SPEC® CFP2006 Result

Hewlett Packard Enterprise

(Test Sponsor: HPE)

$SPECfp^®2006 =$ 126

ProLiant DL380 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

$SPECfp\_base2006 =$ 119

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

SPECfp_base2006 = 119

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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:	44 cores, 2 chips, 22 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:	SUSE Linux Enterprise Server 12 (x86_64) Kernel 3.12.43-52.6-default
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:	btrfs
System State:	Run level 3 (multi-user)

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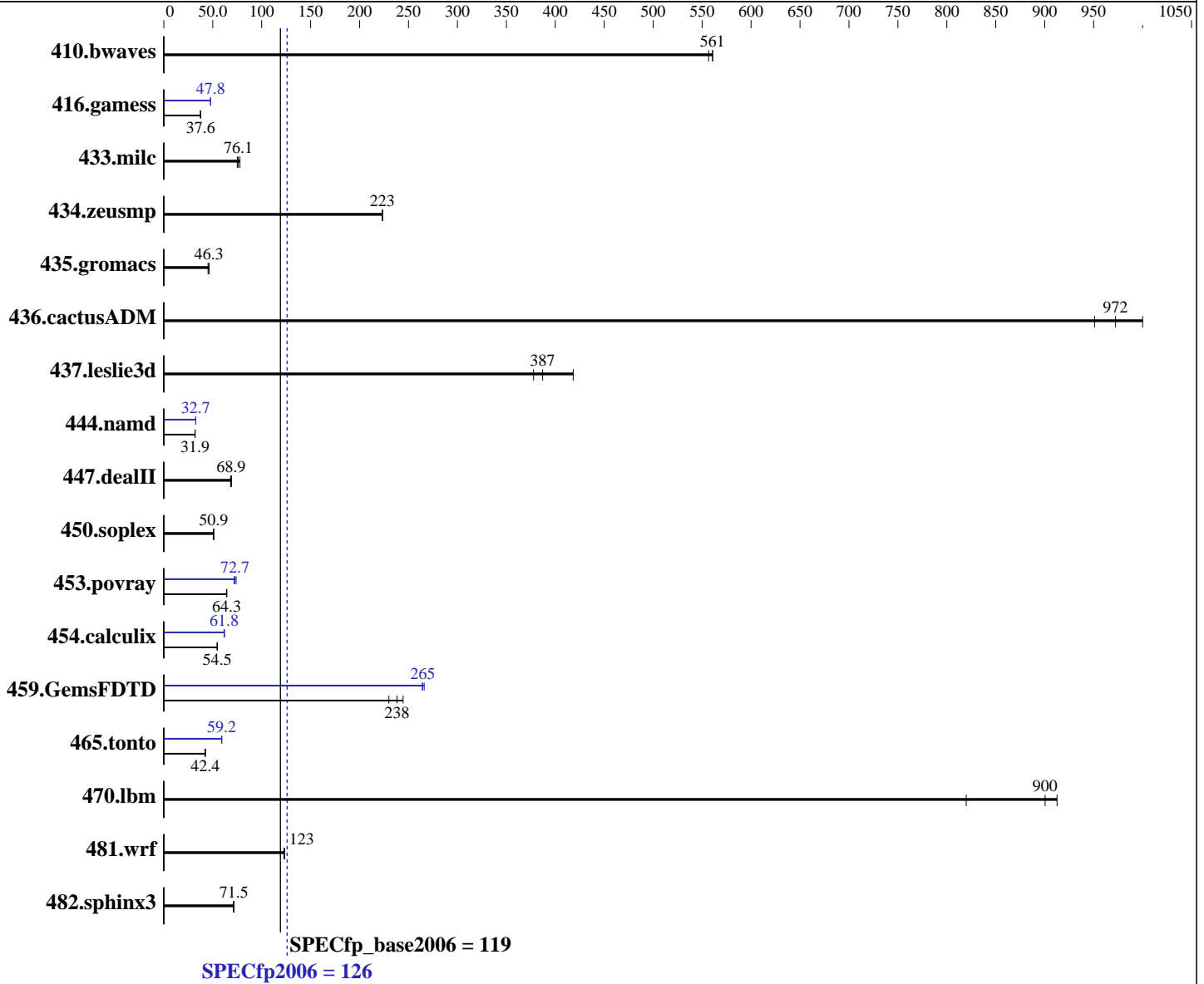$SPECfp2006 =$ 126

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L3 Cache:	55 MB I+D on chip per chip	Base Pointers:	64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)	Other Software:	None
Disk Subsystem:	1 x 400 GB SAS SSD, RAID 0		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	24.4	557	24.2	561	**24.2**	**561**	24.4	557	24.2	561	**24.2**	**561**
416.gamess	**521**	**37.6**	522	37.5	521	37.6	409	47.9	409	47.8	**409**	**47.8**
433.milc	118	77.8	**121**	**76.1**	122	75.0	118	77.8	**121**	**76.1**	122	75.0
434.zeusmp	**40.7**	**223**	40.7	223	40.8	223	**40.7**	**223**	40.7	223	40.8	223
435.gromacs	158	45.2	154	46.3	**154**	**46.3**	158	45.2	154	46.3	**154**	**46.3**
436.cactusADM	11.9	1000	**12.3**	**972**	12.6	951	11.9	1000	**12.3**	**972**	12.6	951
437.leslie3d	**24.3**	**387**	22.5	418	24.9	378	**24.3**	**387**	22.5	418	24.9	378
444.namd	251	31.9	251	31.9	**251**	**31.9**	246	32.7	246	32.6	**246**	**32.7**
447.dealII	166	69.1	168	68.2	**166**	**68.9**	166	69.1	168	68.2	**166**	**68.9**
450.soplex	163	51.1	**164**	**50.9**	165	50.7	163	51.1	**164**	**50.9**	165	50.7
453.povray	**82.7**	**64.3**	82.7	64.3	83.0	64.1	**73.1**	**72.7**	72.0	73.9	74.1	71.8
454.calculix	151	54.7	151	54.5	**151**	**54.5**	**133**	**61.8**	133	61.9	134	61.7
459.GemsFDTD	43.4	245	46.1	230	**44.5**	**238**	40.2	264	39.9	266	**40.1**	**265**
465.tonto	**232**	**42.4**	233	42.3	232	42.4	166	59.3	**166**	**59.2**	167	59.0
470.lbm	15.1	913	16.8	820	**15.3**	**900**	15.1	913	16.8	820	**15.3**	**900**
481.wrf	**90.7**	**123**	90.9	123	90.6	123	**90.7**	**123**	90.9	123	90.6	123
482.sphinx3	272	71.6	274	71.1	**273**	**71.5**	272	71.6	274	71.1	**273**	**71.5**

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 Static High Performance Mode
  Minimum Processor Idle Power Core C-State set to C6 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
  Thermal Configuration set to Maximum Cooling
```

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Software Availability: Aug-2015

Platform Notes (Continued)

```
   Processor Power and Utilization Monitoring set to Disabled
   Memory Refresh Rate set to 1x Refresh
   Energy Performance Bias set to Maximum Performance
   Intel Hyperthreading Options set to Disabled

 Sysinfo program /cpu2006/config/sysinfo.rev6914
 $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
 running on linux-mk6j Fri Mar  4 01:44:05 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
       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:       529179208 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 /usr/bin/lsb_release -d
    SUSE Linux Enterprise Server 12

 From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 0
       # This file is deprecated and will be removed in a future service pack or
       release.
       # Please check /etc/os-release for details about this release.
    os-release:
       NAME="SLES"
       VERSION="12"
       VERSION_ID="12"
       PRETTY_NAME="SUSE Linux Enterprise Server 12"
       ID="sles"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:12"

 uname -a:
```

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Platform Notes (Continued)

```
    Linux linux-mk6j 3.12.43-52.6-default #1 SMP Wed May 20 12:44:39 UTC 2015
    (fc0ceac) x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Mar 3 21:20

  SPEC is set to: /cpu2006
    Filesystem      Type    Size  Used Avail Use% Mounted on
    /dev/sda3       btrfs   369G  225G  144G  62% /
  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 02/22/2016
    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"
OMP_NUM_THREADS = "44"
LD_LIBRARY_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"

  Binaries compiled on a system with 1x Intel Xeon E5-2260 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
```

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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
      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
```

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Tested by: HPE		**Software Availability:**	Aug-2015

Peak Compiler Invocation (Continued)

C++ benchmarks:
```
icpc   -m64
```

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-

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Tested by:	HPE	**Software Availability:**	Aug-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-BDW-revE.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-BDW-revE.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.

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