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

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL120 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

$SPECfp^{®}2006 =$ 120
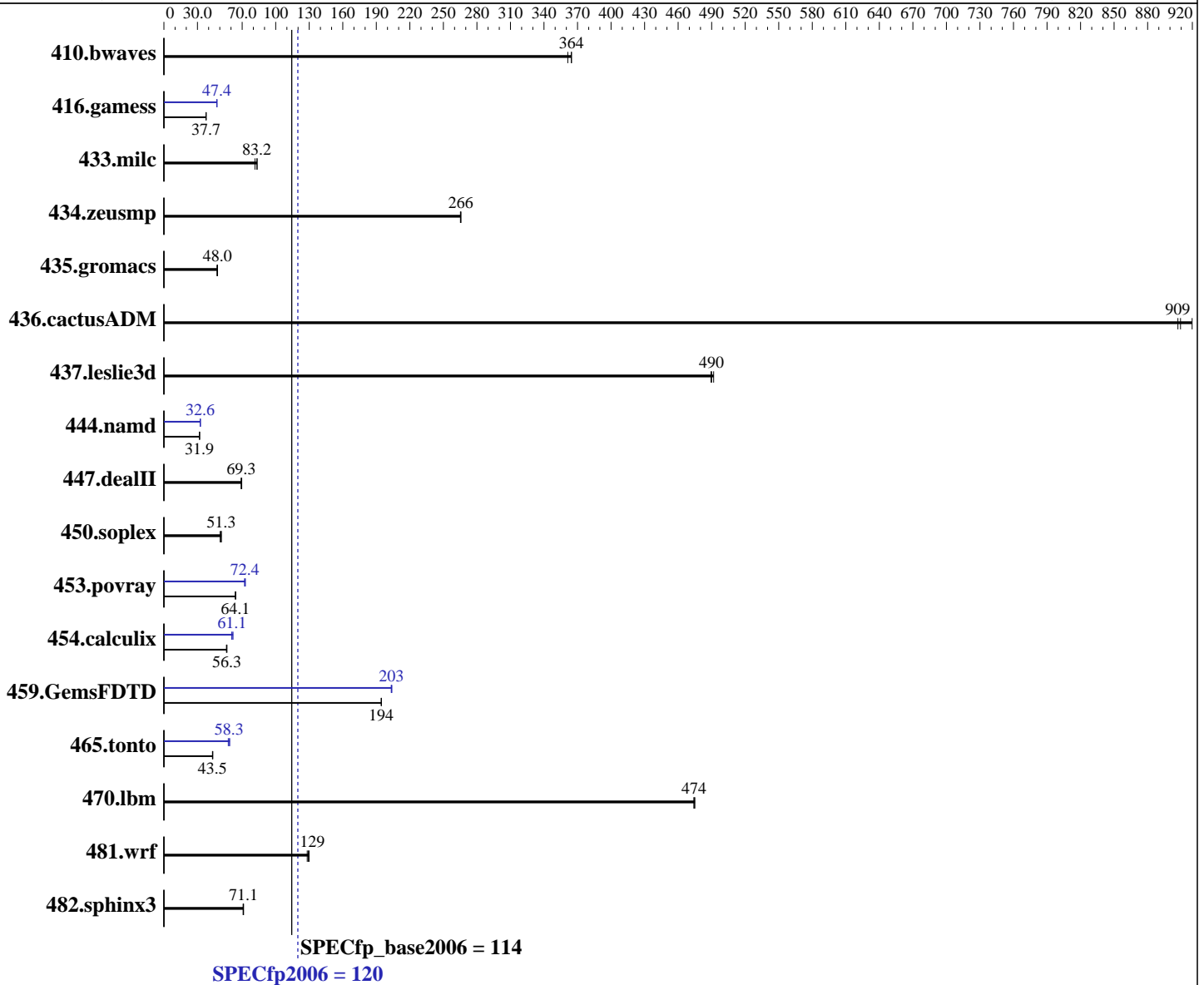
$SPECfp\_base2006 =$ 114

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

Results chart, scale 0 to 920:

- 410.bwaves: 364
- 416.gamess: 47.4 / 37.7
- 433.milc: 83.2
- 434.zeusmp: 266
- 435.gromacs: 48.0
- 436.cactusADM: 909
- 437.leslie3d: 490
- 444.namd: 32.6 / 31.9
- 447.dealII: 69.3
- 450.soplex: 51.3
- 453.povray: 72.4 / 64.1
- 454.calculix: 61.1 / 56.3
- 459.GemsFDTD: 203 / 194
- 465.tonto: 58.3 / 43.5
- 470.lbm: 474
- 481.wrf: 129
- 482.sphinx3: 71.1

SPECfp_base2006 = 114
SPECfp2006 = 120

Hardware

CPU Name:	Intel Xeon E5-2699 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	22 cores, 1 chip, 22 cores/chip, 2 threads/core
CPU(s) orderable:	1 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 DL120 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

SPECfp2006 =	120
SPECfp_base2006 =	114

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

L3 Cache:	55 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	64-bit
Memory:	128 GB (4 x 32 GB 2Rx4 PC4-2400T-R)	Peak Pointers:	32/64-bit
Disk Subsystem:	2 x 400 GB SAS SSD, RAID 1	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
410.bwaves	37.6	361	37.3	365	**37.3**	**364**	37.6	361	37.3	365	**37.3**	**364**
416.gamess	519	37.7	**519**	**37.7**	519	37.7	412	47.5	**414**	**47.4**	414	47.3
433.milc	113	81.5	**110**	**83.2**	110	83.4	113	81.5	**110**	**83.2**	110	83.4
434.zeusmp	34.3	266	**34.3**	**266**	34.3	265	34.3	266	**34.3**	**266**	34.3	265
435.gromacs	**149**	**48.0**	151	47.4	149	48.0	**149**	**48.0**	151	47.4	149	48.0
436.cactusADM	13.2	907	**13.1**	**909**	13.0	920	13.2	907	**13.1**	**909**	13.0	920
437.leslie3d	**19.2**	**490**	19.1	492	19.2	489	**19.2**	**490**	19.1	492	19.2	489
444.namd	**252**	**31.9**	252	31.9	252	31.9	246	32.6	**246**	**32.6**	246	32.5
447.dealII	166	69.1	**165**	**69.3**	164	69.6	166	69.1	**165**	**69.3**	164	69.6
450.soplex	163	51.3	166	50.3	**163**	**51.3**	163	51.3	166	50.3	**163**	**51.3**
453.povray	83.3	63.9	**83.0**	**64.1**	83.0	64.1	73.0	72.9	**73.5**	**72.4**	73.7	72.2
454.calculix	146	56.4	**147**	**56.3**	148	55.9	136	60.6	**135**	**61.1**	133	61.9
459.GemsFDTD	54.6	194	**54.6**	**194**	54.5	195	52.2	203	52.0	204	**52.1**	**203**
465.tonto	**226**	**43.5**	226	43.5	225	43.8	171	57.6	**169**	**58.3**	167	58.9
470.lbm	28.9	475	29.0	474	**29.0**	**474**	28.9	475	29.0	474	**29.0**	**474**
481.wrf	86.0	130	87.1	128	**86.4**	**129**	86.0	130	87.1	128	**86.4**	**129**
482.sphinx3	**274**	**71.1**	273	71.3	275	70.8	**274**	**71.1**	273	71.3	275	70.8

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
```

SPEC CFP2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL120 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

$SPECfp2006 =$ 120

$SPECfp\_base2006 =$ 114

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

Platform Notes (Continued)

```
  Memory Refresh Rate set to 1x Refresh
  Intel Hyperthreading set to Enabled
  QPI Snoop Configuration set to Home Snoop
Sysinfo program /cpu2006-HP/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on DL120.Nishanth Wed May  4 20:44:25 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 E5-2699 v4 @ 2.20GHz
     1 "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  : 44
     physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
     28
  cache size : 56320 KB

From /proc/meminfo
  MemTotal:       131597360 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 DL120.Nishanth 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 03:38

SPEC is set to: /cpu2006-HP
  Filesystem              Type   Size  Used Avail Use% Mounted on
  /dev/mapper/rhel-root xfs     50G   18G   33G  36% /
```
<div align="center">Continued on next page</div>

SPEC CFP2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL120 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

SPECfp2006 =   120

SPECfp_base2006 =   114

CPU2006 license: 3	**Test date:** May-2016
Test sponsor: HPE	**Hardware Availability:** Mar-2016
Tested by: HPE	**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 P86 02/22/2016
    Memory:
    4x UNKNOWN NOT AVAILABLE
    4x 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 128 GB and the dmidecode description should have one line reading as:
  4x 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 = "22"
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
```

Continued on next page

SPEC CFP2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL120 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

$SPECfp2006 =$ 120

$SPECfp\_base2006 =$ 114

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)

```
      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 -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
```

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL120 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

$SPECfp2006 =$ 120

$SPECfp\_base2006 =$ 114

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

Peak Compiler Invocation (Continued)

Fortran benchmarks:
        ifort -m64

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-

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL120 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

SPECfp2006 = 120

SPECfp_base2006 = 114

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

Peak Optimization Flags (Continued)

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
-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

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 19:11:10 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 1 June 2016.