Lenovo Group Limited
Lenovo ThinkServer RD550
(3.50 GHz, Intel Xeon E5-2637 v4)

**SPECint®2006 =** 68.2
**SPECint_base2006 =** 64.9

<table>
<thead>
<tr>
<th>CPU2006 license:</th>
<th>9017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor:</td>
<td>Lenovo Group Limited</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Group Limited</td>
</tr>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon E5-2637 v4</td>
</tr>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.70 GHz</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>3500</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>8 cores, 2 chips, 4 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Primary Cache:</td>
<td>32 KB L1 + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache:</td>
<td>256 KB L1+D on chip per core</td>
</tr>
<tr>
<td>L3 Cache:</td>
<td>15 MB L1+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)</td>
</tr>
<tr>
<td>Disk Subsystem:</td>
<td>1 x 800 GB SATA SSD</td>
</tr>
<tr>
<td>Other Hardware:</td>
<td>None</td>
</tr>
</tbody>
</table>

| Operating System: | SUSE Linux Enterprise Server 12 SP1 (x86_64) |
|                   | Kernel 3.12.49-11-default |
| Compiler:         | C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux |
| Auto Parallel:    | Yes |
| File System:      | xfs |
| System State:     | Run level 3 (multi-user) |
| Base Pointers:    | 32/64-bit |
| Peak Pointers:    | 32/64-bit |
| Other Software:   | Microquill SmartHeap V10.2 |
Lenovo Group Limited

Lenovo ThinkServer RD550
(3.50 GHz, Intel Xeon E5-2637 v4)

SPEClnt2006 = 68.2
SPEClnt_base2006 = 64.9

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

Test date: Feb-2017
Hardware Availability: Mar-2016
Software Availability: Sep-2016

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>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>230</td>
<td>42.5</td>
<td>230</td>
<td>42.4</td>
<td>199</td>
<td>49.0</td>
<td>199</td>
<td>49.1</td>
<td>199</td>
<td>49.1</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>353</td>
<td>27.3</td>
<td>353</td>
<td>27.3</td>
<td>352</td>
<td>27.4</td>
<td>348</td>
<td>27.7</td>
<td>348</td>
<td>27.7</td>
</tr>
<tr>
<td>403.gcc</td>
<td>217</td>
<td>37.1</td>
<td>216</td>
<td>37.2</td>
<td>217</td>
<td>37.2</td>
<td>218</td>
<td>37.0</td>
<td>218</td>
<td>36.9</td>
</tr>
<tr>
<td>429.mcf</td>
<td>126</td>
<td>72.2</td>
<td>127</td>
<td>71.7</td>
<td>126</td>
<td>72.1</td>
<td>126</td>
<td>72.1</td>
<td>126</td>
<td>72.3</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>333</td>
<td>31.5</td>
<td>333</td>
<td>31.5</td>
<td>332</td>
<td>31.6</td>
<td>325</td>
<td>32.3</td>
<td>325</td>
<td>32.3</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>103</td>
<td>91.0</td>
<td>103</td>
<td>90.8</td>
<td>102</td>
<td>91.1</td>
<td>103</td>
<td>91.0</td>
<td>103</td>
<td>90.8</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>343</td>
<td>35.3</td>
<td>343</td>
<td>35.3</td>
<td>342</td>
<td>35.4</td>
<td>334</td>
<td>36.3</td>
<td>334</td>
<td>36.3</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>5.48</td>
<td>3780</td>
<td>5.98</td>
<td>3460</td>
<td>5.43</td>
<td>3810</td>
<td>5.48</td>
<td>3780</td>
<td>5.98</td>
<td>3460</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>344</td>
<td>64.2</td>
<td>344</td>
<td>64.3</td>
<td>344</td>
<td>64.4</td>
<td>344</td>
<td>64.2</td>
<td>344</td>
<td>64.3</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>243</td>
<td>25.8</td>
<td>242</td>
<td>25.9</td>
<td>242</td>
<td>25.8</td>
<td>242</td>
<td>25.8</td>
<td>242</td>
<td>25.8</td>
</tr>
<tr>
<td>473.astar</td>
<td>190</td>
<td>36.9</td>
<td>191</td>
<td>36.8</td>
<td>190</td>
<td>36.9</td>
<td>195</td>
<td>36.0</td>
<td>191</td>
<td>36.8</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>90.4</td>
<td>76.3</td>
<td>90.3</td>
<td>76.4</td>
<td>90.5</td>
<td>76.3</td>
<td>82.5</td>
<td>83.7</td>
<td>82.6</td>
<td>83.5</td>
</tr>
</tbody>
</table>

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

Submit Notes

The config file option 'submit' was used.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled

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
CPU Performance and Energy Bias set to Disabled
Thermal Profile set to High Fan Speed
Memory Power Savings set to Disabled
Sysinfo program /home/cpu2006-1.2-ic17.0/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on RD550-02 Thu Feb 16 21:00:16 2017

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:
Continued on next page
Lenovo Group Limited
Lenovo ThinkServer RD550
(3.50 GHz, Intel Xeon E5-2637 v4)

SPECint2006 = 68.2
SPECint_base2006 = 64.9

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Test date: Feb-2017
Tested by: Lenovo Group Limited
Hardware Availability: Mar-2016
Software Availability: Sep-2016

Platform Notes (Continued)

http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
  model name : Intel(R) Xeon(R) CPU E5-2637 v4 @ 3.50GHz
  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 : 15360 KB

From /proc/meminfo
  MemTotal:  264562596 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 Feb 16 20:53

SPEC is set to: /home/cpu2006-1.2-ic17.0
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda4 xfs 689G 23G 666G 4% /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.

Continued on next page
Lenovo Group Limited
Lenovo ThinkServer RD550
(3.50 GHz, Intel Xeon E5-2637 v4)

SPECint2006 = 68.2
SPECint_base2006 = 64.9

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

Test date: Feb-2017
Hardware Availability: Mar-2016
Software Availability: Sep-2016

Platform Notes (Continued)

BIOS LENOVO PB1TS393 10/28/2016
Memory:
16x Hynix Semiconductor HMA42GR7AFR4N-UH 16 GB 2 rank 2400 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-ic17.0/libs/32:/home/cpu2006-1.2-ic17.0/libs/64:/home/cpu2006-1.2-ic17.0/sh10.2"
OMP_NUM_THREADS = "8"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.2

Base Compiler Invocation

C benchmarks:
  icc -m64

C++ benchmarks:
  icpc -m64

Base Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
471.omnetpp: -DSPEC_CPU_LP64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
-auto-p32

Continued on next page
SPEC CINT2006 Result

Lenovo Group Limited

Lenovo ThinkServer RD550
(3.50 GHz, Intel Xeon E5-2637 v4)

<table>
<thead>
<tr>
<th>SPECint2006</th>
<th>68.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_base2006</td>
<td>64.9</td>
</tr>
</tbody>
</table>

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

Test date: Feb-2017
Hardware Availability: Mar-2016
Software Availability: Sep-2016

---

**Base Optimization Flags (Continued)**

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh10.2 -lsmartheap64

---

**Base Other Flags**

C benchmarks:
403.gcc: -Dalloca=_alloca

---

**Peak Compiler Invocation**

C benchmarks (except as noted below):
icc -m64

400.perlbench: icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
445.gobmk: icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

C++ benchmarks (except as noted below):
icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
473.astar: icpc -m64

---

**Peak Portability Flags**

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -DSPEC_CPU_LP64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
Lenovo Group Limited

Lenovo ThinkServer RD550
(3.50 GHz, Intel Xeon E5-2637 v4)

SPECint2006 = 68.2
SPECint_base2006 = 64.9

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

Test date: Feb-2017
Hardware Availability: Mar-2016
Software Availability: Sep-2016

Peak Optimization Flags

C benchmarks:

400.perlbench: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -qopt-prefetch

401.bzip2: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div -auto-ilp32 -qopt-prefetch

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc
-qopt-malloc-options=3 -auto-ilp32

429.mcf: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel
-qopt-prefetch -auto-p32

445.gobmk: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2)

456.hmmer: basepeak = yes

458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll4

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -qopt-ra-region-strategy=block
-Wl,-z,muldefs -L/sh10.2 -lsmartheap

473.astar: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-auto-p32 -Wl,-z,muldefs -L/sh10.2 -lsmartheap64

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-Wl,-z,muldefs -L/sh10.2 -lsmartheap

Peak Other Flags

C benchmarks:

Continued on next page
Lenovo Group Limited

Lenovo ThinkServer RD550
(3.50 GHz, Intel Xeon E5-2637 v4)

SPECint2006 = 68.2
SPECint_base2006 = 64.9

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

Test date: Feb-2017
Hardware Availability: Mar-2016
Software Availability: Sep-2016

Peak Other Flags (Continued)

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-ic17.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revE.xml

SPEC and SPECint are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2006 v1.2.