# SPEC® CFP2006 Result

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## HITACHI

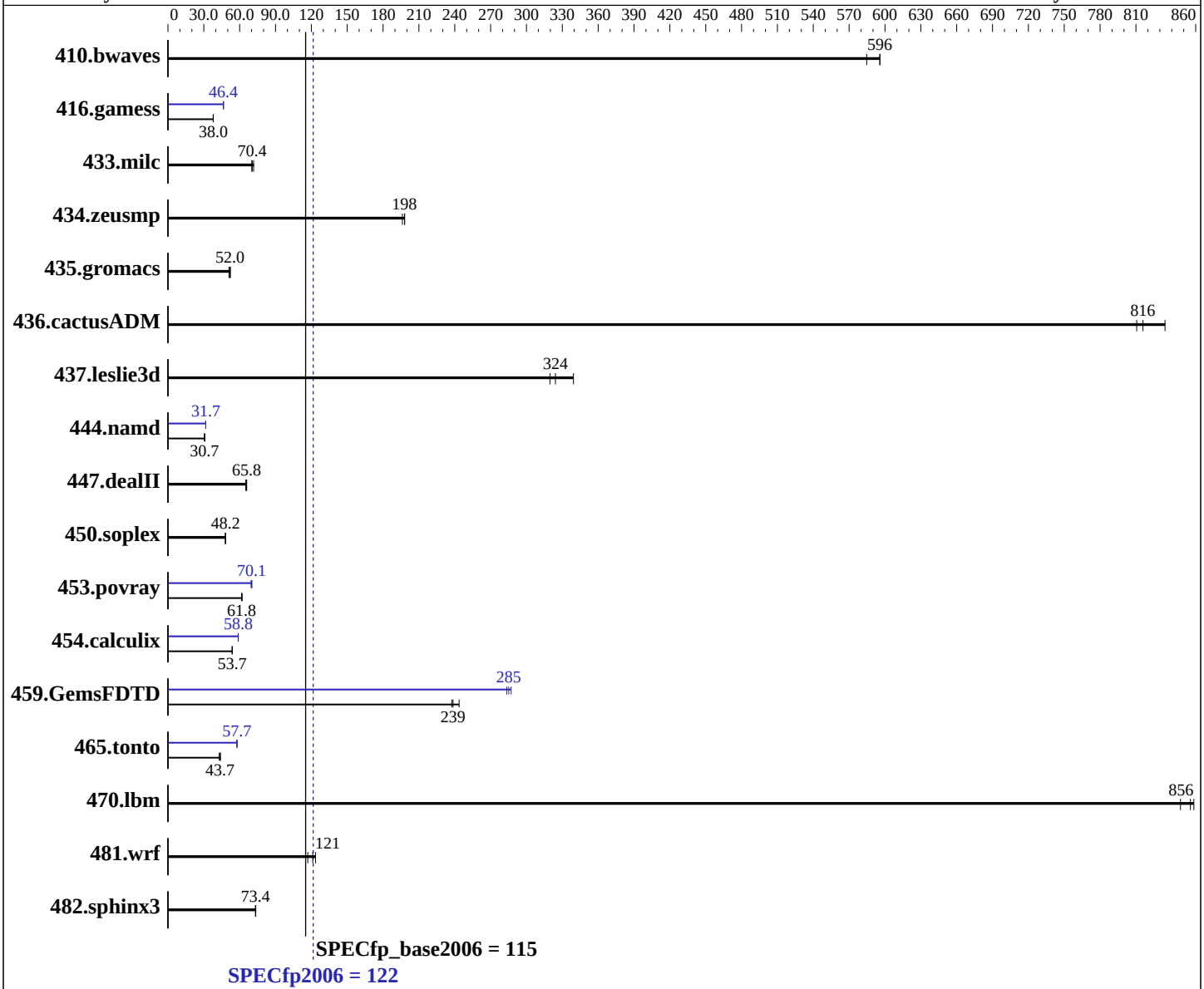
BladeSymphony BS2500 (Intel Xeon E5-2690 v4)

SPECfp®2006 = 122

SPECfp_base2006 = 115

**CPU2006 license:** 35
**Test sponsor:** HITACHI
**Tested by:** HITACHI

**Test date:** Jun-2016
**Hardware Availability:** Jun-2016
**Software Availability:** Nov-2015




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2690 v4 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.50 GHz |
| CPU MHz: | 2600 |
| FPU: | Integrated |
| CPU(s) enabled: | 28 cores, 2 chips, 14 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 |

Continued on next page

## Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 7.2 (Maipo)<br>3.10.0-327.el7.x86_64 |
| Compiler: | C/C++: Version 16.0.0.0 of Intel C++ Studio XE for Linux;<br>Fortran: Version 16.0.0.0 of Intel Fortran Studio XE for Linux |
| Auto Parallel: | Yes |
| File System: | xfs |

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| | | | |
|---|---|---|---|
| L3 Cache: | 35 MB I+D on chip per chip | System State: | Run level 3 (multi-user) |
| Other Cache: | None | Base Pointers: | 64-bit |
| Memory: | 512 GB (16 x 32 GB 2Rx4 PC4-2400T-R) | Peak Pointers: | 32/64-bit |
| Disk Subsystem: | 2 x 300 GB SAS, 15000 RPM, RAID1 | Other Software: | none |
| Other Hardware: | None | | |

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 22.8 | 596 | 23.2 | 585 | **22.8** | **596** | 22.8 | 596 | 23.2 | 585 | **22.8** | **596** |
| 416.gamess | 518 | 37.8 | **516** | **38.0** | 516 | 38.0 | 421 | 46.5 | 422 | 46.4 | **422** | **46.4** |
| 433.milc | 131 | 70.2 | 128 | 71.7 | **130** | **70.4** | 131 | 70.2 | 128 | 71.7 | **130** | **70.4** |
| 434.zeusmp | 46.4 | 196 | **46.0** | **198** | 45.9 | 198 | 46.4 | 196 | **46.0** | **198** | 45.9 | 198 |
| 435.gromacs | 140 | 51.1 | 137 | 52.2 | **137** | **52.0** | 140 | 51.1 | 137 | 52.2 | **137** | **52.0** |
| 436.cactusADM | 14.7 | 811 | **14.6** | **816** | 14.3 | 834 | 14.7 | 811 | **14.6** | **816** | 14.3 | 834 |
| 437.leslie3d | 27.7 | 339 | 29.4 | 320 | **29.0** | **324** | 27.7 | 339 | 29.4 | 320 | **29.0** | **324** |
| 444.namd | 262 | 30.6 | 261 | 30.7 | **261** | **30.7** | 254 | 31.6 | 253 | 31.7 | **253** | **31.7** |
| 447.dealII | 176 | 65.1 | 174 | 65.9 | **174** | **65.8** | 176 | 65.1 | 174 | 65.9 | **174** | **65.8** |
| 450.soplex | 173 | 48.2 | 174 | 48.0 | **173** | **48.2** | 173 | 48.2 | 174 | 48.0 | **173** | **48.2** |
| 453.povray | 86.4 | 61.6 | **86.1** | **61.8** | 85.7 | 62.1 | 76.5 | 69.5 | **75.9** | **70.1** | 75.8 | 70.2 |
| 454.calculix | 154 | 53.7 | 153 | 53.9 | **154** | **53.7** | **140** | **58.8** | 140 | 58.9 | 140 | 58.7 |
| 459.GemsFDTD | 44.7 | 237 | 43.5 | 244 | **44.5** | **239** | **37.2** | **285** | 36.9 | 287 | 37.4 | 284 |
| 465.tonto | 224 | 43.9 | 229 | 42.9 | **225** | **43.7** | 171 | 57.7 | **171** | **57.7** | 170 | 57.9 |
| 470.lbm | 16.0 | 858 | **16.1** | **856** | 16.2 | 847 | 16.0 | 858 | **16.1** | **856** | 16.2 | 847 |
| 481.wrf | 90.5 | 123 | **92.2** | **121** | 95.5 | 117 | 90.5 | 123 | **92.2** | **121** | 95.5 | 117 |
| 482.sphinx3 | **266** | **73.4** | 266 | 73.2 | 265 | 73.5 | **266** | **73.4** | 266 | 73.2 | 265 | 73.5 |

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"
```

## Platform Notes

```
BIOS configuration:
 Patrol Scrub = Disable
 Per Core P-state = Disable

 Sysinfo program /home/cpu2006/config/sysinfo.rev6914
 $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
 running on rhel722 Fri Jun 10 07:20:46 2016

 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

## Platform Notes (Continued)

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

    From /proc/cpuinfo
       model name : Intel(R) Xeon(R) CPU E5-2690 v4@ 2.60GHz
          2 "physical id"s (chips)
          56 "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
       cache size : 35840 KB

    From /proc/meminfo
       MemTotal:       527319476 kB
       HugePages_Total:       0
       Hugepagesize:       2048 kB

    From /etc/*release* /etc/*version*
       os-release:
          NAME="Red Hat Enterprise Linux Server"
          VERSION="7.2 (Maipo)"
          ID="rhel"
          ID_LIKE="fedora"
          VERSION_ID="7.2"
          PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
          ANSI_COLOR="0;31"
          CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"
       redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
       system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
       system-release-cpe: cpe:/o:redhat:enterprise_linux:7.2:ga:server

    uname -a:
       Linux rhel722 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT 2015
       x86_64 x86_64 x86_64 GNU/Linux

    run-level 3 Jun 10 02:23

    SPEC is set to: /home/cpu2006
       Filesystem            Type  Size  Used Avail Use% Mounted on
       /dev/mapper/rhel-home xfs   225G   24G  201G  11% /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 HITACHI 10-00 01/29/2016
      Memory:
```

Continued on next page

## Platform Notes (Continued)

```
      8x NO DIMM Unknown
      16x Samsung M393A4K40BB1-CRC 32 GB 2 rank 2400 MHz

   (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/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"
 OMP_NUM_THREADS = "28"

  Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
  memory using RedHat EL 7.1
  Transparent Huge Pages enabled with:
  echo always > /sys/kernel/mm/transparent_hugepage/enabled
  runspec command invoked through numactl i.e.:
  numactl --interleave=all runspec <etc>
  BladeSymphony BS520H, Hitachi Compute Blade 520H and BladeSymphony BS2500 are electronically equivalent.
  The results have been measured on a Hitachi Compute Blade 520H.
```

## 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
     447.dealII: -DSPEC_CPU_LP64
```

Continued on next page

## Base Portability Flags (Continued)

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 -parallel -opt-prefetch -ansi-alias

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias

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

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -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: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2 -inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -inline-calloc -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

Continued on next page

## Peak Optimization Flags (Continued)

435.gromacs: `basepeak = yes`

436.cactusADM: `basepeak = yes`

454.calculix: `-xCORE-AVX2 -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-ic16.0-official-linux64.html`
`http://www.spec.org/cpu2006/flags/PlatformHitachi-V1.6.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml`
`http://www.spec.org/cpu2006/flags/PlatformHitachi-V1.6.xml`


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