# SPEC® CFP2006 Result

## Lenovo Group Limited

### Lenovo ThinkServer RD650

(2.60 GHz, Intel Xeon E5-2623 v4)

**SPECfp®2006** = 89.1

**SPECfp_base2006** = 85.1

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>41.7</td>
</tr>
<tr>
<td>416.gamess</td>
<td>35.2</td>
</tr>
<tr>
<td>433.milc</td>
<td>65.6</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>116</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>50.1</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>162</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>29.0</td>
</tr>
<tr>
<td>444.namd</td>
<td>28.1</td>
</tr>
<tr>
<td>447.dealII</td>
<td>60.7</td>
</tr>
<tr>
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<tr>
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<td>57.0</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>72.2</td>
</tr>
</tbody>
</table>

## Hardware

- **CPU Name:** Intel Xeon E5-2623 v4
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.20 GHz
- **CPU MHz:** 2600
- **FPU:** Integrated
- **CPU(s) enabled:** 8 cores, 2 chips, 4 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

## 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; Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
- **Auto Parallel:** Yes
- **File System:** xfs
- **System State:** Run level 3 (multi-user)

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SPECfp2006 = 89.1
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CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited
L3 Cache: 10 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 2133 MHz)
Disk Subsystem: 1 x 800 GB SATA SSD
Other Hardware: None
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</tr>
</tbody>
</table>

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

Operating System Notes

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

Platform Notes

BIOS Configuration:
- Hyper-Threading set to Disabled
- Early Snoop set to Enabled
- Performance Profile set to Custom
- C1E Support set to Disabled
- Core C3 set to Disabled
- Core C6 set to Disabled
- Thermal Profile set to High Fan Speed
- Memory Power Savings set to Disabled
### Lenovo Group Limited

**Lenovo ThinkServer RD650**  
(2.60 GHz, Intel Xeon E5-2623 v4)

<table>
<thead>
<tr>
<th>SPECfp2006</th>
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<tr>
<td>SPECfp_base2006</td>
<td>85.1</td>
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**CPU2006 license:** 9017  
**Test date:** Jun-2016  
**Test sponsor:** Lenovo Group Limited  
**Tested by:** Lenovo Group Limited  
**Hardware Availability:** Mar-2016  
**Software Availability:** Dec-2015

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**Platform Notes (Continued)**

Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914  
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1  
running on RD650-MLK Tue Jun 14 20:38:42 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 E5-2623 v4@ 2.60GHz  
  2 "physical id"s (chips)  
  8 "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  
  physical 1: cores 0 1 2 3  
  cache size : 10240 KB

From /proc/meminfo
  
MemTotal:       264558880 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="SL5"  
    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:  
  (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 14 14:45

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

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda3</td>
<td>xfs</td>
<td>691G</td>
<td>7.8G</td>
<td>684G</td>
<td>2%</td>
<td>/home</td>
</tr>
</tbody>
</table>

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Platform Notes (Continued)

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 PB2TS335 01/09/2016
Memory:
8x NO DIMM NO DIMM
16x Samsung M393A2G40DB1-CRC 16 GB 2 rank 2400 MHz, configured at 2133 MHz

(End of data from sysinfo program)

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 = "8"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1
Transparent Huge Pages disabled with:
echo never > /sys/kernel/mm/transparent_hugepage/enabled

Base Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
icc -m64 ifort -m64

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
Lenovo Group Limited

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CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Test date: Jun-2016
Tested by: Lenovo Group Limited
Hardware Availability: Mar-2016
Software Availability: Dec-2015

Base Portability Flags (Continued)

435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64 -nofor_main
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias

Peak Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
icc -m64 ifort -m64
Lenovo Group Limited
Lenovo ThinkServer RD650
(2.60 GHz, Intel Xeon E5-2623 v4)

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

SPECfp2006 = 89.1
SPECfp_base2006 = 85.1

Test date: Jun-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
433.milc: basepeak = yes
470.lbm: basepeak = yes
482.sphinx3: basepeak = yes

C++ benchmarks:
444.namd: -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) -fno-alias
-auto-ilp32

447.dealII: basepeak = yes
450.soplex: basepeak = yes
453.povray: -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
-ansi-alias

Fortran benchmarks:
410.bwaves: basepeak = yes
416.gamess: -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) -unroll2
-inlinelvel=0 -scalar-rep-

434.zeusmp: basepeak = yes
437.leslie3d: basepeak = yes
459.GemsFDTD: -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) -unroll2
-inlinelvel=0 -opt-prefetch -parallel

465.tonto: -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) -inline-calloc

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Software Availability: Dec-2015

Peak Optimization Flags (Continued)

465.tonto (continued):
- opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias
481.wrf: basepeak = yes

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-Flags-V1.2-BDW-B.html

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-Flags-V1.2-BDW-B.xml

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For other inquiries, please contact webmaster@spec.org.

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