IBM Corporation

IBM System x3650 M4 (Intel Xeon E5-2680)

SPECfp®2006 = 88.7
SPECfp_base2006 = 84.2

CPU2006 license: 11
Test date: Apr-2012
Test sponsor: IBM Corporation
Hardware Availability: Mar-2012
Tested by: IBM Corporation
Software Availability: Oct-2011

Hardware

CPU Name: Intel Xeon E5-2680
CPU Characteristics: Intel Turbo Boost Technology up to 3.50 GHz
CPU MHZ: 2700
FPU: Integrated
CPU(s) enabled: 16 cores, 2 chips, 8 cores/chip, 2 threads/core
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

Software

Operating System: Red Hat Enterprise Linux Server release 6.1 (Santiago)
Compiler: C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux;
Fortran: Version 12.1.0.225 of Intel Fortran Studio XE for Linux
Auto Parallel: Yes
File System: ext4
IBM Corporation

IBM System x3650 M4 (Intel Xeon E5-2680)

SPECfp2006 = 88.7
SPECfp_base2006 = 84.2

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

L3 Cache: 20 MB I+D on chip per chip
Other Cache: None
Memory: 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)
Disk Subsystem: 1 x 1 TB SAS, 7200 RPM
Other Hardware: None

System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

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>410.bwaves</td>
<td>33.4</td>
<td>407</td>
<td>33.4</td>
<td>407</td>
<td>33.0</td>
<td>411</td>
<td>33.2</td>
<td>409</td>
<td>34.0</td>
<td>399</td>
</tr>
<tr>
<td>416.gamess</td>
<td>647</td>
<td>30.3</td>
<td>651</td>
<td>30.1</td>
<td>655</td>
<td>29.9</td>
<td>541</td>
<td>36.2</td>
<td>541</td>
<td>36.2</td>
</tr>
<tr>
<td>433.milc</td>
<td>149</td>
<td>61.6</td>
<td>147</td>
<td>62.3</td>
<td>150</td>
<td>61.3</td>
<td>147</td>
<td>62.6</td>
<td>147</td>
<td>62.5</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>61.8</td>
<td>147</td>
<td>62.0</td>
<td>147</td>
<td>62.8</td>
<td>145</td>
<td>61.8</td>
<td>147</td>
<td>62.0</td>
<td>147</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>251</td>
<td>28.5</td>
<td>250</td>
<td>28.5</td>
<td>252</td>
<td>28.4</td>
<td>251</td>
<td>28.5</td>
<td>250</td>
<td>28.5</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>22.5</td>
<td>532</td>
<td>22.7</td>
<td>527</td>
<td>24.7</td>
<td>485</td>
<td>22.5</td>
<td>532</td>
<td>22.7</td>
<td>527</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>39.0</td>
<td>241</td>
<td>36.4</td>
<td>258</td>
<td>47.0</td>
<td>200</td>
<td>39.0</td>
<td>241</td>
<td>36.4</td>
<td>258</td>
</tr>
<tr>
<td>444.namd</td>
<td>337</td>
<td>23.8</td>
<td>336</td>
<td>23.8</td>
<td>337</td>
<td>23.8</td>
<td>331</td>
<td>24.3</td>
<td>332</td>
<td>24.2</td>
</tr>
<tr>
<td>447.dealII</td>
<td>216</td>
<td>52.9</td>
<td>216</td>
<td>52.9</td>
<td>216</td>
<td>53.0</td>
<td>216</td>
<td>52.9</td>
<td>216</td>
<td>52.9</td>
</tr>
<tr>
<td>450.soplex</td>
<td>185</td>
<td>45.2</td>
<td>185</td>
<td>45.0</td>
<td>185</td>
<td>45.1</td>
<td>185</td>
<td>45.2</td>
<td>185</td>
<td>45.0</td>
</tr>
<tr>
<td>453.povray</td>
<td>119</td>
<td>44.8</td>
<td>119</td>
<td>44.6</td>
<td>120</td>
<td>44.5</td>
<td>101</td>
<td>52.5</td>
<td>100</td>
<td>53.0</td>
</tr>
<tr>
<td>454.calculix</td>
<td>212</td>
<td>38.9</td>
<td>216</td>
<td>38.1</td>
<td>219</td>
<td>37.7</td>
<td>199</td>
<td>41.5</td>
<td>199</td>
<td>41.6</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>67.2</td>
<td>158</td>
<td>68.0</td>
<td>156</td>
<td>67.8</td>
<td>156</td>
<td>57.1</td>
<td>186</td>
<td>56.9</td>
<td>186</td>
</tr>
<tr>
<td>465.tonto</td>
<td>289</td>
<td>34.1</td>
<td>286</td>
<td>34.4</td>
<td>287</td>
<td>34.3</td>
<td>226</td>
<td>43.5</td>
<td>220</td>
<td>44.7</td>
</tr>
<tr>
<td>470.lbm</td>
<td>28.4</td>
<td>483</td>
<td>29.2</td>
<td>470</td>
<td>28.2</td>
<td>487</td>
<td>28.4</td>
<td>483</td>
<td>29.2</td>
<td>470</td>
</tr>
<tr>
<td>481.wrf</td>
<td>149</td>
<td>75.0</td>
<td>150</td>
<td>74.6</td>
<td>150</td>
<td>74.4</td>
<td>149</td>
<td>75.0</td>
<td>150</td>
<td>74.6</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>274</td>
<td>71.3</td>
<td>274</td>
<td>71.0</td>
<td>273</td>
<td>71.3</td>
<td>270</td>
<td>72.3</td>
<td>269</td>
<td>72.3</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

Platform Notes

BIOS Settings:
Operating Mode set to Maximum Performance
Sysinfo program /root/SPECcpu-v1.2/config/sysinfo.rev6800
$Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdf5032aaa42e583f96b07f99d3
running on x3650M4 Thu Apr 12 04:55:28 2012

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
IBM Corporation

IBM System x3650 M4 (Intel Xeon E5-2680)

SPECfp2006 = 88.7
SPECfp_base2006 = 84.2

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Apr-2012
Hardware Availability: Mar-2012
Software Availability: Oct-2011

Platform Notes (Continued)

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

From /proc/cpuinfo
  model name: Intel(R) Xeon(R) CPU E5-2680 0 @ 2.70GHz
  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: 132113224 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
  Red Hat Enterprise Linux Server release 6.1 (Santiago)

From /etc/*release* /etc/*version*
  redhat-release: Red Hat Enterprise Linux Server release 6.1 (Santiago)
  system-release: Red Hat Enterprise Linux Server release 6.1 (Santiago)

uname -a:
  Linux x3650M4 2.6.32-131.0.15.el6.x86_64 #1 SMP Tue May 10 15:42:40 EDT 2011
  x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Apr 9 17:04

SPEC is set to: /root/SPECcpu-v1.2
  Filesystem  Type  Size  Used Avail Use% Mounted on
  /dev/mapper/vg_x3650m4-lv_root  ext4  790G  69G  681G  10% /

Additional information from dmidecode:
  Memory:
    16x Samsung M393B1K70DH0-CK0 8 GB 1600 MHz 2 rank

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
  KMP_AFFINITY = "granularity=fine,compact,1,0"
  LD_LIBRARY_PATH = "/root/SPECcpu-v1.2/libs/32:/root/SPECcpu-v1.2/libs/64"
  OMP_NUM_THREADS = "16"

Continued on next page
### IBM Corporation

**IBM System x3650 M4 (Intel Xeon E5-2680)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp2006</td>
<td>88.7</td>
</tr>
<tr>
<td>SPECfp_base2006</td>
<td>84.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2006 license</th>
<th>IBM Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor</td>
<td>IBM Corporation</td>
</tr>
<tr>
<td>Tested by</td>
<td>IBM Corporation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test date</th>
<th>Apr-2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability</td>
<td>Mar-2012</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Oct-2011</td>
</tr>
</tbody>
</table>

#### General Notes (Continued)

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RHEL5.5
Transparent Huge Pages enabled with:
```
echo always > /sys/kernel/mm/redhat_transparent_hugepage/enabled
```

#### Base Compiler Invocation

**C benchmarks:**

```bash
icc -m64
```

**C++ benchmarks:**

```bash
icpc -m64
```

**Fortran benchmarks:**

```bash
ifort -m64
```

**Benchmarks using both Fortran and C:**

```bash
icc -m64 ifort -m64
```

#### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>416.gamess</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>433.milc</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>444.namd</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>447.dealII</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>450.soplex</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>453.povray</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>454.calculix</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>465.tonto</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>470.lbm</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>481.wrf</td>
<td>-DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
</tbody>
</table>

#### Base Optimization Flags

**C benchmarks:**

```bash
-xAVX -ipo -O3 -no-prec-div -static -parallel -opt-prefetch -ansi-alias
```
IBM Corporation

IBM System x3650 M4 (Intel Xeon E5-2680)

SPECfp2006 = 88.7
SPECfp_base2006 = 84.2

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Apr-2012
Hardware Availability: Mar-2012
Software Availability: Oct-2011

Base Optimization Flags (Continued)

C++ benchmarks:
-\texttt{xAVX} -ipo -03 -no-prec-div -static -opt-prefetch -ansi-alias

Fortran benchmarks:
-\texttt{xAVX} -ipo -03 -no-prec-div -static -parallel -opt-prefetch

Benchmarks using both Fortran and C:
-\texttt{xAVX} -ipo -03 -no-prec-div -static -parallel -opt-prefetch
-\ansi-alias

Peak Compiler Invocation

C benchmarks:
\texttt{icc} -m64

C++ benchmarks:
\texttt{icpc} -m64

Fortran benchmarks:
\texttt{ifort} -m64

Benchmarks using both Fortran and C:
\texttt{icc} -m64 \texttt{ifort} -m64

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

\texttt{433.milc}: \texttt{-xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -03(pass 2)}
\texttt{-no-prec-div(pass 2) -prof-use(pass 2) -static -auto-ilp32}
\texttt{-ansi-alias}

\texttt{470.lbm}: basepeak = yes

\texttt{482.sphinx3}: \texttt{-xAVX -ipo -03 -no-prec-div -unroll2 -ansi-alias}
\texttt{-parallel}

C++ benchmarks:

Continued on next page
Peak Optimization Flags (Continued)

444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes
450.soplex: basepeak = yes
453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: -xAVX -ipo -O3 -no-prec-div -opt-prefetch -parallel -static
416.gamess: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2 -inline-level=0 -scalar-rep -static
434.zeusmp: basepeak = yes
437.leslie3d: basepeak = yes
459.GemsFDTD: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2 -inline-level=0 -opt-prefetch -parallel
465.tonto: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -inline-calloc -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
454.calculix: -xAVX -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias
481.wrf: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.html
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-C.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.xml
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-C.xml
# SPEC CFP2006 Result

**IBM Corporation**

**IBM System x3650 M4 (Intel Xeon E5-2680)**

<table>
<thead>
<tr>
<th>SPECfp2006</th>
<th>88.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006</td>
<td>84.2</td>
</tr>
</tbody>
</table>

- **CPU2006 license:** 11
- **Test date:** Apr-2012
- **Test sponsor:** IBM Corporation
- **Hardware Availability:** Mar-2012
- **Tested by:** IBM Corporation
- **Software Availability:** Oct-2011

---

SPEC and SPECfp 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.