



# SPEC® CINT2006 Result

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## Lenovo Group Limited

SPECint®2006 = **73.5**

Lenovo System x3550 M5  
(2.30 GHz, Intel Xeon E5-2697 v4)

SPECint\_base2006 = **71.7**

CPU2006 license: 9017

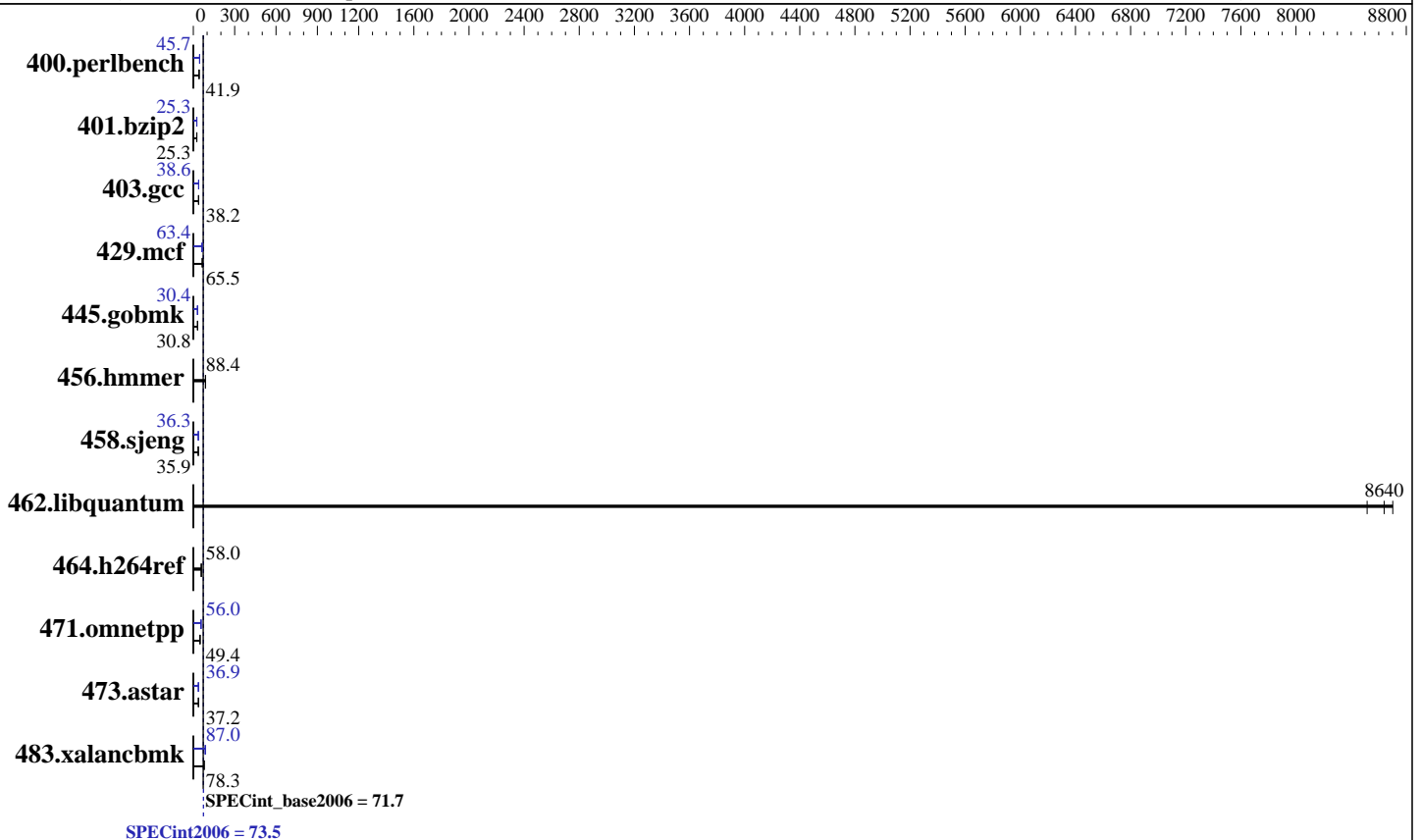
Test date: May-2016

Test sponsor: Lenovo Group Limited

Hardware Availability: Mar-2016

Tested by: Lenovo Group Limited

Software Availability: Dec-2015



### Hardware

CPU Name: Intel Xeon E5-2697 v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 36 cores, 2 chips, 18 cores/chip  
 CPU(s) orderable: 1,2 chips  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core  
 L3 Cache: 45 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)  
 Disk Subsystem: 1 x 800 GB SATA SSD  
 Other Hardware: None

### Software

Operating System: SUSE Linux Enterprise Server 12 SP1 (x86\_64)  
 Kernel 3.12.49-11-default  
 Compiler: C/C++; Version 16.0.0.101 of Intel C++ Studio XE 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	<b><u>233</u></b>	<b><u>41.9</u></b>	233	41.8	233	41.9	<b><u>214</u></b>	<b><u>45.7</u></b>	214	45.7	213	45.8
401.bzip2	<b><u>382</u></b>	<b><u>25.3</u></b>	381	25.4	383	25.2	382	25.3	<b><u>382</u></b>	<b><u>25.3</u></b>	382	25.3
403.gcc	211	38.2	211	38.2	<b><u>211</u></b>	<b><u>38.2</u></b>	<b><u>208</u></b>	<b><u>38.6</u></b>	208	38.8	209	38.5
429.mcf	141	64.6	139	65.6	<b><u>139</u></b>	<b><u>65.5</u></b>	<b><u>144</u></b>	<b><u>63.4</u></b>	142	64.3	144	63.1
445.gobmk	340	30.8	<b><u>341</u></b>	<b><u>30.8</u></b>	342	30.7	<b><u>345</u></b>	<b><u>30.4</u></b>	345	30.4	346	30.4
456.hammer	106	88.4	<b><u>106</u></b>	<b><u>88.4</u></b>	105	88.5	106	88.4	<b><u>106</u></b>	<b><u>88.4</u></b>	105	88.5
458.sjeng	337	35.9	<b><u>337</u></b>	<b><u>35.9</u></b>	338	35.9	333	36.4	<b><u>333</u></b>	<b><u>36.3</u></b>	333	36.3
462.libquantum	2.43	8520	2.38	8700	<b><u>2.40</u></b>	<b><u>8640</u></b>	2.43	8520	2.38	8700	<b><u>2.40</u></b>	<b><u>8640</u></b>
464.h264ref	382	58.0	382	57.9	<b><u>382</u></b>	<b><u>58.0</u></b>	382	58.0	382	57.9	<b><u>382</u></b>	<b><u>58.0</u></b>
471.omnetpp	133	47.1	<b><u>127</u></b>	<b><u>49.4</u></b>	126	49.5	112	55.8	<b><u>112</u></b>	<b><u>56.0</u></b>	111	56.2
473.astar	188	37.3	189	37.1	<b><u>189</u></b>	<b><u>37.2</u></b>	190	36.9	190	36.9	<b><u>190</u></b>	<b><u>36.9</u></b>
483.xalancbmk	87.7	78.7	89.5	77.1	<b><u>88.1</u></b>	<b><u>78.3</u></b>	79.1	87.2	79.5	86.8	<b><u>79.3</u></b>	<b><u>87.0</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:

Operating Mode set to Maximum Performance

Hyper-Threading set to Disabled

Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914

\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1

running on DaAn-03 Wed May 25 06:12:19 2016

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) CPU E5-2697 v4 @ 2.30GHz

2 "physical id"s (chips)

36 "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

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info@spec.org

<http://www.spec.org/>

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### Platform Notes (Continued)

```

siblings      : 18
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   : 46080 KB

```

From /proc/meminfo

```

MemTotal:      263827712 kB
HugePages_Total: 0
Hugepagesize:  2048 kB

```

From /etc/\*release\* /etc/\*version\*

```

SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 1
# 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-SP1"
VERSION_ID="12.1"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp1"

```

uname -a:

```

Linux DaAn-03 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 May 25 05:55

SPEC is set to: /home/cpu2006-1.2-ic16.0

```

Filesystem      Type      Size      Used Avail Use% Mounted on
/dev/sda4        xfs       689G      28G  662G   5% /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 -[TBE124K-2.10]- 05/10/2016

Memory:

```

16x Hynix HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz
8x NO DIMM Unknown

```

(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"

LD\_LIBRARY\_PATH = "/home/cpu2006-1.2-ic16.0/libs/32:/home/cpu2006-1.2-ic16.0/libs/64:/home/cpu2006-1.2-ic16.0/sh"

OMP\_NUM\_THREADS = "36"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1

Transparent Huge Pages enabled with:

echo always > /sys/kernel/mm/transparent\_hugepage/enabled

## 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 -opt-prefetch -auto-p32

C++ benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32

-Wl,-z,muldefs -L/sh -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\_2016/linux/compiler/lib/ia32\_lin

445.gobmk: icc -m32 -L/opt/intel/compilers\_and\_libraries\_2016/linux/compiler/lib/ia32\_lin

C++ benchmarks (except as noted below):

icpc -m32 -L/opt/intel/compilers\_and\_libraries\_2016/linux/compiler/lib/ia32\_lin

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: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -prof-use(pass 2) -opt-prefetch  
-ansi-alias

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

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## Peak Optimization Flags (Continued)

401.bzip2 (continued):

-opt-prefetch -ansi-alias

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc

-opt-malloc-options=3 -auto-ilp32

429.mcf: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel

-opt-prefetch -auto-p32

445.gobmk: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)

-prof-use(pass 2) -par-num-threads=1(pass 1) -ansi-alias

456.hmmr: basepeak = yes

458.sjeng: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)

-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)

-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)

-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)

-par-num-threads=1(pass 1) -prof-use(pass 2)

-opt-ra-region-strategy=block

-ansi-alias

-Wl,-z,muldefs -L/sh -lsmartheap

473.astar: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

-auto-p32 -Wl,-z,muldefs -L/sh -lsmartheap64

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

-ansi-alias -Wl,-z,muldefs -L/sh -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-ic16.0-official-linux64.html>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revC.html>



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You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revC.xml>

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