SPEC® CFP2006 Result
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Hewlett-Packard Company

ProLiant BL660c Gen9
(2.10 GHz, Intel Xeon E5-4660 v3)

$SPECfp^{®}2006 =$ 102

$SPECfp\_base2006 =$ 96.5

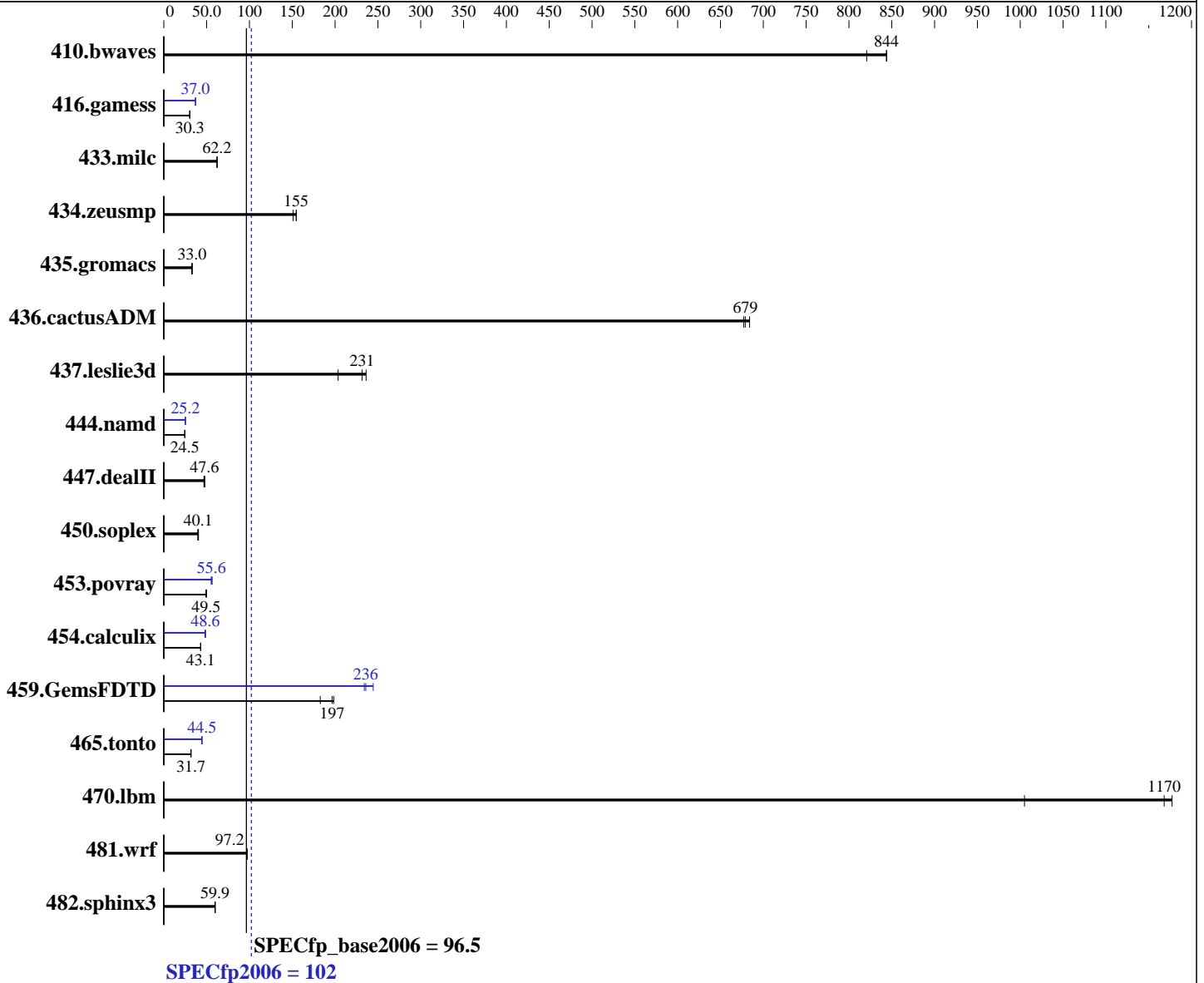|	
CPU2006 license: 3	**Test date:** May-2015
Test sponsor: Hewlett-Packard Company	**Hardware Availability:** Jun-2015
Tested by: Hewlett-Packard Company	**Software Availability:** Oct-2014

Results chart (scale 0 to 1200):
- 410.bwaves: 844
- 416.gamess: 37.0 / 30.3
- 433.milc: 62.2
- 434.zeusmp: 155
- 435.gromacs: 33.0
- 436.cactusADM: 679
- 437.leslie3d: 231
- 444.namd: 25.2 / 24.5
- 447.dealII: 47.6
- 450.soplex: 40.1
- 453.povray: 55.6 / 49.5
- 454.calculix: 48.6 / 43.1
- 459.GemsFDTD: 236 / 197
- 465.tonto: 44.5 / 31.7
- 470.lbm: 1170
- 481.wrf: 97.2
- 482.sphinx3: 59.9

SPECfp_base2006 = 96.5
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Hardware

CPU Name:	Intel Xeon E5-4660 v3
CPU Characteristics:	Intel Turbo Boost Technology up to 2.90 GHz
CPU MHz:	2100
FPU:	Integrated
CPU(s) enabled:	56 cores, 4 chips, 14 cores/chip
CPU(s) orderable:	2,4 chips
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) Kernel 3.12.28-4-default
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
System State:	Run level 3 multi-user

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L3 Cache:	35 MB I+D on chip per chip	Base Pointers:	64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	512 GB (32 x 16 GB 2Rx4 PC4-2133P-R)	Other Software:	None
Disk Subsystem:	1 x 400 GB SAS SSD, RAID 0		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	16.6	821	16.1	844	**16.1**	**844**	16.6	821	16.1	844	**16.1**	**844**
416.gamess	647	30.3	**645**	**30.3**	643	30.4	529	37.0	529	37.0	**529**	**37.0**
433.milc	148	62.2	148	62.2	**148**	**62.2**	148	62.2	148	62.2	**148**	**62.2**
434.zeusmp	**58.9**	**155**	60.3	151	58.8	155	**58.9**	**155**	60.3	151	58.8	155
435.gromacs	217	32.9	**217**	**33.0**	215	33.1	217	32.9	**217**	**33.0**	215	33.1
436.cactusADM	17.6	677	**17.6**	**679**	17.5	684	17.6	677	**17.6**	**679**	17.5	684
437.leslie3d	39.8	236	46.2	204	**40.6**	**231**	39.8	236	46.2	204	**40.6**	**231**
444.namd	327	24.6	**327**	**24.5**	327	24.5	318	25.2	318	25.2	**318**	**25.2**
447.dealII	**240**	**47.6**	244	46.9	240	47.7	**240**	**47.6**	244	46.9	240	47.7
450.soplex	**208**	**40.1**	210	39.7	206	40.5	**208**	**40.1**	210	39.7	206	40.5
453.povray	107	49.9	**108**	**49.5**	108	49.3	**95.8**	**55.6**	96.0	55.4	94.2	56.5
454.calculix	191	43.1	**191**	**43.1**	192	42.9	172	48.1	170	48.7	**170**	**48.6**
459.GemsFDTD	58.1	183	**54.0**	**197**	53.5	198	45.3	234	43.4	245	**45.0**	**236**
465.tonto	311	31.7	310	31.7	**310**	**31.7**	221	44.6	**221**	**44.5**	221	44.5
470.lbm	**11.8**	**1170**	13.7	1000	11.7	1180	**11.8**	**1170**	13.7	1000	11.7	1180
481.wrf	115	97.3	**115**	**97.2**	115	96.7	115	97.3	**115**	**97.2**	115	96.7
482.sphinx3	**325**	**59.9**	324	60.1	326	59.7	**325**	**59.9**	324	60.1	326	59.7

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:
```

Platform Notes

```
BIOS Configuration
  Intel Hyperthreading 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
  Collaborative Power Control set to Enabled
  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

  Sysinfo program /root/cpu2006/config/sysinfo.rev6914
  $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
  running on linux-wzg5 Sun May 17 08:09:05 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 E5-4660 v3 @ 2.10GHz
       4 "physical id"s (chips)
       56 "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 : 14
       siblings  : 14
       physical 0: cores 0 2 4 5 6 8 9 10 11 12 13 14
       physical 1: cores 0 2 4 5 6 8 9 10 11 12 13 14
       physical 2: cores 0 2 4 5 6 8 9 10 11 12 13 14
       physical 3: cores 0 2 4 5 6 8 9 10 11 12 13 14
    cache size : 35840 KB

  From /proc/meminfo
    MemTotal:       529177784 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

  From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 0
       # 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"
       VERSION="12"
       VERSION_ID="12"
       PRETTY_NAME="SUSE Linux Enterprise Server 12"
       ID="sles"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:12"

  uname -a:
    Linux linux-wzg5 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
    (9879bd4) x86_64 x86_64 x86_64 GNU/Linux
```

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Platform Notes (Continued)

```
run-level 3 May 17 08:06

SPEC is set to: /root/cpu2006
   Filesystem      Type   Size  Used Avail Use% Mounted on
   /dev/sdb4       xfs    300G  8.7G  292G   3% /
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 I38 03/05/2015
   Memory:
   32x 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 = "/root/cpu2006/libs/32:/root/cpu2006/libs/64:/root/cpu2006/sh"
OMP_NUM_THREADS = "56"

 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
```

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Base Portability Flags (Continued)

```
      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
```

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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:

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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

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

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