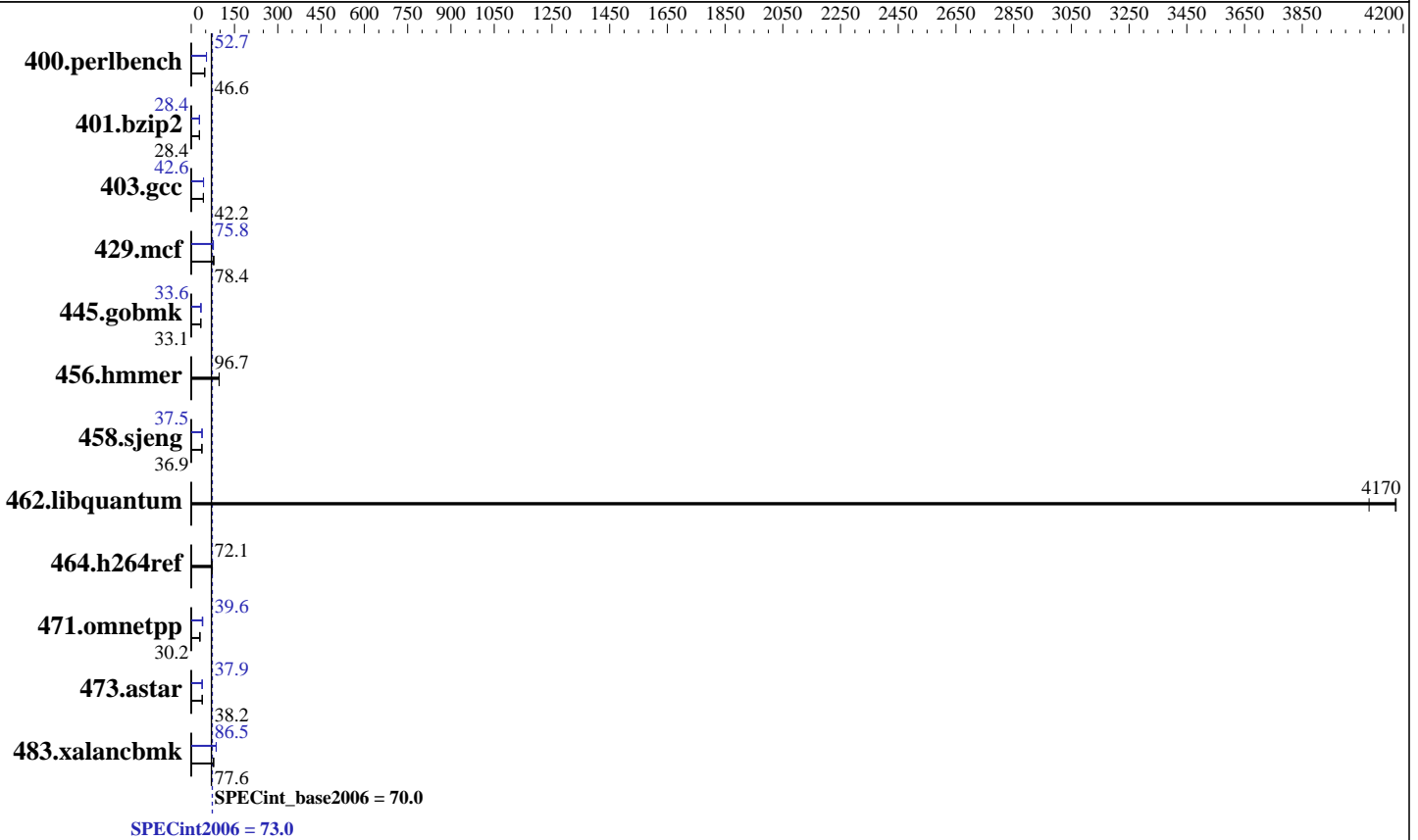
Test date: Aug-2017

Test sponsor: Lenovo Global Technology

Hardware Availability: Aug-2017

Tested by: Lenovo Global Technology

Software Availability: Apr-2017



### Hardware

CPU Name: Intel Xeon Gold 5122  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz  
 CPU MHz: 3600  
 FPU: Integrated  
 CPU(s) enabled: 8 cores, 2 chips, 4 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: 16.5 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)  
 Disk Subsystem: 1 x 800 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	209	46.7	210	46.5	<b><u>210</u></b>	<b><u>46.6</u></b>	186	52.7	<b><u>185</u></b>	<b><u>52.7</u></b>	185	52.9
401.bzip2	340	28.4	339	28.4	<b><u>340</u></b>	<b><u>28.4</u></b>	339	28.4	<b><u>339</u></b>	<b><u>28.4</u></b>	339	28.4
403.gcc	191	42.2	191	42.2	<b><u>191</u></b>	<b><u>42.2</u></b>	189	42.5	<b><u>189</u></b>	<b><u>42.6</u></b>	189	42.6
429.mcf	120	76.0	116	78.4	<b><u>116</u></b>	<b><u>78.4</u></b>	121	75.7	<b><u>120</u></b>	<b><u>75.8</u></b>	119	76.9
445.gobmk	317	33.1	<b><u>317</u></b>	<b><u>33.1</u></b>	317	33.1	<b><u>312</u></b>	<b><u>33.6</u></b>	312	33.6	312	33.6
456.hammer	96.2	97.0	96.6	96.6	<b><u>96.5</u></b>	<b><u>96.7</u></b>	96.2	97.0	96.6	96.6	<b><u>96.5</u></b>	<b><u>96.7</u></b>
458.sjeng	328	36.9	328	36.9	<b><u>328</u></b>	<b><u>36.9</u></b>	323	37.5	<b><u>323</u></b>	<b><u>37.5</u></b>	323	37.5
462.libquantum	5.08	4080	4.96	4180	<b><u>4.97</u></b>	<b><u>4170</u></b>	5.08	4080	4.96	4180	<b><u>4.97</u></b>	<b><u>4170</u></b>
464.h264ref	308	71.9	306	72.3	<b><u>307</u></b>	<b><u>72.1</u></b>	308	71.9	306	72.3	<b><u>307</u></b>	<b><u>72.1</u></b>
471.omnetpp	212	29.5	207	30.2	<b><u>207</u></b>	<b><u>30.2</u></b>	<b><u>158</u></b>	<b><u>39.6</u></b>	164	38.2	157	39.7
473.astar	184	38.1	184	38.2	<b><u>184</u></b>	<b><u>38.2</u></b>	<b><u>185</u></b>	<b><u>37.9</u></b>	185	38.0	185	37.9
483.xalancbmk	89.4	77.2	88.9	77.6	<b><u>88.9</u></b>	<b><u>77.6</u></b>	79.5	86.8	80.0	86.2	<b><u>79.8</u></b>	<b><u>86.5</u></b>

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  
 LLC dead line alloc set to Disable  
 Hyper-Threading set to Disable  
 Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993  
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)  
 running on Stark-node-02 Fri Aug 18 19:28:42 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) Gold 5122 CPU @ 3.60GHz  
 2 "physical id"s (chips)  
 8 "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 : 4
siblings  : 4
physical 0: cores 2 3 4 10
physical 1: cores 1 5 9 13
cache size : 16896 KB
```

From /proc/meminfo

```
MemTotal:      395751076 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 Stark-node-02 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 Aug 18 19:27

SPEC is set to: /home/cpu2006-1.2-ic17.0u3

```
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/sda4        xfs       688G  27G  662G   4% /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 -[TEE113D-1.00]- 05/19/2017

Memory:

```
4x NO DIMM NO DIMM
12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666 MHz
```

(End of data from sysinfo program)



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## 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 = "8"

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



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## 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.hmmmer: -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.hmmr: 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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