



# SPEC<sup>®</sup> CFP2006 Result

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## Hewlett-Packard Company

**SPECfp<sup>®</sup>2006 = 99.3**

ProLiant ML110 Gen9  
(2.60 GHz, Intel Xeon E5-2660 v3)

**SPECfp\_base2006 = 96.4**

CPU2006 license: 3

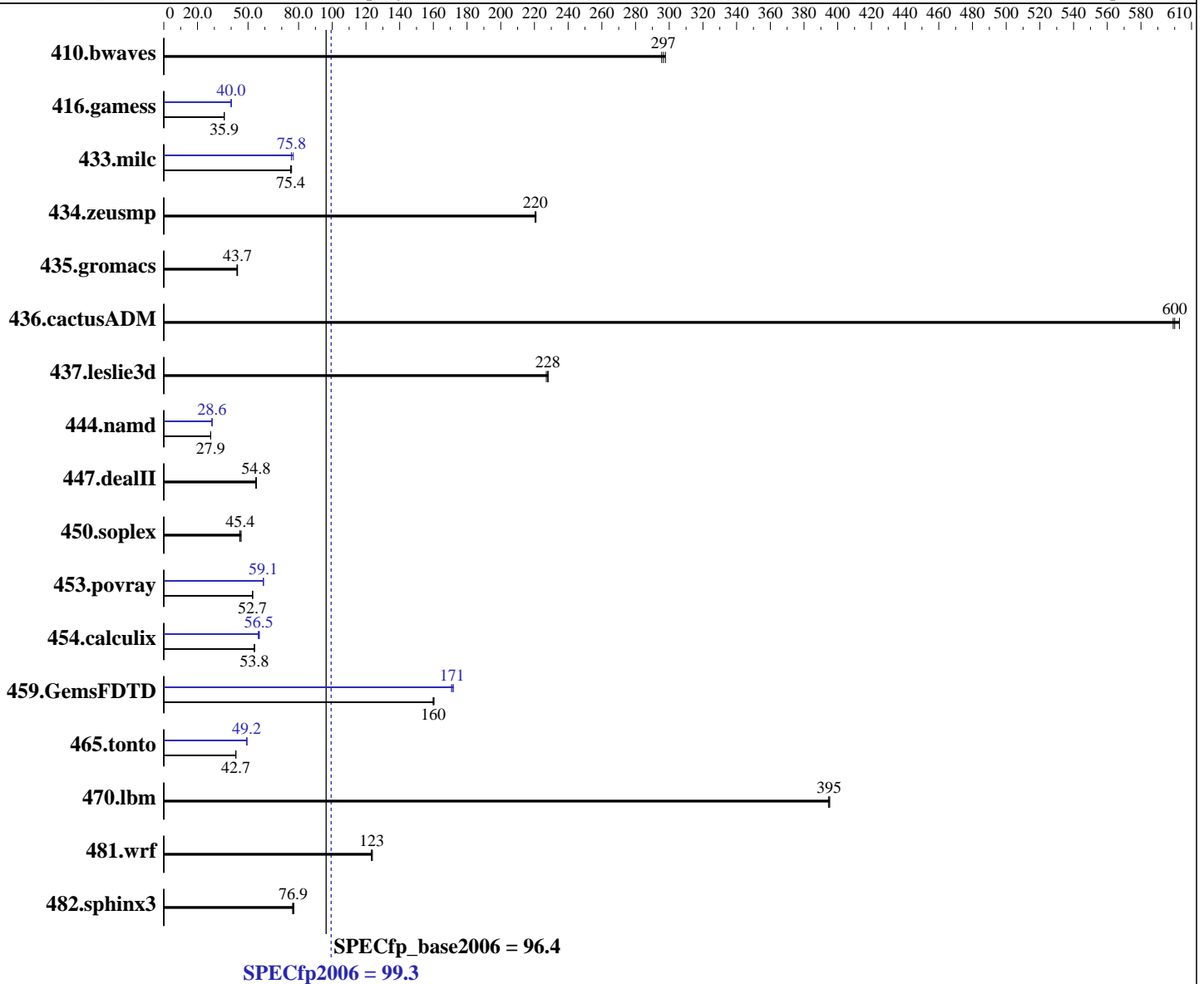
Test date: Feb-2015

Test sponsor: Hewlett-Packard Company

Hardware Availability: Mar-2015

Tested by: Hewlett-Packard Company

Software Availability: Sep-2014



### Hardware

CPU Name: Intel Xeon E5-2660 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2600  
 FPU: Integrated  
 CPU(s) enabled: 10 cores, 1 chip, 10 cores/chip  
 CPU(s) orderable: 1 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 7.0 (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: xfs

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L3 Cache: 25 MB I+D on chip per chip  
Other Cache: None  
Memory: 128 GB (8 x 16 GB 2Rx4 PC4-2133P-R)  
Disk Subsystem: 1 x 500 GB 7.2 K SATA, 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	45.6	298	46.0	295	<b>45.8</b>	<b>297</b>	45.6	298	46.0	295	<b>45.8</b>	<b>297</b>
416.gamess	<b>546</b>	<b>35.9</b>	546	35.9	546	35.8	<b>489</b>	<b>40.0</b>	489	40.1	491	39.9
433.milc	<b>122</b>	<b>75.4</b>	122	75.3	121	75.9	119	76.9	<b>121</b>	<b>75.8</b>	121	75.7
434.zeusmp	41.3	220	41.2	221	<b>41.3</b>	<b>220</b>	41.3	220	41.2	221	<b>41.3</b>	<b>220</b>
435.gromacs	165	43.4	<b>163</b>	<b>43.7</b>	163	43.7	165	43.4	<b>163</b>	<b>43.7</b>	163	43.7
436.cactusADM	<b>19.9</b>	<b>600</b>	19.8	603	19.9	599	<b>19.9</b>	<b>600</b>	19.8	603	19.9	599
437.leslie3d	41.2	228	<b>41.2</b>	<b>228</b>	41.4	227	41.2	228	<b>41.2</b>	<b>228</b>	41.4	227
444.namd	288	27.9	<b>288</b>	<b>27.9</b>	289	27.8	280	28.7	280	28.6	<b>280</b>	<b>28.6</b>
447.dealII	209	54.6	208	54.9	<b>209</b>	<b>54.8</b>	209	54.6	208	54.9	<b>209</b>	<b>54.8</b>
450.soplex	182	45.9	185	45.0	<b>184</b>	<b>45.4</b>	182	45.9	185	45.0	<b>184</b>	<b>45.4</b>
453.povray	<b>101</b>	<b>52.7</b>	101	52.7	101	52.6	89.9	59.2	90.1	59.0	<b>90.1</b>	<b>59.1</b>
454.calculix	153	53.8	153	53.8	<b>153</b>	<b>53.8</b>	<b>146</b>	<b>56.5</b>	145	56.8	147	56.1
459.GemsFDTD	<b>66.3</b>	<b>160</b>	66.3	160	66.1	160	62.1	171	<b>62.0</b>	<b>171</b>	61.7	172
465.tonto	230	42.7	<b>230</b>	<b>42.7</b>	230	42.8	199	49.4	200	49.2	<b>200</b>	<b>49.2</b>
470.lbm	34.8	395	<b>34.8</b>	<b>395</b>	34.8	394	34.8	395	<b>34.8</b>	<b>395</b>	34.8	394
481.wrf	<b>90.5</b>	<b>123</b>	90.2	124	90.6	123	<b>90.5</b>	<b>123</b>	90.2	124	90.6	123
482.sphinx3	255	76.4	<b>254</b>	<b>76.9</b>	253	77.2	255	76.4	<b>254</b>	<b>76.9</b>	253	77.2

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

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### Platform Notes (Continued)

```
Sysinfo program /cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Fri Feb 6 18:46:36 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 E5-2660 v3 @ 2.60GHz
 1 "physical id"s (chips)
 10 "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
cache size : 25600 KB
```

```
From /proc/meminfo
MemTotal:      131776976 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 localhost.localdomain 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 Feb 6 13:22

```
SPEC is set to: /cpu2006
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-root xfs   50G   21G   30G   41% /
```

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  
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### Platform Notes (Continued)

determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS HP P99 12/24/2014

Memory:

8x 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,1,0"

LD\_LIBRARY\_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"

OMP\_NUM\_THREADS = "10"

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

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## Base Portability Flags (Continued)

```

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



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## 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.dealIII: 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:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

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## Peak Optimization Flags (Continued)

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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