Lenovo Group Limited
IBM System x3650 M4 HD
(Intel Xeon E5-2680 v2, 2.80 GHz)

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

CPU Name: Intel Xeon E5-2680 v2
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz: 2800
FPU: Integrated
CPU(s) enabled: 20 cores, 2 chips, 10 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: 25 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC3-14900R-13, ECC)
Disk Subsystem: 1 x 400 GB SSD, RAID 0
Other Hardware: None

Software
Operating System: Red Hat Enterprise Linux Server release 6.4 (Santiago)
Compiler: C/C++ Version 14.0.0.080 of Intel C++ Studio XE for Linux
Auto Parallel: Yes
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.0

SPECint2006 = 62.1
SPECint_base2006 = 57.0

Test date: Oct-2014
Hardware Availability: Dec-2013
Software Availability: Sep-2013
### Lenovo Group Limited

IBM System x3650 M4 HD (Intel Xeon E5-2680 v2, 2.80 GHz)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2006 license:</td>
<td>9017</td>
<td></td>
</tr>
<tr>
<td>Test sponsor:</td>
<td>Lenovo Group Limited</td>
<td></td>
</tr>
<tr>
<td>Tested by:</td>
<td>IBM Corporation</td>
<td></td>
</tr>
</tbody>
</table>

**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>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>293</td>
<td>33.4</td>
<td>293</td>
<td>33.3</td>
<td>293</td>
<td>33.3</td>
</tr>
<tr>
<td>401.bzip2</td>
<td><strong>389</strong></td>
<td><strong>24.8</strong></td>
<td>389</td>
<td>24.8</td>
<td>388</td>
<td>24.9</td>
</tr>
<tr>
<td>403.gcc</td>
<td>225</td>
<td>35.7</td>
<td>225</td>
<td>35.8</td>
<td><strong>225</strong></td>
<td><strong>35.7</strong></td>
</tr>
<tr>
<td>429.mcf</td>
<td><strong>131</strong></td>
<td><strong>69.8</strong></td>
<td>131</td>
<td>69.9</td>
<td>131</td>
<td>69.6</td>
</tr>
<tr>
<td>445.gobmk</td>
<td><strong>423</strong></td>
<td><strong>24.8</strong></td>
<td>423</td>
<td>24.8</td>
<td>424</td>
<td>24.8</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>151</td>
<td>61.9</td>
<td>148</td>
<td>62.9</td>
<td><strong>149</strong></td>
<td><strong>62.7</strong></td>
</tr>
<tr>
<td>458.sjeng</td>
<td>399</td>
<td>30.3</td>
<td>399</td>
<td>30.3</td>
<td>399</td>
<td>30.3</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>5.48</td>
<td>3780</td>
<td>5.48</td>
<td>3780</td>
<td>5.48</td>
<td>3780</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>466</td>
<td>47.5</td>
<td>466</td>
<td>47.5</td>
<td><strong>466</strong></td>
<td><strong>47.5</strong></td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>189</td>
<td>33.2</td>
<td>188</td>
<td>33.2</td>
<td><strong>188</strong></td>
<td><strong>33.2</strong></td>
</tr>
<tr>
<td>473.astar</td>
<td>210</td>
<td>33.4</td>
<td><strong>210</strong></td>
<td><strong>33.5</strong></td>
<td>209</td>
<td>33.5</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>117</td>
<td>58.8</td>
<td><strong>115</strong></td>
<td><strong>60.2</strong></td>
<td>114</td>
<td>60.3</td>
</tr>
</tbody>
</table>

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

**Operating System Notes**

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

Zone reclaim mode enabled with:

```
  echo 1 > /proc/sys/vm/zone_reclaim_mode
```

Intel Idle Driver disabled with the following Linux kernel parameter in /etc/grub.conf:

```
  intel_idle.max_cstate=0
```

**Platform Notes**

BIOS setting:

Operating Mode set to Maximum Performance

Hyper-Threading set to Disable

Sysinfo program /home/SPECcpu-20140116-ic14.0/config/sysinfo.rev6874

$Rev: 6874 $ $Date:: 2013-11-20 #$ 654bd3fcf53b06faef0efe54ed011998

running on x3650M4HD Wed Oct  1 06:41:34 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
```

From /proc/cpuinfo

```
  model name : Intel(R) Xeon(R) CPU E5-2680 v2 @ 2.80GHz
```

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
```

Continued on next page
Lenovo Group Limited
IBM System x3650 M4 HD
(Intel Xeon E5-2680 v2, 2.80 GHz)

SPECint2006 = 62.1
SPECint_base2006 = 57.0

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

Platform Notes (Continued)

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:  264654284 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
   Red Hat Enterprise Linux Server release 6.4 (Santiago)

From /etc/*release* /etc/*version*
   redhat-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
   system-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)

uname -a:
   Linux x3650M4HD 2.6.32-358.el6.x86_64 #1 SMP Tue Jan 29 11:47:41 EST 2013
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Oct 1 01:07

SPEC is set to: /home/SPECcpu-20140116-ic14.0

Filesystem    Type    Size  Used Avail Use% Mounted on
/dev/mapper/vg_x3650m4plus-lv_home
ext4    309G  222G   71G  76% /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 IBM -[VVE141DUS-1.73]- 07/31/2014
Memory:
   8x Not Specified Not Specified
   16x Samsung M393B2G70QH0-CMA 16 GB 2 rank 1866 MHz, configured at 1867 MHz

(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/SPECcpu-20140116-ic14.0/libs/32:/home/SPECcpu-20140116-ic14.0/libs/64:/home/SPECcpu-20140116-ic14.0/sh*"
OMP_NUM_THREADS = "20"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
memory using RedHat EL 6.4

Continued on next page
SPEC CINT2006 Result

Lenovo Group Limited
IBM System x3650 M4 HD
(Intel Xeon E5-2680 v2, 2.80 GHz)

SPECint2006 = 62.1
SPECint_base2006 = 57.0

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Test date: Oct-2014
Tested by: IBM Corporation
Hardware Availability: Dec-2013
Software Availability: Sep-2013

General Notes (Continued)

Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/redhat_transparent_hugepage/enabled
runspec command invoked through numacl t i.e.:
umactl --interleave=all runspec <etc>

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:
  -xsSE4.2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32
C++ benchmarks:
  -xsSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
  -Wl,-z,muldefs -L/sh -lsmartheap64

Base Other Flags

C benchmarks:
  403.gcc: -Dalloca=_alloca
Lenovo Group Limited
IBM System x3650 M4 HD
(Intel Xeon E5-2680 v2, 2.80 GHz)

SPECint2006 = 62.1
SPECint_base2006 = 57.0

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

Test date: Oct-2014
Hardware Availability: Dec-2013
Software Availability: Sep-2013

Peak Compiler Invocation

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

  400.perlbench: icc -m32
  445.gobmk: icc -m32
  464.h264ref: icc -m32

C++ benchmarks (except as noted below):
  icpc -m64

  471.omnetpp: icpc -m32

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
  473.astar: -DSPEC_CPU_LP64
  483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

  400.perlbench: -xSSE4.2(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

  401.bzip2: -xSSE4.2(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

  403.gcc: -xSSE4.2 -ipo -O3 -no-prec-div -inline-calloc
  -opt-malloc-options=3 -auto-ilp32

  429.mcf: basepeak = yes

  445.gobmk: -xSSE4.2(pass 2) -prof-gen(pass 1) -prof-use(pass 2)
  -ansi-alias
Lenovo Group Limited
IBM System x3650 M4 HD
(Intel Xeon E5-2680 v2, 2.80 GHz)

SPECint2006 = 62.1
SPECint_base2006 = 57.0

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

Test date: Oct-2014
Hardware Availability: Dec-2013
Software Availability: Sep-2013

Peak Optimization Flags (Continued)

456.hmmer: -xSSE4.2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32
-ansi-alias

458.sjeng: -xSSE4.2(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: -xSSE4.2(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: -xSSE4.2(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: 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/IBM-Platform-Flags-V1.2-IVB-C.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/IBM-Platform-Flags-V1.2-IVB-C.xml
# SPEC CINT2006 Result

**Lenovo Group Limited**

IBM System x3650 M4 HD
(Intel Xeon E5-2680 v2, 2.80 GHz)

<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>IBM Corporation</td>
</tr>
</tbody>
</table>

**SPECint2006 =** 62.1

**SPECint_base2006 =** 57.0

- **Test date:** Oct-2014
- **Hardware Availability:** Dec-2013
- **Software Availability:** Sep-2013

---

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.