# SPEC® CFP2006 Result



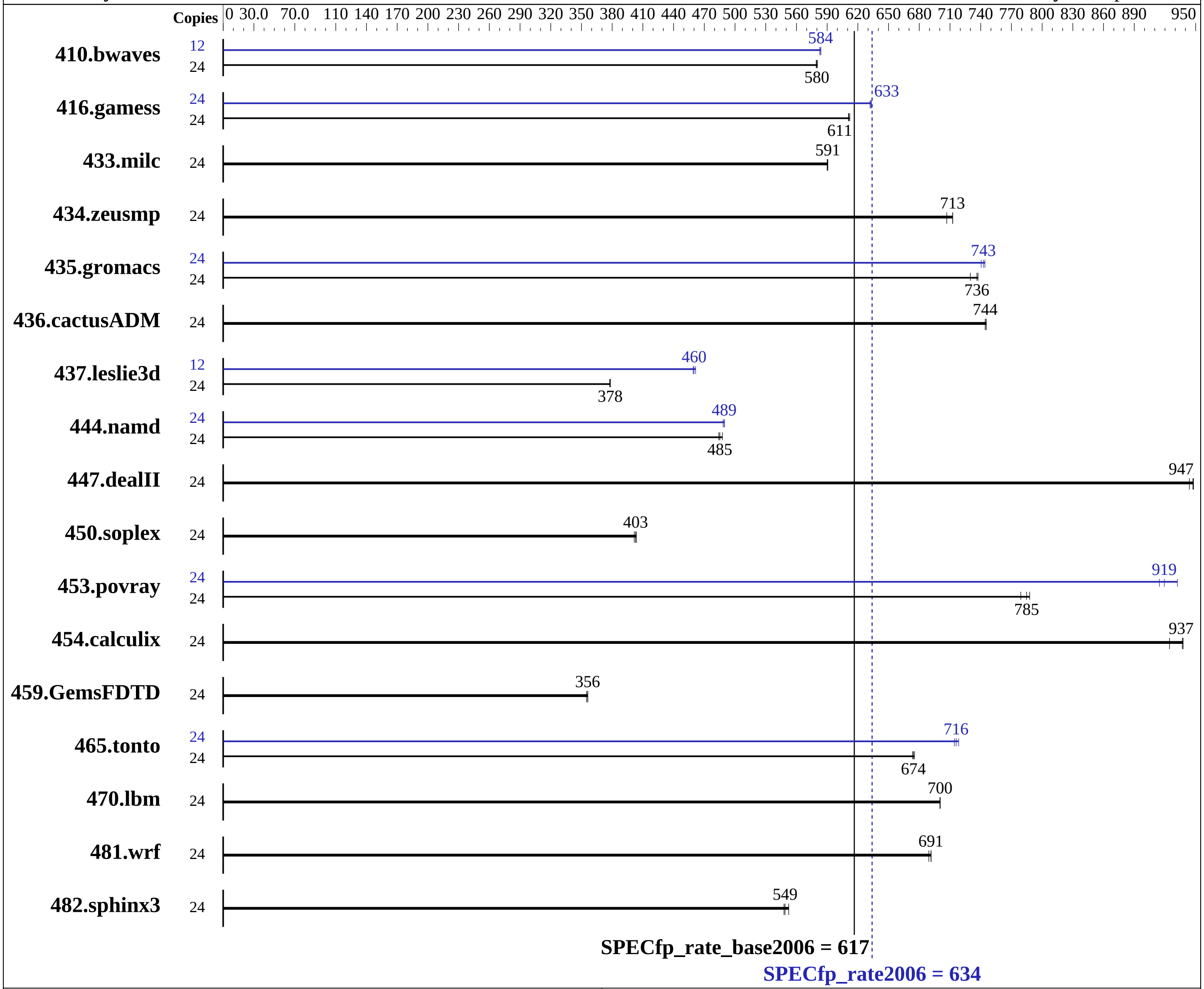
Hewlett Packard Enterprise
(Test Sponsor: HPE)

Synergy 480 Gen9
(3.40 GHz, Intel Xeon E5-2643 v4)

SPECfp®_rate2006 = 634

SPECfp_rate_base2006 = 617

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




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2643 v4 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.70 GHz |
| CPU MHz: | 3400 |
| FPU: | Integrated |
| CPU(s) enabled: | 12 cores, 2 chips, 6 cores/chip, 2 threads/core |
| CPU(s) orderable: | 1,2 chip |
| 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 (x86_64) SP1, Kernel 3.12.49-11-default |
| Compiler: | C/C++: Version 17.0.0.098 of Intel C++ Studio XE for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Studio XE for Linux |
| Auto Parallel: | No |
| File System: | xfs |
| System State: | Run level 3 (multi-user) |

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L3 Cache: 20 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 1 x 600 GB 10 K SAS, RAID 0
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 | 24 | **562** | **580** | 562 | 581 | 563 | 579 | 12 | 279 | 584 | 280 | 583 | **279** | **584** |
| 416.gamess | 24 | 769 | 611 | **769** | **611** | 768 | 612 | 24 | **743** | **633** | 744 | 632 | 742 | 633 |
| 433.milc | 24 | 373 | 591 | 373 | 590 | **373** | **591** | 24 | 373 | 591 | 373 | 590 | **373** | **591** |
| 434.zeusmp | 24 | **307** | **713** | 306 | 713 | 309 | 707 | 24 | **307** | **713** | 306 | 713 | 309 | 707 |
| 435.gromacs | 24 | 235 | 730 | 232 | 737 | **233** | **736** | 24 | 230 | 744 | 231 | 740 | **231** | **743** |
| 436.cactusADM | 24 | 385 | 746 | **385** | **744** | 385 | 744 | 24 | 385 | 746 | **385** | **744** | 385 | 744 |
| 437.leslie3d | 24 | 596 | 378 | **597** | **378** | 597 | 378 | 12 | **245** | **460** | 246 | 459 | 244 | 462 |
| 444.namd | 24 | 395 | 488 | **397** | **485** | 398 | 484 | 24 | 394 | 488 | 393 | 490 | **393** | **489** |
| 447.dealII | 24 | 291 | 944 | **290** | **947** | 290 | 948 | 24 | 291 | 944 | **290** | **947** | 290 | 948 |
| 450.soplex | 24 | 498 | 402 | **497** | **403** | 496 | 404 | 24 | 498 | 402 | **497** | **403** | 496 | 404 |
| 453.povray | 24 | **163** | **785** | 164 | 779 | 162 | 788 | 24 | **139** | **919** | 140 | 915 | 137 | 932 |
| 454.calculix | 24 | 211 | 938 | 214 | 924 | **211** | **937** | 24 | 211 | 938 | 214 | 924 | **211** | **937** |
| 459.GemsFDTD | 24 | 717 | 355 | **715** | **356** | 715 | 356 | 24 | 717 | 355 | **715** | **356** | 715 | 356 |
| 465.tonto | 24 | 350 | 675 | 351 | 674 | **350** | **674** | 24 | **330** | **716** | 331 | 714 | 329 | 718 |
| 470.lbm | 24 | **471** | **700** | 471 | 700 | 471 | 701 | 24 | **471** | **700** | 471 | 700 | 471 | 701 |
| 481.wrf | 24 | 388 | 692 | 389 | 689 | **388** | **691** | 24 | 388 | 692 | 389 | 689 | **388** | **691** |
| 482.sphinx3 | 24 | 854 | 548 | **852** | **549** | 847 | 552 | 24 | 854 | 548 | **852** | **549** | 847 | 552 |

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 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>
```

## Platform Notes

```
BIOS Configuration:
  Power Profile set to Custom
  Power Regulator to Static High Performance Mode
  Minimum Processor Idle Power Core C-State set to C6 State
  Minimum Processor Idle Power Package C-State set to No Package State
  Energy/Performance Bias set to Maximum Performance
  Collaborative Power Control set to Disabled
  QPI Snoop Configuration set to Home Snoop
  Thermal Configuration set to Maximum Cooling
  Processor Power and Utilization Monitoring set to Disabled
  Memory Refresh Rate set to 1x Refresh

Sysinfo program /home/cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-8p7b Wed Oct 26 22:32:51 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(R) CPU E5-2643 v4 @ 3.40GHz
      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 6 7
      physical 1: cores 0 1 2 3 6 7
   cache size : 20480 KB

From /proc/meminfo
   MemTotal:       264548504 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12 SP1

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 1
      # 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-SP1"
```

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## Platform Notes (Continued)

```
        VERSION_ID="12.1"
        PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
        ID="sles"
        ANSI_COLOR="0;32"
        CPE_NAME="cpe:/o:suse:sles:12:sp1"

  uname -a:
     Linux linux-8p7b 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
     (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Oct 26 14:17

  SPEC is set to: /home/cpu2006
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/sda4      xfs   517G   64G  453G  13% /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 I37 09/14/2016
    Memory:
     8x UNKNOWN NOT AVAILABLE
     16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz

  (End of data from sysinfo program)
  Regarding the sysinfo display about the memory installed, the correct amount of
  memory is 256 GB and the dmidecode description should have one line reading as:
  16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz
```

## 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 i7-4790 CPU + 32GB RAM
  memory using Redhat Enterprise Linux 7.2
```

# Base Compiler Invocation

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

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

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**Software Availability:** Sep-2016

# 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 -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

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

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
-qopt-mem-layout-trans=3
```

## 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: -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) -fno-alias -auto-ilp32 -qopt-mem-layout-trans=3

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 -qopt-mem-layout-trans=3

Fortran benchmarks:

410.bwaves: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

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## Peak Optimization Flags (Continued)

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: Same as 410.bwaves

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 -qopt-mem-layout-trans=3

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

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



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

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