



# SPEC® CINT2006 Result

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## Lenovo Group Limited

SPECint®2006 = 73.4

Lenovo ThinkServer TS460  
(3.70 GHz, Intel Xeon E3-1280 v5)

SPECint\_base2006 = 71.2

CPU2006 license: 9017

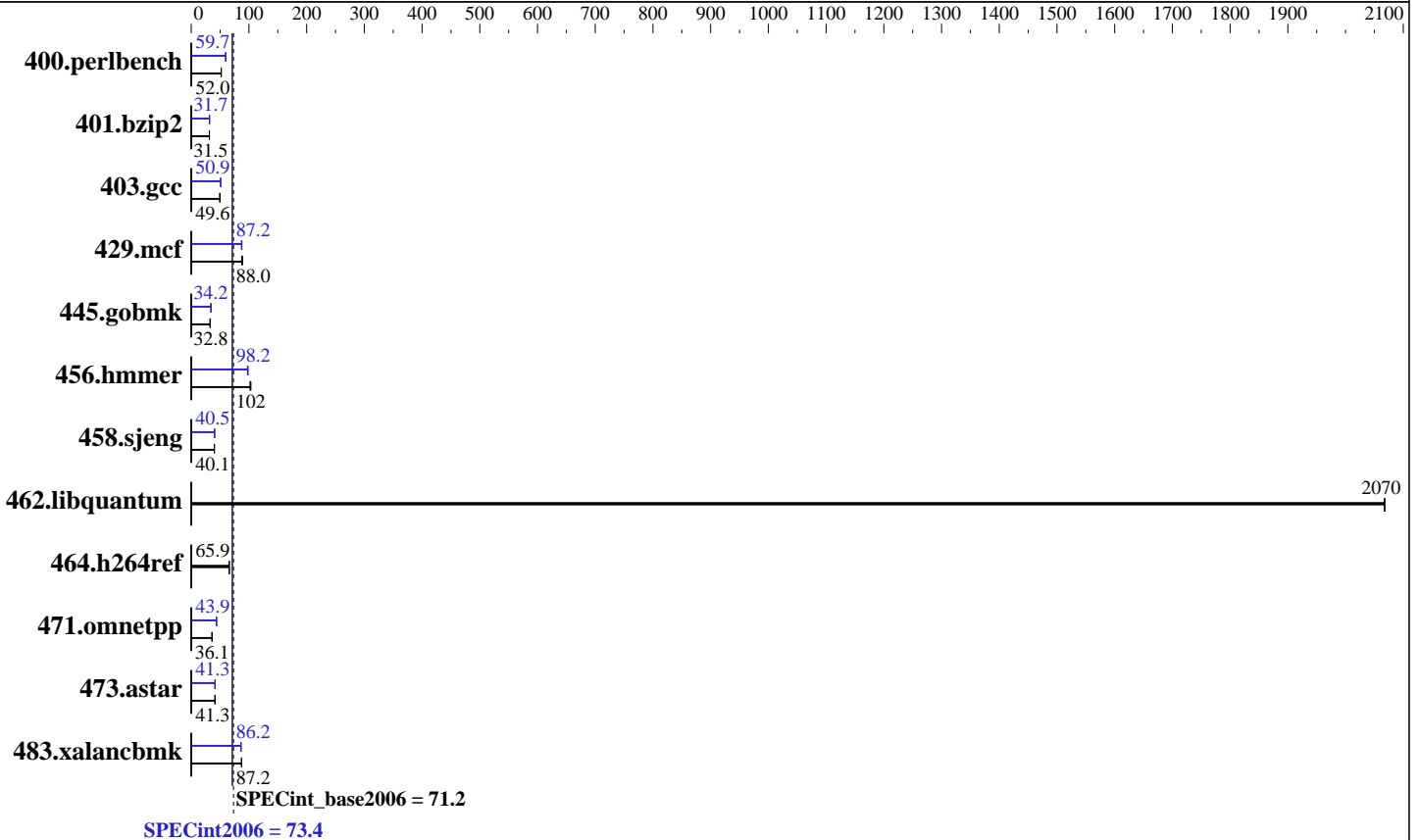
Test date: Jan-2017

Test sponsor: Lenovo Group Limited

Hardware Availability: Feb-2017

Tested by: Lenovo Group Limited

Software Availability: May-2016



### Hardware

CPU Name: Intel Xeon E3-1280 v5  
 CPU Characteristics: Intel Turbo Boost Technology up to 4.00 GHz  
 CPU MHz: 3700  
 FPU: Integrated  
 CPU(s) enabled: 4 cores, 1 chip, 4 cores/chip  
 CPU(s) orderable: 1 chip  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core  
 L3 Cache: 8 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 16 GB (2 x 8 GB 2Rx8 PC4-2133P-E)  
 Disk Subsystem: 1 x 800 GB SATA SSD  
 Other Hardware: None

### Software

Operating System: Red Hat Enterprise Linux Server release 6.8 (Santiago)  
 Kernel 2.6.32-642.el6.x86\_64  
 Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux  
 Auto Parallel: Yes  
 File System: ext4  
 System State: Run level 3 (multi-user)  
 Base Pointers: 32/64-bit  
 Peak Pointers: 32/64-bit  
 Other Software: Microquill SmartHeap V10.0



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## Results Table

| Benchmark      | Base       |             |             |             |             |             | Peak       |             |             |             |            |             |
|----------------|------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|-------------|-------------|------------|-------------|
|                | Seconds    | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Seconds    | Ratio       | Seconds     | Ratio       | Seconds    | Ratio       |
| 400.perlbench  | 188        | 52.0        | <b>188</b>  | <b>52.0</b> | 188         | 52.0        | 164        | 59.7        | <b>164</b>  | <b>59.7</b> | 163        | 59.8        |
| 401.bzip2      | 307        | 31.5        | <b>307</b>  | <b>31.5</b> | 306         | 31.5        | 304        | 31.7        | 304         | 31.7        | <b>304</b> | <b>31.7</b> |
| 403.gcc        | 162        | 49.8        | <b>162</b>  | <b>49.6</b> | 162         | 49.6        | <b>158</b> | <b>50.9</b> | 158         | 50.9        | 158        | 50.9        |
| 429.mcf        | <b>104</b> | <b>88.0</b> | 104         | 87.8        | 102         | 89.0        | 104        | 87.9        | 105         | 87.2        | <b>105</b> | <b>87.2</b> |
| 445.gobmk      | 320        | 32.8        | <b>320</b>  | <b>32.8</b> | 320         | 32.8        | 307        | 34.2        | <b>307</b>  | <b>34.2</b> | 307        | 34.2        |
| 456.hammer     | 91.5       | 102         | 90.2        | 103         | <b>91.2</b> | <b>102</b>  | 94.9       | 98.3        | <b>95.0</b> | <b>98.2</b> | 95.7       | 97.4        |
| 458.sjeng      | 302        | 40.1        | <b>302</b>  | <b>40.1</b> | 302         | 40.1        | 299        | 40.5        | 299         | 40.5        | <b>299</b> | <b>40.5</b> |
| 462.libquantum | 10.0       | 2070        | <b>10.0</b> | <b>2070</b> | 10.0        | 2070        | 10.0       | 2070        | <b>10.0</b> | <b>2070</b> | 10.0       | 2070        |
| 464.h264ref    | <b>336</b> | <b>65.9</b> | 336         | 65.9        | 336         | 65.9        | <b>336</b> | <b>65.9</b> | 336         | 65.9        | 336        | 65.9        |
| 471.omnetpp    | 173        | 36.1        | 173         | 36.1        | <b>173</b>  | <b>36.1</b> | <b>143</b> | <b>43.9</b> | 143         | 43.8        | 142        | 43.9        |
| 473.astar      | <b>170</b> | <b>41.3</b> | 170         | 41.2        | 170         | 41.4        | 170        | 41.2        | 170         | 41.4        | <b>170</b> | <b>41.3</b> |
| 483.xalancbmk  | 79.2       | 87.1        | 79.0        | 87.3        | <b>79.1</b> | <b>87.2</b> | 80.1       | 86.1        | <b>80.0</b> | <b>86.2</b> | 80.0       | 86.3        |

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"

Transparent Huge Pages enabled with:

```
echo always > /sys/kernel/mm/transparent_hugepage/enabled
```

## Platform Notes

BIOS Configuration:

Boot performance mode set to Turbo Performance

Hyper-Threading set to Disabled

CPU C3 State Support set to Disabled

CPU C6 State Support set to Disabled

CPU C7 State Support set to Enabled

Package C State Support set to C7

No-Execute Memory Protection set to Disabled

Intel Virtualization Technology set to Disabled

CPU Thermal Throttling set to Disabled

Sysinfo program /home/cpu2006-ic14/config/sysinfo.rev6818

\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191

running on TS460-01 Sun Jan 22 07:07:31 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>

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

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### Platform Notes (Continued)

```

From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E3-1280 v5 @ 3.70GHz
 1 "physical id"s (chips)
 4 "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 : 4
  siblings  : 4
  physical 0: cores 0 1 2 3
cache size : 8192 KB

```

```

From /proc/meminfo
MemTotal:      16274480 kB
HugePages_Total:    0
Hugepagesize:    2048 kB

```

```

/usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.8 (Santiago)

```

```

From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.8 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.8 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

```

```

uname -a:
Linux TS460-01 2.6.32-642.el6.x86_64 #1 SMP Wed Apr 13 00:51:26 EDT 2016
x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 Jan 22 07:06

```

SPEC is set to: /home/cpu2006-ic14
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sdal        ext4   50G   17G   31G   35% /

```

```

Additional information from dmidecode:
BIOS LENOVO TB1TS100 11/26/2016
Memory:
 2x    8 GB
 2x Not Specified Not Specified
 2x Samsung M391A1G43EB1-CPB 8 GB 2133 MHz 2 rank

```

(End of data from sysinfo program)

### General Notes

```

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2006-ic14/libs/32:/home/cpu2006-ic14/libs/64:/home/cpu2006-ic14/sh"
OMP_NUM_THREADS = "4"

```

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## General Notes (Continued)

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RedHat EL 6.4  
runspec command invoked through numactl i.e.:  
numactl --interleave=all runspec <etc>

## 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

## Base Other Flags

C benchmarks:  
403.gcc: -Dalloca=\_alloca



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**Software Availability:** May-2016

## Peak Compiler Invocation

C benchmarks (except as noted below):

icc -m64

400.perlbench: icc -m32

445.gobmk: icc -m32

C++ benchmarks (except as noted below):

icpc -m32

473.astar: icpc -m64

## Peak Portability Flags

400.perlbench: -DSPEC\_CPU\_LINUX\_IA32  
401.bzip2: -DSPEC\_CPU\_LP64  
403.gcc: -DSPEC\_CPU\_LP64  
429.mcf: -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  
473.astar: -DSPEC\_CPU\_LP64  
483.xalancbmk: -DSPEC\_CPU\_LINUX

## Peak Optimization Flags

C benchmarks:

400.perlbench: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-opt-prefetch -ansi-alias

401.bzip2: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div -prof-use(pass 2) -auto-ilp32  
-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(pass 1) -prof-use(pass 2)  
-ansi-alias

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## Peak Optimization Flags (Continued)

456.hmmr: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32  
-ansi-alias

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

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-opt-ra-region-strategy=block -ansi-alias  
-Wl,-z,muldefs -L/sh -lsmarheap

473.astar: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch  
-auto-p32 -Wl,-z,muldefs -L/sh -lsmarheap64

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch  
-ansi-alias -Wl,-z,muldefs -L/sh -lsmarheap

## 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-ic14.0-official-linux64.20140128.html>

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

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

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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