



SPEC® CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9

(2.40 GHz, Intel Xeon E5-2640 v4)

SPECfp®2006 =

117

SPECfp_base2006 =

110

CPU2006 license: 3

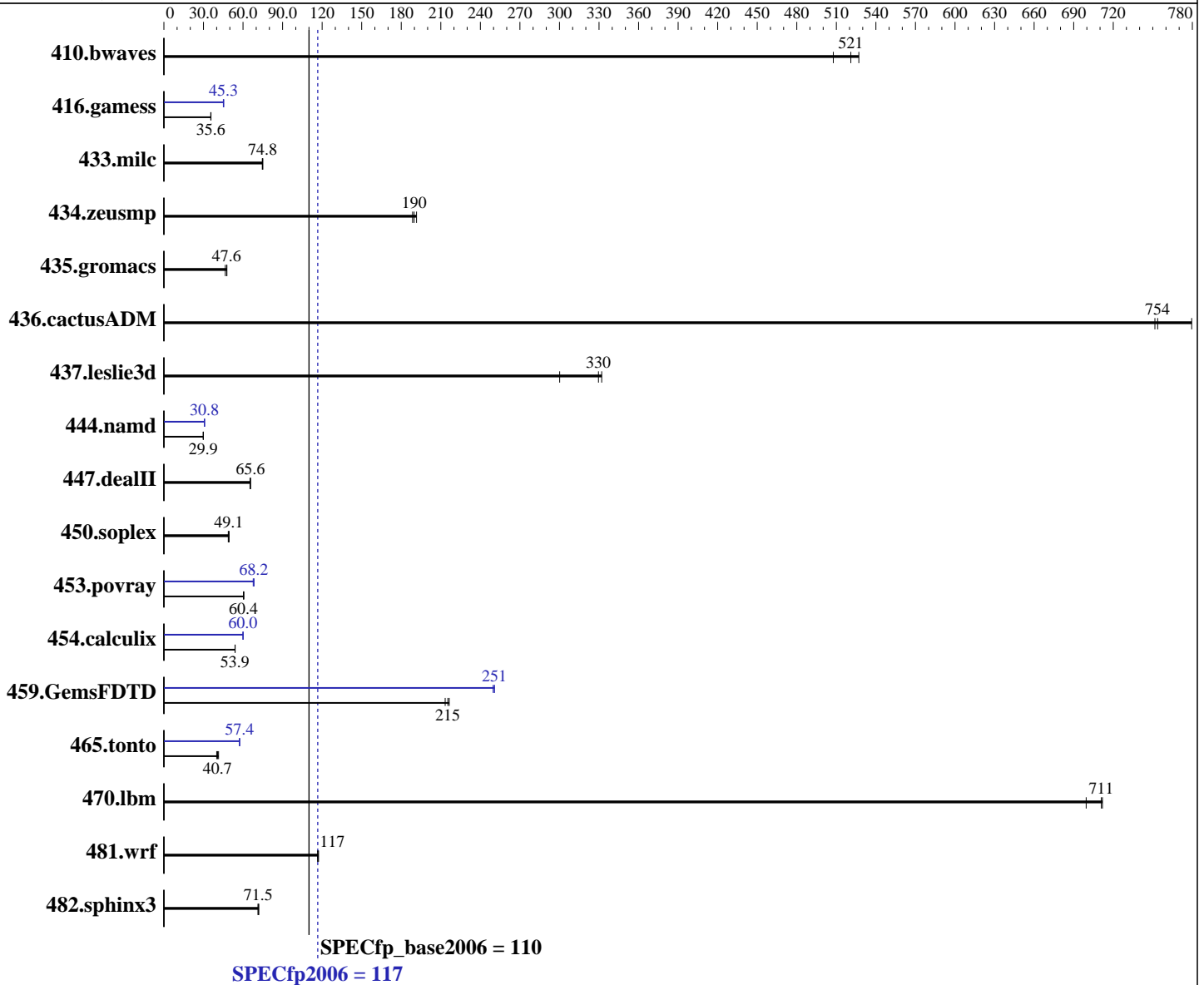
Test sponsor: HPE

Tested by: HPE

Test date: Jul-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015



Hardware

CPU Name: Intel Xeon E5-2640 v4
 CPU Characteristics: Intel Turbo Boost Technology up to 3.40 GHz
 CPU MHz: 2400
 FPU: Integrated
 CPU(s) enabled: 20 cores, 2 chips, 10 cores/chip, 2 threads/core
 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 7.2 (Maipo)
 Kernel 3.10.0-327.el7.x86_64
 Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux;
 Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
 Auto Parallel: Yes
 File System: xfs

Continued on next page



SPEC CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9

(2.40 GHz, Intel Xeon E5-2640 v4)

SPECfp2006 =

117

SPECfp_base2006 =

110

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Jul-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

L3 Cache: 25 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2400T-R, running at 2133 MHz)
Disk Subsystem: 2 x 400 GB SAS SSD, RAID 1
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	26.8	508	25.8	527	<u>26.1</u>	<u>521</u>	26.8	508	25.8	527	<u>26.1</u>	<u>521</u>
416.gamess	551	35.6	548	35.7	<u>550</u>	<u>35.6</u>	434	45.1	<u>432</u>	<u>45.3</u>	432	45.3
433.milc	122	75.0	123	74.6	<u>123</u>	<u>74.8</u>	122	75.0	123	74.6	<u>123</u>	<u>74.8</u>
434.zeusmp	<u>48.0</u>	<u>190</u>	48.3	189	47.5	192	<u>48.0</u>	<u>190</u>	48.3	189	47.5	192
435.gromacs	153	46.5	149	47.8	<u>150</u>	<u>47.6</u>	153	46.5	149	47.8	<u>150</u>	<u>47.6</u>
436.cactusADM	<u>15.9</u>	<u>754</u>	15.3	779	15.9	752	<u>15.9</u>	<u>754</u>	15.3	779	15.9	752
437.leslie3d	31.3	300	<u>28.5</u>	<u>330</u>	28.3	332	31.3	300	<u>28.5</u>	<u>330</u>	28.3	332
444.namd	268	29.9	<u>269</u>	<u>29.9</u>	269	29.9	260	30.8	<u>261</u>	<u>30.8</u>	261	30.8
447.dealII	<u>174</u>	<u>65.6</u>	174	65.7	175	65.3	<u>174</u>	<u>65.6</u>	174	65.7	175	65.3
450.soplex	169	49.4	171	48.8	<u>170</u>	<u>49.1</u>	169	49.4	171	48.8	<u>170</u>	<u>49.1</u>
453.povray	87.7	60.7	88.2	60.3	<u>88.1</u>	<u>60.4</u>	78.6	67.7	77.9	68.3	<u>78.0</u>	<u>68.2</u>
454.calculix	153	54.0	<u>153</u>	<u>53.9</u>	153	53.9	137	60.1	<u>137</u>	<u>60.0</u>	138	60.0
459.GemsFDTD	49.7	213	<u>49.3</u>	<u>215</u>	49.0	216	<u>42.3</u>	<u>251</u>	42.3	251	42.5	250
465.tonto	<u>242</u>	<u>40.7</u>	246	40.0	237	41.4	172	57.3	171	57.4	<u>171</u>	<u>57.4</u>
470.lbm	19.3	712	19.6	699	<u>19.3</u>	<u>711</u>	19.3	712	19.6	699	<u>19.3</u>	<u>711</u>
481.wrf	95.2	117	95.9	117	<u>95.6</u>	<u>117</u>	95.2	117	95.9	117	<u>95.6</u>	<u>117</u>
482.sphinx3	<u>273</u>	<u>71.5</u>	271	72.0	273	71.4	<u>273</u>	<u>71.5</u>	271	72.0	273	71.4

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 C-State set to C1E State

Minimum Processor Idle Power Package C-State set to No Package State

QPI Snoop Configuration set to Home Snoop

Collaborative Power Control set to Disabled

Continued on next page

Standard Performance Evaluation Corporation

info@spec.org

http://www.spec.org/

Page 2



SPEC CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9

(2.40 GHz, Intel Xeon E5-2640 v4)

SPECfp2006 =

117

SPECfp_base2006 =

110

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Jul-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Platform Notes (Continued)

Thermal Configuration set to Maximum Cooling
 Processor Power and Utilization Monitoring set to Disabled
 Memory Refresh Rate set to 1x Refresh
 Intel Hyperthreading set to Enabled
 Sysinfo program /cpu2006/config/sysinfo.rev6914
 \$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1
 running on localhost.localdomain Mon Jul 11 15:01:53 2016

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 E5-2640 v4 @ 2.40GHz
 2 "physical id"s (chips)
 40 "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     : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12
 cache size    : 25600 KB
```

```
From /proc/meminfo
MemTotal:      528065724 kB
HugePages_Total:      0
Hugepagesize:    2048 kB
```

```
From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.2 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.2"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.2:ga:server
```

```
uname -a:
Linux localhost.localdomain 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT 2015 x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Jul 11 10:03

SPEC is set to: /cpu2006

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
------------	------	------	------	-------	------	------------

Continued on next page



SPEC CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9

(2.40 GHz, Intel Xeon E5-2640 v4)

SPECfp2006 =

117

SPECfp_base2006 =

110

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Jul-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Platform Notes (Continued)

/dev/sda4 xfs 368G 207G 161G 57% /
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 P89 04/12/2016

Memory:

8x UNKNOWN NOT AVAILABLE

16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz, configured at 2133 MHz

(End of data from sysinfo program)

Regarding the sysinfo display about the memory installed, the correct amount of memory is 512 GB and the dmidecode description should have one line reading as:
16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz, configured at 2133 MHz

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 = "20"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1

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

Continued on next page

Standard Performance Evaluation Corporation

info@spec.org

http://www.spec.org/

Page 4



SPEC CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9

(2.40 GHz, Intel Xeon E5-2640 v4)

SPECfp2006 =

117

SPECfp_base2006 =

110

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Jul-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

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

```



SPEC CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9

(2.40 GHz, Intel Xeon E5-2640 v4)

SPECfp2006 =

117

SPECfp_base2006 =

110

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Jul-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

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

447.dealIII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4
-ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -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:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
-inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2) -inline-calloc

Continued on next page



SPEC CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9

(2.40 GHz, Intel Xeon E5-2640 v4)

SPECfp2006 =

117

SPECfp_base2006 =

110

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Jul-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Peak Optimization Flags (Continued)

465.tonto (continued):

`-opt-malloc-options=3 -auto -unroll4`

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/HP-Platform-Flags-Intel-V1.2-HSW-revE.html>

<http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.html>

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

<http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml>

<http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml>

SPEC and SPECfp are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2006 v1.2.

Report generated on Tue Aug 9 17:03:20 2016 by SPEC CPU2006 PS/PDF formatter v6932.

Originally published on 9 August 2016.

Standard Performance Evaluation Corporation

info@spec.org

<http://www.spec.org/>

Page 7