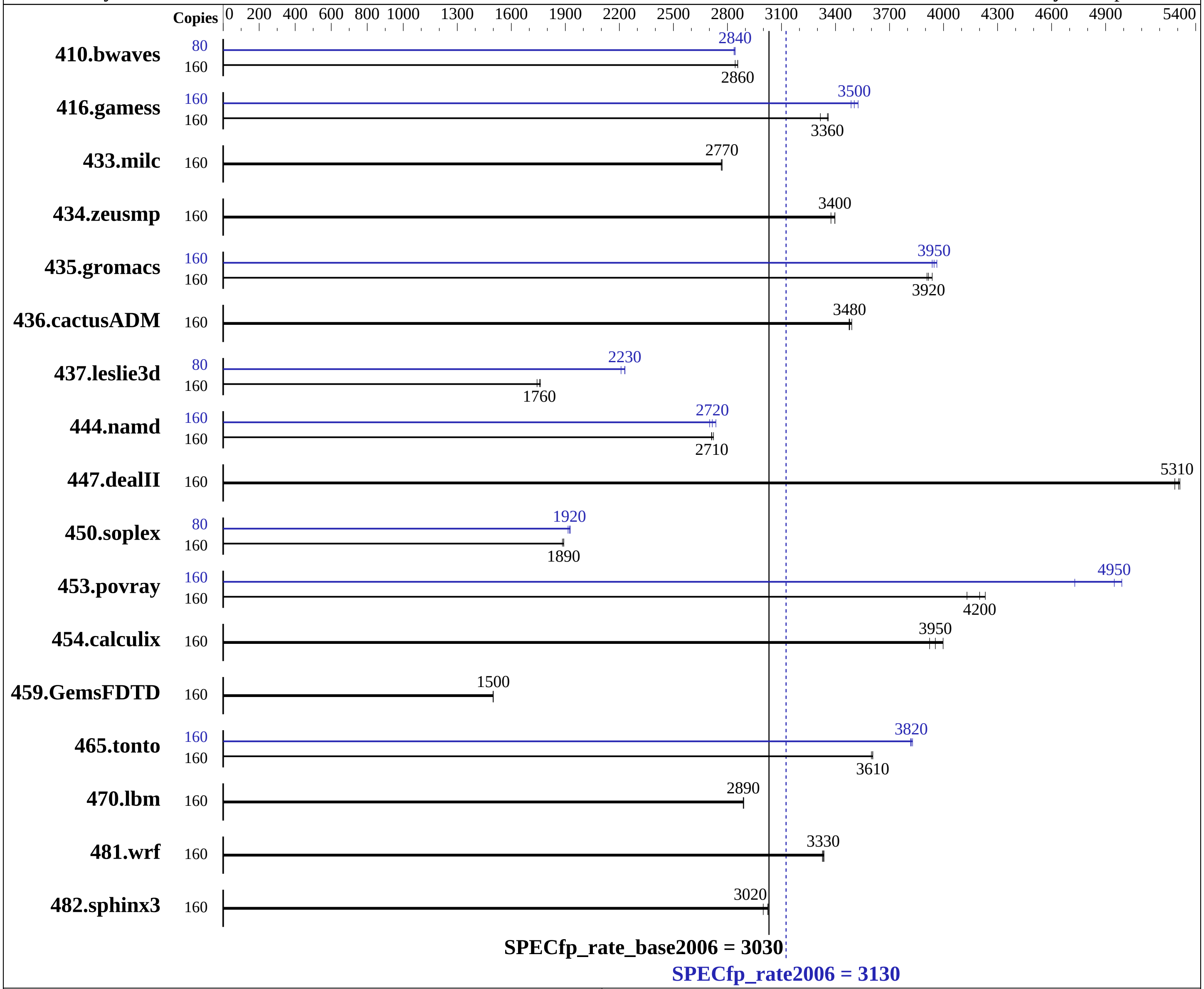
SPEC® CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
Integrity Superdome X
(80 core, 2.80 GHz, Intel Xeon E7-8891 v3)

SPECfp®_rate2006 = 3130

SPECfp_rate_base2006 = 3030

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



Hardware

CPU Name:	Intel Xeon E7-8891 v3
CPU Characteristics:	Intel Turbo Boost Technology up to 3.50 GHz
CPU MHz:	2800
FPU:	Integrated
CPU(s) enabled:	80 cores, 8 chips, 10 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 12 (x86_64) SP1 Kernel 3.12.49-11-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:	45 MB I+D on chip per chip
Other Cache:	None
Memory:	2 TB (64 x 32 GB 4Rx4 PC4-2133P-L, running at 1600 MHz)
Disk Subsystem:	8 x C8S59A, 900 GB 10 K RPM SAS
Other Hardware:	None

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

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	160	765	2840	**761**	**2860**	761	2860	80	383	2840	382	2840	**383**	**2840**
416.gamess	160	945	3320	**934**	**3360**	932	3360	160	889	3530	**894**	**3500**	899	3490
433.milc	160	**530**	**2770**	531	2770	530	2770	160	**530**	**2770**	531	2770	530	2770
434.zeusmp	160	**429**	**3400**	431	3370	429	3400	160	**429**	**3400**	431	3370	429	3400
435.gromacs	160	290	3940	292	3910	**292**	**3920**	160	**289**	**3950**	288	3960	290	3940
436.cactusADM	160	548	3490	550	3480	**550**	**3480**	160	548	3490	550	3480	**550**	**3480**
437.leslie3d	160	854	1760	**856**	**1760**	863	1740	80	337	2230	**337**	**2230**	340	2210
444.namd	160	473	2710	**473**	**2710**	471	2720	160	475	2700	**472**	**2720**	469	2740
447.dealII	160	**345**	**5310**	345	5310	346	5280	160	**345**	**5310**	345	5310	346	5280
450.soplex	160	708	1880	**706**	**1890**	706	1890	80	346	1930	348	1920	**347**	**1920**
453.povray	160	201	4230	206	4130	**203**	**4200**	160	171	4990	**172**	**4950**	180	4730
454.calculix	160	**334**	**3950**	330	4000	337	3920	160	**334**	**3950**	330	4000	337	3920
459.GemsFDTD	160	1133	1500	**1132**	**1500**	1132	1500	160	1133	1500	**1132**	**1500**	1132	1500
465.tonto	160	436	3610	437	3600	**436**	**3610**	160	411	3830	412	3820	**412**	**3820**
470.lbm	160	**761**	**2890**	760	2890	761	2890	160	**761**	**2890**	760	2890	761	2890
481.wrf	160	536	3340	**536**	**3330**	537	3330	160	536	3340	**536**	**3330**	537	3330
482.sphinx3	160	1040	3000	**1031**	**3020**	1031	3020	160	1040	3000	**1031**	**3020**	1031	3020

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>
```

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Operating System Notes (Continued)

```
Power profile set with: cpupower -c all frequency-set -g performance
Setting the value of perf-bias: cpupower set -b 0
Tuned profile set with: tuned-adm profile throughput-performance
```

Platform Notes

```
Firmware settings:
 Memory RAS Configuration set to Maximum Performance
Sysinfo program /home/cpu17/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on gh10 Mon Oct 10 19:07:34 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 E7-8891 v3 @ 2.80GHz
      8 "physical id"s (chips)
      160 "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 : 10
      siblings  : 20
      physical 0: cores 0 1 2 4 6 8 17 19 20 23
      physical 1: cores 0 1 2 4 6 8 17 19 20 23
      physical 2: cores 0 1 2 4 6 8 17 19 20 23
      physical 3: cores 0 1 2 4 6 8 17 19 20 23
      physical 4: cores 0 1 2 4 6 8 17 19 20 23
      physical 5: cores 0 1 2 4 6 8 17 19 20 23
      physical 6: cores 0 1 2 4 6 8 17 19 20 23
      physical 7: cores 0 1 2 4 6 8 17 19 20 23
   cache size : 46080 KB

From /proc/meminfo
   MemTotal:       2117603700 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.
```

Continued on next page

Platform Notes (Continued)

```
      os-release:
         NAME="SLES"
         VERSION="12-SP1"
         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 gh10 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 5 Oct 8 22:13

   SPEC is set to: /home/cpu17
      Filesystem                                                 Type  Size  Used Avail
      Use% Mounted on
      /dev/mapper/3600c0ff0002626a42792985701000000-part4 xfs   1.8T  285G  1.5T
      16% /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 Bundle: 008.004.084 SFW: 043.025.000 08/16/2016
     Memory:
      64x HP M386A4G40DM0-CPB 32 GB 4 rank 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 2 TB and the dmidecode description should have one line reading as:
   64x HP M386A4G40DM0-CPB 32 GB 4 rank 2133 MHz, configured at 1600 MHz
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/cpu17/libs/32:/home/cpu17/libs/64:/home/cpu17/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
```

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Base Compiler Invocation (Continued)

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 -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 (except as noted below):
`icpc -m64`

450.soplex: `icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

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: -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: -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) -qopt-malloc-options=3 -qopt-mem-layout-trans=3

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

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

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

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