SPEC® CFP2006 Result

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Hewlett-Packard Company

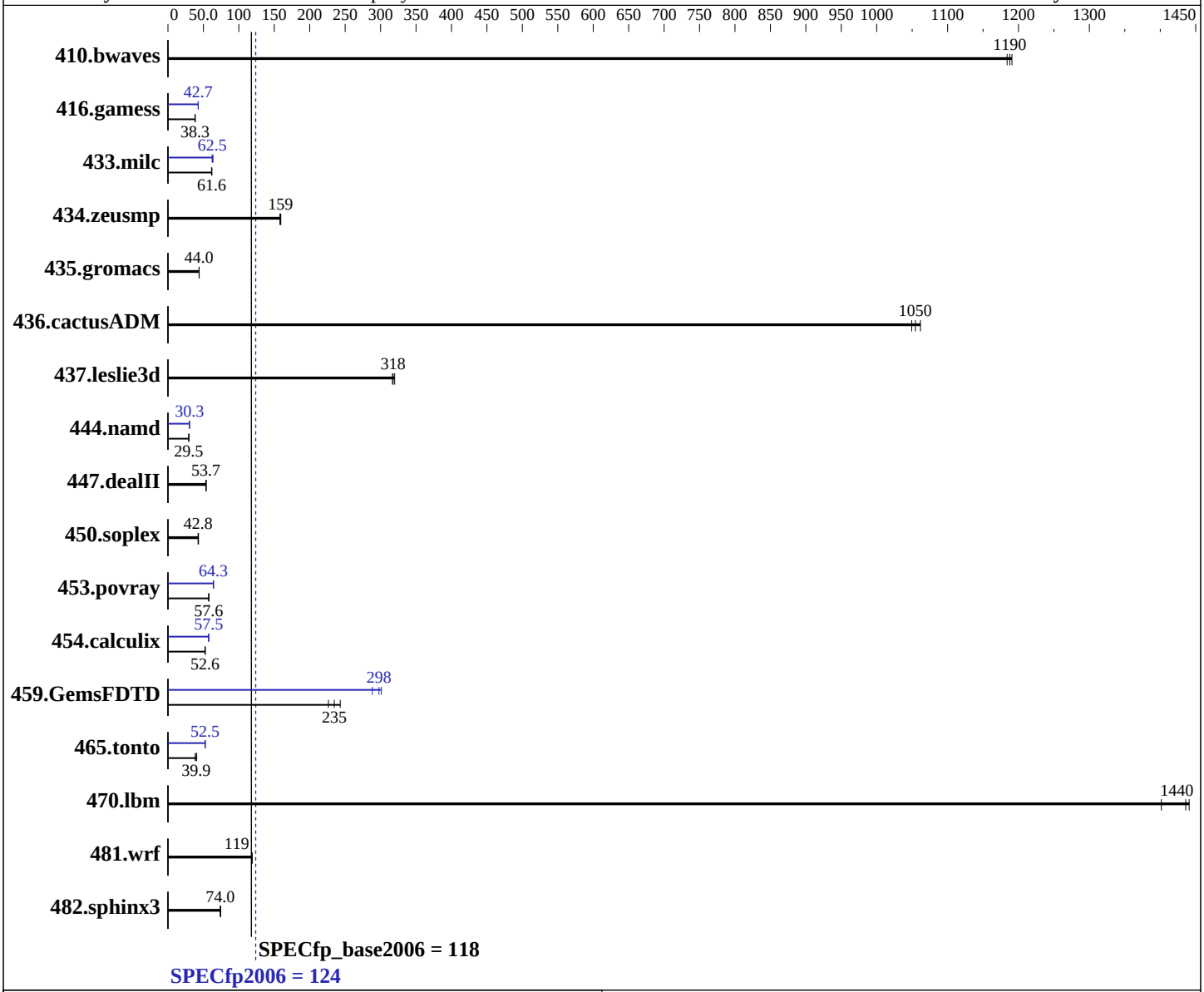
ProLiant DL580 Gen9
(2.80 GHz, Intel Xeon E7-8891 v3)

SPECfp®2006 = 124

SPECfp_base2006 = 118

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

Test date: Apr-2015
Hardware Availability: May-2015
Software Availability: Mar-2015



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:	40 cores, 4 chips, 10 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

Continued on next page

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: 45 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: 1 x 400 GB SAS SSD, RAID 0
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	11.5	1180	11.4	1190	**11.4**	**1190**	11.5	1180	11.4	1190	**11.4**	**1190**
416.gamess	510	38.4	512	38.2	**511**	**38.3**	**459**	**42.7**	460	42.6	457	42.8
433.milc	149	61.5	**149**	**61.6**	148	62.1	147	62.4	**147**	**62.5**	144	63.6
434.zeusmp	57.2	159	57.6	158	**57.3**	**159**	57.2	159	57.6	158	**57.3**	**159**
435.gromacs	162	44.1	163	43.9	**162**	**44.0**	162	44.1	163	43.9	**162**	**44.0**
436.cactusADM	11.3	1060	11.4	1050	**11.3**	**1050**	11.3	1060	11.4	1050	**11.3**	**1050**
437.leslie3d	29.4	320	**29.6**	**318**	29.7	317	29.4	320	**29.6**	**318**	29.7	317
444.namd	272	29.5	273	29.4	**272**	**29.5**	**264**	**30.3**	266	30.2	264	30.4
447.dealII	**213**	**53.7**	213	53.8	213	53.7	**213**	**53.7**	213	53.8	213	53.7
450.soplex	197	42.4	193	43.1	**195**	**42.8**	197	42.4	193	43.1	**195**	**42.8**
453.povray	92.1	57.8	92.4	57.6	**92.4**	**57.6**	82.7	64.3	82.9	64.2	**82.8**	**64.3**
454.calculix	157	52.6	158	52.2	**157**	**52.6**	**143**	**57.5**	143	57.5	143	57.5
459.GemsFDTD	46.9	226	43.6	243	**45.2**	**235**	36.8	288	35.2	301	**35.6**	**298**
465.tonto	256	38.4	**247**	**39.9**	243	40.6	188	52.5	**187**	**52.5**	187	52.6
470.lbm	9.80	1400	**9.57**	**1440**	9.54	1440	9.80	1400	**9.57**	**1440**	9.54	1440
481.wrf	94.7	118	94.1	119	**94.1**	**119**	94.7	118	94.1	119	**94.1**	**119**
482.sphinx3	**263**	**74.0**	262	74.5	264	73.8	**263**	**74.0**	262	74.5	264	73.8

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
  Intel Hypthreading Options set to Disabled
  Power Profile set to Custom
  Power Regulator set to Static High Performance Mode
  Minimum Processor Idle Power Core C-State set to C6 State
  Minimum Processor Idle Power Package C-State set to Package C6 (retention) State
  Energy/Performance Bias set to Maximum Performance
```

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Platform Notes (Continued)

```
      Collaborative Power Control set to Enabled
      Thermal Configuration set to Maximum Cooling
      Processor Power and Utilization Monitoring set to Disabled
      Memory Refresh Rate set to 1x Refresh

    Sysinfo program /cpu2006/config/sysinfo.rev6914
    $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
    running on localhost.localdomain Wed Apr  1 21:30:43 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 E7-8891 v3 @ 2.80GHz
          4 "physical id"s (chips)
          40 "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  : 10
          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
       cache size : 46080 KB

    From /proc/meminfo
       MemTotal:       528076380 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 Apr 1 10:07
```

Continued on next page

Platform Notes (Continued)

```
 SPEC is set to: /cpu2006
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda4      xfs   368G   26G  343G   7% /
 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:
    11x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1600 MHz
    64x UNKNOWN NOT AVAILABLE
    21x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 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 512 GB and the dmidecode description should have two lines reading as:
     11x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1600 MHz
     21x UNKNOWN NOT AVAILABLE 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 = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"
OMP_NUM_THREADS = "40"

 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
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

Continued on next page

Peak Compiler Invocation (Continued)

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: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32 -ansi-alias

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

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Peak Optimization Flags (Continued)

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:

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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