Lenovo Group Limited

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

Test date: Nov-2014
Hardware Availability: Sep-2014
Software Availability: Jan-2014

Hardware

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon E5-2680 v3</td>
</tr>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.30 GHz</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>2500</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>24 cores, 2 chips, 12 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1.2 chip</td>
</tr>
<tr>
<td>Primary Cache:</td>
<td>32 KB I + 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>
<tr>
<td>L3 Cache:</td>
<td>30 MB I+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 PC4-2133P-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: Red Hat Enterprise Linux Server release 6.5 (Santiago)
Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux
Auto Parallel: No
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 32-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.0
## Lenovo Group Limited

**Lenovo ThinkServer RD550 (Intel Xeon E5-2680 v3, 2.50 GHz)**

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

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</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>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>48</td>
<td>576</td>
<td>814</td>
<td>574</td>
<td>816</td>
<td>574</td>
<td>817</td>
<td>48</td>
<td>475</td>
<td>987</td>
<td>474</td>
<td>990</td>
<td>474</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>48</td>
<td>910</td>
<td>509</td>
<td>910</td>
<td>509</td>
<td>914</td>
<td>507</td>
<td>48</td>
<td>872</td>
<td>531</td>
<td>873</td>
<td>530</td>
<td>875</td>
</tr>
<tr>
<td>403.gcc</td>
<td>48</td>
<td>495</td>
<td>780</td>
<td>498</td>
<td>777</td>
<td>495</td>
<td>781</td>
<td>48</td>
<td>502</td>
<td>770</td>
<td>499</td>
<td>775</td>
<td>498</td>
</tr>
<tr>
<td>429.mcf</td>
<td>48</td>
<td>327</td>
<td>1340</td>
<td>324</td>
<td>1350</td>
<td>323</td>
<td>1350</td>
<td>48</td>
<td>327</td>
<td>1340</td>
<td>324</td>
<td>1350</td>
<td>323</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>48</td>
<td>306</td>
<td>1460</td>
<td>308</td>
<td>1450</td>
<td>308</td>
<td>1450</td>
<td>48</td>
<td>307</td>
<td>1460</td>
<td>307</td>
<td>1460</td>
<td>307</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>48</td>
<td>764</td>
<td>760</td>
<td>765</td>
<td>759</td>
<td>765</td>
<td>759</td>
<td>48</td>
<td>739</td>
<td>785</td>
<td>741</td>
<td>784</td>
<td>740</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>48</td>
<td>103</td>
<td>9620</td>
<td>103</td>
<td>9690</td>
<td>103</td>
<td>9690</td>
<td>48</td>
<td>103</td>
<td>9620</td>
<td>103</td>
<td>9690</td>
<td>103</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>48</td>
<td>861</td>
<td>1230</td>
<td>870</td>
<td>1220</td>
<td>876</td>
<td>1210</td>
<td>48</td>
<td>849</td>
<td>1250</td>
<td>847</td>
<td>1250</td>
<td>836</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>48</td>
<td>552</td>
<td>543</td>
<td>557</td>
<td>539</td>
<td>559</td>
<td>537</td>
<td>48</td>
<td>529</td>
<td>567</td>
<td>529</td>
<td>567</td>
<td>527</td>
</tr>
<tr>
<td>473.astar</td>
<td>48</td>
<td>607</td>
<td>555</td>
<td>608</td>
<td>554</td>
<td>605</td>
<td>557</td>
<td>48</td>
<td>607</td>
<td>555</td>
<td>608</td>
<td>554</td>
<td>605</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>48</td>
<td>306</td>
<td>1080</td>
<td>306</td>
<td>1080</td>
<td>305</td>
<td>1080</td>
<td>48</td>
<td>306</td>
<td>1080</td>
<td>306</td>
<td>1080</td>
<td>305</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 Enabled  
Early Snoop set to Disabled  
Performance Profile set to Custom  
CR 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 Tue Nov 4 21:45:17 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

Continued on next page
Lenovo Group Limited
Lenovo ThinkServer RD550 (Intel Xeon E5-2680 v3, 2.50 GHz)

SPECint_rate2006 = 1060
SPECint_rate_base2006 = 1020

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

Lenovo Group Limited
Lenovo ThinkServer RD550 (Intel Xeon E5-2680 v3, 2.50 GHz)

SPECint_rate2006 = 1060
SPECint_rate_base2006 = 1020

Platform Notes (Continued)

From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E5-2680 v3 @ 2.50GHz
  2 "physical id"s (chips)
  48 "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 : 12
siblings : 24
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
cache size : 15360 KB

From /proc/meminfo
MemTotal: 264411044 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 Nov 4 21:43

SPEC is set to: /usr/cpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 730G 99G 594G 15% /

Additional information from dmidecode:
BIOS LENOVO PB1TS110 10/06/2014
Memory:
  16x 16 GB
  1x Hynix Semiconductor HMA42GR7MFR4N-TF 16 GB 2133 MHz 2 rank
  15x Hynix Semiconductor HMA42GR7MFR4N-TFTD 16 GB 2133 MHz 2 rank
  8x NO DIMM NO DIMM

(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**

Lenovo ThinkServer RD550 (Intel Xeon E5-2680 v3, 2.50 GHz)

---

**SPECint_rate2006** = 1060  
**SPECint_rate_base2006** = 1020

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2006 license</td>
<td>9017</td>
</tr>
<tr>
<td>Test sponsor</td>
<td>Lenovo Group Limited</td>
</tr>
<tr>
<td>Tested by</td>
<td>Lenovo Group Limited</td>
</tr>
<tr>
<td>Test date</td>
<td>Nov-2014</td>
</tr>
<tr>
<td>Hardware Availability</td>
<td>Sep-2014</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Jan-2014</td>
</tr>
</tbody>
</table>

**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.:

```
numactl --interleave=all runspec <etc>
```

**Base CompilerInvocation**

**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
Lenovo ThinkServer RD550 (Intel Xeon E5-2680 v3, 2.50 GHz)

SPECint\_rate2006 = 1060
SPECint\_rate\_base2006 = 1020

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Test date: Nov-2014
Tested by: Lenovo Group Limited
Hardware Availability: Sep-2014
Software Availability: Jan-2014

Peak Compiler Invocation

C benchmarks (except as noted below):
\texttt{icc -m32}
\texttt{400.perlbench: icc -m64}
\texttt{401.bzip2: icc -m64}
\texttt{456.hmmer: icc -m64}
\texttt{458.sjeng: icc -m64}

C++ benchmarks:
\texttt{icpc -m32}

Peak Portability Flags

\texttt{400.perlbench: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_LINUX\_X64}
\texttt{401.bzip2: -DSPEC\_CPU\_LP64}
\texttt{456.hmmer: -DSPEC\_CPU\_LP64}
\texttt{458.sjeng: -DSPEC\_CPU\_LP64}
\texttt{462.libquantum: -DSPEC\_CPU\_LINUX}
\texttt{483.xalancbmk: -DSPEC\_CPU\_LINUX}

Peak Optimization Flags

C benchmarks:
\texttt{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}
\texttt{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}
\texttt{403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div}
\texttt{429.mcf: basepeak = yes}
\texttt{445.gobmk: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -prof-use(pass 2) -ansi-alias -opt-mem-layout-trans=3}
\texttt{456.hmmer: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32}
\texttt{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}

Continued on next page
Lenovo Group Limited
Lenovo ThinkServer RD550 (Intel Xeon E5-2680 v3, 2.50 GHz)

SPECint_rate2006 = 1060
SPECint_rate_base2006 = 1020

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

Test date: Nov-2014
Hardware Availability: Sep-2014
Software Availability: Jan-2014

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-RD550-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-RD550-revA.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.
Originally published on 27 January 2015.