# SPEC® CINT2006 Result

## Lenovo Group Limited

Lenovo ThinkServer TS150
(3.40 GHz, Intel Xeon E3-1230 v5)

SPECint®2006 = 72.7

SPECint_base2006 = 70.5
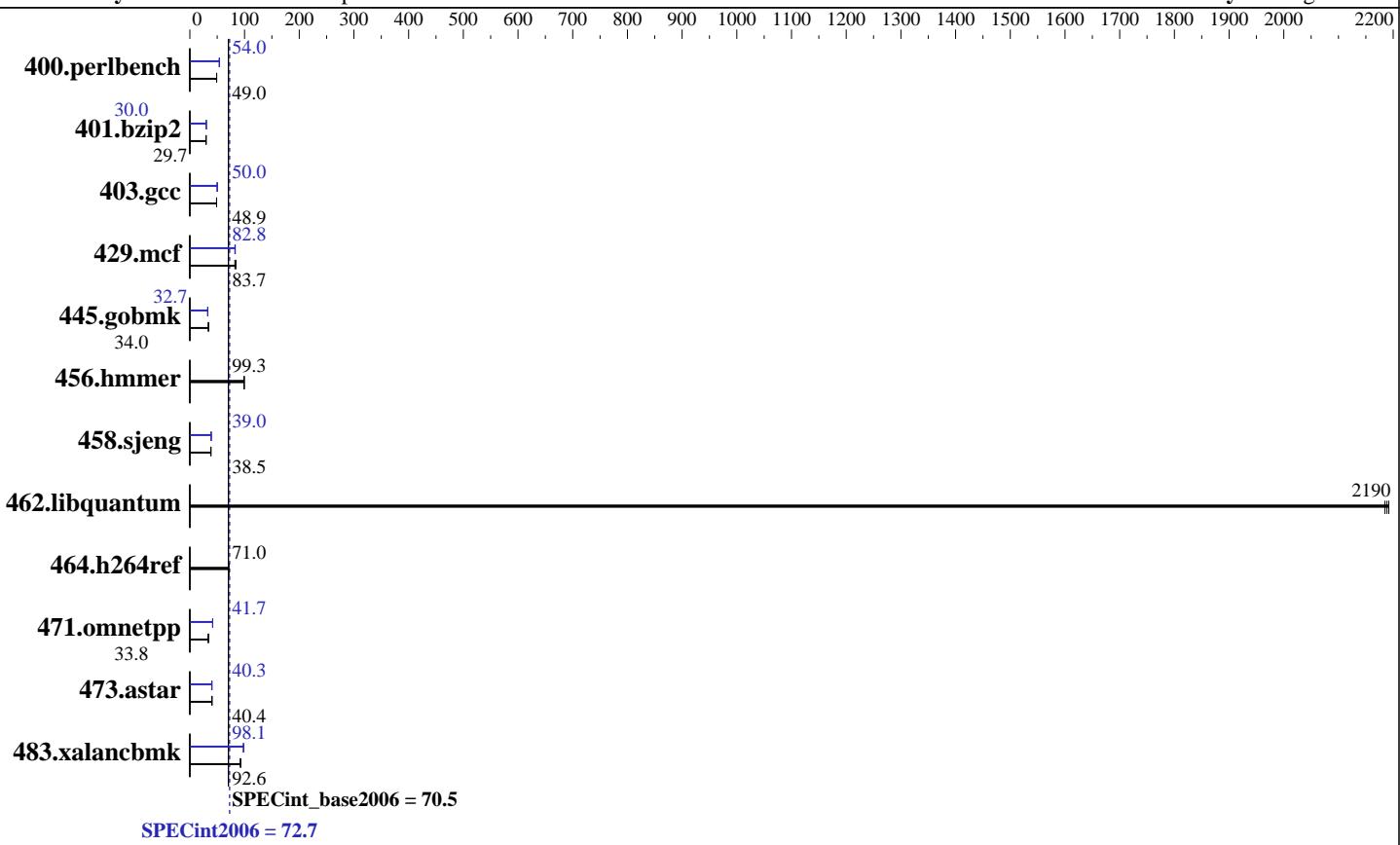
**CPU2006 license:** 9017
**Test sponsor:** Lenovo Group Limited
**Tested by:** Lenovo Group Limited

**Test date:** Jan-2016
**Hardware Availability:** Oct-2015
**Software Availability:** Aug-2015



Benchmark results chart:

| Benchmark | Peak | Base |
|---|---|---|
| 400.perlbench | 54.0 | 49.0 |
| 401.bzip2 | 30.0 | 29.7 |
| 403.gcc | 50.0 | 48.9 |
| 429.mcf | 82.8 | 83.7 |
| 445.gobmk | 32.7 | 34.0 |
| 456.hmmer | | 99.3 |
| 458.sjeng | 39.0 | 38.5 |
| 462.libquantum | | 2190 |
| 464.h264ref | | 71.0 |
| 471.omnetpp | 41.7 | 33.8 |
| 473.astar | 40.3 | 40.4 |
| 483.xalancbmk | 98.1 | 92.6 |

SPECint_base2006 = 70.5

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## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E3-1230 v5 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.80 GHz |
| CPU MHz: | 3400 |
| 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: | 32 GB (4 x 8 GB 2Rx8 PC4-2133P-U) |
| Disk Subsystem: | 1 x 800 GB SATA SSD |
| Other Hardware: | None |

## Software

| | |
|---|---|
| Operating System: | SUSE Linux Enterprise Server 12 (x86_64) Kernel 3.12.28-4-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 | 199 | 49.0 | 200 | 49.0 | **199** | **49.0** | 181 | 54.1 | **181** | **54.0** | 181 | 53.9 |
| 401.bzip2 | **325** | **29.7** | 325 | 29.7 | 326 | 29.6 | 321 | 30.0 | 321 | 30.1 | **321** | **30.0** |
| 403.gcc | 164 | 48.9 | **165** | **48.9** | 165 | 48.8 | 161 | 50.0 | 161 | 50.1 | **161** | **50.0** |
| 429.mcf | 108 | 84.1 | 111 | 82.3 | **109** | **83.7** | **110** | **82.8** | 111 | 82.4 | 110 | 83.1 |
| 445.gobmk | 309 | 34.0 | **309** | **34.0** | 309 | 33.9 | **321** | **32.7** | 321 | 32.7 | 321 | 32.7 |
| 456.hmmer | **94.0** | **99.3** | 93.8 | 99.4 | 94.0 | 99.2 | **94.0** | **99.3** | 93.8 | 99.4 | 94.0 | 99.2 |
| 458.sjeng | **314** | **38.5** | 315 | 38.5 | 314 | 38.5 | 310 | 39.0 | 310 | 39.0 | **310** | **39.0** |
| 462.libquantum | 9.45 | 2190 | **9.47** | **2190** | 9.48 | 2180 | 9.45 | 2190 | **9.47** | **2190** | 9.48 | 2180 |
| 464.h264ref | 312 | 70.9 | 312 | 71.0 | **312** | **71.0** | 312 | 70.9 | 312 | 71.0 | **312** | **71.0** |
| 471.omnetpp | 185 | 33.7 | 184 | 34.0 | **185** | **33.8** | 150 | 41.8 | 150 | 41.7 | **150** | **41.7** |
| 473.astar | 173 | 40.5 | 174 | 40.3 | **174** | **40.4** | 175 | 40.1 | 174 | 40.4 | **174** | **40.3** |
| 483.xalancbmk | 74.4 | 92.8 | **74.5** | **92.6** | 74.6 | 92.5 | **70.3** | **98.1** | 70.3 | 98.2 | 70.4 | 98.1 |

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:
 EIST Support set to Enabled
 Intel (R) Hyper-Threading set to Disabled
 C1E Support set to Enabled
 C State Support set to Enabled
 Turbo Mode set to Enable
 Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
 $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
 running on TS150 Wed Jan  6 09:11:28 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 E3-1230 v5 @ 3.40GHz
       1 "physical id"s (chips)
       4 "processors"
    cores, siblings (Caution: counting these is hw and system dependent.  The
```

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## Platform Notes (Continued)

```
    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:       32933324 kB
    HugePages_Total:       0
    Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 0
       # 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"
       VERSION_ID="12"
       PRETTY_NAME="SUSE Linux Enterprise Server 12"
       ID="sles"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:12"

uname -a:
    Linux TS150 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014 (9879bd4)
    x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jan 6 09:02

SPEC is set to: /home/cpu2006-1.2-ic16.0
    Filesystem     Type   Size   Used Avail Use% Mounted on
    /dev/sda3      xfs    693G    27G  667G   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 FWKT32A    12/25/2015
  Memory:
  4x Samsung M378A1G43DB0-CPB 8 GB 2 rank 2133 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,scatter"
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 = "4"

 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.hmmer: `-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.hmmer: `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/Default-Platform-Flags.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/Default-Platform-Flags.xml

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