



SPEC® CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9
(2.40 GHz, Intel Xeon E5-2699A v4)

SPECfp®2006 = 115

SPECfp_base2006 = 109

CPU2006 license: 3

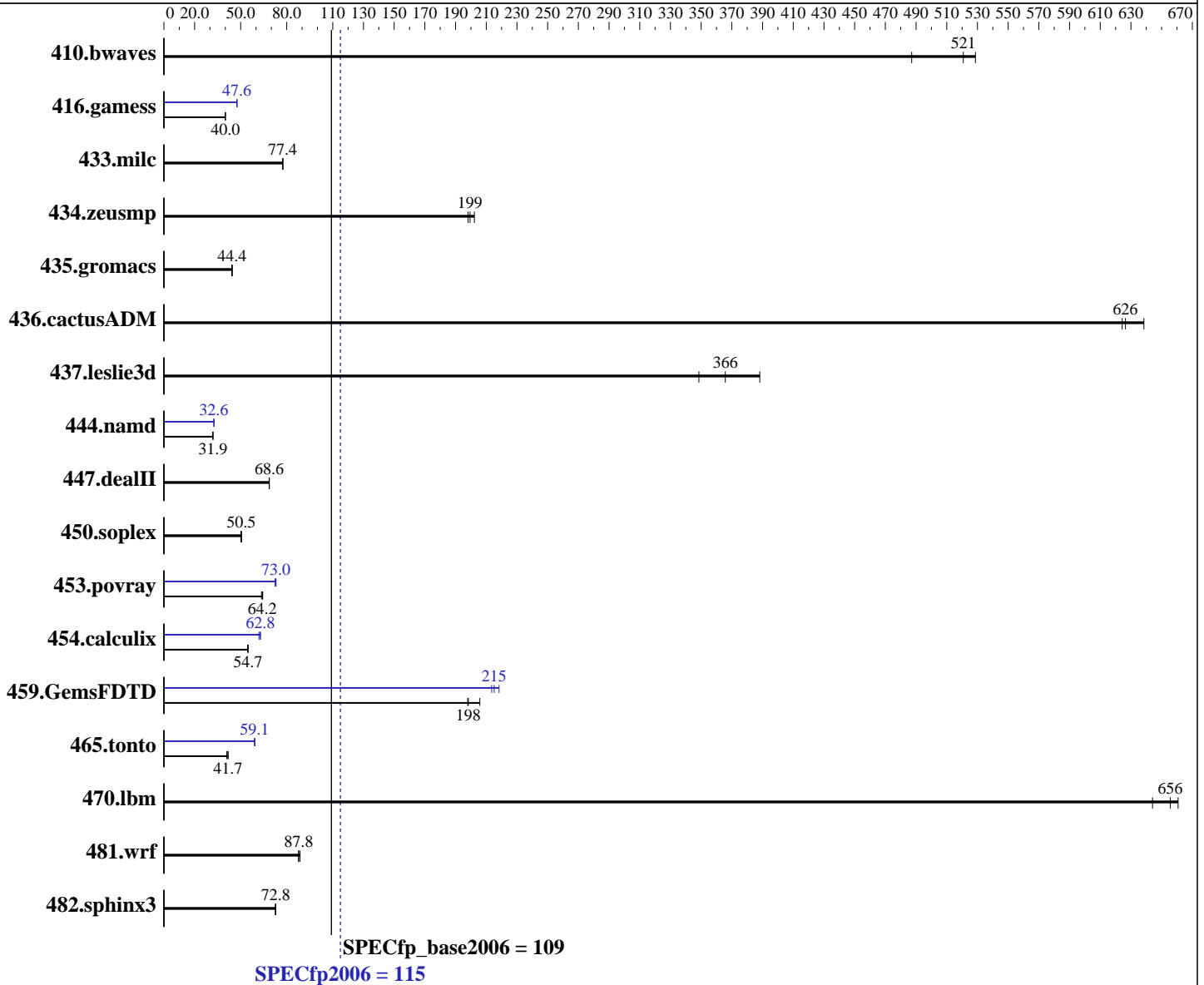
Test sponsor: HPE

Tested by: HPE

Test date: Sep-2016

Hardware Availability: Oct-2016

Software Availability: Nov-2015



Hardware

CPU Name: Intel Xeon E5-2699A v4
 CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
 CPU MHz: 2400
 FPU: Integrated
 CPU(s) enabled: 44 cores, 2 chips, 22 cores/chip
 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
 Auto Parallel: Yes
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 32/64-bit

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 E5-2699A v4)

SPECfp2006 = 115

SPECfp_base2006 = 109

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Sep-2016

Hardware Availability: Oct-2016

Software Availability: Nov-2015

L3 Cache: 55 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 1 x 400 GB SAS SSD, RAID 0
Other Hardware: None

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	27.9	487	25.7	529	<u>26.1</u>	<u>521</u>	27.9	487	25.7	529	<u>26.1</u>	<u>521</u>
416.gamess	<u>489</u>	<u>40.0</u>	489	40.1	490	39.9	411	47.6	<u>412</u>	<u>47.6</u>	412	47.5
433.milc	<u>119</u>	<u>77.4</u>	119	77.3	118	77.6	<u>119</u>	<u>77.4</u>	119	77.3	118	77.6
434.zeusmp	45.0	202	<u>45.6</u>	<u>199</u>	45.9	198	45.0	202	<u>45.6</u>	<u>199</u>	45.9	198
435.gromacs	<u>161</u>	<u>44.4</u>	162	44.2	160	44.6	<u>161</u>	<u>44.4</u>	162	44.2	160	44.6
436.cactusADM	18.7	638	19.1	624	<u>19.1</u>	<u>626</u>	18.7	638	19.1	624	<u>19.1</u>	<u>626</u>
437.leslie3d	24.2	388	<u>25.7</u>	<u>366</u>	27.0	349	24.2	388	<u>25.7</u>	<u>366</u>	27.0	349
444.namd	251	31.9	251	31.9	<u>251</u>	<u>31.9</u>	246	32.6	246	32.6	<u>246</u>	<u>32.6</u>
447.dealII	<u>167</u>	<u>68.6</u>	167	68.7	167	68.6	<u>167</u>	<u>68.6</u>	167	68.7	167	68.6
450.soplex	166	50.2	165	50.5	<u>165</u>	<u>50.5</u>	166	50.2	165	50.5	<u>165</u>	<u>50.5</u>
453.povray	<u>82.8</u>	<u>64.2</u>	82.6	64.4	83.7	63.6	72.9	73.0	73.5	72.4	<u>72.9</u>	<u>73.0</u>
454.calculix	150	54.9	<u>151</u>	<u>54.7</u>	151	54.5	131	62.9	133	61.9	<u>131</u>	<u>62.8</u>
459.GemsFDTD	51.6	206	<u>53.5</u>	<u>198</u>	53.6	198	<u>49.3</u>	<u>215</u>	48.6	218	49.7	214
465.tonto	<u>236</u>	<u>41.7</u>	241	40.9	235	41.8	<u>166</u>	<u>59.1</u>	167	59.0	166	59.3
470.lbm	20.8	661	21.3	644	<u>21.0</u>	<u>656</u>	20.8	661	21.3	644	<u>21.0</u>	<u>656</u>
481.wrf	126	88.7	128	87.6	<u>127</u>	<u>87.8</u>	126	88.7	128	87.6	<u>127</u>	<u>87.8</u>
482.sphinx3	268	72.8	268	72.6	<u>268</u>	<u>72.8</u>	268	72.8	268	72.6	<u>268</u>	<u>72.8</u>

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
Collaborative Power Control set to Disabled
Thermal Configuration set to Maximum Cooling
Processor Power and Utilization Monitoring set to Disabled

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 E5-2699A v4)

SPECfp2006 =

115

SPECfp_base2006 =

109

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Sep-2016

Hardware Availability: Oct-2016

Software Availability: Nov-2015

Platform Notes (Continued)

```
Memory Refresh Rate set to 1x Refresh
Intel Hyperthreading set to Disabled
Sysinfo program /cpu2006-HP/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Thu Sep 29 11:54:20 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 E5-2699A v4 @ 2.40GHz
 2 "physical id"s (chips)
 44 "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 : 22
  siblings  : 22
  physical 0: cores 0 2 3 4 8 10 11 12 16 17 18 19 20 21 24 25 26 27 28
  physical 1: cores 0 2 3 4 8 10 11 12 16 17 18 19 20 21 24 25 26 27 28
cache size : 56320 KB
```

```
From /proc/meminfo
MemTotal:      528065208 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 Sep 29 11:53
```

```
SPEC is set to: /cpu2006-HP
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4       xfs   460G  83G  378G  18% /
```

Additional information from dmidecode:

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 E5-2699A v4)

SPECfp2006 = 115

SPECfp_base2006 = 109

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Sep-2016

Hardware Availability: Oct-2016

Software Availability: Nov-2015

Platform Notes (Continued)

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 09/12/2016

Memory:

8x UNKNOWN NOT AVAILABLE

16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 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

General Notes

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

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

OMP_NUM_THREADS = "44"

LD_LIBRARY_PATH = "/cpu2006-HP/libs/32:/cpu2006-HP/libs/64:/cpu2006-HP/sh"

Binaries compiled on a system with 1x Intel Xeon E5-2660 v4 CPU + 128GB memory using RedHat EL 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

416.gamess: -DSPEC_CPU_LP64

433.milc: -DSPEC_CPU_LP64

434.zeusmp: -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 E5-2699A v4)

SPECfp2006 =

115

SPECfp_base2006 =

109

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Sep-2016

Hardware Availability: Oct-2016

Software Availability: Nov-2015

Base Portability Flags (Continued)

```

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 -static -parallel -opt-prefetch
-ansi-alias -fp-model fast=2
-qopt-prefetch-issue-excl-hint

```

C++ benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias
-fp-model fast=2
-qopt-prefetch-issue-excl-hint

```

Fortran benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-fp-model fast=2
-qopt-prefetch-issue-excl-hint

```

Benchmarks using both Fortran and C:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-ansi-alias -fp-model fast=2
-qopt-prefetch-issue-excl-hint

```

Peak Compiler Invocation

C benchmarks:

icc -m64

C++ benchmarks:

icpc -m64

Fortran benchmarks:

ifort -m64

Continued on next page

Standard Performance Evaluation Corporation

info@spec.org

http://www.spec.org/

Page 5



SPEC CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9

(2.40 GHz, Intel Xeon E5-2699A v4)

SPECfp2006 =

115

SPECfp_base2006 =

109

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Sep-2016

Hardware Availability: Oct-2016

Software Availability: Nov-2015

Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

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.dealII: 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

Continued on next page

Standard Performance Evaluation Corporation

info@spec.org

http://www.spec.org/

Page 6



SPEC CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9
(2.40 GHz, Intel Xeon E5-2699A v4)

SPECfp2006 = 115

SPECfp_base2006 = 109

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Sep-2016

Hardware Availability: Oct-2016

Software Availability: Nov-2015

Peak Optimization Flags (Continued)

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
-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-Compiler-Flags-Intel-V1.2-HSW-revF.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/HP-Compiler-Flags-Intel-V1.2-HSW-revF.xml>

<http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.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 Wed Nov 2 10:38:45 2016 by SPEC CPU2006 PS/PDF formatter v6932.

Originally published on 1 November 2016.