SPEC® CFP2006 Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

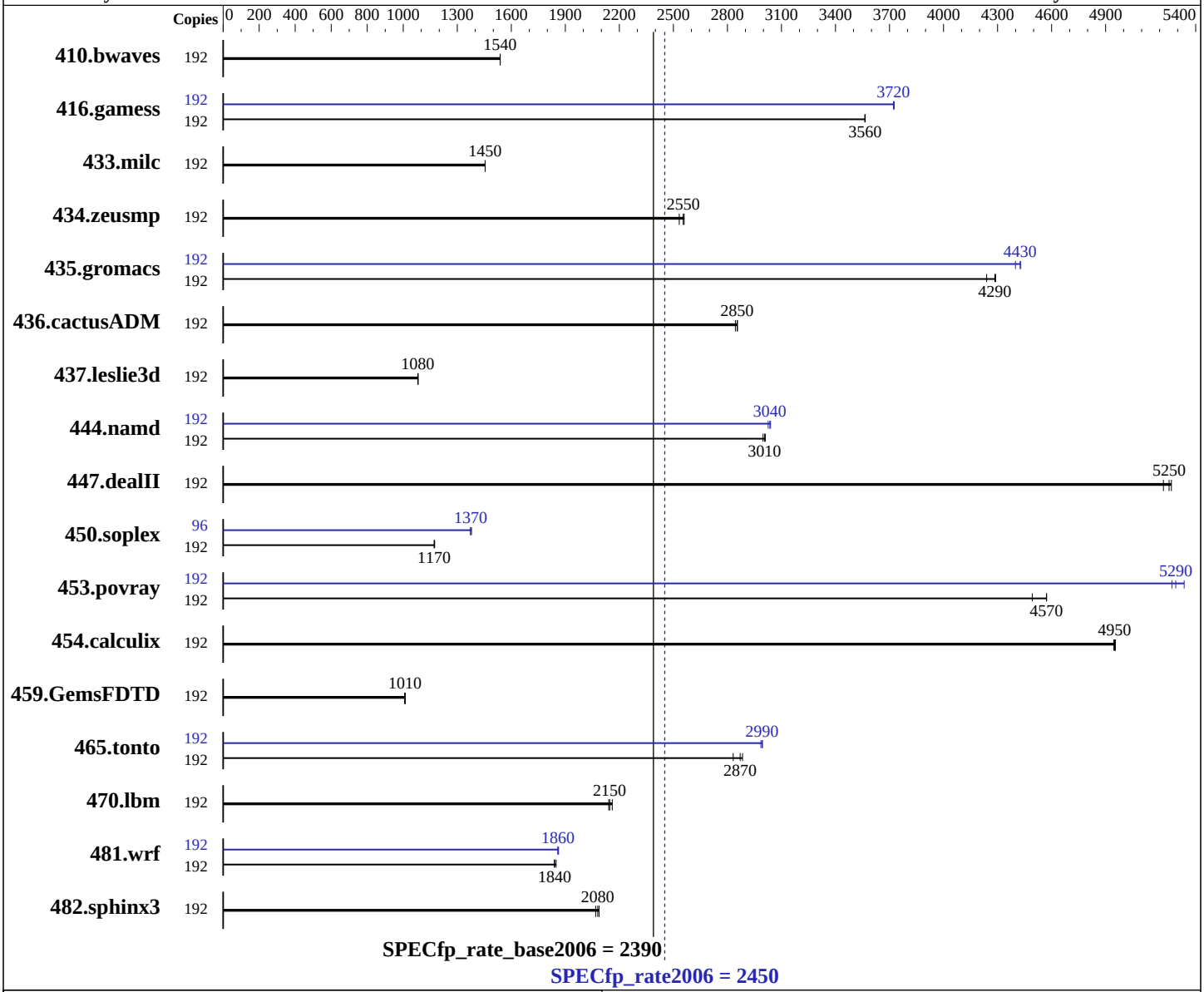
Synergy 680 Gen9
(2.40 GHz, Intel Xeon E7-8894 v4)

SPECfp®_rate2006 = 2450

SPECfp_rate_base2006 = 2390

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

Test date: Jan-2017
Hardware Availability: Mar-2017
Software Availability: Nov-2016



Hardware

CPU Name:	Intel Xeon E7-8894 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.40 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	96 cores, 4 chips, 24 cores/chip, 2 threads/core
CPU(s) orderable:	2,4 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:	SUSE Linux Enterprise Server 12 (x86_64) SP2, Kernel 4.4.21-69-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 3 (multi-user)

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L3 Cache: 60 MB I+D on chip per chip
Other Cache: None
Memory: 1 TB (32 x 32 GB 2Rx4 PC4-2400T-R, running at 1600 MHz)
Disk Subsystem: 1 x 400 GB SAS SSD, RAID 0
Other Hardware: None

Base Pointers: 32-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	192	1696	1540	1697	1540	**1696**	**1540**	192	1696	1540	1697	1540	**1696**	**1540**
416.gamess	192	**1055**	**3560**	1055	3560	1054	3570	192	1010	3720	1009	3730	**1010**	**3720**
433.milc	192	**1212**	**1450**	1211	1450	1212	1450	192	**1212**	**1450**	1211	1450	1212	1450
434.zeusmp	192	683	2560	**684**	**2550**	690	2530	192	683	2560	**684**	**2550**	690	2530
435.gromacs	192	320	4290	**320**	**4290**	323	4240	192	310	4430	**310**	**4430**	312	4400
436.cactusADM	192	**804**	**2850**	803	2860	807	2840	192	**804**	**2850**	803	2860	807	2840
437.leslie3d	192	1669	1080	1667	1080	**1669**	**1080**	192	1669	1080	1667	1080	**1669**	**1080**
444.namd	192	512	3010	514	3000	**512**	**3010**	192	**507**	**3040**	507	3040	509	3030
447.dealII	192	**418**	**5250**	421	5220	417	5270	192	**418**	**5250**	421	5220	417	5270
450.soplex	192	1366	1170	1363	1170	**1366**	**1170**	96	**583**	**1370**	583	1370	580	1380
453.povray	192	227	4490	**223**	**4570**	223	4570	192	**193**	**5290**	191	5340	194	5270
454.calculix	192	**320**	**4950**	320	4950	320	4950	192	**320**	**4950**	320	4950	320	4950
459.GemsFDTD	192	2013	1010	**2015**	**1010**	2021	1010	192	2013	1010	**2015**	**1010**	2021	1010
465.tonto	192	667	2830	**658**	**2870**	655	2880	192	**631**	**2990**	633	2990	631	2990
470.lbm	192	**1229**	**2150**	1232	2140	1221	2160	192	**1229**	**2150**	1232	2140	1221	2160
481.wrf	192	**1165**	**1840**	1166	1840	1160	1850	192	1154	1860	**1153**	**1860**	1151	1860
482.sphinx3	192	1809	2070	**1799**	**2080**	1793	2090	192	1809	2070	**1799**	**2080**	1793	2090

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 by default
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:
  HP Power Profile set to Custom
  HP Power Regulator to HP 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
  QPI Snoop Configuration set to Cluster on Die
  Collaborative Power Control set to Disabled
  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 synergy680_manju Tue Jan 31 10:44:07 2017

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 E7-8894 v4 @ 2.40GHz
      4 "physical id"s (chips)
      192 "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 : 24
      siblings  : 48
      physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
   cache size : 30720 KB

From /proc/meminfo
   MemTotal:       1056730580 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 2
      # 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"
```

Continued on next page

Platform Notes (Continued)

```
        VERSION="12-SP2"
        VERSION_ID="12.2"
        PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
        ID="sles"
        ANSI_COLOR="0;32"
        CPE_NAME="cpe:/o:suse:sles:12:sp2"

  uname -a:
     Linux synergy680_manju 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
     (9464f67) x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Jan 25 16:48

  SPEC is set to: /home/cpu2006
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/sda4      xfs   331G   20G  311G   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
     determined", but the intent may not be met, as there are frequent changes to
     hardware, firmware, and the "DMTF SMBIOS" standard.

    BIOS HP I40 12/08/2016
    Memory:
     64x UNKNOWN NOT AVAILABLE
     32x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz, configured at 1600 MHz

  (End of data from sysinfo program)
  Regarding the sysinfo display about the memory installed, the correct amount of
  memory is 1 TB and the dmidecode description should have one line reading as:
  32x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz, configured at 1600 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 i7-4790K CPU + 32GB RAM
  memory using Redhat Enterprise Linux 7.2
```

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 -no-prec-sqrt -static
-qopt-prefetch -fp-model fast=2
-qopt-prefetch-issue-excl-hint -auto-ilp32 -ansi-alias
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -no-prec-sqrt -static
-qopt-prefetch -fp-model fast=2
-qopt-prefetch-issue-excl-hint -auto-ilp32 -ansi-alias
-qopt-mem-layout-trans=3 -qopt-calloc

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -no-prec-sqrt -static
-qopt-prefetch -fp-model fast=2
-qopt-prefetch-issue-excl-hint

Continued on next page

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -no-prec-sqrt -static
-qopt-prefetch -fp-model fast=2
-qopt-prefetch-issue-excl-hint -auto-ilp32 -ansi-alias
-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:

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) -no-prec-sqrt(pass 2) -static(pass 2) -qopt-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) -no-prec-sqrt(pass 2) -static(pass 2) -qopt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -qopt-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) -no-prec-sqrt(pass 2) -static(pass 2) -qopt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -prof-gen=threadsafe(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) -no-prec-sqrt(pass 2) -static(pass 2) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: basepeak = yes

465.tonto: -prof-gen=threadsafe(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) -no-prec-sqrt(pass 2) -static(pass 2) -unroll4 -auto -inline-calloc -qopt-malloc-options=3

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Peak Optimization Flags (Continued)

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) `-no-prec-sqrt`(pass 2) `-static`(pass 2) `-qopt-mem-layout-trans=3`(pass 2) `-prof-use`(pass 2) `-qopt-prefetch -auto-ilp32`

436.cactusADM: `basepeak = yes`

454.calculix: `basepeak = yes`

481.wrf: `-xCORE-AVX2 -ipo -O3 -no-prec-div -no-prec-sqrt -static -auto-ilp32`

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/HPE-Compiler-Flags-Intel-V1.2-HSW-revH.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/HPE-Compiler-Flags-Intel-V1.2-HSW-revH.xml`

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Tested with SPEC CPU2006 v1.2.
Report generated on Tue May 2 15:21:57 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 2 May 2017.