SPEC® CFP2006 Result

Hewlett-Packard Company

$SPECfp^{®}2006 =$ 107

ProLiant BL460c Gen9
(2.30 GHz, Intel Xeon E5-2650 v3)

$SPECfp\_base2006 =$ 103

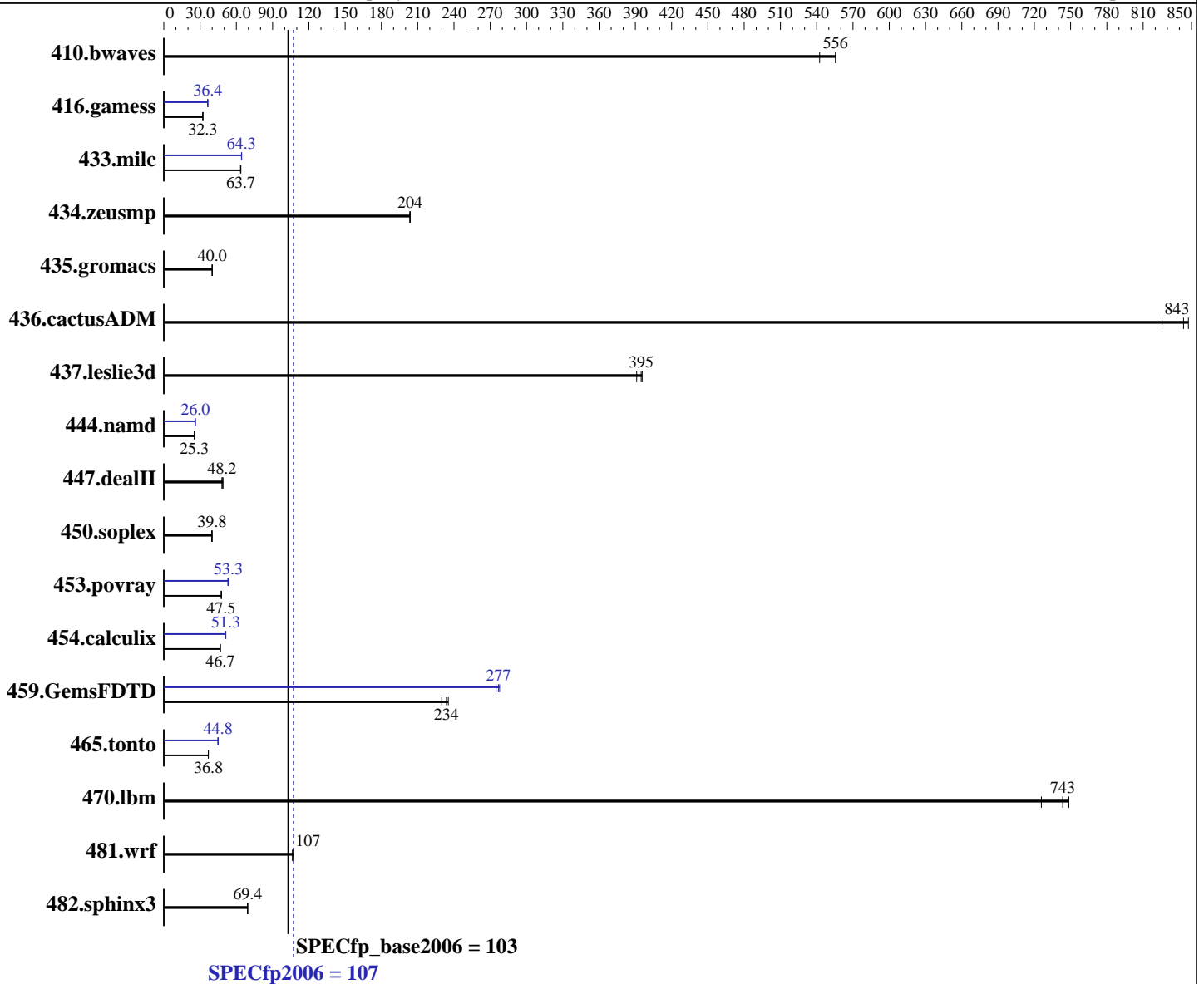| Benchmark	Result
410.bwaves	556
416.gamess	36.4 / 32.3
433.milc	64.3 / 63.7
434.zeusmp	204
435.gromacs	40.0
436.cactusADM	843
437.leslie3d	395
444.namd	26.0 / 25.3
447.dealII	48.2
450.soplex	39.8
453.povray	53.3 / 47.5
454.calculix	51.3 / 46.7
459.GemsFDTD	277 / 234
465.tonto	44.8 / 36.8
470.lbm	743
481.wrf	107
482.sphinx3	69.4

SPECfp_base2006 = 103

SPECfp2006 = 107

Hardware

CPU Name: Intel Xeon E5-2650 v3
CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz: 2300
FPU: Integrated
CPU(s) enabled: 20 cores, 2 chips, 10 cores/chip
CPU(s) orderable: 1,2 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 7.0 (Maipo)
Kernel 3.10.0-123.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: ext4
Continued on next page

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

Test date: Dec-2014
Hardware Availability: Sep-2014
Software Availability: Sep-2014

L3 Cache:	25 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	64-bit
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)	Peak Pointers:	32/64-bit
Disk Subsystem:	2 x 400 GB SAS SSD, RAID 1	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	**24.5**	**556**	25.1	542	24.5	556	**24.5**	**556**	25.1	542	24.5	556
416.gamess	**606**	**32.3**	608	32.2	605	32.3	540	36.3	538	36.4	**538**	**36.4**
433.milc	**144**	**63.7**	144	63.7	145	63.4	142	64.5	143	64.2	**143**	**64.3**
434.zeusmp	**44.7**	**204**	44.7	204	44.7	204	**44.7**	**204**	44.7	204	44.7	204
435.gromacs	179	39.9	178	40.1	**178**	**40.0**	179	39.9	178	40.1	**178**	**40.0**
436.cactusADM	14.1	847	14.5	826	**14.2**	**843**	14.1	847	14.5	826	**14.2**	**843**
437.leslie3d	24.0	391	23.8	396	**23.8**	**395**	24.0	391	23.8	396	**23.8**	**395**
444.namd	**317**	**25.3**	318	25.2	317	25.3	**308**	**26.0**	308	26.0	308	26.0
447.dealII	233	49.0	238	48.2	**237**	**48.2**	233	49.0	238	48.2	**237**	**48.2**
450.soplex	208	40.0	**210**	**39.8**	210	39.7	208	40.0	**210**	**39.8**	210	39.7
453.povray	112	47.5	**112**	**47.5**	112	47.7	**99.7**	**53.3**	99.6	53.4	101	52.9
454.calculix	177	46.5	**177**	**46.7**	176	46.8	**161**	**51.3**	161	51.3	162	50.8
459.GemsFDTD	45.1	235	46.2	230	**45.4**	**234**	38.2	278	**38.3**	**277**	38.6	275
465.tonto	**267**	**36.8**	267	36.8	267	36.9	219	45.0	220	44.8	**220**	**44.8**
470.lbm	18.9	726	18.4	749	**18.5**	**743**	18.9	726	18.4	749	**18.5**	**743**
481.wrf	104	107	**105**	**107**	105	106	104	107	**105**	**107**	105	106
482.sphinx3	281	69.4	282	69.2	**281**	**69.4**	281	69.4	282	69.2	**281**	**69.4**

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:
 HP Power Profile set to Custom
 HP Power Regulator to HP Static High Performance Mode
 Minimum Processor Idle Power Core State set to C6 State
 Minimum Processor Idle Power Package State set to No Package State
 QPI Snoop Configuration set to Home Snoop
 Thermal Configuration set to Maximum Cooling
 Collaborative Power Control set to Disabled
```

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Test date: Dec-2014
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Platform Notes (Continued)

```
 Processor Power and Utilization Monitoring set to Disabled
 Memory Double Refresh Rate set to 1x Refresh
 Intel Hyperthreading Options set to Disabled
Sysinfo program /cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on Y-BL460cGen9-VP2 Thu Dec 18 14:27:55 2014

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 E5-2650 v3 @ 2.30GHz
      2 "physical id"s (chips)
      20 "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 2 3 4 8 9 10 11 12
      physical 1: cores 0 2 3 4 8 9 10 11 12
   cache size : 25600 KB

From /proc/meminfo
   MemTotal:       263845756 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.0 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.0"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

uname -a:
   Linux Y-BL460cGen9-VP2 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT
   2014 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 18 07:58

SPEC is set to: /cpu2006
   Filesystem          Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-root ext4  310G  116G  179G  40% /
```
Continued on next page

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Test sponsor:	Hewlett-Packard Company	**Hardware Availability:**	Sep-2014
Tested by:	Hewlett-Packard Company	**Software Availability:**	Sep-2014

Platform Notes (Continued)

```
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 I36 08/26/2014
   Memory:
   16x HP 752369-081 16 GB 2 rank 2133 MHz

(End of data from sysinfo program)
```

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 = "20"

 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
```

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Test sponsor: Hewlett-Packard Company	**Hardware Availability:** Sep-2014
Tested by: Hewlett-Packard Company	**Software Availability:** Sep-2014

Base Portability Flags (Continued)

```
  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
```

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

Test date: Dec-2014
Hardware Availability: Sep-2014
Software Availability: Sep-2014

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

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

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Tested by: Hewlett-Packard Company	**Software Availability:** Sep-2014

Peak Optimization Flags (Continued)

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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For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.
Report generated on Tue Jan 27 13:34:46 2015 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 27 January 2015.