## Lenovo Group Limited
Lenovo ThinkServer RD550 (1.80 GHz, Intel Xeon E5-2630L v4)

<table>
<thead>
<tr>
<th>SPECfp®2006</th>
<th>102</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006</td>
<td>96.1</td>
</tr>
</tbody>
</table>

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

### Hardware

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E5-2630L v4</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 2.90 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>1800</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>20 cores, 2 chips, 10 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Primary Cache</td>
<td>32 KB L + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache</td>
<td>256 KB I+D on chip per core</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 12 SP1 (x86_64)</td>
</tr>
<tr>
<td></td>
<td>Kernel 3.12.49-11-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux;</td>
</tr>
<tr>
<td></td>
<td>Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux</td>
</tr>
<tr>
<td>Auto Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
</tbody>
</table>

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**SPEC CFP2006 Result**

**Lenovo Group Limited**

Lenovo ThinkServer RD550  
(1.80 GHz, Intel Xeon E5-2630L v4)

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

**Disk Subsystem:** 1 x 800 GB SATA SSD  
**Other Hardware:** None  
**L3 Cache:** 25 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)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 32/64-bit  
**Other Software:** None

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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>410.bwaves</td>
<td>28.3</td>
<td>480</td>
<td>28.5</td>
<td>477</td>
<td>28.3</td>
<td>480</td>
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<td>480</td>
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<tr>
<td>416.gamess</td>
<td>675</td>
<td>29.0</td>
<td>673</td>
<td>29.1</td>
<td>676</td>
<td>29.0</td>
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<td>518</td>
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<tr>
<td>433.milc</td>
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<td>434.zeusmp</td>
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<td>57.5</td>
<td>158</td>
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<td>435.gromacs</td>
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<td>193</td>
<td>37.0</td>
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<td>437.leslie3d</td>
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<td>301</td>
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<td>31.3</td>
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<tr>
<td>444.namd</td>
<td>315</td>
<td>25.5</td>
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<td>25.5</td>
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<td>25.6</td>
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<td>453.povray</td>
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<td>459.GemsFDTD</td>
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<td>187</td>
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<td>196</td>
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<td>465.tonto</td>
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<td>470.lbm</td>
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<td>18.6</td>
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<tr>
<td>481.wrf</td>
<td>112</td>
<td>100</td>
<td>117</td>
<td>95.8</td>
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<td>95.8</td>
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<td>100</td>
<td>117</td>
<td>95.8</td>
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<tr>
<td>482.sphinx3</td>
<td>338</td>
<td>57.6</td>
<td>338</td>
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<td>57.5</td>
<td>338</td>
<td>57.6</td>
<td>339</td>
<td>57.5</td>
</tr>
</tbody>
</table>

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

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**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
Lenovo Group Limited

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SPECfp2006 = 102
SPECfp_base2006 = 96.1

CPU2006 license: 9017
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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 Thu May 19 23:47:50 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 E5-2630L v4 @ 1.80GHz
    2 "physical id"s (chips)
    20 "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 : 10
    siblings : 10
    physical 0: cores 0 1 2 3 4 8 9 10 11 12
    physical 1: cores 0 1 2 3 4 8 9 10 11 12
    cache size : 25600 KB

From /proc/meminfo
    MemTotal:       263674140 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"
    CPE_NAME="cpe:/o:suse:sles:12:sp1"

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

run-level 3 May 19 18:05

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

Filesystem Type Size Used Avail Use% Mounted on
Continued on next page
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Test date: May-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

Platform Notes (Continued)
/dev/sda3 xfs 693G 4.0G 689G 1% /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 PB1TS335 01/09/2016
Memory:
16x Hynix Semiconductor HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz, configured at
2133 MHz
8x NO DIMM NO DIMM

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 = "20"

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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Test date: May-2016

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 -nofor_main
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 RD550
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**SPECFp2006 = 102**

**SPECFp_base2006 = 96.1**

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- **Tested by:** Lenovo Group Limited
- **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
  -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`

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SPEC CFP2006 Result

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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 questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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