SPEC® CFP2006 Result

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Hewlett-Packard Company

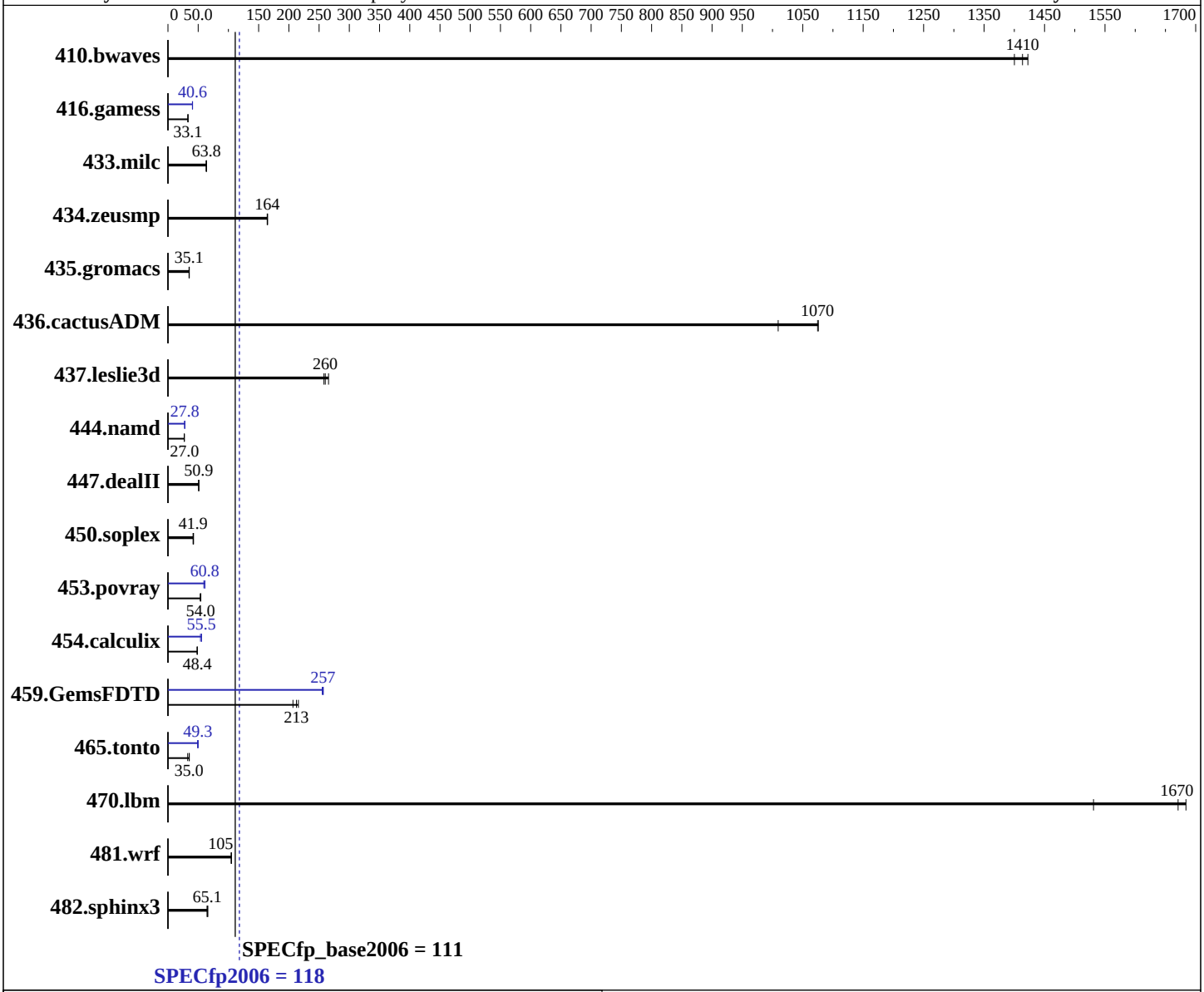
ProLiant DL580 Gen9
(2.20 GHz, Intel Xeon E7-8860 v3)

SPECfp®2006 = 118

SPECfp_base2006 = 111

CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
Tested by: Hewlett-Packard Company

Test date: Jun-2015
Hardware Availability: Jun-2015
Software Availability: Mar-2015



Hardware

CPU Name:	Intel Xeon E7-8860 v3
CPU Characteristics:	Intel Turbo Boost Technology up to 3.20 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	64 cores, 4 chips, 16 cores/chip
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

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Software

Operating System:	Red Hat Enterprise Linux Server release 7.1 (Maipo) Kernel 3.10.0-229.el7.x86_64
Compiler:	C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux; Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux
Auto Parallel:	Yes
File System:	xfs

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L3 Cache: 40 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (32 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)
Disk Subsystem: 2 x 400 GB SAS SSD, RAID 1
Other Hardware: None

System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	9.71	1400	**9.61**	**1410**	9.55	1420	9.71	1400	**9.61**	**1410**	9.55	1420
416.gamess	**592**	**33.1**	591	33.1	592	33.1	485	40.4	481	40.7	**482**	**40.6**
433.milc	144	63.9	146	63.0	**144**	**63.8**	144	63.9	146	63.0	**144**	**63.8**
434.zeusmp	**55.3**	**164**	55.2	165	55.4	164	**55.3**	**164**	55.2	165	55.4	164
435.gromacs	205	34.8	**204**	**35.1**	202	35.3	205	34.8	**204**	**35.1**	202	35.3
436.cactusADM	**11.1**	**1070**	11.8	1010	11.1	1080	**11.1**	**1070**	11.8	1010	11.1	1080
437.leslie3d	**36.1**	**260**	36.4	258	35.4	266	**36.1**	**260**	36.4	258	35.4	266
444.namd	**297**	**27.0**	297	27.0	297	27.0	289	27.8	289	27.7	**289**	**27.8**
447.dealII	**225**	**50.9**	225	50.8	224	51.1	**225**	**50.9**	225	50.8	224	51.1
450.soplex	**199**	**41.9**	197	42.4	201	41.5	**199**	**41.9**	197	42.4	201	41.5
453.povray	99.7	53.4	**98.5**	**54.0**	97.8	54.4	89.7	59.3	86.9	61.2	**87.5**	**60.8**
454.calculix	170	48.4	170	48.5	**170**	**48.4**	148	55.6	**149**	**55.5**	153	53.8
459.GemsFDTD	49.2	216	51.3	207	**49.9**	**213**	41.6	255	**41.4**	**257**	41.3	257
465.tonto	278	35.3	302	32.6	**281**	**35.0**	197	50.0	**200**	**49.3**	200	49.2
470.lbm	**8.22**	**1670**	8.16	1680	8.97	1530	**8.22**	**1670**	8.16	1680	8.97	1530
481.wrf	106	105	107	105	**107**	**105**	106	105	107	105	**107**	**105**
482.sphinx3	301	64.7	295	66.0	**299**	**65.1**	301	64.7	295	66.0	**299**	**65.1**

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

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
```

Platform Notes

```
BIOS Configuration
  Power Profile set to Custom
  Power Regulator set to Static High Performance Mode
  Minimum Processor Idle Power Core C-State set to C6 State
  Energy/Performance Bias set to Maximum Performance
  Collaborative Power Control set to Disabled
  Thermal Configuration set to Maximum Cooling
```

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Platform Notes (Continued)

```
      Processor Power and Utilization Monitoring set to Disabled
      Memory Refresh Rate set to 1x Refresh
      Intel Hyperthreading Options set to Disabled
    Sysinfo program /home/cpu2006/config/sysinfo.rev6914
    $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
    running on localhost.localdomain Mon Jun  1 18:34:06 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 E7-8860 v3 @ 2.20GHz
          4 "physical id"s (chips)
          64 "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 : 16
          siblings  : 16
          physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
          physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
          physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
          physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       cache size : 40960 KB

    From /proc/meminfo
       MemTotal:       528073652 kB
       HugePages_Total:       0
       Hugepagesize:       2048 kB

    From /etc/*release* /etc/*version*
       os-release:
          NAME="Red Hat Enterprise Linux Server"
          VERSION="7.1 (Maipo)"
          ID="rhel"
          ID_LIKE="fedora"
          VERSION_ID="7.1"
          PRETTY_NAME="Red Hat Enterprise Linux Server 7.1 (Maipo)"
          ANSI_COLOR="0;31"
          CPE_NAME="cpe:/o:redhat:enterprise_linux:7.1:GA:server"
       redhat-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
       system-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
       system-release-cpe: cpe:/o:redhat:enterprise_linux:7.1:ga:server

    uname -a:
       Linux localhost.localdomain 3.10.0-229.el7.x86_64 #1 SMP Thu Jan 29 18:37:38
       EST 2015 x86_64 x86_64 x86_64 GNU/Linux

    run-level 3 Jun 1 18:26

    SPEC is set to: /home/cpu2006
```

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Platform Notes (Continued)

```
     Filesystem            Type  Size  Used Avail Use% Mounted on
     /dev/mapper/rhel-home xfs   318G  6.0G  312G   2% /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 U17 03/13/2015
    Memory:
     32x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1600 MHz
     64x UNKNOWN NOT AVAILABLE

  (End of data from sysinfo program)
 Regarding the sysinfo display about the memory installed, the correct amount of
 memory is 512 GB and the dmidecode description should have one line reading as:
     32x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1600 MHz
```

General Notes

```
 Environment variables set by runspec before the start of the run:
 KMP_AFFINITY = "granularity=fine,compact"
 LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"
 OMP_NUM_THREADS = "64"

  Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB
  memory using RedHat EL 7.0
```

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

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Base Portability Flags (Continued)

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 -parallel -opt-prefetch -ansi-alias

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias

Peak Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

Peak Portability Flags

Same as Base Portability Flags

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(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2 -inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -inline-calloc -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

Continued on next page

Peak Optimization Flags (Continued)

435.gromacs: `basepeak = yes`

436.cactusADM: `basepeak = yes`

454.calculix: `-xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias`

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-ic15.0-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-ic15.0-official-linux64.xml`
`http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml`

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