# Lenovo Group Limited

**Lenovo ThinkServer RD550 (Intel Xeon E5-2630L v3, 1.80 GHz)**

**SPECint\_rate2006** = 575  
**SPECint\_rate\_base2006** = 555

<table>
<thead>
<tr>
<th>Test sponsor</th>
<th>Lenovo Group Limited</th>
<th>CPU2006 license</th>
<th>9017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by</td>
<td>Lenovo Group Limited</td>
<td>Test date</td>
<td>Dec-2014</td>
</tr>
<tr>
<td>Hardware Availability</td>
<td></td>
<td>Hardware Availability</td>
<td>Sep-2014</td>
</tr>
<tr>
<td>Tested by</td>
<td>Lenovo Group Limited</td>
<td>Tested by</td>
<td>Lenovo Group Limited</td>
</tr>
<tr>
<td>Software Availability</td>
<td></td>
<td>Software Availability</td>
<td>Jan-2014</td>
</tr>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E5-2630L v3</td>
<td>Software</td>
<td>Red Hat Enterprise Linux Server release 6.5 (Santiago)</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 2.90 GHz</td>
<td>Compiler</td>
<td>C/C++: Version 14.0.0.0.080 of Intel C++ Studio XE for Linux</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>1800</td>
<td>Auto Parallel</td>
<td>No</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
<td>File System</td>
<td>ext4</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>16 cores, 2 chips, 8 cores/chip, 2 threads/core</td>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>1.2 chip</td>
<td>Base Pointers</td>
<td>32-bit</td>
</tr>
<tr>
<td>Primary Cache</td>
<td>32 KB I + 32 KB D on chip per core</td>
<td>Peak Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Secondary Cache</td>
<td>256 KB I+D on chip per core</td>
<td>Other Software</td>
<td>Microquill SmartHeap V10.0</td>
</tr>
<tr>
<td>L3 Cache</td>
<td>20 MB I+D on chip per chip</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1866 MHz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x 800 GB SATA SSD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Hardware

<table>
<thead>
<tr>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
</tr>
<tr>
<td>Compiler</td>
</tr>
<tr>
<td>Auto Parallel</td>
</tr>
<tr>
<td>File System</td>
</tr>
<tr>
<td>System State</td>
</tr>
<tr>
<td>Base Pointers</td>
</tr>
<tr>
<td>Peak Pointers</td>
</tr>
<tr>
<td>Other Software</td>
</tr>
</tbody>
</table>
Lenovo Group Limited

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CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
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SPECint_rate2006 = 575
SPECint_rate_base2006 = 555

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds Base</th>
<th>Seconds Ratio</th>
<th>Seconds Peak</th>
<th>Seconds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>32</td>
<td>778</td>
<td>402</td>
<td>779</td>
<td>401</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>32</td>
<td>1141</td>
<td>271</td>
<td>1140</td>
<td>271</td>
</tr>
<tr>
<td>403.gcc</td>
<td>32</td>
<td>588</td>
<td>438</td>
<td>597</td>
<td>431</td>
</tr>
<tr>
<td>429.mcf</td>
<td>32</td>
<td>366</td>
<td>797</td>
<td>369</td>
<td>792</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>32</td>
<td>956</td>
<td>351</td>
<td>956</td>
<td>351</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>32</td>
<td>389</td>
<td>768</td>
<td>387</td>
<td>772</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>32</td>
<td>1040</td>
<td>372</td>
<td>1041</td>
<td>372</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>32</td>
<td>119</td>
<td>5580</td>
<td>118</td>
<td>5630</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>32</td>
<td>1161</td>
<td>610</td>
<td>1151</td>
<td>615</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>32</td>
<td>601</td>
<td>333</td>
<td>603</td>
<td>332</td>
</tr>
<tr>
<td>473.astar</td>
<td>32</td>
<td>721</td>
<td>311</td>
<td>723</td>
<td>311</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>32</td>
<td>347</td>
<td>636</td>
<td>347</td>
<td>636</td>
</tr>
</tbody>
</table>

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

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

Platform Notes

BIOS configuration:
Cluster On Die set to Auto
Early Snoop set to Auto
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
Sysinfo program /usr/cpu2006/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on RD550 Mon Dec 29 18:54:05 2014

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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**SPECint_rate2006 = 575**
**SPECint_rate_base2006 = 555**

**Platform Notes (Continued)**

From /proc/cpuinfo
- model name : Intel(R) Xeon(R) CPU E5-2630L v3 @ 1.80GHz
- 2 "physical id"s (chips)
- 32 "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 : 8
  - siblings : 16
  - physical 0: cores 0 1 2 3 4 5 6 7
  - physical 1: cores 0 1 2 3 4 5 6 7
- cache size : 20480 KB

From /proc/meminfo
- MemTotal: 264413548 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
- Red Hat Enterprise Linux Server release 6.5 (Santiago)

From /etc/*release* /etc/*version*
- redhat-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
- system-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)

uname -a:
- Linux RD550 2.6.32-431.el6.x86_64 #1 SMP Sun Nov 10 22:19:54 EST 2013 x86_64
- x86_64 x86_64 GNU/Linux

run-level 3 Dec 29 18:52

SPEC is set to: /usr/cpu2006
- Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda2 ext4 730G 68G 626G 10% /

Additional information from dmidecode:
- BIOS LENOVO PB1TS110 10/06/2014
- Memory:
  - 16x 16 GB
  - 8x NO DIMM NO DIMM
  - 16x Samsung M393A2G40DB0-CPB 16 GB 1866 MHz 2 rank

(End of data from sysinfo program)
RD550 support 4 channels and 12 DIMMs per processor, total 8 channels and 24 DIMMs. 16 DIMM slots installed with 16 GB DIMM for this run.
Lenovo Group Limited
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Software Availability: Jan-2014
Hardware Availability: Sep-2014
Test date: Dec-2014

CPU2006 license: 9017
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General Notes
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/usr/cpu2006/libs/32:/usr/cpu2006/libs/64:/usr/cpu2006/sh"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RedHat EL 6.4
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/redhat_transparent_hugepage/enabled
Filesystem page cache cleared with:
echo 1 > /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
umactl --interleave=all runspec <etc>

Base Compiler Invocation
C benchmarks:
   icc -m32
C++ benchmarks:
   icpc -m32

Base Portability Flags
400.perlbench: -DSPEC_CPU_LINUX_IA32
462.libquantum: -DSPEC_CPU_LINUX
483.xalancbmk: -DSPEC_CPU_LINUX

Base Optimization Flags
C benchmarks:
   -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
   -opt-mem-layout-trans=3
C++ benchmarks:
   -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
   -opt-mem-layout-trans=3 -Wl,-z,muldefs -L/sh -lsmartheap

Base Other Flags
C benchmarks:
   403.gcc: -Dalloca=_alloca
**Lenovo Group Limited**

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**Peak Compiler Invocation**

C benchmarks (except as noted below):

```bash
icc  -m32
```

400.perlbench: ```icc  -m64```

401.bzip2: ```icc  -m64```

456.hmmer: ```icc  -m64```

458.sjeng: ```icc  -m64```

C++ benchmarks:

```bash
icpc  -m32
```

---

**Peak Portability Flags**

400.perlbench: ```-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64```

401.bzip2: ```-DSPEC_CPU_LP64```

456.hmmer: ```-DSPEC_CPU_LP64```

458.sjeng: ```-DSPEC_CPU_LP64```

462.libquantum: ```-DSPEC_CPU_LINUX```

483.xalancbmk: ```-DSPEC_CPU_LINUX```

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**Peak Optimization Flags**

C benchmarks:

400.perlbench: ```-xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32```

401.bzip2: ```-xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -opt-prefetch -auto-ilp32 -ansi-alias```

403.gcc: ```-xCORE-AVX2 -ipo -O3 -no-prec-div```

429.mcf: ```basepeak = yes```

445.gobmk: ```-xCORE-AVX2(pass 2) -prof-gen(pass 1) -prof-use(pass 2) -ansi-alias -opt-mem-layout-trans=3```

456.hmmer: ```-xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32```

458.sjeng: ```-xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -auto-ilp32```
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**Peak Optimization Flags (Continued)**

462.libquantum: basepeak = yes

464.h264ref:
- -xCORE-AVX2(pass 2)
- -prof-gen(pass 1)
- -ipo(pass 2)
- -O3(pass 2)
- -no-prec-div(pass 2)
- -prof-use(pass 2)
- -unroll2
- -ansi-alias

C++ benchmarks:

471.omnetpp:
- -xCORE-AVX2(pass 2)
- -prof-gen(pass 1)
- -ipo(pass 2)
- -O3(pass 2)
- -no-prec-div(pass 2)
- -prof-use(pass 2)
- -ansi-alias
- -opt-ra-region-strategy=block
- -Wl,-z,muldefs
- -L/sh -lsmartheap

473.astar: basepeak = yes
483.xalancbmk: basepeak = yes

---

**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-ic14.0-official-linux64.20140128.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-HSW-revA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-HSW-revA.xml

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