Lenovo Group Limited

Lenovo System x3500 M5
(Intel Xeon E5-2698 v3, 2.30 GHz)

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

SPECint®2006 = 65.6
SPECint_base2006 = 63.7

CPU Name: Intel Xeon E5-2698 v3
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz: 2300
FPU: Integrated
CPU(s) enabled: 32 cores, 2 chips, 16 cores/chip
CPU(s) orderable: 1.2 chips
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per core
L3 Cache: 40 MB I+D on chip per core
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)
Disk Subsystem: 1 x 960 GB SATA SSD
Other Hardware: None

Operating System: Red Hat Enterprise Linux Server release 7.0 (Maipo) 3.10.0-123.el7.x86_64
Compiler: C/C++ Version 15.0.0.090 of Intel C++ Studio XE 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 V10.0
## Lenovo Group Limited

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### SPEC CINT2006 Result

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<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>
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<tbody>
<tr>
<td>400.perlbench</td>
<td>234</td>
<td>41.7</td>
<td>239</td>
<td>40.9</td>
<td>240</td>
<td>40.7</td>
<td>207</td>
<td>47.1</td>
<td>205</td>
<td>47.6</td>
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<tr>
<td>401.bzip2</td>
<td>394</td>
<td>24.5</td>
<td>394</td>
<td>24.5</td>
<td>394</td>
<td>24.5</td>
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<tr>
<td>403.gcc</td>
<td>238</td>
<td>33.8</td>
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<td>33.8</td>
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<td>33.8</td>
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<td>34.6</td>
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<tr>
<td>429.mcf</td>
<td><strong>157</strong></td>
<td><strong>58.3</strong></td>
<td>153</td>
<td>59.7</td>
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<tr>
<td>445.gobmk</td>
<td>358</td>
<td>29.3</td>
<td>357</td>
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<td><strong>357</strong></td>
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<td><strong>29.3</strong></td>
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<td>456.hmmer</td>
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<td>70.7</td>
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<td>68.4</td>
<td><strong>136</strong></td>
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<td>458.sjeng</td>
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<td>34.9</td>
<td><strong>347</strong></td>
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<td>35.1</td>
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<td>462.libquantum</td>
<td>2.52</td>
<td>8210</td>
<td><strong>2.55</strong></td>
<td><strong>8120</strong></td>
<td>2.59</td>
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<td>464.h264ref</td>
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<td>524</td>
<td>42.2</td>
<td><strong>523</strong></td>
<td><strong>42.3</strong></td>
<td>521</td>
<td>42.5</td>
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<td>42.2</td>
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<tr>
<td>471.omnetpp</td>
<td><strong>150</strong></td>
<td><strong>41.7</strong></td>
<td>149</td>
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<td>153</td>
<td>40.8</td>
<td>121</td>
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<td>50.6</td>
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<tr>
<td>473.astar</td>
<td>212</td>
<td>33.0</td>
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<td><strong>33.1</strong></td>
<td>210</td>
<td>33.4</td>
<td><strong>212</strong></td>
<td><strong>33.1</strong></td>
<td>212</td>
<td>33.1</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>105</td>
<td>65.6</td>
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<td><strong>65.2</strong></td>
<td>106</td>
<td>65.0</td>
<td><strong>104</strong></td>
<td><strong>66.6</strong></td>
<td>104</td>
<td>66.3</td>
</tr>
</tbody>
</table>

### Results 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"

### Platform Notes

BIOS setting:  
Operating Mode set to "Efficiency-Favor Performance"  
Hyper-Threading set to "Disable"

Sysinfo program /home/SPEC/config/sysinfo.rev6914  
$Rev: 6914 $ $Date:: 2014-06-25 #s e3fbb8667b5a285932ceab81e28219e1  
running on x3500M5 Sat Aug 29 00:46:58 2015

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 E5-2698 v3 @ 2.30GHz  
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 : 16

Continued on next page
Platform Notes (Continued)

siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
cache size : 40960 KB

From /proc/meminfo
   MemTotal:       263455828 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release*/ /etc/*version*
   os-release:
       NAME="Red Hat Enterprise Linux Server"
       VERSION="7.0 (Maipo)"
       ID="rhel"
       ID_LIKE="fedora"
       VERSION_ID="7.0"
       PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
       ANSI_COLOR="0;31"
       CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

uname -a:
   Linux x3500M5 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT 2014 x86_64
   x86_64 x86_64 GNU/Linux

SPEC is set to: /home/SPEC
   Filesystem            Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-root xfs   927G  139G  789G  15% /

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 IBM -[TAE105J-1.10]- 04/20/2015
Memory:
   16x Hynix HMA42GR7MFR4N-TFT1 16 GB 2 rank 2133 MHz
   8x NO DIMM Unknown

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/SPEC/libs/32:/home/SPEC/libs/64:/home/SPEC/sh"
Continued on next page
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Test date: Aug-2015
Hardware Availability: Jan-2015
Software Availability: Sep-2014

General Notes (Continued)

OMP_NUM_THREADS = "32"

Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB memory using RedHat EL 7.0
Transparent Huge Pages enabled with:
  echo always > /sys/kernel/mm/transparent_hugepage/enabled

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 -opt-prefetch -auto-p32

C++ benchmarks:
  -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
  -Wl,-z,muldefs -L/sh -lsmartheap64

Base Other Flags

Continued on next page
Lenovo Group Limited

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| SPECint2006 = | 65.6 |
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Base Other Flags (Continued)

403.gcc: -Dalloca=_alloca

Peak Compiler Invocation

C benchmarks (except as noted below):

```bash
icc -m64
```

400.perlbench: icc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

445.gobmk: icc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

C++ benchmarks (except as noted below):

```bash
icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32
```

473.astar: icpc -m64

Peak Portability Flags

400.perlbench: -DSPEC_CPU_LINUX_IA32
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -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
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

```bash
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)
-opt-prefetch -ansi-alias
```

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

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

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**SPEC CINT2006 Result**

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### Peak Optimization Flags (Continued)

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

445.gobmk: `-xCORE-AVX2` `(pass 2)` `-prof-gen` `(pass 1)` `-prof-use` `(pass 2)`
`-ansi-alias`

456.hmmer: `-xCORE-AVX2` `-ipo` `-O3` `-no-prec-div` `-unroll2` `-auto-1lp32`
`-ansi-alias`

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`

462.libquantum: `basepeak = yes`

464.h264ref: `basepeak = yes`

#### 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)
`-opt-ra-region-strategy=block` `-ansi-alias`
`-Wl,-z,muldefs -L/sh -lsmartheap`

473.astar: `-xCORE-AVX2` `-ipo` `-O3` `-no-prec-div` `-opt-prefetch`
`-auto-p32` `-Wl,-z,muldefs -L/sh -lsmartheap64`

483.xalancbmk: `-xCORE-AVX2` `-ipo` `-O3` `-no-prec-div` `-opt-prefetch`
`-ansi-alias` `-Wl,-z,muldefs -L/sh -lsmartheap`

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### Peak Other Flags

#### C benchmarks:

403.gcc: `-Dalloca=_alloca`

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The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.20150923.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.20150923.xml
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