SPEC® CFP2006 Result

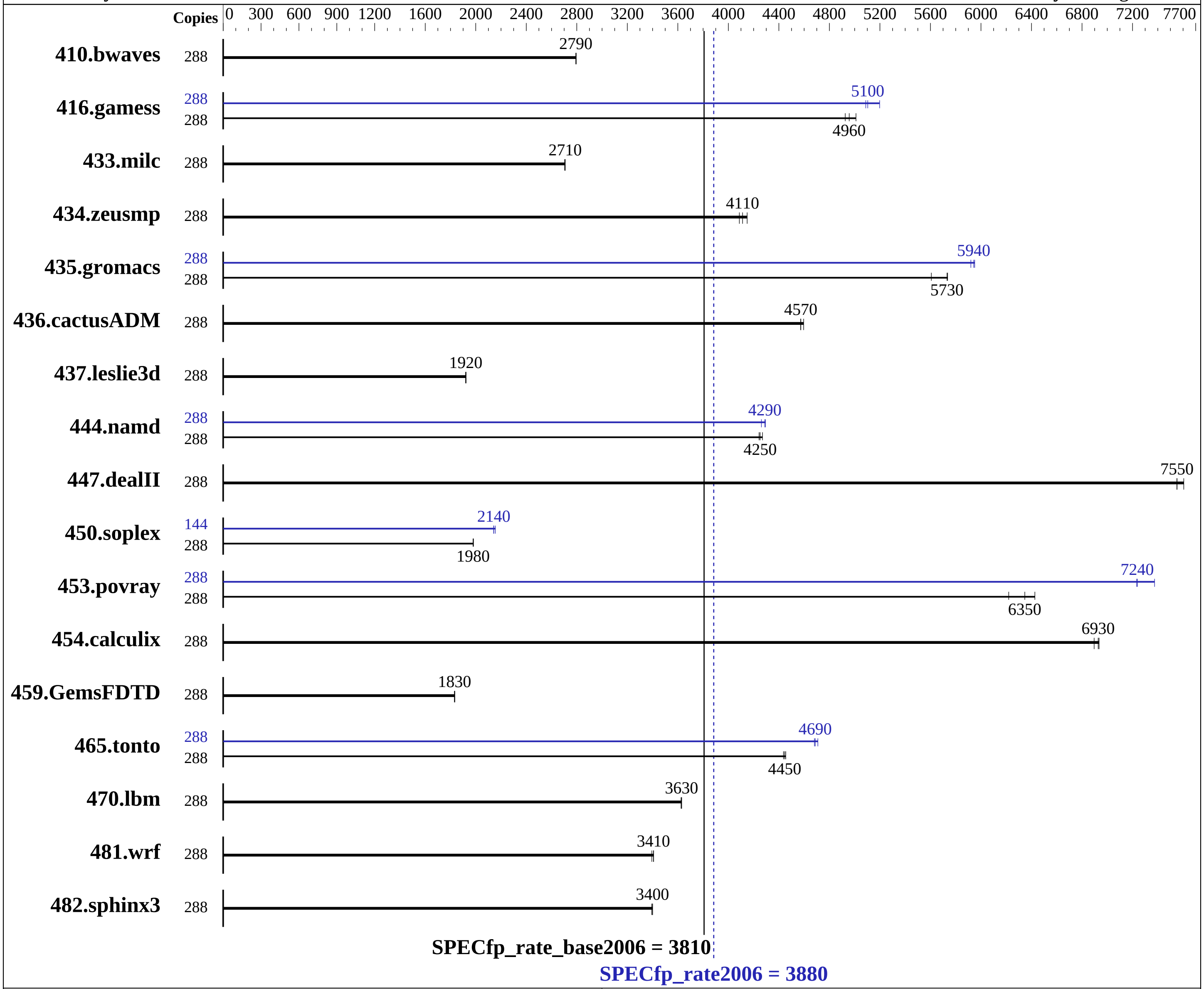
Hewlett Packard Enterprise
(Test Sponsor: HPE)

Integrity Superdome X
(144 core, 2.50 GHz, Intel Xeon E7-8890 v3)

SPECfp®_rate2006 = 3880

SPECfp_rate_base2006 = 3810

CPU2006 license:	3	**Test date:**	Oct-2015
Test sponsor:	HPE	**Hardware Availability:**	Oct-2015
Tested by:	HPE	**Software Availability:**	Aug-2015



Hardware

CPU Name:	Intel Xeon E7-8890 v3
CPU Characteristics:	Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz:	2500
FPU:	Integrated
CPU(s) enabled:	144 cores, 8 chips, 18 cores/chip, 2 threads/core
CPU(s) orderable:	2 to 16 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 11 (x86_64) SP3 Kernel 3.0.101-0.47.55-bigsmp
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:	tmpfs
System State:	Run level 3 (multi-user)

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L3 Cache:	45 MB I+D on chip per chip
Other Cache:	None
Memory:	2 TB (128 x 16 GB 2Rx4 PC4-2133P-L, running at 1600 MHz)
Disk Subsystem:	8 x C8S59A, 900 GB 10K RPM SAS
Other Hardware:	None

Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	Updated libgcc_s1, glibc, and libstdc++6

Results Table

	Base							Peak						
Benchmark	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	288	**1401**	**2790**	1400	2800	1402	2790	288	**1401**	**2790**	1400	2800	1402	2790
416.gamess	288	1145	4930	**1138**	**4960**	1125	5010	288	1108	5090	1085	5200	**1105**	**5100**
433.milc	288	978	2700	976	2710	**976**	**2710**	288	978	2700	976	2710	**976**	**2710**
434.zeusmp	288	641	4090	632	4150	**637**	**4110**	288	641	4090	632	4150	**637**	**4110**
435.gromacs	288	**359**	**5730**	367	5610	358	5740	288	346	5950	**346**	**5940**	347	5920
436.cactusADM	288	**752**	**4570**	749	4600	753	4570	288	**752**	**4570**	749	4600	753	4570
437.leslie3d	288	**1409**	**1920**	1408	1920	1410	1920	288	**1409**	**1920**	1408	1920	1410	1920
444.namd	288	541	4270	544	4240	**543**	**4250**	288	**539**	**4290**	542	4260	538	4290
447.dealII	288	**436**	**7550**	436	7550	433	7610	288	**436**	**7550**	436	7550	433	7610
450.soplex	288	1212	1980	1214	1980	**1213**	**1980**	144	561	2140	**560**	**2140**	557	2160
453.povray	288	246	6220	**241**	**6350**	238	6430	288	**212**	**7240**	212	7230	208	7370
454.calculix	288	343	6930	**343**	**6930**	345	6900	288	343	6930	**343**	**6930**	345	6900
459.GemsFDTD	288	**1667**	**1830**	1669	1830	1666	1830	288	**1667**	**1830**	1669	1830	1666	1830
465.tonto	288	636	4450	**637**	**4450**	639	4440	288	602	4710	605	4680	**605**	**4690**
470.lbm	288	1092	3630	1090	3630	**1090**	**3630**	288	1092	3630	1090	3630	**1090**	**3630**
481.wrf	288	**944**	**3410**	944	3410	948	3390	288	**944**	**3410**	944	3410	948	3390
482.sphinx3	288	1651	3400	1654	3390	**1651**	**3400**	288	1651	3400	1654	3390	**1651**	**3400**

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"
intel_idle.max_cstate=1 appended in kernel command line
Power profile set with:
 cpupower -c all frequency-set -g performance
Benchmark installed under /dev/shm/cpu2006 and mounted with:
  mount -o bind /dev/shm/cpu2006 /cpu2006
Transparent Huge Pages enabled with:
```

Continued on next page

Operating System Notes (Continued)

```
 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>
To run the Intel binaries based off the Intel 16.0 compiler (with SLES11 SP3), the following software was updated:
 libgcc_s1 (32 and 64-bit versions) to version 4.8.3+r212056-6.3
 glibc (32 and 64-bit versions) to version 2.19-17.72
 libstdc++6 (32 and 64-bit versions) to version 4.8.3+r212056-6.3
```

Platform Notes

```
Firmware settings:
 Memory RAS Configuration set to Maximum Performance
Sysinfo program /cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on hawk050os1 Tue Oct 27 00:20:10 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 E7-8890 v3 @ 2.50GHz
      8 "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 : 18
      siblings  : 36
      physical 0: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 1: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 2: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 3: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 4: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 5: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 6: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 7: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
   cache size : 46080 KB

From /proc/meminfo
   MemTotal:       2117695720 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 11 (x86_64)

From /etc/*release* /etc/*version*
   SuSE-release:
```

Continued on next page

Platform Notes (Continued)

```
        SUSE Linux Enterprise Server 11 (x86_64)
        VERSION = 11
        PATCHLEVEL = 3

  uname -a:
     Linux hawk050os1 3.0.101-0.47.55-bigsmp #1 SMP Thu May 28 08:25:11 UTC 2015
     (dc083ee) x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Oct 26 10:56 last=S

  SPEC is set to: /cpu2006
     Filesystem     Type   Size  Used Avail Use% Mounted on
     tmpfs          tmpfs 1010G  246G  764G  25% /dev/shm
  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 Bundle: 007.005.000 SFW: 033.161.000 07/18/2015
    Memory:
     103x HP 36ASF2G72LZ-2G1A1 16 GB 2133 MHz, configured at 1600 MHz
     12x HP HMA42GL7MFR4N-TF 16 GB 2133 MHz, configured at 1600 MHz
     13x HP M386A2G40DB0-CPB 16 GB 2133 MHz, configured at 1600 MHz
     64x not defined not defined

  (End of data from sysinfo program)
 Regarding the sysinfo display about the memory installed, the correct amount of
 memory is 2 TB and the dmidecode description should have three lines reading as:
  103x HP 36ASF2G72LZ-2G1A1 16 GB 2133 MHz, configured at 1600 MHz
  12x HP HMA42GL7MFR4N-TF 16 GB 2133 MHz, configured at 1600 MHz
  13x HP M386A2G40DB0-CPB 16 GB 2133 MHz, configured at 1600 MHz
```

General Notes

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

  Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
  memory using RedHat EL 7.1
```

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/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin`

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`
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:

Continued on next page

Peak Optimization Flags (Continued)

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) -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) -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) -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: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: 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) -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) -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

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(Test Sponsor: HPE)

Integrity Superdome X
(144 core, 2.50 GHz, Intel Xeon E7-8890 v3)

SPECfp_rate2006 = 3880

SPECfp_rate_base2006 = 3810

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE
Test date: Oct-2015
Hardware Availability: Oct-2015
Software Availability: Aug-2015

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/HP-Platform-Flags-Intel-V1.2-Integrity-revA.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/HP-Platform-Flags-Intel-V1.2-Integrity-revA.xml

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

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