# SPEC® CFP2006 Result



## Hewlett Packard Enterprise

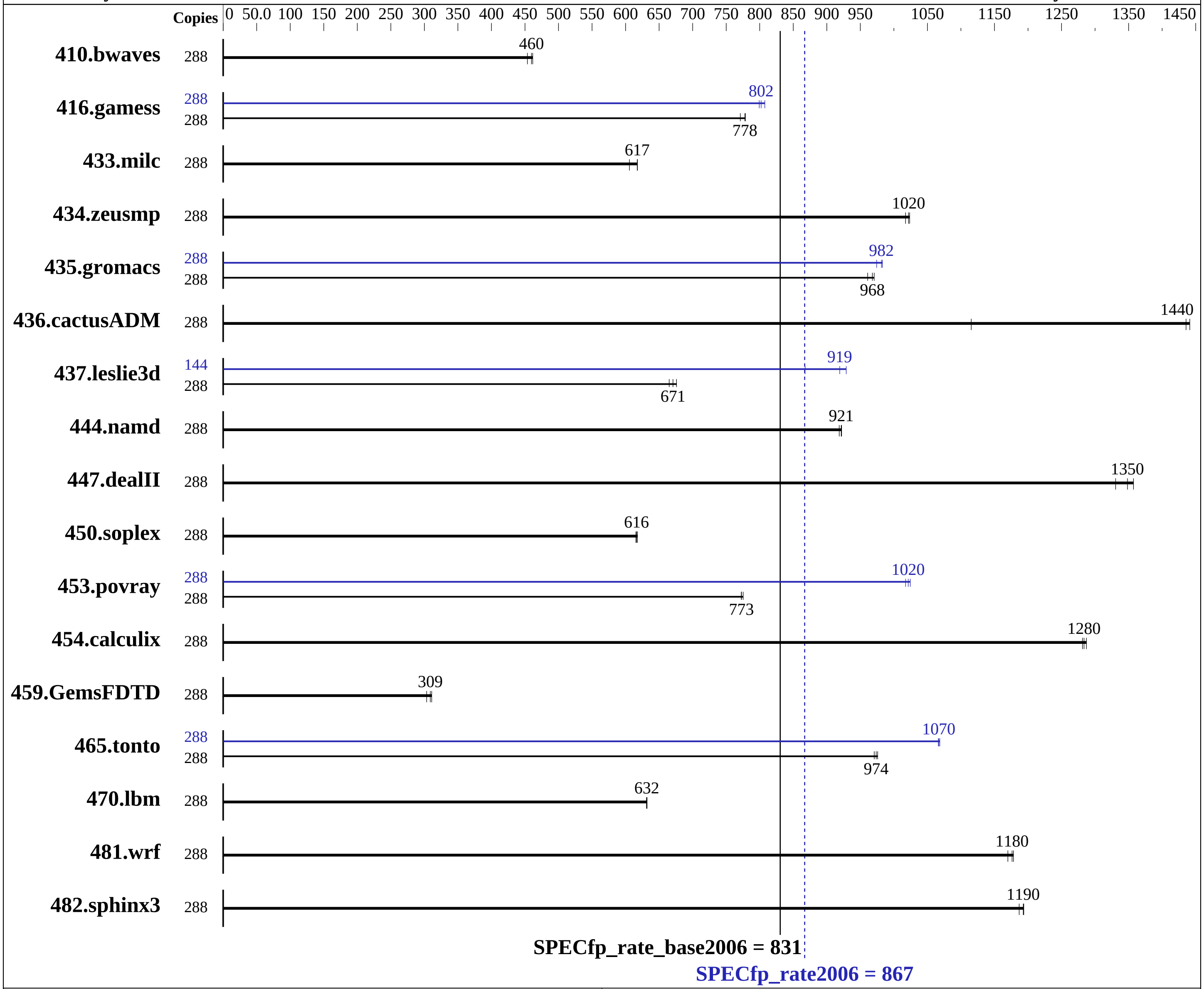
(Test Sponsor: HPE)

ProLiant XL260a Gen9
(1.50 GHz, Intel Xeon Phi 7290)

SPECfp®_rate2006 = 867

SPECfp_rate_base2006 = 831

| | | | |
|---|---|---|---|
| **CPU2006 license:** | 3 | **Test date:** | Dec-2016 |
| **Test sponsor:** | HPE | **Hardware Availability:** | Sep-2016 |
| **Tested by:** | HPE | **Software Availability:** | Nov-2016 |




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon Phi 7290 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 1.70 GHz |
| CPU MHz: | 1500 |
| FPU: | Integrated |
| CPU(s) enabled: | 72 cores, 1 chip, 72 cores/chip, 4 threads/core |
| CPU(s) orderable: | 1 chips |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 1 MB I+D on chip per two cores |

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### Software

| | |
|---|---|
| Operating System: | SUSE Linux Enterprise Server 12 (x86_64) SP2 Kernel 4.4.21-69-default |
| Compiler: | C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux |
| Auto Parallel: | No |
| File System: | xfs |
| System State: | Run level 5 (multi-user w/GUI) |

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| | |
|---|---|
| L3 Cache: | None |
| Other Cache: | None |
| Memory: | 384 GB (6 x 64 GB 2Rx4 PC4-2400T-L) |
| Disk Subsystem: | 1 x 800 GB SATA SSD |
| Other Hardware: | None |

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

## Results Table

| | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Benchmark** | **Copies** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Copies** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Seconds** | **Ratio** |
| 410.bwaves | 288 | 8479 | 462 | **8514** | **460** | 8628 | 454 | 288 | 8479 | 462 | **8514** | **460** | 8628 | 454 |
| 416.gamess | 288 | **7249** | **778** | 7313 | 771 | 7242 | 779 | 288 | 7055 | 799 | **7030** | **802** | 6982 | 808 |
| 433.milc | 288 | 4365 | 606 | 4281 | 618 | **4282** | **617** | 288 | 4365 | 606 | 4281 | 618 | **4282** | **617** |
| 434.zeusmp | 288 | 2576 | 1020 | **2565** | **1020** | 2561 | 1020 | 288 | 2576 | 1020 | **2565** | **1020** | 2561 | 1020 |
| 435.gromacs | 288 | 2119 | 971 | **2124** | **968** | 2140 | 961 | 288 | **2095** | **982** | 2092 | 983 | 2111 | 974 |
| 436.cactusADM | 288 | 2388 | 1440 | 3086 | 1120 | **2397** | **1440** | 288 | 2388 | 1440 | 3086 | 1120 | **2397** | **1440** |
| 437.leslie3d | 288 | 4071 | 665 | **4037** | **671** | 4005 | 676 | 144 | 1560 | 868 | **1472** | **919** | 1457 | 929 |
| 444.namd | 288 | 2505 | 922 | **2507** | **921** | 2515 | 919 | 288 | 2505 | 922 | **2507** | **921** | 2515 | 919 |
| 447.dealII | 288 | 2476 | 1330 | 2427 | 1360 | **2444** | **1350** | 288 | 2476 | 1330 | 2427 | 1360 | **2444** | **1350** |
| 450.soplex | 288 | 3903 | 615 | 3889 | 618 | **3897** | **616** | 288 | 3903 | 615 | 3889 | 618 | **3897** | **616** |
| 453.povray | 288 | 1976 | 775 | **1983** | **773** | 1983 | 773 | 288 | **1500** | **1020** | 1496 | 1020 | 1506 | 1020 |
| 454.calculix | 288 | 1855 | 1280 | 1846 | 1290 | **1851** | **1280** | 288 | 1855 | 1280 | 1846 | 1290 | **1851** | **1280** |
| 459.GemsFDTD | 288 | **9894** | **309** | 10069 | 303 | 9827 | 311 | 288 | **9894** | **309** | 10069 | 303 | 9827 | 311 |
| 465.tonto | 288 | **2911** | **974** | 2904 | 976 | 2919 | 971 | 288 | **2656** | **1070** | 2652 | 1070 | 2658 | 1070 |
| 470.lbm | 288 | **6264** | **632** | 6261 | 632 | 6269 | 631 | 288 | **6264** | **632** | 6261 | 632 | 6269 | 631 |
| 481.wrf | 288 | **2735** | **1180** | 2730 | 1180 | 2750 | 1170 | 288 | **2735** | **1180** | 2730 | 1180 | 2750 | 1170 |
| 482.sphinx3 | 288 | 4730 | 1190 | 4702 | 1190 | **4705** | **1190** | 288 | 4730 | 1190 | 4702 | 1190 | **4705** | **1190** |

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

## Platform Notes

```
BIOS Configuration:
   Power Profile set to Maximum Performance
   Thermal Configuration set to Maximum Cooling
   Processor Power and Utilization Monitoring set to Disabled
   Memory Patrol Scrubbing set to Disabled
   Cluster Model set to SNC-4

Sysinfo program /home/cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on pilot-xl260a-g9 Fri Dec  2 08:43:46 2016

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 Phi(TM) CPU 7290 @ 1.50GHz
      1 "physical id"s (chips)
      288 "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 : 72
      siblings  : 288
      physical 0: cores 0 1 2 4 5 6 7 8 9 10 11 12 13 14 15 18 19 20 21 22 23 24
      25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49
      50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73
   cache size : 1024 KB

From /proc/meminfo
   MemTotal:       395894732 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12 SP2

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 2
      # 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-SP2"
      VERSION_ID="12.2"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
      ID="sles"
      ANSI_COLOR="0;32"
```

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## Platform Notes (Continued)

```
        CPE_NAME="cpe:/o:suse:sles:12:sp2"

  uname -a:
     Linux pilot-xl260a-g9 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
     (9464f67) x86_64 x86_64 x86_64 GNU/Linux

  run-level 5 Nov 30 09:37

  SPEC is set to: /home/cpu2006
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/sda4      xfs   400G  4.5G  396G   2% /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 HP U24 10/31/2016
    Memory:
     6x UNKNOWN NOT AVAILABLE 64 GB 4 rank 2400 MHz

  (End of data from sysinfo program)
```

## General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh10.2"

 Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.2
```

# 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
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 -qopt-prefetch -auto-p32

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32

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

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32

## 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: basepeak = yes

447.dealII: basepeak = yes

450.soplex: basepeak = yes

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

Fortran benchmarks:

410.bwaves: basepeak = yes

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

434.zeusmp: basepeak = yes

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

459.GemsFDTD: basepeak = yes

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

Benchmarks using both Fortran and C:

435.gromacs: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2) -par-num-threads=1(pass 1) -qopt-prefetch -auto-ilp32

Continued on next page

# Peak Optimization Flags (Continued)

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

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-ic17.0-official-linux64-revD.html
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-Phi-revA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revD.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-Phi-revA.xml



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

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