



SPEC® CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant XL450 Gen9

(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp®2006 =

71.2

SPECfp_base2006 =

69.6

CPU2006 license: 3

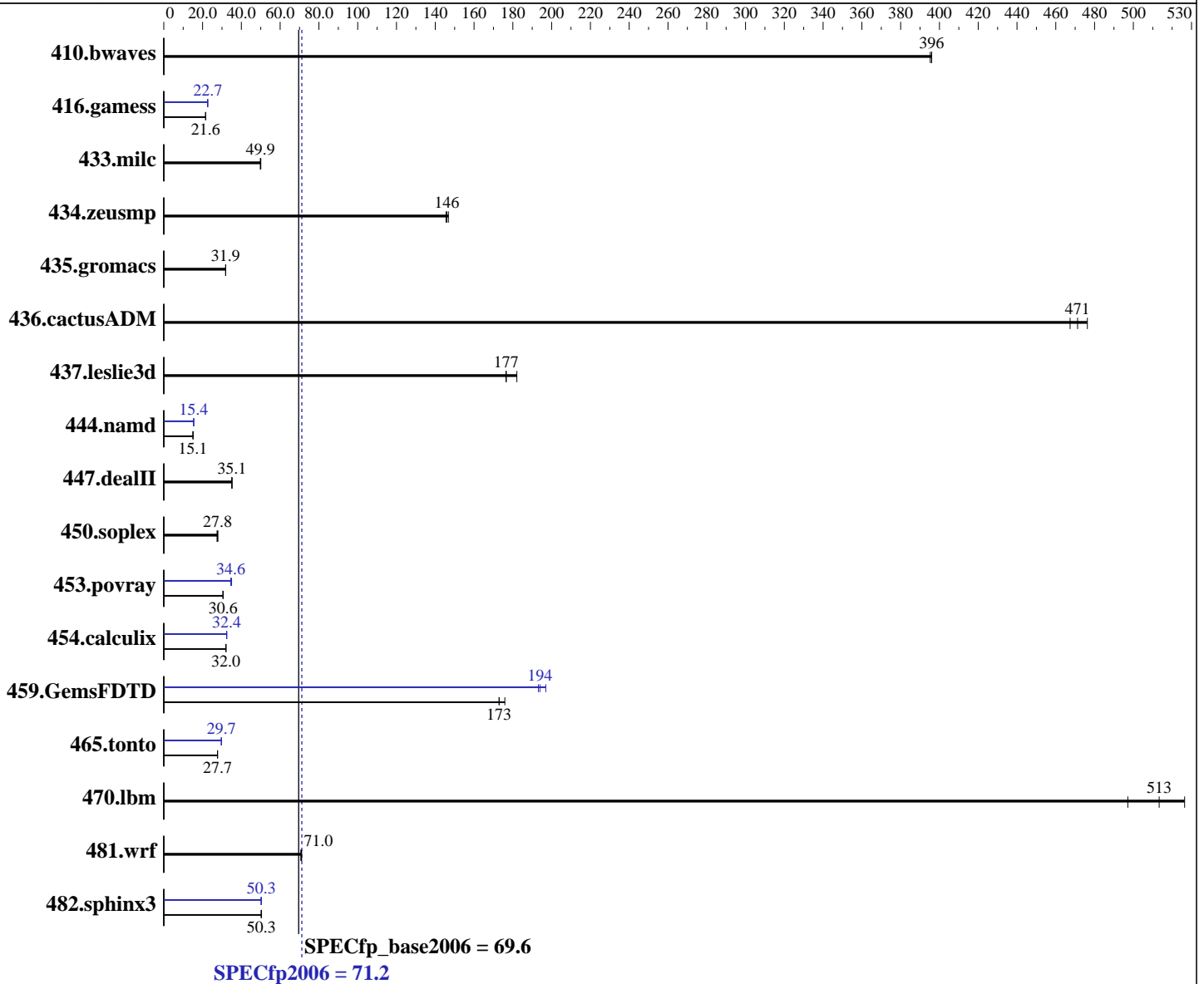
Test sponsor: HPE

Tested by: HPE

Test date: May-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015



Hardware

CPU Name: Intel Xeon E5-2603 v4
 CPU Characteristics:
 CPU MHz: 1700
 FPU: Integrated
 CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip
 CPU(s) orderable: 1,2 chips
 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 XL450 Gen9

(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp2006 = 71.2

SPECfp_base2006 = 69.6

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: May-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

L3 Cache: 15 MB I+D on chip per chip
 Other Cache: None
 Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 1866 MHz)
 Disk Subsystem: 2 x 480 GB SATA 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	34.3	396	<u>34.3</u>	<u>396</u>	34.4	395	34.3	396	<u>34.3</u>	<u>396</u>	34.4	395
416.gamess	<u>907</u>	<u>21.6</u>	906	21.6	909	21.5	869	22.5	863	22.7	<u>864</u>	<u>22.7</u>
433.milc	183	50.0	184	49.8	<u>184</u>	<u>49.9</u>	183	50.0	184	49.8	<u>184</u>	<u>49.9</u>
434.zeusmp	62.0	147	<u>62.4</u>	<u>146</u>	62.5	146	62.0	147	<u>62.4</u>	<u>146</u>	62.5	146
435.gromacs	224	31.9	<u>224</u>	<u>31.9</u>	224	31.9	224	31.9	<u>224</u>	<u>31.9</u>	224	31.9
436.cactusADM	<u>25.4</u>	<u>471</u>	25.1	476	25.6	467	<u>25.4</u>	<u>471</u>	25.1	476	25.6	467
437.leslie3d	<u>53.2</u>	<u>177</u>	53.3	176	51.6	182	<u>53.2</u>	<u>177</u>	53.3	176	51.6	182
444.namd	532	15.1	<u>532</u>	<u>15.1</u>	532	15.1	520	15.4	<u>520</u>	<u>15.4</u>	520	15.4
447.dealII	326	35.1	325	35.1	<u>326</u>	<u>35.1</u>	326	35.1	325	35.1	<u>326</u>	<u>35.1</u>
450.soplex	304	27.4	299	27.9	<u>300</u>	<u>27.8</u>	304	27.4	299	27.9	<u>300</u>	<u>27.8</u>
453.povray	174	30.5	174	30.6	<u>174</u>	<u>30.6</u>	154	34.6	<u>154</u>	<u>34.6</u>	152	35.0
454.calculix	257	32.1	<u>258</u>	<u>32.0</u>	258	32.0	254	32.5	255	32.4	<u>254</u>	<u>32.4</u>
459.GemsFDTD	61.4	173	<u>61.4</u>	<u>173</u>	60.3	176	53.9	197	<u>54.7</u>	<u>194</u>	54.9	193
465.tonto	<u>355</u>	<u>27.7</u>	356	27.7	355	27.7	<u>331</u>	<u>29.7</u>	332	29.7	331	29.7
470.lbm	27.6	497	26.1	526	<u>26.8</u>	<u>513</u>	27.6	497	26.1	526	<u>26.8</u>	<u>513</u>
481.wrf	<u>157</u>	<u>71.0</u>	158	70.6	157	71.1	<u>157</u>	<u>71.0</u>	158	70.6	157	71.1
482.sphinx3	387	50.4	<u>387</u>	<u>50.3</u>	388	50.2	387	50.3	<u>388</u>	<u>50.3</u>	389	50.1

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:

Power Profile set to Custom

Power Regulator set 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 XL450 Gen9

(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp2006 =

71.2

SPECfp_base2006 =

69.6

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: May-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

Sysinfo program /home/cpu2006/config/sysinfo.rev6914
\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1
running on XL450-G9-node2 Thu May 5 11:15:58 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 E5-2603 v4 @ 1.70GHz
 2 "physical id"s (chips)
 12 "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     : 6
  siblings      : 6
  physical 0:   : cores 0 1 2 3 4 5
  physical 1:   : cores 0 1 2 3 4 5
 cache size     : 15360 KB
```

From /proc/meminfo

```
MemTotal:      263713756 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 XL450-G9-node2 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 May 4 09:20

SPEC is set to: /home/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 XL450 Gen9

(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp2006 =

71.2

SPECfp_base2006 =

69.6

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: May-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Platform Notes (Continued)

/dev/sda4 xfs 438G 20G 419G 5% /
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 U21 03/10/2016

Memory:

16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 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"

OMP_NUM_THREADS = "12"

LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/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

435.gromacs: -DSPEC_CPU_LP64 -nofor_main

436.cactusADM: -DSPEC_CPU_LP64 -nofor_main

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 XL450 Gen9

(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp2006 =

71.2

SPECfp_base2006 =

69.6

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: May-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Base Portability Flags (Continued)

```

437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.deall: -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 -qopt-prefetch-issue-excl-hint

```

C++ benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias

```

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 -qopt-prefetch-issue-excl-hint
-fp-model fast=2

```

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 XL450 Gen9

(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp2006 =

71.2

SPECfp_base2006 =

69.6

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: May-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: -xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel
-opt-prefetch -ansi-alias
-fp-model fast=2
-qopt-prefetch-issue-excl-hint -funroll-all-loops

-nofor-main

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

Continued on next page



SPEC CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant XL450 Gen9

(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp2006 =

71.2

SPECfp_base2006 =

69.6

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: May-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Peak Optimization Flags (Continued)

```
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 Jun 1 19:11:08 2016 by SPEC CPU2006 PS/PDF formatter v6932.

Originally published on 1 June 2016.

Standard Performance Evaluation Corporation

info@spec.org

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