# SPEC® CINT2006 Result

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## Lenovo Group Limited

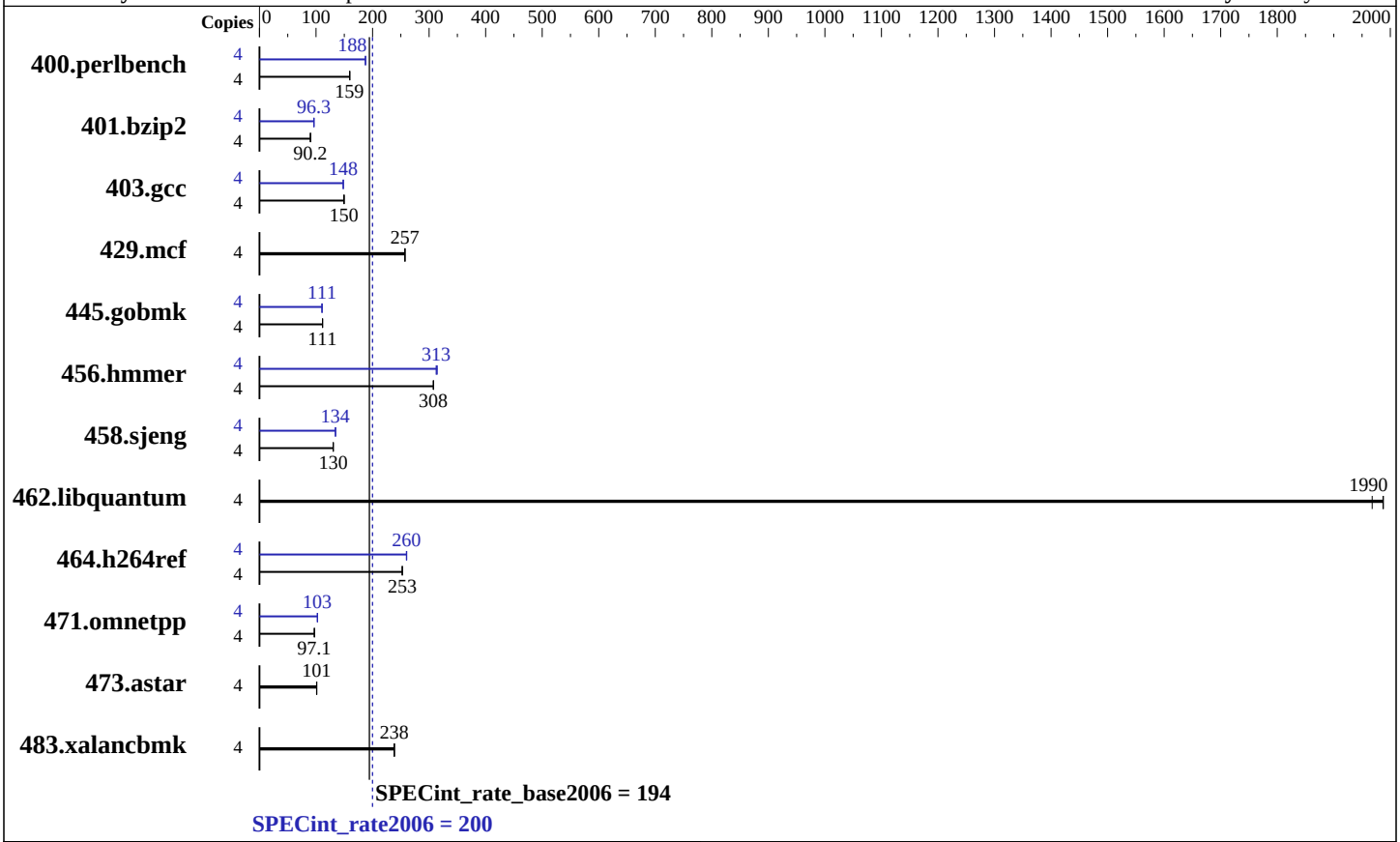
Lenovo ThinkServer TS460
(3.00 GHz, Intel Xeon E3-1220 v5)

SPECint®_rate2006 = 200

SPECint_rate_base2006 = 194

**CPU2006 license:** 9017
**Test sponsor:** Lenovo Group Limited
**Tested by:** Lenovo Group Limited

**Test date:** Feb-2017
**Hardware Availability:** Feb-2017
**Software Availability:** May-2016




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E3-1220 v5 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.50 GHz |
| CPU MHz: | 3000 |
| 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)<br>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: | No |
| File System: | ext4 |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 32-bit |
| Peak Pointers: | 32/64-bit |
| Other Software: | Microquill SmartHeap V10.0 |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 400.perlbench | 4 | **245** | **159** | 244 | 160 | 245 | 159 | 4 | **208** | **188** | 208 | 188 | 209 | 187 |
| 401.bzip2 | 4 | 428 | 90.3 | 429 | 90.1 | **428** | **90.2** | 4 | 401 | 96.3 | 400 | 96.5 | **401** | **96.3** |
| 403.gcc | 4 | 215 | 150 | 216 | 149 | **215** | **150** | 4 | **217** | **148** | 217 | 148 | 217 | 148 |
| 429.mcf | 4 | 142 | 257 | **142** | **257** | 142 | 258 | 4 | 142 | 257 | **142** | **257** | 142 | 258 |
| 445.gobmk | 4 | 377 | 111 | **377** | **111** | 375 | 112 | 4 | **380** | **111** | 378 | 111 | 380 | 110 |
| 456.hmmer | 4 | 121 | 307 | 121 | 308 | **121** | **308** | 4 | 119 | 314 | **119** | **313** | 119 | 313 |
| 458.sjeng | 4 | 371 | 130 | **371** | **130** | 371 | 130 | 4 | **360** | **134** | 360 | 135 | 360 | 134 |
| 462.libquantum | 4 | 42.1 | 1970 | 41.7 | 1990 | **41.7** | **1990** | 4 | 42.1 | 1970 | 41.7 | 1990 | **41.7** | **1990** |
| 464.h264ref | 4 | 350 | 253 | 351 | 252 | **351** | **253** | 4 | 340 | 260 | 341 | 260 | **341** | **260** |
| 471.omnetpp | 4 | **258** | **97.1** | 257 | 97.2 | 258 | 97.0 | 4 | 244 | 102 | 243 | 103 | **244** | **103** |
| 473.astar | 4 | 278 | 101 | 277 | 101 | **278** | **101** | 4 | 278 | 101 | 277 | 101 | **278** | **101** |
| 483.xalancbmk | 4 | 116 | 238 | **116** | **238** | 116 | 239 | 4 | 116 | 238 | **116** | **238** | 116 | 239 |

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

## Submit Notes

```
The taskset mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate taskset 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"
Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
Filesystem page cache cleared with:
echo 1>       /proc/sys/vm/drop_caches
```

## Platform Notes

```
BIOS Configuration:
 Boot performance mode set to Turbo Performance
 Sysinfo program /home/cpu2006-ic14/config/sysinfo.rev6818
 $Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
 running on TS460-01 Tue Feb  7 03:38:22 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) CPU E3-1220 v5 @ 3.00GHz
       1 "physical id"s (chips)
```

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## Platform Notes (Continued)

```
        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 Feb 7 03:32

  SPEC is set to: /home/cpu2006-ic14
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/sda1      ext4   50G   17G   31G  36% /

  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:
 LD_LIBRARY_PATH = "/home/cpu2006-ic14/libs/32:/home/cpu2006-ic14/libs/64:/home/cpu2006-ic14/sh"

  Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
  memory using RedHat EL 6.4
```

## Base Compiler Invocation

C benchmarks:
```
icc  -m32
```

C++ benchmarks:
```
icpc -m32
```

## Base Portability Flags

400.perlbench: `-DSPEC_CPU_LINUX_IA32`
462.libquantum: `-DSPEC_CPU_LINUX`
483.xalancbmk: `-DSPEC_CPU_LINUX`

## Base Optimization Flags

C benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-opt-mem-layout-trans=3
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-opt-mem-layout-trans=3 -Wl,-z,muldefs -L/sh -lsmartheap
```

## Base Other Flags

C benchmarks:

403.gcc: `-Dalloca=_alloca`

## Peak Compiler Invocation

C benchmarks (except as noted below):
```
icc  -m32
```

400.perlbench: `icc -m64`

401.bzip2: `icc -m64`

456.hmmer: `icc -m64`

458.sjeng: `icc -m64`

Continued on next page

## Peak Compiler Invocation (Continued)

C++ benchmarks:
icpc -m32

## Peak Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LINUX
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) -auto-ilp32

401.bzip2: -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 -auto-ilp32 -ansi-alias

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

429.mcf: basepeak = yes

445.gobmk: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -prof-use(pass 2) -ansi-alias -opt-mem-layout-trans=3

456.hmmer: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32

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 -auto-ilp32

462.libquantum: basepeak = yes

464.h264ref: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2 -ansi-alias

C++ benchmarks:

Continued on next page

## Peak Optimization Flags (Continued)

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) -ansi-alias -opt-ra-region-strategy=block -Wl,-z,muldefs -L/sh -lsmartheap

473.astar: basepeak = yes

483.xalancbmk: basepeak = yes

## 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
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revE.xml


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