



SPEC® CFP2006 Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant BL460c Gen10
(3.60 GHz, Intel Xeon Gold 5122)

SPECfp®2006 = 93.3

SPECfp_base2006 = 90.7

CPU2006 license: 3

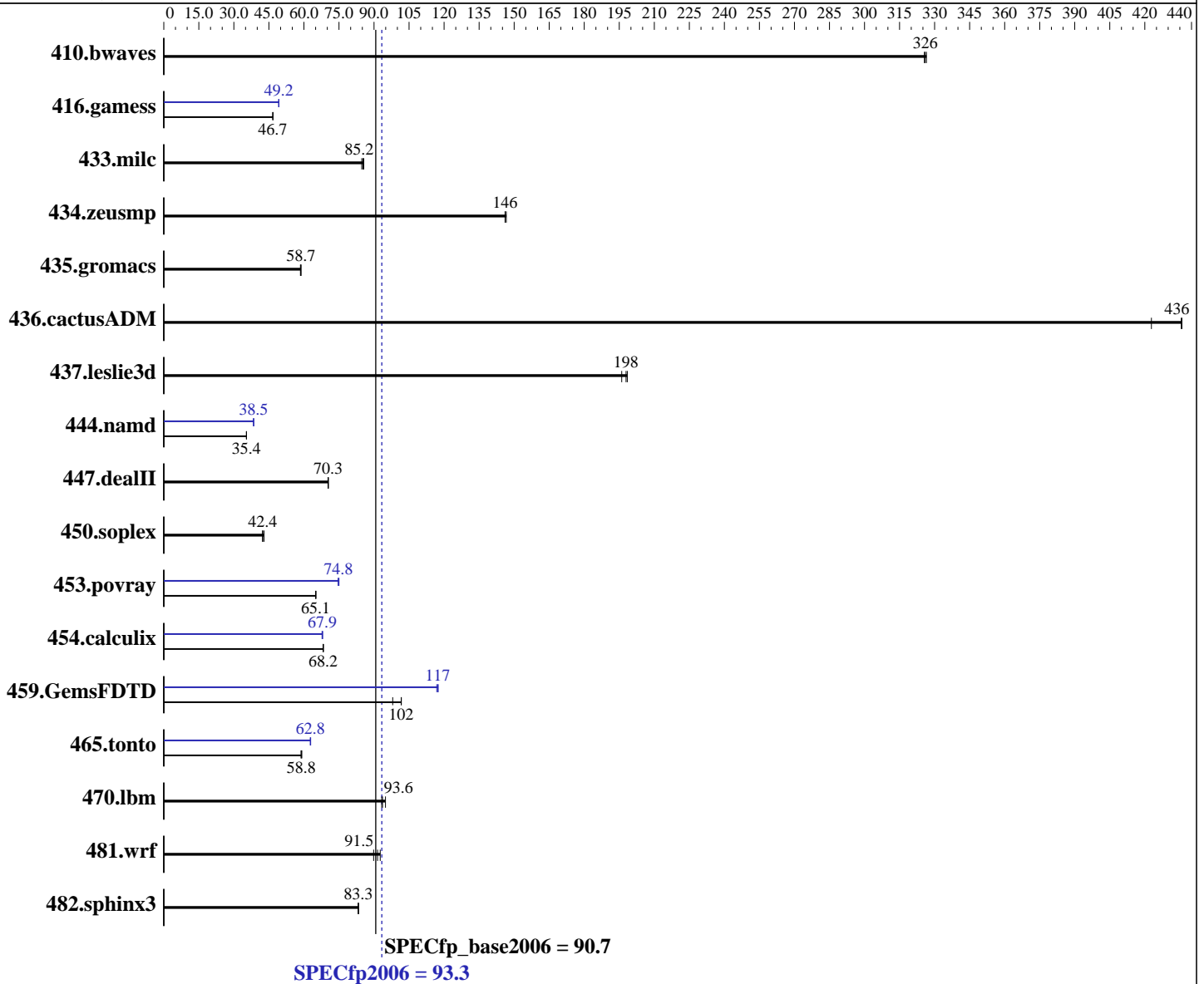
Test sponsor: HPE

Tested by: HPE

Test date: Dec-2017

Hardware Availability: Oct-2017

Software Availability: Nov-2016



Hardware

CPU Name: Intel Xeon Gold 5122
 CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
 CPU MHz: 3600
 FPU: Integrated
 CPU(s) enabled: 8 cores, 2 chips, 4 cores/chip
 CPU(s) orderable: 1, 2 chip(s)
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 1 MB I+D on chip per core

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Software

Operating System: Red Hat Enterprise Linux Server release 7.3 (Maipo)
 Kernel 3.10.0-514.el7.x86_64
 Compiler: C/C++: Version 17.0.1.132 of Intel C/C++ Compiler for Linux;
 Fortran: Version 17.0.1.132 of Intel Fortran Compiler for Linux
 Auto Parallel: Yes
 File System: xfs

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L3 Cache: 16.5 MB I+D on chip per chip
Other Cache: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)
Disk Subsystem: 1 x 480 GB SATA 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	41.6	326	<u>41.7</u>	<u>326</u>	41.7	326	41.6	326	<u>41.7</u>	<u>326</u>	41.7	326
416.gamess	419	46.7	419	46.7	<u>419</u>	<u>46.7</u>	<u>398</u>	<u>49.2</u>	398	49.2	398	49.3
433.milc	107	85.6	<u>108</u>	<u>85.2</u>	108	84.7	107	85.6	<u>108</u>	<u>85.2</u>	108	84.7
434.zeusmp	62.1	147	<u>62.3</u>	<u>146</u>	62.3	146	62.1	147	<u>62.3</u>	<u>146</u>	62.3	146
435.gromacs	122	58.5	122	58.7	<u>122</u>	<u>58.7</u>	122	58.5	122	58.7	<u>122</u>	<u>58.7</u>
436.cactusADM	<u>27.4</u>	<u>436</u>	28.3	423	27.4	436	<u>27.4</u>	<u>436</u>	28.3	423	27.4	436
437.leslie3d	47.4	198	47.9	196	<u>47.5</u>	<u>198</u>	47.4	198	47.9	196	<u>47.5</u>	<u>198</u>
444.namd	227	35.4	227	35.4	<u>227</u>	<u>35.4</u>	209	38.4	<u>209</u>	<u>38.5</u>	209	38.5
447.dealII	162	70.5	163	70.3	<u>163</u>	<u>70.3</u>	162	70.5	163	70.3	<u>163</u>	<u>70.3</u>
450.soplex	<u>197</u>	<u>42.4</u>	198	42.2	194	42.9	<u>197</u>	<u>42.4</u>	198	42.2	194	42.9
453.povray	81.8	65.0	<u>81.8</u>	<u>65.1</u>	81.7	65.1	70.9	75.0	<u>71.1</u>	<u>74.8</u>	71.3	74.7
454.calculix	121	68.4	<u>121</u>	<u>68.2</u>	121	68.2	122	67.8	<u>121</u>	<u>67.9</u>	121	68.0
459.GemsFDTD	108	98.0	<u>104</u>	<u>102</u>	104	102	90.3	117	<u>90.5</u>	<u>117</u>	90.8	117
465.tonto	167	58.8	167	59.1	<u>167</u>	<u>58.8</u>	156	62.9	<u>157</u>	<u>62.8</u>	157	62.7
470.lbm	<u>147</u>	<u>93.6</u>	145	94.9	147	93.3	<u>147</u>	<u>93.6</u>	145	94.9	147	93.3
481.wrf	124	89.8	121	92.7	<u>122</u>	<u>91.5</u>	124	89.8	121	92.7	<u>122</u>	<u>91.5</u>
482.sphinx3	234	83.3	<u>234</u>	<u>83.3</u>	234	83.4	234	83.3	<u>234</u>	<u>83.3</u>	234	83.4

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 by default
Filesystem page cache cleared with:
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
IRQ balance service was stop using "service irqbalance stop"
Tuned-adm profile was set to Throughput-Performance

Platform Notes

BIOS Configuration:
Intel Hyperthreading set to Disabled
Thermal Configuration set to Maximum Cooling
LLC Prefetch set to Enabled
LLC Dead Line Allocation set to Disabled

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Platform Notes (Continued)

Memory Patrol Scrubbing set to Disabled
 Workload Profile set to General Peak Frequency Compute
 Energy/Performance Bias set to Maximum Performance
 Workload Profile set to Custom
 NUMA Group Size Optimization set to Flat
 Sysinfo program /root/cpu2006/config/sysinfo.rev6993
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
 running on localhost.localdomain Thu Dec 7 20:02:07 2017

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) Gold 5122 CPU @ 3.60GHz
 2 "physical id"s (chips)
 8 "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 : 4
  siblings  : 4
  physical 0: cores 1 5 9 13
  physical 1: cores 1 2 5 11
cache size : 16896 KB
```

```
From /proc/meminfo
MemTotal:      197446384 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

```
From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.3 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.3"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.3:ga:server
```

```
uname -a:
Linux localhost.localdomain 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13
EDT 2016 x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Dec 7 15:13

SPEC is set to: /root/cpu2006

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Platform Notes (Continued)

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda4	xfs	442G	29G	414G	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 HPE I41 09/29/2017

Memory:

4x UNKNOWN NOT AVAILABLE

12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666 MHz

(End of data from sysinfo program)

Regarding the sysinfo display about the memory installed, the correct amount of memory is 192 GB and the dmidecode description should have one line reading as:

12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666 MHz

General Notes

Environment variables set by runspec before the start of the run:

KMP_AFFINITY = "granularity=fine,compact,1,0"

LD_LIBRARY_PATH = "/root/cpu2006/lib/ia32:/root/cpu2006/lib/intel64:/root/cpu2006/sh10.2"

OMP_NUM_THREADS = "4"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.2

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

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Base Portability Flags (Continued)

```

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-AVX512 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
```

C++ benchmarks:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
```

Fortran benchmarks:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
```

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: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll2 -inline-level=0
-qopt-prefetch -parallel

465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -inline-calloc -qopt-malloc-options=3
-auto -unroll4

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Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xCORE-AVX512 -ipo -O3 -no-prec-div -auto-ilp32

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-ic17.0-official-linux64-revF.html>

<http://www.spec.org/cpu2006/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml>

<http://www.spec.org/cpu2006/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.xml>

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