



SPEC[®] CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant BL460c Gen9
(2.60 GHz, Intel Xeon E5-2697A v4)

SPECfp[®]2006 = 121

SPECfp_base2006 = 116

CPU2006 license: 3

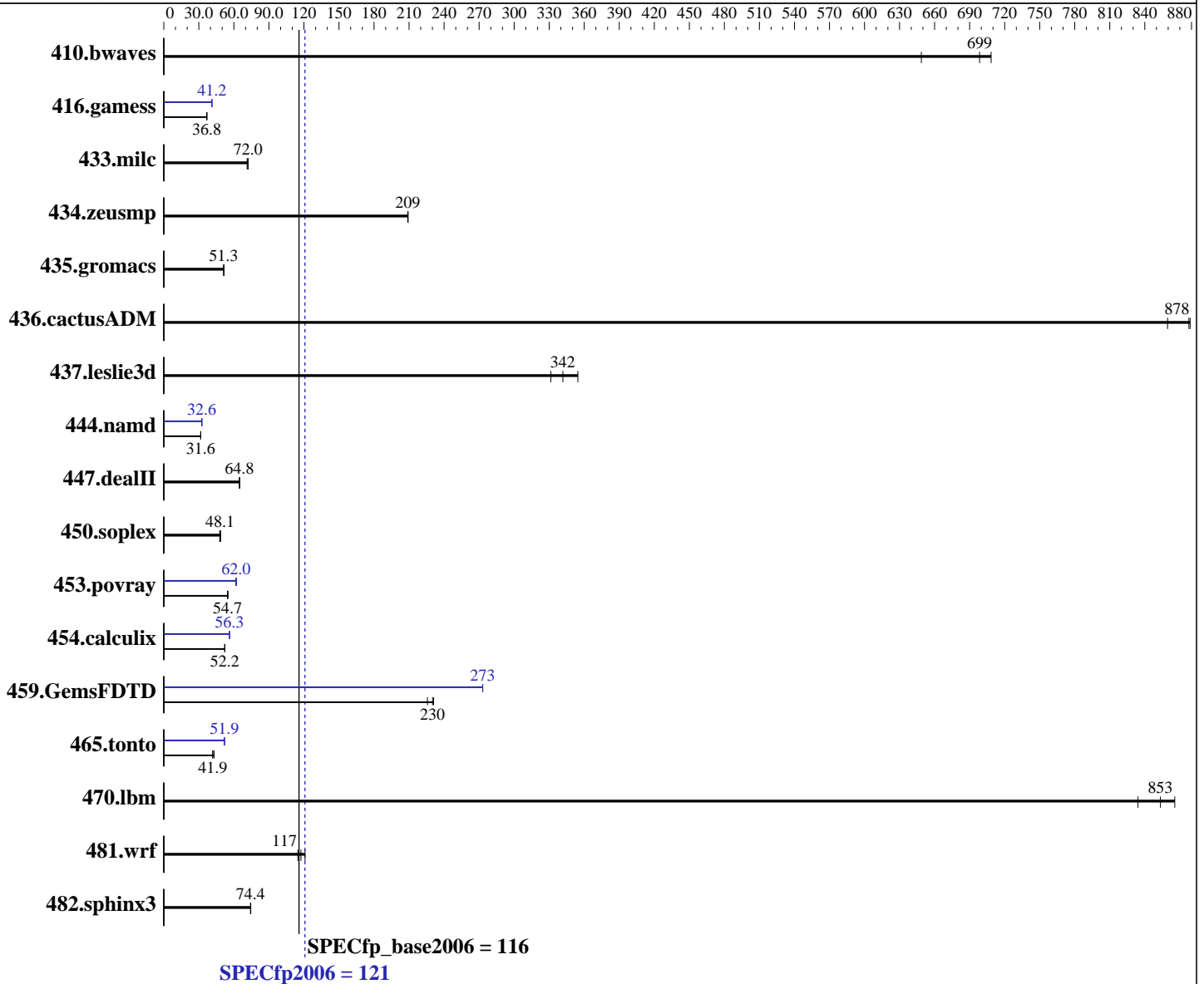
Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015



Hardware

CPU Name: Intel Xeon E5-2697A v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz: 2600
FPU: Integrated
CPU(s) enabled: 32 cores, 2 chips, 16 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 BL460c Gen9
(2.60 GHz, Intel Xeon E5-2697A v4)

SPECfp2006 = 121

SPECfp_base2006 = 116

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

L3 Cache: 40 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (8 x 32 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 1 x 400 GB SAS 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	<u>19.5</u>	<u>699</u>	21.0	649	19.2	708	<u>19.5</u>	<u>699</u>	21.0	649	19.2	708
416.gamess	531	36.9	532	36.8	<u>532</u>	<u>36.8</u>	476	41.2	475	41.2	<u>475</u>	<u>41.2</u>
433.milc	127	72.1	129	71.3	<u>127</u>	<u>72.0</u>	127	72.1	129	71.3	<u>127</u>	<u>72.0</u>
434.zeusmp	43.5	209	43.6	209	<u>43.5</u>	<u>209</u>	43.5	209	43.6	209	<u>43.5</u>	<u>209</u>
435.gromacs	138	51.6	<u>139</u>	<u>51.3</u>	139	51.2	138	51.6	<u>139</u>	<u>51.3</u>	139	51.2
436.cactusADM	13.6	879	<u>13.6</u>	<u>878</u>	13.9	859	13.6	879	<u>13.6</u>	<u>878</u>	13.9	859
437.leslie3d	28.4	331	<u>27.5</u>	<u>342</u>	26.5	355	28.4	331	<u>27.5</u>	<u>342</u>	26.5	355
444.namd	253	31.6	254	31.6	<u>254</u>	<u>31.6</u>	<u>246</u>	<u>32.6</u>	246	32.6	246	32.6
447.dealII	177	64.7	<u>176</u>	<u>64.8</u>	176	65.0	177	64.7	<u>176</u>	<u>64.8</u>	176	65.0
450.soplex	<u>173</u>	<u>48.1</u>	171	48.7	174	47.9	<u>173</u>	<u>48.1</u>	171	48.7	174	47.9
453.povray	<u>97.3</u>	<u>54.7</u>	97.6	54.5	96.8	55.0	85.5	62.2	86.2	61.7	<u>85.9</u>	<u>62.0</u>
454.calculix	158	52.3	<u>158</u>	<u>52.2</u>	158	52.2	<u>147</u>	<u>56.3</u>	147	56.2	146	56.3
459.GemsFDTD	<u>46.1</u>	<u>230</u>	47.0	226	45.9	231	38.8	273	38.9	273	<u>38.9</u>	<u>273</u>
465.tonto	235	41.8	228	43.1	<u>235</u>	<u>41.9</u>	190	51.8	189	52.0	<u>189</u>	<u>51.9</u>
470.lbm	15.9	866	16.5	834	<u>16.1</u>	<u>853</u>	15.9	866	16.5	834	<u>16.1</u>	<u>853</u>
481.wrf	97.3	115	92.4	121	<u>95.1</u>	<u>117</u>	97.3	115	92.4	121	<u>95.1</u>	<u>117</u>
482.sphinx3	262	74.5	<u>262</u>	<u>74.4</u>	262	74.3	262	74.5	<u>262</u>	<u>74.4</u>	262	74.3

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 Option set to Enabled
Power Profile set to Custom
Power Regulator set to 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
QPI Snoop Configuration set to Home Snoop

Continued on next page



SPEC CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant BL460c Gen9
(2.60 GHz, Intel Xeon E5-2697A v4)

SPECfp2006 = 121

SPECfp_base2006 = 116

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-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 BL460c-Gen9-B Fri May 13 09:49:49 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 E5-2697A v4 @ 2.60GHz
 2 "physical id"s (chips)
 64 "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    : 16
  siblings     : 32
  physical 0:  cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1:  cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
cache size     : 40960 KB
```

```
From /proc/meminfo
MemTotal:      263837552 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 BL460c-Gen9-B 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 13 09:34

```
SPEC is set to: /home/cpu2006
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda5       xfs   314G  192G  123G  62% /home
```

Continued on next page



SPEC CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant BL460c Gen9
(2.60 GHz, Intel Xeon E5-2697A v4)

SPECfp2006 = 121

SPECfp_base2006 = 116

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Platform Notes (Continued)

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 I36 02/29/2016

Memory:

8x UNKNOWN NOT AVAILABLE

8x 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 256 GB and the dmidecode description should have one line reading as:
8x 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"

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

OMP_NUM_THREADS = "32"

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

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 BL460c Gen9

(2.60 GHz, Intel Xeon E5-2697A v4)

SPECfp2006 =

121

SPECfp_base2006 =

116

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Base Portability Flags (Continued)

```

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.deallI: -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 BL460c Gen9
(2.60 GHz, Intel Xeon E5-2697A v4)

SPECfp2006 = 121

SPECfp_base2006 = 116

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-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.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

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 BL460c Gen9

(2.60 GHz, Intel Xeon E5-2697A v4)

SPECfp2006 =

121

SPECfp_base2006 =

116

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-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-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 19:11:13 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/>

Page 7