SPEC® CFP2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL360 Gen9
(3.40 GHz, Intel Xeon E5-2643 v4)
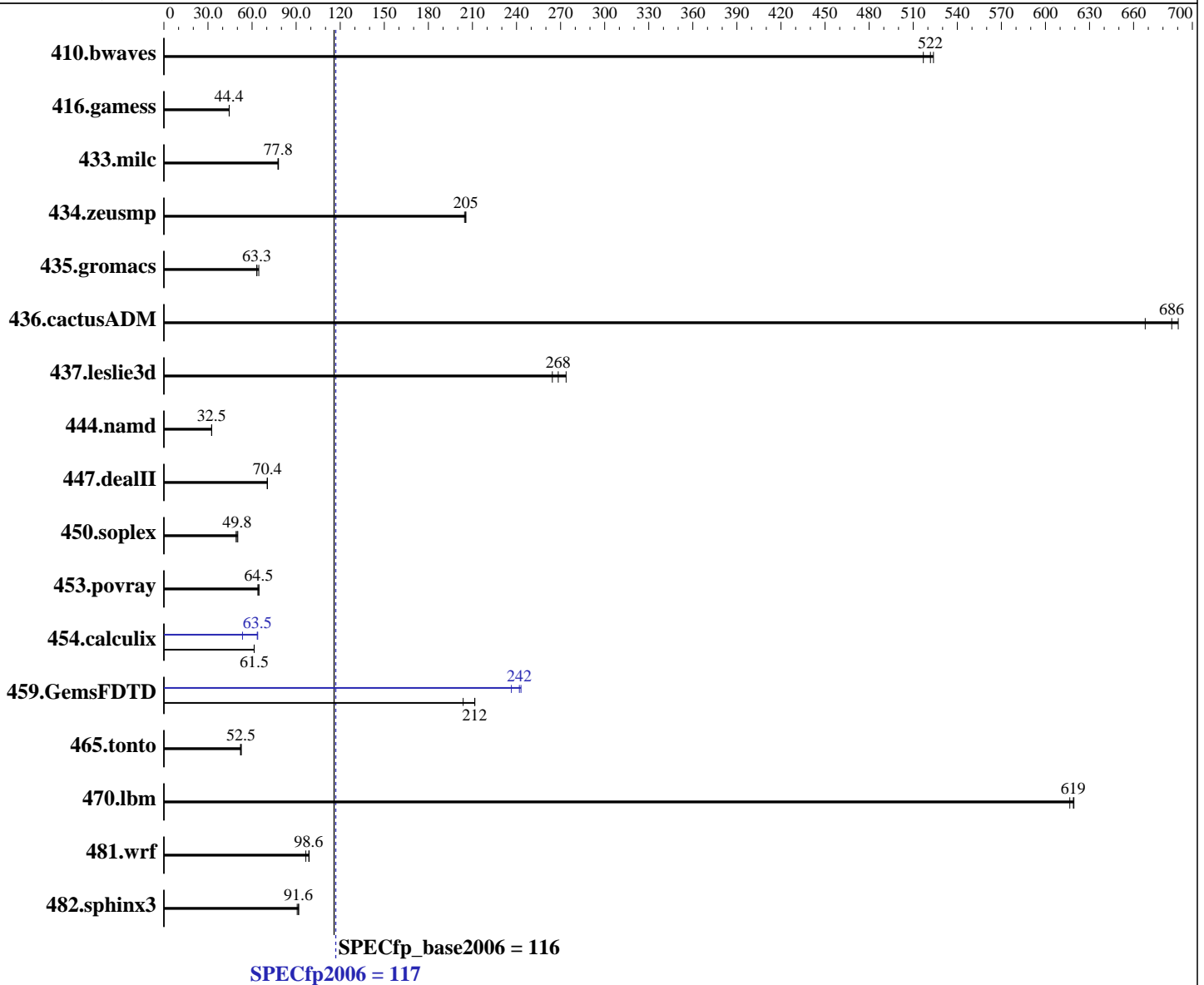
$SPECfp^{®}2006 =$ 117

$SPECfp\_base2006 =$ 116

CPU2006 license: 3		**Test date:**	Jun-2016
Test sponsor:	HPE	**Hardware Availability:**	Mar-2016
Tested by:	HPE	**Software Availability:**	Nov-2015

SPECfp_base2006 = 116

SPECfp2006 = 117

Results for benchmarks:
- 410.bwaves — 522
- 416.gamess — 44.4
- 433.milc — 77.8
- 434.zeusmp — 205
- 435.gromacs — 63.3
- 436.cactusADM — 686
- 437.leslie3d — 268
- 444.namd — 32.5
- 447.dealII — 70.4
- 450.soplex — 49.8
- 453.povray — 64.5
- 454.calculix — 63.5 / 61.5
- 459.GemsFDTD — 242 / 212
- 465.tonto — 52.5
- 470.lbm — 619
- 481.wrf — 98.6
- 482.sphinx3 — 91.6

Hardware

CPU Name:	Intel Xeon E5-2643 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz:	3400
FPU:	Integrated
CPU(s) enabled:	12 cores, 2 chips, 6 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
(3.40 GHz, Intel Xeon E5-2643 v4)

SPECfp2006 =	117

SPECfp_base2006 =	116

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE

Test date: Jun-2016
Hardware Availability: Mar-2016
Software Availability: Nov-2015

L3 Cache:	20 MB I+D on chip per chip
Other Cache:	None
Memory:	512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)
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	**26.0**	**522**	25.9	524	26.3	517	**26.0**	**522**	25.9	524	26.3	517
416.gamess	440	44.5	**441**	**44.4**	441	44.4	440	44.5	**441**	**44.4**	441	44.4
433.milc	**118**	**77.8**	118	77.6	118	78.0	**118**	**77.8**	118	77.6	118	78.0
434.zeusmp	44.5	205	**44.3**	**205**	44.3	205	44.5	205	**44.3**	**205**	44.3	205
435.gromacs	**113**	**63.3**	113	63.2	111	64.6	**113**	**63.3**	113	63.2	111	64.6
436.cactusADM	17.3	690	**17.4**	**686**	17.9	668	17.3	690	**17.4**	**686**	17.9	668
437.leslie3d	35.6	264	**35.0**	**268**	34.3	274	35.6	264	**35.0**	**268**	34.3	274
444.namd	247	32.5	**247**	**32.5**	247	32.5	247	32.5	**247**	**32.5**	247	32.5
447.dealII	163	70.4	162	70.4	**162**	**70.4**	163	70.4	162	70.4	**162**	**70.4**
450.soplex	170	49.1	**167**	**49.8**	166	50.3	170	49.1	**167**	**49.8**	166	50.3
453.povray	83.2	63.9	82.2	64.7	**82.5**	**64.5**	83.2	63.9	82.2	64.7	**82.5**	**64.5**
454.calculix	134	61.5	134	61.4	**134**	**61.5**	129	63.9	154	53.5	**130**	**63.5**
459.GemsFDTD	**50.2**	**212**	50.1	212	52.1	204	44.9	237	43.7	243	**43.9**	**242**
465.tonto	189	52.1	187	52.6	**187**	**52.5**	189	52.1	187	52.6	**187**	**52.5**
470.lbm	22.2	619	**22.2**	**619**	22.3	617	22.2	619	**22.2**	**619**	22.3	617
481.wrf	**113**	**98.6**	116	96.6	113	98.9	**113**	**98.6**	116	96.6	113	98.9
482.sphinx3	215	90.7	**213**	**91.6**	212	91.7	215	90.7	**213**	**91.6**	212	91.7

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
  Thermal Configuration set to Maximum Cooling
```
Continued on next page

Hewlett Packard Enterprise

(Test Sponsor: HPE)

$SPECfp2006 =$ 117

ProLiant DL360 Gen9
(3.40 GHz, Intel Xeon E5-2643 v4)

$SPECfp\_base2006 =$ 116

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE

Test date: Jun-2016
Hardware Availability: Mar-2016
Software Availability: Nov-2015

Platform Notes (Continued)

```
  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 Jun 13 19:29:27 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 E5-2643 v4 @ 3.40GHz
      2 "physical id"s (chips)
      24 "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  : 12
      physical 0: cores 0 1 2 3 6 7
      physical 1: cores 0 1 2 3 6 7
   cache size : 20480 KB

From /proc/meminfo
   MemTotal:      528067704 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 Jun 13 14:43

SPEC is set to: /cpu2006
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda4      xfs   368G  263G  106G  72% /
```

SPEC CFP2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL360 Gen9
(3.40 GHz, Intel Xeon E5-2643 v4)

SPECfp2006 =   117

SPECfp_base2006 =   116

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE

Test date: Jun-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 P89 04/12/2016
    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"
  LD_LIBRARY_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"
  OMP_NUM_THREADS = "12"

   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
      433.milc: -DSPEC_CPU_LP64
```

Continued on next page

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL360 Gen9
(3.40 GHz, Intel Xeon E5-2643 v4)

$SPECfp2006 =$ 117

$SPECfp\_base2006 =$ 116

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE

Test date: Jun-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.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
(3.40 GHz, Intel Xeon E5-2643 v4)

$SPECfp2006 =$ **117**

$SPECfp\_base2006 =$ **116**

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE

Test date: Jun-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: basepeak = yes

    447.dealII: basepeak = yes

    450.soplex: basepeak = yes

    453.povray: basepeak = yes

Fortran benchmarks:

    410.bwaves: basepeak = yes

    416.gamess: basepeak = yes

    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: basepeak = yes

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECfp2006 = 117

ProLiant DL360 Gen9
(3.40 GHz, Intel Xeon E5-2643 v4)

SPECfp_base2006 = 116

CPU2006 license: 3		**Test date:**	Jun-2016
Test sponsor:	HPE	**Hardware Availability:**	Mar-2016
Tested by:	HPE	**Software Availability:**	Nov-2015

Peak Optimization Flags (Continued)

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

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 Jul 26 16:12:38 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 26 July 2016.