



# SPEC® CINT2006 Result

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## Lenovo Global Technology

### SPECint®\_rate2006 = 2030

ThinkSystem SR650  
(2.70 GHz, Intel Xeon Gold 6150)

### SPECint\_rate\_base2006 = 1930

CPU2006 license: 9017

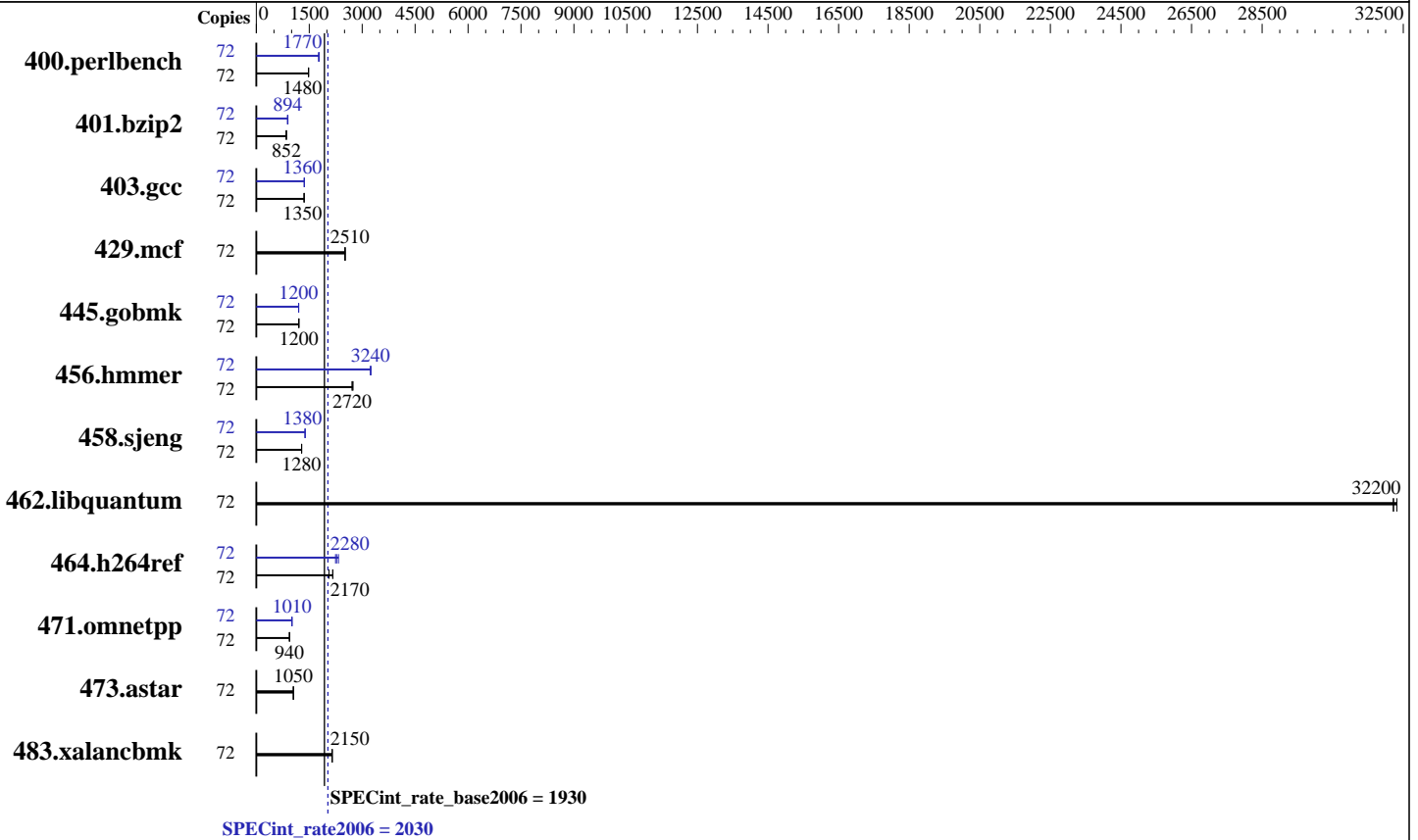
Test date: Jul-2017

Test sponsor: Lenovo Global Technology

Hardware Availability: Aug-2017

Tested by: Lenovo Global Technology

Software Availability: Apr-2017



### Hardware

CPU Name: Intel Xeon Gold 6150  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz  
 CPU MHz: 2700  
 FPU: Integrated  
 CPU(s) enabled: 36 cores, 2 chips, 18 cores/chip, 2 threads/core  
 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: 24.75 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)  
 Disk Subsystem: 1 x 800 GB SAS SSD  
 Other Hardware: None

### Software

Operating System: SUSE Linux Enterprise Server 12 SP2 (x86\_64)  
 Kernel 4.4.21-69-default  
 Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux  
 Auto Parallel: Yes  
 File System: btrfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 32-bit  
 Peak Pointers: 32/64-bit  
 Other Software: Microquill SmartHeap V10.2



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## Results Table

| Benchmark      | Base   |                    |                     |                   |                    |                   |                    | Peak   |                    |                     |                   |                    |                   |                    |
|----------------|--------|--------------------|---------------------|-------------------|--------------------|-------------------|--------------------|--------|--------------------|---------------------|-------------------|--------------------|-------------------|--------------------|
|                | Copies | Seconds            | Ratio               | Seconds           | Ratio              | Seconds           | Ratio              | Copies | Seconds            | Ratio               | Seconds           | Ratio              | Seconds           | Ratio              |
| 400.perlbench  | 72     | 474                | 1480                | <b><u>475</u></b> | <b><u>1480</u></b> | 476               | 1480               | 72     | <b><u>396</u></b>  | <b><u>1770</u></b>  | 399               | 1760               | 395               | 1780               |
| 401.bzip2      | 72     | 815                | 853                 | <b><u>815</u></b> | <b><u>852</u></b>  | 821               | 846                | 72     | 789                | 880                 | 777               | 894                | <b><u>777</u></b> | <b><u>894</u></b>  |
| 403.gcc        | 72     | <b><u>428</u></b>  | <b><u>1350</u></b>  | 428               | 1350               | 428               | 1360               | 72     | <b><u>426</u></b>  | <b><u>1360</u></b>  | 425               | 1360               | 427               | 1360               |
| 429.mcf        | 72     | 260                | 2520                | <b><u>261</u></b> | <b><u>2510</u></b> | 262               | 2510               | 72     | 260                | 2520                | <b><u>261</u></b> | <b><u>2510</u></b> | 262               | 2510               |
| 445.gobmk      | 72     | 626                | 1210                | 627               | 1200               | <b><u>627</u></b> | <b><u>1200</u></b> | 72     | 631                | 1200                | <b><u>629</u></b> | <b><u>1200</u></b> | 629               | 1200               |
| 456.hammer     | 72     | <b><u>247</u></b>  | <b><u>2720</u></b>  | 245               | 2740               | 248               | 2710               | 72     | 208                | 3230                | 207               | 3250               | <b><u>208</u></b> | <b><u>3240</u></b> |
| 458.sjeng      | 72     | <b><u>679</u></b>  | <b><u>1280</u></b>  | 679               | 1280               | 679               | 1280               | 72     | 630                | 1380                | <b><u>630</u></b> | <b><u>1380</u></b> | 631               | 1380               |
| 462.libquantum | 72     | <b><u>46.3</u></b> | <b><u>32200</u></b> | 46.3              | 32200              | 46.2              | 32300              | 72     | <b><u>46.3</u></b> | <b><u>32200</u></b> | 46.3              | 32200              | 46.2              | 32300              |
| 464.h264ref    | 72     | <b><u>736</u></b>  | <b><u>2170</u></b>  | 774               | 2060               | 735               | 2170               | 72     | 684                | 2330                | <b><u>700</u></b> | <b><u>2280</u></b> | 710               | 2250               |
| 471.omnetpp    | 72     | 479                | 939                 | 478               | 941                | <b><u>479</u></b> | <b><u>940</u></b>  | 72     | 446                | 1010                | <b><u>446</u></b> | <b><u>1010</u></b> | 445               | 1010               |
| 473.astar      | 72     | 482                | 1050                | <b><u>481</u></b> | <b><u>1050</u></b> | 481               | 1050               | 72     | 482                | 1050                | <b><u>481</u></b> | <b><u>1050</u></b> | 481               | 1050               |
| 483.xalancbmk  | 72     | 231                | 2150                | <b><u>231</u></b> | <b><u>2150</u></b> | 231               | 2150               | 72     | 231                | 2150                | <b><u>231</u></b> | <b><u>2150</u></b> | 231               | 2150               |

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

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

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

## Platform Notes

BIOS configuration:  
Operating Mode set to Maximum Performance  
SNC set to Enable  
DCU Streamer Prefetcher set to Disable  
Stale AtoS set to Enable  
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 Cyborg-SPECcpu2006-SUSE12SP2 Wed Jul 12 21:29:58 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 6150 CPU @ 2.70GHz  
2 "physical id"s (chips)

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### Platform Notes (Continued)

72 "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 : 18
siblings  : 36
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
cache size : 25344 KB
```

```
From /proc/meminfo
MemTotal:      395892112 kB
HugePages_Total: 0
Hugepagesize:  2048 kB
```

```
From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# This file is deprecated and will be removed in a future service pack or
release.
# Please check /etc/os-release for details about this release.
os-release:
NAME="SLES"
VERSION="12-SP2"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"
```

```
uname -a:
Linux Cyborg-SPECcpu2006-SUSE12SP2 4.4.21-69-default #1 SMP Tue Oct 25
10:58:20 UTC 2016 (9464f67) x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Jul 12 21:29
```

```
SPEC is set to: /home/cpu2006-1.2-ic17.0u3
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sdb2       btrfs 744G   30G  712G   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 -[IVE109Q-1.00]- 06/28/2017
Memory:
24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666 MHz
```

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## Platform Notes (Continued)

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:

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"

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

runspec command invoked through numactl i.e.:

numactl --interleave=all runspec <etc>

## Base Compiler Invocation

C benchmarks:

icc -m32 -L/opt/intel/compilers\_and\_libraries\_2017/linux/lib/ia32

C++ benchmarks:

icpc -m32 -L/opt/intel/compilers\_and\_libraries\_2017/linux/lib/ia32

## Base Portability Flags

400.perlbench: -D\_FILE\_OFFSET\_BITS=64 -DSPEC\_CPU\_LINUX\_IA32  
401.bzip2: -D\_FILE\_OFFSET\_BITS=64  
403.gcc: -D\_FILE\_OFFSET\_BITS=64  
429.mcf: -D\_FILE\_OFFSET\_BITS=64  
445.gobmk: -D\_FILE\_OFFSET\_BITS=64  
456.hmmer: -D\_FILE\_OFFSET\_BITS=64  
458.sjeng: -D\_FILE\_OFFSET\_BITS=64  
462.libquantum: -D\_FILE\_OFFSET\_BITS=64 -DSPEC\_CPU\_LINUX  
464.h264ref: -D\_FILE\_OFFSET\_BITS=64  
471.omnetpp: -D\_FILE\_OFFSET\_BITS=64  
473.astar: -D\_FILE\_OFFSET\_BITS=64  
483.xalancbmk: -D\_FILE\_OFFSET\_BITS=64 -DSPEC\_CPU\_LINUX

## Base Optimization Flags

C benchmarks:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-qopt-mem-layout-trans=3

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## Base Optimization Flags (Continued)

C++ benchmarks:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-qopt-mem-layout-trans=3 -Wl,-z,muldefs -L/sh10.2 -lsmartheap

## Base Other Flags

C benchmarks:

403.gcc: -Dalloca=\_alloca

## Peak Compiler Invocation

C benchmarks (except as noted below):

icc -m32 -L/opt/intel/compilers\_and\_libraries\_2017/linux/lib/ia32

400.perlbench: icc -m64

401.bzip2: icc -m64

456.hmmer: icc -m64

458.sjeng: icc -m64

C++ benchmarks:

icpc -m32 -L/opt/intel/compilers\_and\_libraries\_2017/linux/lib/ia32

## Peak Portability Flags

400.perlbench: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_LINUX\_X64

401.bzip2: -DSPEC\_CPU\_LP64

403.gcc: -D\_FILE\_OFFSET\_BITS=64

429.mcf: -D\_FILE\_OFFSET\_BITS=64

445.gobmk: -D\_FILE\_OFFSET\_BITS=64

456.hmmer: -DSPEC\_CPU\_LP64

458.sjeng: -DSPEC\_CPU\_LP64

462.libquantum: -D\_FILE\_OFFSET\_BITS=64 -DSPEC\_CPU\_LINUX

464.h264ref: -D\_FILE\_OFFSET\_BITS=64

471.omnetpp: -D\_FILE\_OFFSET\_BITS=64

473.astar: -D\_FILE\_OFFSET\_BITS=64

483.xalancbmk: -D\_FILE\_OFFSET\_BITS=64 -DSPEC\_CPU\_LINUX



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## Peak Optimization Flags

C benchmarks:

400.perlbench: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -auto-ilp32 -qopt-mem-layout-trans=3

401.bzip2: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -qopt-prefetch -auto-ilp32  
-qopt-mem-layout-trans=3

403.gcc: -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3

429.mcf: basepeak = yes

445.gobmk: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -qopt-mem-layout-trans=3

456.hmmer: -xCORE-AVX512 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32  
-qopt-mem-layout-trans=3

458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -unroll4 -auto-ilp32  
-qopt-mem-layout-trans=3

462.libquantum: basepeak = yes

464.h264ref: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -unroll2 -qopt-mem-layout-trans=3

C++ benchmarks:

471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2)  
-qopt-ra-region-strategy=block  
-qopt-mem-layout-trans=3 -Wl,-z,muldefs  
-L/sh10.2 -lsmartheap

473.astar: basepeak = yes

483.xalancbmk: basepeak = yes



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## 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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