IBM Corporation

IBM System x3530 M4
(Intel Xeon E5-2430 v2, 2.50 GHz)

SPECfp®_rate2006 = 384
SPECfp_rate_base2006 = 375

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

Hardware

- CPU Name: Intel Xeon E5-2430 v2
- CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
- CPU MHz: 2500
- FPU: Integrated
- CPU(s) enabled: 12 cores, 2 chips, 6 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 6.5 (Santiago)
- Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux;
  Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux
- Auto Parallel: No
- File System: ext4

Test date: Mar-2014
Hardware Availability: Mar-2014
Software Availability: Nov-2013
**IBM Corporation**  
IBM System x3530 M4  
(Intel Xeon E5-2430 v2, 2.50 GHz)

**SPEC CFP2006 Result**

**IBM System x3530 M4**  
(Intel Xeon E5-2430 v2, 2.50 GHz)

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

**L3 Cache:** 15 MB I+D on chip per chip  
**Other Cache:** None  
**Memory:** 192 GB (12 x 16 GB 2Rx4 PC3-12800R-13, ECC)

**Disk Subsystem:** 1 x 500 GB SATA, 7200 RPM  
**Other Hardware:** None

**System State:** Run level 3 (multi-user)  
**Base Pointers:** 32/64-bit  
**Peak Pointers:** 32/64-bit  
**Software Availability:** Nov-2013

---

**Results Table**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>24</td>
<td>974</td>
<td><strong>335</strong></td>
<td>973</td>
<td>335</td>
<td>974</td>
<td>335</td>
<td>24</td>
<td>974</td>
<td><strong>335</strong></td>
<td>973</td>
<td>335</td>
<td>974</td>
<td>335</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>416.gamess</td>
<td>24</td>
<td><strong>1253</strong></td>
<td>375</td>
<td>1256</td>
<td>374</td>
<td>1249</td>
<td>376</td>
<td>24</td>
<td><strong>1234</strong></td>
<td>381</td>
<td>1234</td>
<td>381</td>
<td>1233</td>
<td>381</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>433.milc</td>
<td>24</td>
<td>688</td>
<td>320</td>
<td><strong>688</strong></td>
<td><strong>320</strong></td>
<td>688</td>
<td>320</td>
<td>24</td>
<td>688</td>
<td>320</td>
<td><strong>688</strong></td>
<td><strong>320</strong></td>
<td>688</td>
<td>320</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>24</td>
<td>512</td>
<td><strong>426</strong></td>
<td>515</td>
<td>424</td>
<td>498</td>
<td>439</td>
<td>24</td>
<td>512</td>
<td><strong>426</strong></td>
<td>515</td>
<td>424</td>
<td>498</td>
<td>439</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>24</td>
<td>618</td>
<td>464</td>
<td>620</td>
<td>463</td>
<td>617</td>
<td>465</td>
<td>24</td>
<td>618</td>
<td>464</td>
<td>620</td>
<td>463</td>
<td>617</td>
<td>465</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>24</td>
<td>1002</td>
<td>225</td>
<td><strong>1004</strong></td>
<td><strong>225</strong></td>
<td>1005</td>
<td>225</td>
<td>12</td>
<td>461</td>
<td>245</td>
<td><strong>462</strong></td>
<td><strong>244</strong></td>
<td>462</td>
<td>244</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>444.namd</td>
<td>24</td>
<td>658</td>
<td>293</td>
<td>654</td>
<td>294</td>
<td><strong>657</strong></td>
<td><strong>293</strong></td>
<td>24</td>
<td>654</td>
<td>294</td>
<td>647</td>
<td>298</td>
<td>654</td>
<td>294</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>447.dealII</td>
<td>24</td>
<td>418</td>
<td>657</td>
<td><strong>418</strong></td>
<td><strong>656</strong></td>
<td>418</td>
<td>656</td>
<td>24</td>
<td>418</td>
<td>657</td>
<td><strong>418</strong></td>
<td><strong>656</strong></td>
<td>418</td>
<td>656</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>450.soplex</td>
<td>24</td>
<td>868</td>
<td>230</td>
<td>870</td>
<td>230</td>
<td><strong>869</strong></td>
<td><strong>230</strong></td>
<td>12</td>
<td>400</td>
<td>250</td>
<td>398</td>
<td>251</td>
<td><strong>399</strong></td>
<td><strong>251</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>453.povray</td>
<td>24</td>
<td>246</td>
<td>520</td>
<td>247</td>
<td>517</td>
<td><strong>246</strong></td>
<td><strong>520</strong></td>
<td>24</td>
<td>215</td>
<td>593</td>
<td>213</td>
<td>601</td>
<td><strong>214</strong></td>
<td><strong>596</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>454.calculix</td>
<td>24</td>
<td><strong>349</strong></td>
<td>567</td>
<td>350</td>
<td>565</td>
<td>349</td>
<td>567</td>
<td>24</td>
<td><strong>349</strong></td>
<td>567</td>
<td>350</td>
<td>565</td>
<td>349</td>
<td>567</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>24</td>
<td>1219</td>
<td>209</td>
<td><strong>1217</strong></td>
<td><strong>209</strong></td>
<td>1215</td>
<td>210</td>
<td>24</td>
<td>1219</td>
<td>209</td>
<td><strong>1217</strong></td>
<td><strong>209</strong></td>
<td>1215</td>
<td>210</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>465.tonto</td>
<td>24</td>
<td><strong>571</strong></td>
<td>414</td>
<td>572</td>
<td>413</td>
<td>569</td>
<td>415</td>
<td>24</td>
<td>545</td>
<td>433</td>
<td>542</td>
<td>436</td>
<td><strong>544</strong></td>
<td><strong>434</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>470.lbm</td>
<td>24</td>
<td>798</td>
<td>413</td>
<td>796</td>
<td>414</td>
<td><strong>797</strong></td>
<td><strong>414</strong></td>
<td>24</td>
<td>798</td>
<td>413</td>
<td>796</td>
<td>414</td>
<td><strong>797</strong></td>
<td><strong>414</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>481.wrf</td>
<td>24</td>
<td>690</td>
<td>389</td>
<td><strong>681</strong></td>
<td><strong>394</strong></td>
<td>680</td>
<td>394</td>
<td>24</td>
<td>679</td>
<td>395</td>
<td><strong>678</strong></td>
<td><strong>396</strong></td>
<td>677</td>
<td>396</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>24</td>
<td><strong>1219</strong></td>
<td>384</td>
<td>1219</td>
<td>384</td>
<td>1217</td>
<td>384</td>
<td>24</td>
<td><strong>1219</strong></td>
<td>384</td>
<td>1219</td>
<td>384</td>
<td>1217</td>
<td>384</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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"

Zone reclaim mode enabled with:

```
    echo 1 > /proc/sys/vm/zone_reclaim_mode
```
IBM Corporation
IBM System x3530 M4
(Intel Xeon E5-2430 v2, 2.50 GHz)

SPECfp_rate2006 = 384
SPECfp_rate_base2006 = 375

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

Platform Notes

BIOS setting:
Operating Mode set to Maximum Performance

General Notes

Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/SPECcpu/libs/32:/home/SPECcpu/libs/64:/home/SPECcpu/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.:
umactl --interleave=all runspec <etc>

Base Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
icc -m64 ifort -m64

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64 -nofor_main
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64

Continued on next page
IBM Corporation
IBM System x3530 M4
(Intel Xeon E5-2430 v2, 2.50 GHz)

SPECfp_rate2006 = 384
SPECfp_rate_base2006 = 375

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

Test date: Mar-2014
Hardware Availability: Mar-2014
Software Availability: Nov-2013

Base Portability Flags (Continued)

465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

Base Optimization Flags

C benchmarks:
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3

C++ benchmarks:
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3

Fortran benchmarks:
-xAVX -ipo -O3 -no-prec-div -opt-prefetch

Benchmarks using both Fortran and C:
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3

Peak Compiler Invocation

C benchmarks:
icc -m64

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

450.soplex: icpc -m32

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
icc -m64 ifort -m64

Peak Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64

Continued on next page
IBM Corporation
IBM System x3530 M4
(Intel Xeon E5-2430 v2, 2.50 GHz)

SPECfp_rate2006 = 384
SPECfp_rate_base2006 = 375

Peak Portability Flags (Continued)

434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

Peak Optimization Flags

C benchmarks:
433.milc: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
          -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
          -prof-use(pass 2) -auto-ilp32

470.lbm: basepeak = yes
482.sphinx3: basepeak = yes

C++ benchmarks:
444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
          -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
          -prof-use(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes
450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
          -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
          -prof-use(pass 2) -opt-malloc-options=3

453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
          -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
          -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:
410.bwaves: basepeak = yes
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-
Peak Optimization Flags (Continued)

434.zeusmp: basepeak = yes

437.leslie3d: -xAVX -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -auto
            -inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
            -prof-use(pass 2) -opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xAVX -ipo -O3 -no-prec-div -auto-ilp32

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-A.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-A.xml