### SPEC® CFP2006 Result

**Lenovo Group Limited**

Lenovo ThinkServer RD550  
(2.60 GHz, Intel Xeon E5-2623 v4)

**SPECfp®2006** = 89.7  
**SPECfp_base2006** = 85.7

<table>
<thead>
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<th>Test sponsor:</th>
<th>Lenovo Group Limited</th>
<th>Test date:</th>
<th>May-2016</th>
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<tr>
<td>Tested by:</td>
<td>Lenovo Group Limited</td>
<td>Hardware Availability:</td>
<td>Mar-2016</td>
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<tr>
<td></td>
<td></td>
<td>Software Availability:</td>
<td>Dec-2015</td>
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#### 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)

#### 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

#### Benchmark Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Result</th>
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<tr>
<td>410.bwaves</td>
<td>41.8</td>
</tr>
<tr>
<td>416.gamess</td>
<td>35.1</td>
</tr>
<tr>
<td>433.milc</td>
<td>65.9</td>
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<tr>
<td>434.zeusmp</td>
<td>118</td>
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<tr>
<td>435.gromacs</td>
<td>50.1</td>
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<tr>
<td>436.cactusADM</td>
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</tr>
<tr>
<td>437.leslie3d</td>
<td>161</td>
</tr>
<tr>
<td>444.namd</td>
<td>29.0</td>
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<tr>
<td>447.dealII</td>
<td>60.9</td>
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<tr>
<td>450.soplex</td>
<td>35.6</td>
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<td>453.povray</td>
<td>64.3</td>
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<td>57.0</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>54.4</td>
</tr>
<tr>
<td>465.tonto</td>
<td>53.5</td>
</tr>
<tr>
<td>470.lbm</td>
<td>42.5</td>
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<tr>
<td>481.wrf</td>
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<tr>
<td>482.sphinx3</td>
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**SPECfp_base2006** = 85.7

**SPECfp2006** = 89.7

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CPU2006 license: 9017
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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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<td>270</td>
<td>72.2</td>
<td>272</td>
<td>71.7</td>
</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
Cluster On Die 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

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Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
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Platform Notes (Continued)

Memory Power Savings set to Disabled
Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on rd550-mlk-rackA02 Tue May 3 06:17:41 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
cautions.)
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: 264558876 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"
CVE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
Linux rd550-mlk-rackA02 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 Apr 27 14:28

SPEC is set to: /home/cpu2006-1.2-ic16.0
Filesystem Type Size Used Avail Use% Mounted on
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### Platform Notes (Continued)

/\dev/sda4 xfs 690G 7.8G 683G 2% /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 PBITS362 03/24/2016**

Memory:
- 16x Hynix Semiconductor HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz, configured at 2133 MHz
- 8x NO DIMM NO DIMM

(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

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Base Portability Flags (Continued)

433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
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.caculi: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.llvm: -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
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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-threatds=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-threatds=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-threatds=1(pass 1) -prof-use(pass 2) -unroll2
            -inline-level=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-threatds=1(pass 1) -prof-use(pass 2) -unroll2
            -inline-level=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-threatds=1(pass 1) -prof-use(pass 2) -inline-calloc

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### 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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