IBM Corporation

IBM System x3630 M4 (Intel Xeon E5-2420)

SPECfp®2006 = 59.2
SPECfp_base2006 = 56.3

CPU2006 license: 11
Test sponsor: IBM Corporation
Test date: Jul-2012
Hardware Availability: May-2012
Tested by: IBM Corporation
Software Availability: Dec-2011

<table>
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<th>Benchmark</th>
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<tr>
<td>482.sphinx3</td>
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</tbody>
</table>

Hardware

- CPU Name: Intel Xeon E5-2420
- CPU Characteristics: Intel Turbo Boost Technology up to 2.40 GHz
- CPU MHz: 1900
- 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 6.2 (Santiago)
- Compiler: C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux
- Auto Parallel: Yes
- File System: ext4

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SPEC CFP2006 Result

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L3 Cache: 15 MB I+D on chip per chip
Other Cache: None
Memory: 96 GB (12 x 8 GB 2Rx4 PC3-12800R-11, ECC, running at 1333 MHz)
Disk Subsystem: 1 x 500 GB SATA, 7200 RPM
Other Hardware: None

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

Benchmark | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
---|---|---|---|---|---|---|---|---|---|---|
410.bwaves | 62.4 | 218 | 62.6 | 217 | 62.4 | 218 | 62.2 | 218 | 62.4 | 218 |
416.gamess | 916 | 21.4 | 914 | 21.4 | 915 | 21.4 | 778 | 25.2 | 775 | 25.3 |
433.milc | 199 | 46.2 | 198 | 46.2 | 199 | 46.2 | 195 | 47.1 | 194 | 47.2 |
434.zeusmp | 90.5 | 101 | 90.1 | 101 | 323 | 22.1 | 90.5 | 101 | 90.1 | 101 |
435.gromacs | 324 | 22.0 | 323 | 22.1 | 323 | 22.1 | 324 | 22.0 | 323 | 22.1 |
436.cactusADM | 37.1 | 322 | 36.9 | 324 | 37.1 | 322 | 37.1 | 322 | 37.1 | 322 |
437.leslie3d | 81.9 | 115 | 86.7 | 108 | 82.1 | 115 | 81.9 | 115 | 86.7 | 108 |
444.namd | 489 | 16.4 | 489 | 16.4 | 489 | 16.4 | 481 | 16.7 | 481 | 16.7 |
447.dealII | 310 | 36.9 | 310 | 36.9 | 310 | 36.9 | 310 | 36.9 | 310 | 36.9 |
450.soplex | 269 | 31.0 | 275 | 30.3 | 275 | 30.3 | 269 | 31.0 | 275 | 30.3 |
453.povray | 175 | 30.3 | 176 | 30.3 | 177 | 30.1 | 149 | 35.8 | 148 | 35.9 |
454.calculix | 305 | 27.1 | 302 | 27.3 | 305 | 27.1 | 280 | 29.4 | 280 | 29.5 |
459.GemsFDTD | 98.3 | 108 | 97.7 | 109 | 98.7 | 107 | 84.4 | 126 | 84.4 | 126 |
465.tonto | 403 | 24.4 | 404 | 24.4 | 407 | 24.2 | 320 | 30.7 | 321 | 30.7 |
470.lbm | 43.4 | 316 | 42.4 | 324 | 43.8 | 314 | 43.4 | 316 | 42.4 | 324 |
481.wrf | 222 | 50.3 | 220 | 50.7 | 217 | 51.5 | 222 | 50.3 | 220 | 50.7 |
482.sphinx3 | 381 | 51.1 | 386 | 50.4 | 384 | 50.8 | 376 | 51.8 | 375 | 52.0 |

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 setting:
Operating Mode set to Maximum Performance
Sysinfo program /home/SPECcpu-v1.2/config/sysinfo.rev6800
$Rev: 6800 $ $Date:: 2011-10-11 ## 6f2ebdfff5032aaa42e583f96b07f99d3 running on x3630m4-rhel62 Sun Jul 15 22:01:26 2012

This section contains SUT (System Under Test) info as seen by
Continued on next page
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**Platform Notes (Continued)**

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 E5-2420 0 @ 1.90GHz
- 2 "physical id"s (chips)
- 24 "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: 6
  - siblings: 12
  - physical 0: cores 0 1 2 3 4 5
  - physical 1: cores 0 1 2 3 4 5
- cache size: 15360 KB

From /proc/meminfo
- MemTotal: 99043000 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
- Red Hat Enterprise Linux Server release 6.2 (Santiago)

From /etc/*release* /etc/*version*
- redhat-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)
- system-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)

uname -a:
- Linux x3630m4-rhel62 2.6.32-220.el6.x86_64 #1 SMP Wed Nov 9 08:03:13 EST 2011
- x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 13 12:49

SPEC is set to: /home/SPECcpu-v1.2
- Filesystem Type Size Used Avail Use% Mounted on
- /dev/mapper/vg_x3630m4rhel62-lv_home ext4 383G 51G 313G 14% /home

Additional information from dmidecode:
- Memory:
  - 12x Samsung M393B1K70DH0-CK0 8 GB 1333 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 = "/home/SPECcpu-v1.2/32:/home/SPECcpu-v1.2/64"

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SPEC CFP2006 Result

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General Notes (Continued)

OMP_NUM_THREADS = "12"

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:
  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.game5s: -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
450.soplex: -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

Base Optimization Flags

C benchmarks:
  -xAVX -ipo -03 -no-prec-div -static -parallel -opt-prefetch
  -ansi-alias

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Base Optimization Flags (Continued)

C++ benchmarks:
- xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias

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

Benchmarks using both Fortran and C:
- xAVX -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
- -ansi-alias

Peak Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

Peak Portability Flags

Same as Base Portability Flags

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) -prof-use(pass 2) -static -auto-ilp32
- -ansi-alias

470.lbm: basepeak = yes

482.sphinx3: -xAVX -ipo -O3 -no-prec-div -unroll2 -ansi-alias
- parallel

C++ benchmarks:

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IBM Corporation

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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) -unroll12
-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
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For questions about this result, please contact the tester. For other inquiries, please contact webmaster@spec.org.

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