SPEC® CFP2006 Result

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant ML10 Gen9
(3.30 GHz, Intel Xeon E3-1225 v5)

$SPECfp^{®}\_rate2006 =$ 182
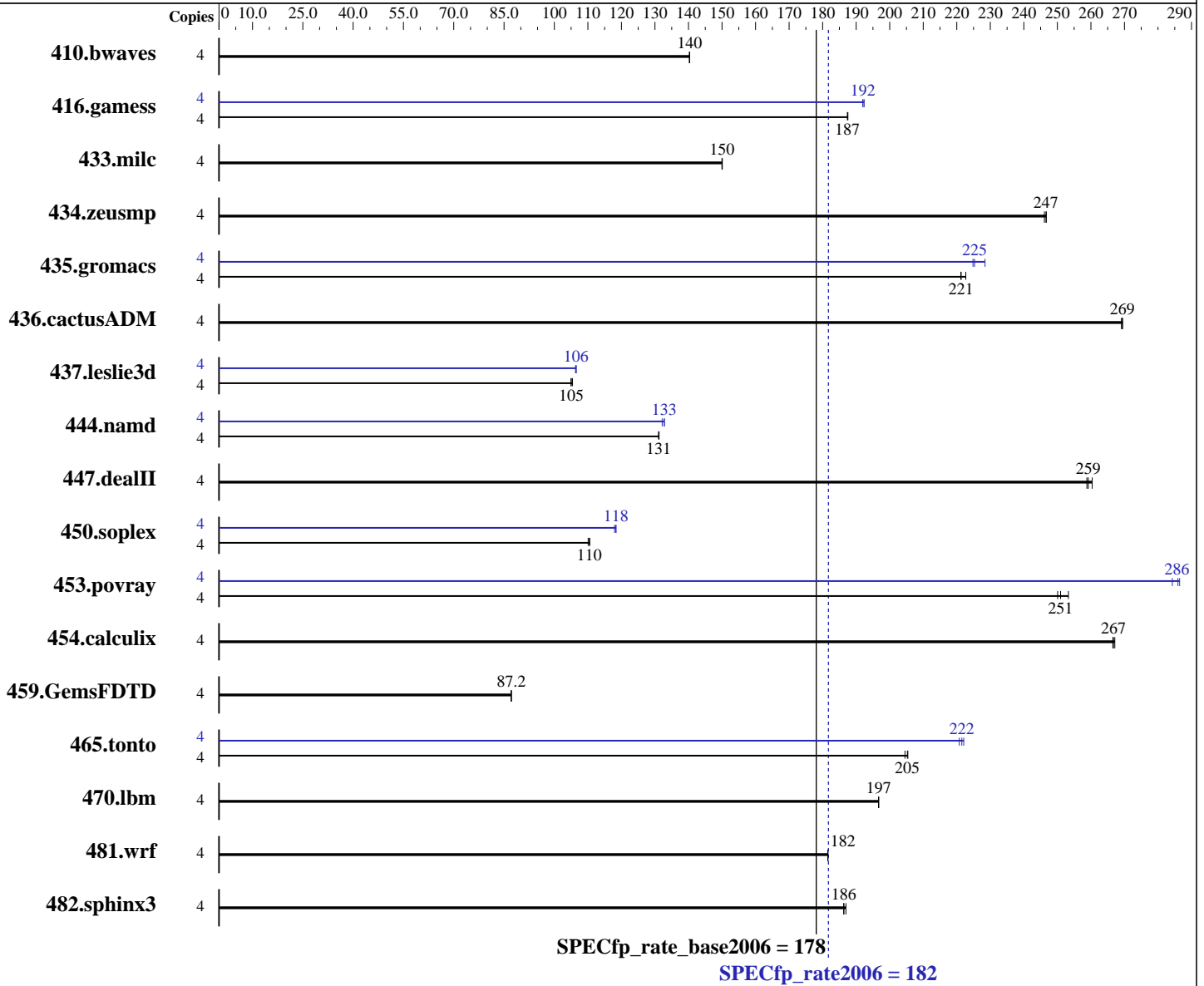
$SPECfp\_rate\_base2006 =$ 178

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE

Test date: Mar-2016
Hardware Availability: Feb-2016
Software Availability: Nov-2015

SPECfp_rate_base2006 = 178

SPECfp_rate2006 = 182

	Hardware	
CPU Name:	Intel Xeon E3-1225 v5	
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz	
CPU MHz:	3300	
FPU:	Integrated	
CPU(s) enabled:	4 cores, 1 chip, 4 cores/chip	
CPU(s) orderable:	1 chip	
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) Kernel 3.10.0-327.el7.x86_64	
Compiler:	C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux	
Auto Parallel:	No	
File System:	xfs	

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L3 Cache:	8 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	32 GB (4 x 8 GB 2Rx4 PC4-2133P-U)	Peak Pointers:	32/64-bit
Disk Subsystem:	1 x 400 GB SATA, RAID 0	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Copies	Base Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Peak Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	4	388	140	**387**	**140**	387	140	4	388	140	**387**	**140**	387	140
416.gamess	4	418	187	418	188	**418**	**187**	4	407	192	408	192	**408**	**192**
433.milc	4	**245**	**150**	245	150	245	150	4	**245**	**150**	245	150	245	150
434.zeusmp	4	148	246	**148**	**247**	148	247	4	148	246	**148**	**247**	148	247
435.gromacs	4	128	223	**129**	**221**	129	221	4	127	225	125	228	**127**	**225**
436.cactusADM	4	178	269	**177**	**269**	177	269	4	178	269	**177**	**269**	177	269
437.leslie3d	4	357	105	358	105	**358**	**105**	4	354	106	353	107	**353**	**106**
444.namd	4	244	131	**245**	**131**	245	131	4	**242**	**133**	243	132	242	133
447.dealII	4	**177**	**259**	176	260	177	259	4	**177**	**259**	176	260	177	259
450.soplex	4	**302**	**110**	302	111	303	110	4	282	118	**282**	**118**	283	118
453.povray	4	84.0	253	85.1	250	**84.8**	**251**	4	74.9	284	74.3	286	**74.4**	**286**
454.calculix	4	**124**	**267**	124	267	124	267	4	**124**	**267**	124	267	124	267
459.GemsFDTD	4	**487**	**87.2**	487	87.1	487	87.2	4	**487**	**87.2**	487	87.1	487	87.2
465.tonto	4	192	205	**192**	**205**	192	205	4	**178**	**222**	178	221	177	222
470.lbm	4	**279**	**197**	279	197	279	197	4	**279**	**197**	279	197	279	197
481.wrf	4	246	182	**246**	**182**	246	182	4	246	182	**246**	**182**	246	182
482.sphinx3	4	417	187	**418**	**186**	419	186	4	417	187	**418**	**186**	419	186

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

   The taskset mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate taskset 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

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Platform Notes

```
Sysinfo program /home/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Tue Mar  1 12:23:43 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 E3-1225 v5 @ 3.30GHz
      1 "physical id"s (chips)
      4 "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 : 4
      siblings  : 4
      physical 0: cores 0 1 2 3
   cache size : 8192 KB

From /proc/meminfo
   MemTotal:       32676372 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 localhost.localdomain 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 Feb 23 17:04

SPEC is set to: /home/cpu2006
   Filesystem          Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-home xfs   384G   20G  364G   6% /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
```
Continued on next page

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Platform Notes (Continued)

```
    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. 5.11 09/11/2015
  Memory:
    4x SK Hynix HMA41GU7AFR8N-TF 8 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/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"

 Binaries compiled on a system with 1x Intel Xeon E5-2660 v4 CPU + 128GB
 memory using RedHat EL 7.2

Submitted_by: "Bucek, James" <james.bucek@hpe.com>
Submitted: Mon Mar  7 18:24:48 EST 2016
Submission: cpu2006-20160307-39070.sub
```

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
```

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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 -static -opt-prefetch
-qopt-prefetch-issue-excl-hint -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -static -opt-prefetch
-qopt-prefetch-issue-excl-hint -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -static -opt-prefetch
-qopt-prefetch-issue-excl-hint
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -static -opt-prefetch
-qopt-prefetch-issue-excl-hint -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/compilers_and_libraries_2016/linux/lib/ia32_lin
```

Fortran benchmarks:
```
ifort -m64
```

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

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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
      450.soplex: -D_FILE_OFFSET_BITS=64
     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: 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) -static(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:threadsafe(pass 1)
            -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
            -par-num-threads=1(pass 1) -static(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:threadsafe(pass 1)
            -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
            -par-num-threads=1(pass 1) -static(pass 2)
            -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -unroll4
            -ansi-alias
```

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Peak Optimization Flags (Continued)

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) -static(pass 2) -prof-use(pass 2)`
           `-unroll2 -inline-level=0 -scalar-rep-`

    434.zeusmp: `basepeak = yes`

    437.leslie3d: `-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) -static(pass 2) -prof-use(pass 2)`
           `-opt-malloc-options=3 -opt-prefetch`

  459.GemsFDTD: `basepeak = yes`

    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) -static(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:threadsafe(pass 1)`
           `-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)`
           `-par-num-threads=1(pass 1) -static(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: `basepeak = yes`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/HP-Compiler-Flags-Intel-V1.2-BDW-revE.html
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.html

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

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

Tested with SPEC CPU2006 v1.2.
Report generated on Tue Apr 5 14:53:08 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 5 April 2016.