# SPEC® CFP2006 Result

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## Supermicro

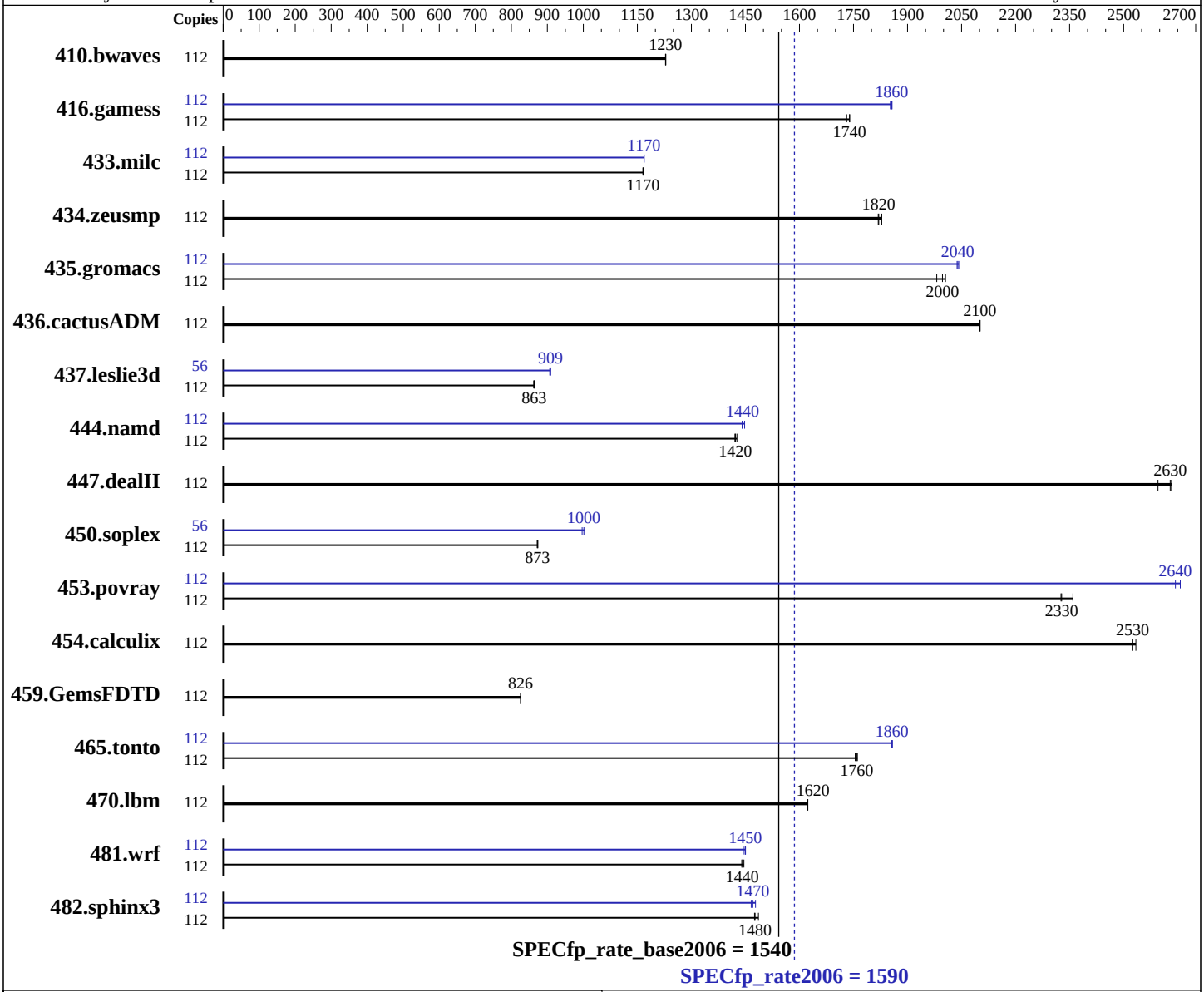
SuperServer 2048U-RTR4
(X10QRH+ , Intel Xeon E5-4660 v3)

SPECfp®_rate2006 = 1590

SPECfp_rate_base2006 = 1540

**CPU2006 license:** 001176
**Test sponsor:** Supermicro
**Tested by:** Supermicro

**Test date:** Jun-2015
**Hardware Availability:** Jun-2015
**Software Availability:** Oct-2014




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-4660 v3 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 2.90 GHz |
| CPU MHz: | 2100 |
| FPU: | Integrated |
| CPU(s) enabled: | 56 cores, 4 chips, 14 cores/chip, 2 threads/core |
| CPU(s) orderable: | 1,2,4 chips |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 256 KB I+D on chip per core |

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### Software

| | |
|---|---|
| Operating System: | SUSE Linux Enterprise Server 12, Kernel 3.12.28-4-default |
| Compiler: | C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux; Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux |
| Auto Parallel: | No |
| File System: | ext4 |
| System State: | Run level 3 (multi-user) |

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L3 Cache: 35 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (32 x 16 GB 2Rx4 PC4-2133P-R)
Disk Subsystem: 1 x 512 GB SATA III, SSD
Other Hardware: None

Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: None

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 112 | **1239** | **1230** | 1239 | 1230 | 1239 | 1230 | 112 | **1239** | **1230** | 1239 | 1230 | 1239 | 1230 |
| 416.gamess | 112 | 1267 | 1730 | **1261** | **1740** | 1261 | 1740 | 112 | 1181 | 1860 | **1181** | **1860** | 1184 | 1850 |
| 433.milc | 112 | **882** | **1170** | 882 | 1170 | 881 | 1170 | 112 | **880** | **1170** | 880 | 1170 | 880 | 1170 |
| 434.zeusmp | 112 | 557 | 1830 | **560** | **1820** | 560 | 1820 | 112 | 557 | 1830 | **560** | **1820** | 560 | 1820 |
| 435.gromacs | 112 | **400** | **2000** | 399 | 2010 | 404 | 1980 | 112 | 392 | 2040 | 392 | 2040 | **392** | **2040** |
| 436.cactusADM | 112 | **637** | **2100** | 637 | 2100 | 637 | 2100 | 112 | **637** | **2100** | 637 | 2100 | 637 | 2100 |
| 437.leslie3d | 112 | **1219** | **863** | 1221 | 862 | 1219 | 864 | 56 | **579** | **909** | 579 | 909 | 581 | 907 |
| 444.namd | 112 | 630 | 1430 | **632** | **1420** | 632 | 1420 | 112 | **623** | **1440** | 623 | 1440 | 620 | 1450 |
| 447.dealII | 112 | **487** | **2630** | 494 | 2600 | 487 | 2630 | 112 | **487** | **2630** | 494 | 2600 | 487 | 2630 |
| 450.soplex | 112 | **1070** | **873** | 1071 | 872 | 1069 | 874 | 56 | 465 | 1000 | **466** | **1000** | 469 | 997 |
| 453.povray | 112 | **256** | **2330** | 256 | 2330 | 253 | 2360 | 112 | 226 | 2630 | **225** | **2640** | 224 | 2660 |
| 454.calculix | 112 | **366** | **2530** | 366 | 2520 | 365 | 2530 | 112 | **366** | **2530** | 366 | 2520 | 365 | 2530 |
| 459.GemsFDTD | 112 | 1439 | 826 | **1438** | **826** | 1438 | 826 | 112 | 1439 | 826 | **1438** | **826** | 1438 | 826 |
| 465.tonto | 112 | **627** | **1760** | 626 | 1760 | 628 | 1750 | 112 | **593** | **1860** | 593 | 1860 | 594 | 1860 |
| 470.lbm | 112 | 948 | 1620 | 949 | 1620 | **948** | **1620** | 112 | 948 | 1620 | 949 | 1620 | **948** | **1620** |
| 481.wrf | 112 | **868** | **1440** | 869 | 1440 | 865 | 1450 | 112 | 865 | 1450 | 863 | 1450 | **863** | **1450** |
| 482.sphinx3 | 112 | 1469 | 1490 | **1478** | **1480** | 1480 | 1480 | 112 | 1477 | 1480 | 1489 | 1470 | **1485** | **1470** |

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"
```

## Platform Notes

```
BIOS Settings:
COD Enable = Enable
Early Snoop = Disable
```

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## Platform Notes (Continued)

```
Enforce POR = Disabled
Sysinfo program /home/SPEC2K6/SPEC2006-V12/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-rrui Fri Jun 12 20:56:22 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 E5-4660 v3 @ 2.10GHz
      4 "physical id"s (chips)
      112 "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 : 14
      siblings  : 28
      physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
      physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
      physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
      physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
   cache size : 35840 KB

From /proc/meminfo
   MemTotal:       529328168 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 0
      # This file is deprecated and will be removed in a future service pack or
      release.
      # Please check /etc/os-release for details about this release.
   os-release:
      NAME="SLES"
      VERSION="12"
      VERSION_ID="12"
      PRETTY_NAME="SUSE Linux Enterprise Server 12"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12"

uname -a:
   Linux linux-rrui 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
   (9879bd4) x86_64 x86_64 x86_64 GNU/Linux
```

Continued on next page

## Platform Notes (Continued)

```
 run-level 5 Jun 12 07:43

 SPEC is set to: /home/SPEC2K6/SPEC2006-V12
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda3      ext4  458G  102G  355G  23% /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 American Megatrends Inc. 1.00 06/01/2015
   Memory:
    16x NO DIMM NO DIMM
    1x Samsung(data:13/44) M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    1x Samsung(data:13/48) M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    3x Samsung(data:13/51) M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    2x Samsung(data:14/13) M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    1x Samsung(data:14/16) M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    5x Samsung(data:14/17) M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    1x Samsung(data:14/25) M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    14x Samsung(data:14/26) M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    4x Samsung(data:14/47) M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz

 (End of data from sysinfo program)
```

## General Notes

```
 Environment variables set by runspec before the start of the run:
 LD_LIBRARY_PATH = "/home/SPEC2K6/SPEC2006-V12/libs/32:/home/SPEC2K6/SPEC2006-V12/libs/64:/home/SPEC2K6/SPEC2006-V12/sh"

  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
  Filesystem page cache cleared with:
  echo 1>       /proc/sys/vm/drop_caches
  runspec command invoked through numactl i.e.:
  numactl --interleave=all runspec <etc>
```

## Base Compiler Invocation

C benchmarks:
```
     icc   -m64
```

C++ benchmarks:
```
     icpc  -m64
```

Continued on next page

## Base Compiler Invocation (Continued)

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
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
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:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -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 -L/opt/intel/composer_xe_2015/lib/ia32

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
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: -xCORE-AVX2(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: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3
-unroll2

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## Peak Optimization Flags (Continued)

C++ benchmarks:

444.namd: -xCORE-AVX2(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: -xCORE-AVX2(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: -xCORE-AVX2(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: -xCORE-AVX2(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-

434.zeusmp: basepeak = yes

437.leslie3d: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xCORE-AVX2(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: -xCORE-AVX2(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: -xCORE-AVX2 -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-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Supermicro-Platform-Settings-V1.2-revG.20141230.00.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/Supermicro-Platform-Settings-V1.2-revG.20141230.00.xml


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Tested with SPEC CPU2006 v1.2.
Report generated on Tue Jun 30 16:17:24 2015 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 30 June 2015.