# Lenovo Group Limited

Lenovo ThinkServer RS160
(3.70 GHz, Intel Xeon E3-1280 v5)

| SPECfp®2006 | 99.0 |
| SPECfp_base2006 | 96.6 |

**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 L1 + 32 KB D on chip per core
- **Secondary Cache:** 256 KB L1+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)
**Lenovo Group Limited**

**SPEC CFP2006 Result**

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<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
<th>Base</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>95.0</td>
<td>143</td>
<td>94.9</td>
<td>143</td>
</tr>
<tr>
<td>416.gamess</td>
<td>394</td>
<td>49.7</td>
<td>395</td>
<td>49.6</td>
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<tr>
<td>433.milec</td>
<td>87.9</td>
<td>104</td>
<td>88.0</td>
<td>104</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>45.0</td>
<td>202</td>
<td>45.0</td>
<td>202</td>
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<tr>
<td>435.gromacs</td>
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<td>104</td>
<td>68.7</td>
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<tr>
<td>436.cactusADM</td>
<td>31.1</td>
<td>384</td>
<td>31.2</td>
<td>383</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>89.6</td>
<td>105</td>
<td>89.5</td>
<td>105</td>
</tr>
<tr>
<td>444.namd</td>
<td>208</td>
<td>38.6</td>
<td>208</td>
<td>38.6</td>
</tr>
<tr>
<td>447.dealII</td>
<td>138</td>
<td>82.7</td>
<td>138</td>
<td>82.8</td>
</tr>
<tr>
<td>450.soplex</td>
<td>152</td>
<td>55.0</td>
<td>152</td>
<td>54.8</td>
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<tr>
<td>453.povray</td>
<td>71.9</td>
<td>73.9</td>
<td>71.6</td>
<td>74.3</td>
</tr>
<tr>
<td>454.calculix</td>
<td>103</td>
<td>79.7</td>
<td>104</td>
<td>79.6</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>132</td>
<td>80.7</td>
<td>131</td>
<td>80.8</td>
</tr>
<tr>
<td>465.tonto</td>
<td>147</td>
<td>66.9</td>
<td>147</td>
<td>67.0</td>
</tr>
<tr>
<td>470.lbm</td>
<td>72.9</td>
<td>189</td>
<td>73.0</td>
<td>188</td>
</tr>
<tr>
<td>481.wrf</td>
<td>88.5</td>
<td>126</td>
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<td>126</td>
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<tr>
<td>482.sphinx3</td>
<td>193</td>
<td>101</td>
<td>194</td>
<td>100</td>
</tr>
</tbody>
</table>

**Results Table**

- **Base Pointers**: 64-bit
- **Peak Pointers**: 32/64-bit
- **Other Software**: None
- **Operating System Notes**: Stack size set to unlimited using "ulimit -s unlimited"

**Platform Notes**

- BIOS configuration:
  Hyper-Threading set to disabled
  Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
  $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
  running on RS160-01 Sun May 29 18:17:42 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

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**SPECfp2006 =**  99.0  
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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: 32955088 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*:
- SuSE-release:
- 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"
  - CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
- (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 29 14:12

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

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 VB1TS022 06/21/2016
Memory: 

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SPECfp_base2006 = 96.6

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

Platform Notes (Continued)

4x SK Hynix <BAD INDEX> 8 GB 2 rank 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,1,0"
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

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
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
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

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**CPU2006 license:** 9017  
**Test sponsor:** Lenovo Group Limited  
**Tested by:** Lenovo Group Limited  
**Test date:** May-2016  
**Hardware Availability:** Sep-2016  
**Software Availability:** Dec-2015

## Base Portability Flags (Continued)

<table>
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<tr>
<td>470.lbm</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>481.wrf</td>
<td>-DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
</tbody>
</table>

## 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

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

**C benchmarks:**

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

Peak Optimization Flags (Continued)

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
            -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-threads=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-threads=1(pass 1) -prof-use(pass 2) -inline-calloc
            -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

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| Hardware Availability: | Sep-2016 |
| Software Availability: | Dec-2015 |

**Peak Optimization Flags (Continued)**

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-Settings-V1.2-BDW-revC.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-Settings-V1.2-BDW-revC.xml

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