



# SPEC® CFP2006 Result

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## Hewlett-Packard Company

**SPECfp®2006 = 88.1**

ProLiant BL660c Gen9  
(1.90 GHz, Intel Xeon E5-4640 v3)

**SPECfp\_base2006 = 82.9**

CPU2006 license: 3

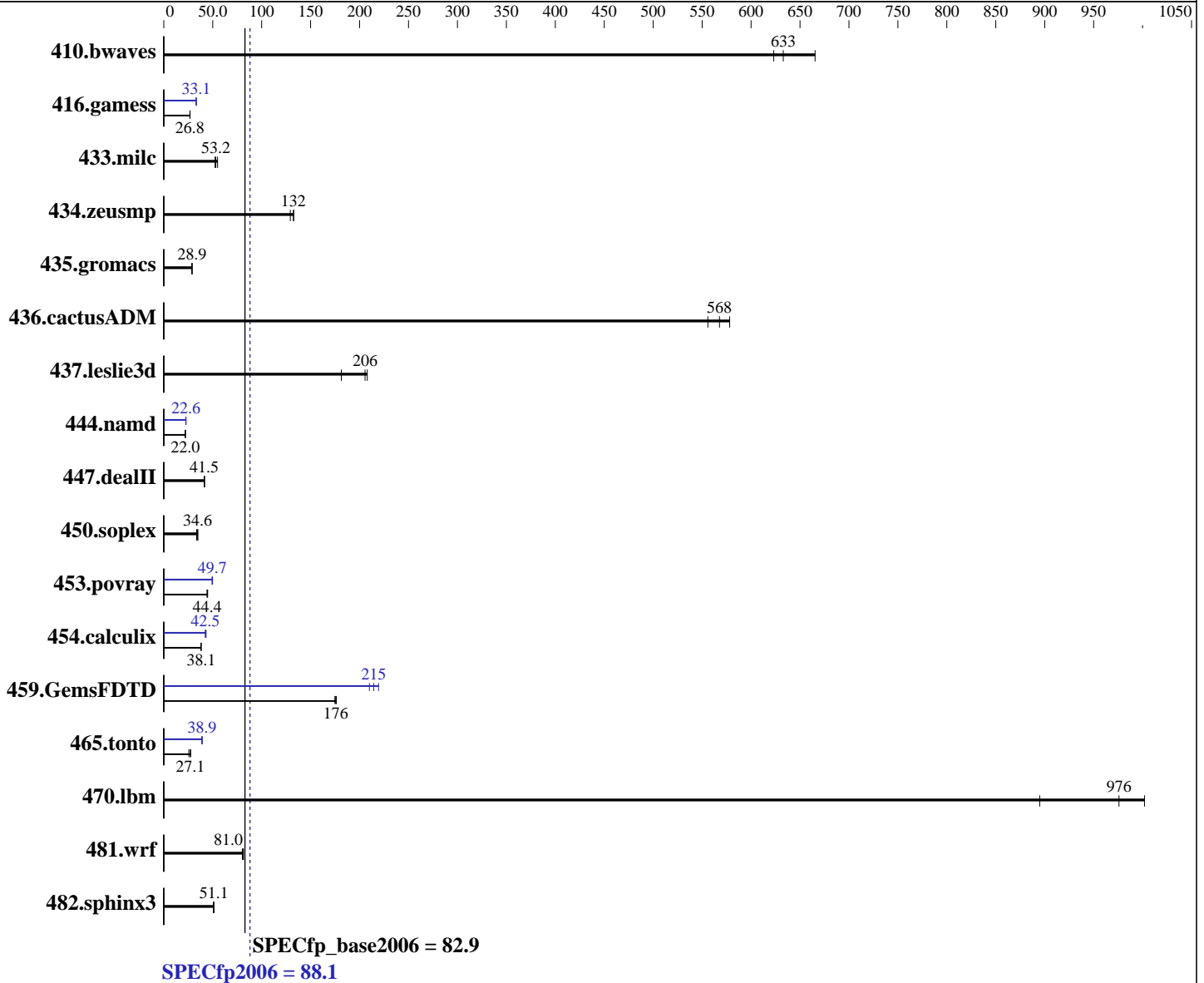
Test date: May-2015

Test sponsor: Hewlett-Packard Company

Hardware Availability: Jun-2015

Tested by: Hewlett-Packard Company

Software Availability: Oct-2014



**Hardware**

CPU Name: Intel Xeon E5-4640 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.60 GHz  
 CPU MHz: 1900  
 FPU: Integrated  
 CPU(s) enabled: 48 cores, 4 chips, 12 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

**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: 30 MB I+D on chip per chip  
Other Cache: None  
Memory: 512 GB (32 x 16 GB 2Rx4 PC4-2133P-R, running at 1866 MHz)  
Disk Subsystem: 1 x 400 GB SAS SSD, RAID 0  
Other Hardware: None

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	<b><u>21.5</u></b>	<b><u>633</u></b>	20.4	665	21.8	623	<b><u>21.5</u></b>	<b><u>633</u></b>	20.4	665	21.8	623
416.gamess	<b><u>732</u></b>	<b><u>26.8</u></b>	734	26.7	729	26.9	591	33.1	592	33.1	<b><u>592</u></b>	<b><u>33.1</u></b>
433.milc	<b><u>173</u></b>	<b><u>53.2</u></b>	175	52.4	167	55.0	<b><u>173</u></b>	<b><u>53.2</u></b>	175	52.4	167	55.0
434.zeusmp	68.6	133	<b><u>68.7</u></b>	<b><u>132</u></b>	70.4	129	68.6	133	<b><u>68.7</u></b>	<b><u>132</u></b>	70.4	129
435.gromacs	249	28.6	247	29.0	<b><u>247</u></b>	<b><u>28.9</u></b>	249	28.6	247	29.0	<b><u>247</u></b>	<b><u>28.9</u></b>
436.cactusADM	<b><u>21.0</u></b>	<b><u>568</u></b>	21.5	556	20.7	578	<b><u>21.0</u></b>	<b><u>568</u></b>	21.5	556	20.7	578
437.leslie3d	<b><u>45.7</u></b>	<b><u>206</u></b>	45.2	208	51.8	181	<b><u>45.7</u></b>	<b><u>206</u></b>	45.2	208	51.8	181
444.namd	365	22.0	<b><u>365</u></b>	<b><u>22.0</u></b>	365	22.0	355	22.6	355	22.6	<b><u>355</u></b>	<b><u>22.6</u></b>
447.dealII	275	41.6	<b><u>276</u></b>	<b><u>41.5</u></b>	276	41.4	275	41.6	<b><u>276</u></b>	<b><u>41.5</u></b>	276	41.4
450.soplex	248	33.6	<b><u>241</u></b>	<b><u>34.6</u></b>	240	34.7	248	33.6	<b><u>241</u></b>	<b><u>34.6</u></b>	240	34.7
453.povray	119	44.8	<b><u>120</u></b>	<b><u>44.4</u></b>	120	44.2	<b><u>107</u></b>	<b><u>49.7</u></b>	108	49.3	107	49.8
454.calculix	216	38.2	<b><u>217</u></b>	<b><u>38.1</u></b>	217	38.0	<b><u>194</u></b>	<b><u>42.5</u></b>	191	43.2	195	42.4
459.GemsFDTD	60.2	176	60.7	175	<b><u>60.4</u></b>	<b><u>176</u></b>	48.4	219	<b><u>49.5</u></b>	<b><u>215</u></b>	50.5	210
465.tonto	<b><u>363</u></b>	<b><u>27.1</u></b>	358	27.5	385	25.6	253	38.9	<b><u>253</u></b>	<b><u>38.9</u></b>	251	39.3
470.lbm	13.7	1000	15.4	895	<b><u>14.1</u></b>	<b><u>976</u></b>	13.7	1000	15.4	895	<b><u>14.1</u></b>	<b><u>976</u></b>
481.wrf	<b><u>138</u></b>	<b><u>81.0</u></b>	139	80.2	137	81.4	<b><u>138</u></b>	<b><u>81.0</u></b>	139	80.2	137	81.4
482.sphinx3	<b><u>381</u></b>	<b><u>51.1</u></b>	381	51.2	384	50.7	<b><u>381</u></b>	<b><u>51.1</u></b>	381	51.2	384	50.7

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:  
echo always > /sys/kernel/mm/transparent\_hugepage/enabled

## Platform Notes

BIOS Configuration:  
Intel Hyperthreading Options set to Disabled  
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  
Energy/Performance Bias set to Maximum Performance  
Collaborative Power Control set to Disabled

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CPU2006 license: 3

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### Platform Notes (Continued)

Thermal Configuration set to Maximum Cooling  
 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 24 23:58:55 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 E5-4640 v3 @ 1.90GHz
 4 "physical id"s (chips)
 48 "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    : 12
  siblings     : 12
  physical 0   : cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 1   : cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 2   : cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 3   : cores 0 1 2 3 4 5 8 9 10 11 12 13
cache size     : 30720 KB

```

From /proc/meminfo

```

MemTotal:      529178648 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 24 23:55

SPEC is set to: /root/cpu2006

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sdb4	xfs	300G	8.8G	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, configured at 1866 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 = "48"

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:

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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.deallI: 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>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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