SPEC® CFP2006 Result

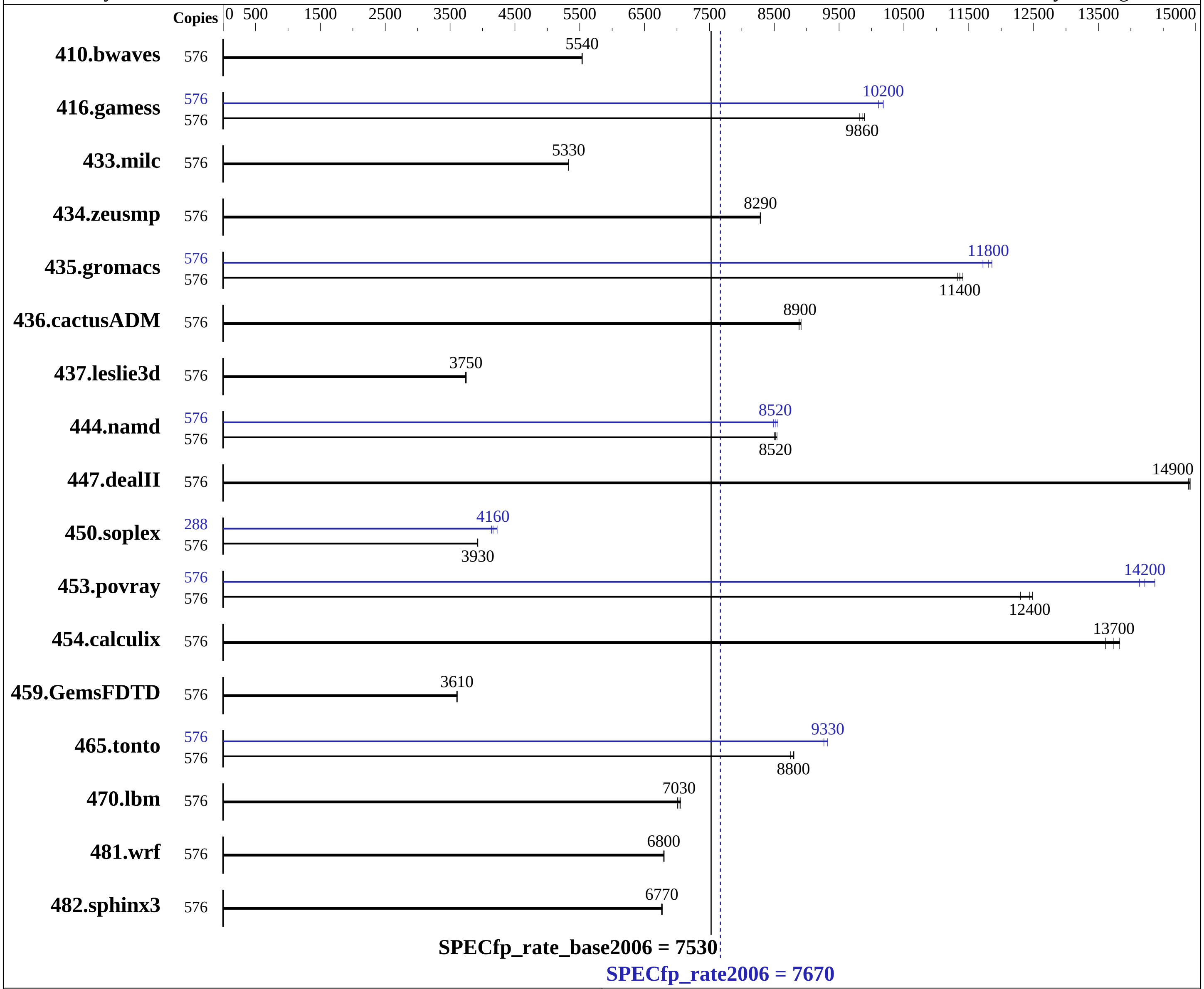
Hewlett Packard Enterprise
(Test Sponsor: HPE)

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

SPECfp®_rate2006 = 7670

SPECfp_rate_base2006 = 7530

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:	288 cores, 16 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

Continued on next page

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)

Continued on next page

Hewlett Packard Enterprise
(Test Sponsor: HPE)
Integrity Superdome X
(288 core, 2.50 GHz, Intel Xeon E7-8890 v3)

SPECfp_rate2006 = 7670
SPECfp_rate_base2006 = 7530

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

L3 Cache:	45 MB I+D on chip per chip
Other Cache:	None
Memory:	4 TB (256 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

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	576	1415	5530	1413	5540	**1414**	**5540**	576	1415	5530	1413	5540	**1414**	**5540**
416.gamess	576	**1144**	**9860**	1140	9890	1149	9810	576	1108	10200	1116	10100	**1108**	**10200**
433.milc	576	992	5330	992	5330	**992**	**5330**	576	992	5330	992	5330	**992**	**5330**
434.zeusmp	576	**633**	**8290**	633	8280	632	8290	576	**633**	**8290**	633	8280	632	8290
435.gromacs	576	360	11400	363	11300	**362**	**11400**	576	347	11900	**348**	**11800**	351	11700
436.cactusADM	576	775	8880	**774**	**8900**	772	8910	576	775	8880	**774**	**8900**	772	8910
437.leslie3d	576	**1445**	**3750**	1449	3740	1444	3750	576	**1445**	**3750**	1449	3740	1444	3750
444.namd	576	**542**	**8520**	543	8500	541	8540	576	**543**	**8520**	544	8490	540	8560
447.dealII	576	**442**	**14900**	443	14900	442	14900	576	**442**	**14900**	443	14900	442	14900
450.soplex	576	1223	3930	1225	3920	**1224**	**3930**	288	580	4140	**577**	**4160**	568	4230
453.povray	576	**246**	**12400**	246	12500	249	12300	576	213	14400	217	14100	**216**	**14200**
454.calculix	576	349	13600	**346**	**13700**	344	13800	576	349	13600	**346**	**13700**	344	13800
459.GemsFDTD	576	1697	3600	1692	3610	**1695**	**3610**	576	1697	3600	1692	3610	**1695**	**3610**
465.tonto	576	648	8750	644	8800	**644**	**8800**	576	**608**	**9330**	608	9330	612	9270
470.lbm	576	**1125**	**7030**	1122	7060	1130	7010	576	**1125**	**7030**	1122	7060	1130	7010
481.wrf	576	946	6800	**947**	**6800**	948	6780	576	946	6800	**947**	**6800**	948	6780
482.sphinx3	576	1657	6770	**1659**	**6770**	1661	6760	576	1657	6770	**1659**	**6770**	1661	6760

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 20 23:12:43 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
      16 "physical id"s (chips)
      576 "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
      physical 8: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 9: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 10: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 11: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 12: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 13: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 14: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 15: 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:       4235779104 kB
```

Continued on next page

Platform Notes (Continued)

```
   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:
      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 20 08:13 last=S

SPEC is set to: /cpu2006
   Filesystem     Type   Size  Used Avail Use% Mounted on
   tmpfs          tmpfs  2.0T  488G  1.5T  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:
   222x HP 36ASF2G72LZ-2G1A1 16 GB 2133 MHz, configured at 1600 MHz
   18x HP HMA42GL7MFR4N-TF 16 GB 2133 MHz, configured at 1600 MHz
   16x HP M386A2G40DB0-CPB 16 GB 2133 MHz, configured at 1600 MHz
   128x not defined not defined

(End of data from sysinfo program)
Regarding the sysinfo display about the memory installed, the correct amount of
memory is 4 TB and the dmidecode description should have three lines reading as:
 222x HP 36ASF2G72LZ-2G1A1 16 GB 2133 MHz, configured at 1600 MHz
 18x HP HMA42GL7MFR4N-TF 16 GB 2133 MHz, configured at 1600 MHz
 16x 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
```

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
```

Continued on next page

Base Optimization Flags (Continued)

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:

Continued on next page

Peak Optimization Flags (Continued)

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) -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

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-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.

Tested with SPEC CPU2006 v1.2.
Report generated on Tue Nov 17 19:17:23 2015 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 17 November 2015.