SPEC® CFP2006 Result
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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant XL170r Gen9
(3.50 GHz, Intel Xeon E5-2637 v3)

$SPECfp^{®}2006 =$ 94.9
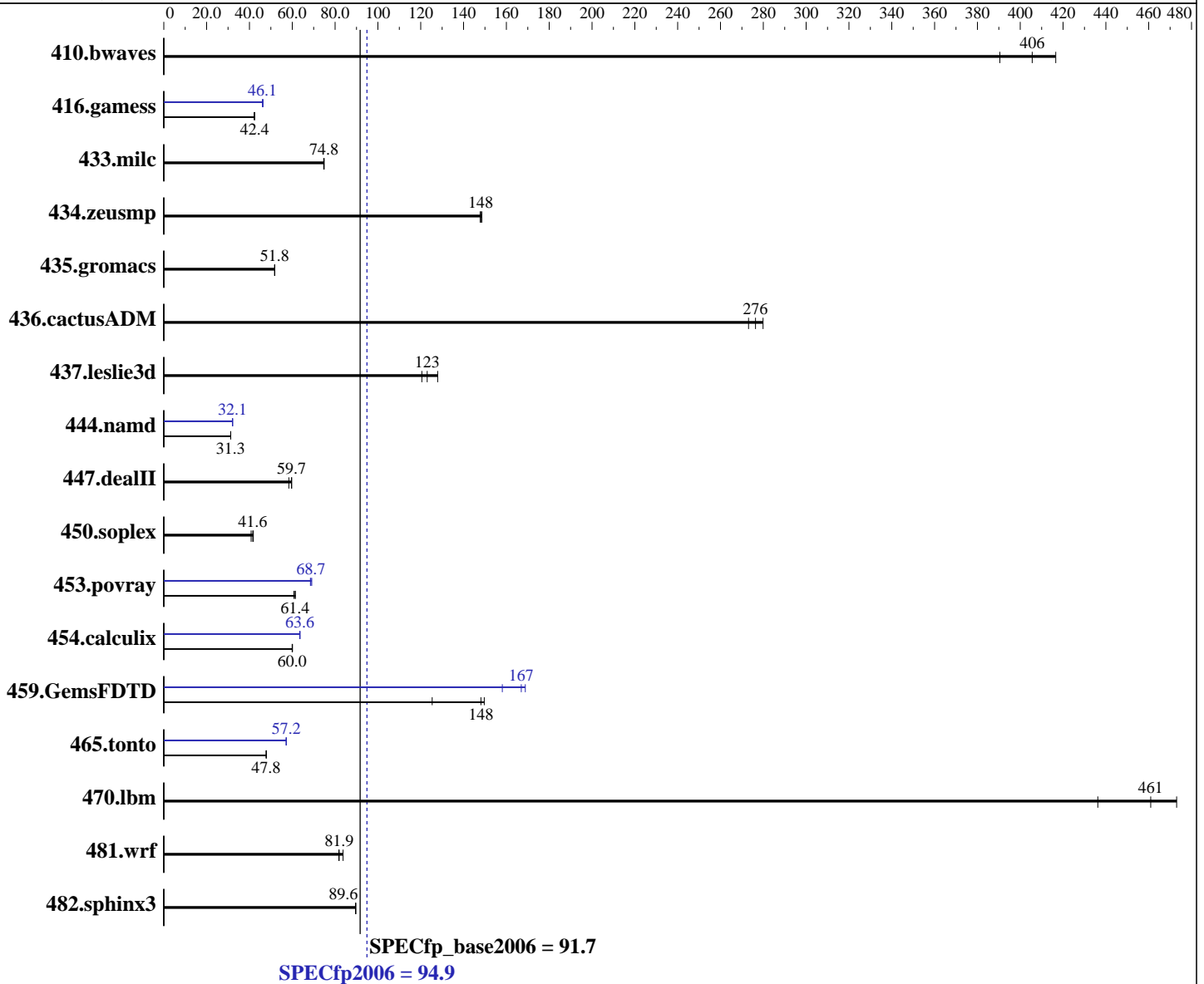
$SPECfp\_base2006 =$ 91.7

CPU2006 license: 3	**Test date:** Nov-2015
Test sponsor: HPE	**Hardware Availability:** Jul-2015
Tested by: HPE	**Software Availability:** Oct-2014

Results chart (scale 0 to 480):

- **410.bwaves**: 406
- **416.gamess**: 46.1 / 42.4
- **433.milc**: 74.8
- **434.zeusmp**: 148
- **435.gromacs**: 51.8
- **436.cactusADM**: 276
- **437.leslie3d**: 123
- **444.namd**: 32.1 / 31.3
- **447.dealII**: 59.7
- **450.soplex**: 41.6
- **453.povray**: 68.7 / 61.4
- **454.calculix**: 63.6 / 60.0
- **459.GemsFDTD**: 167 / 148
- **465.tonto**: 57.2 / 47.8
- **470.lbm**: 461
- **481.wrf**: 81.9
- **482.sphinx3**: 89.6

SPECfp_base2006 = 91.7
SPECfp2006 = 94.9

Hardware

CPU Name:	Intel Xeon E5-2637 v3
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz:	3500
FPU:	Integrated
CPU(s) enabled:	8 cores, 2 chips, 4 cores/chip
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:	SUSE Linux Enterprise Server 12 (x86_64) Kernel-3.12.28-4-default
Compiler:	C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux; Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux
Auto Parallel:	Yes
File System:	btrfs
System State:	Run level 3 (multi-user)

Continued on next page

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L3 Cache:	15 MB I+D on chip per chip	Base Pointers:	64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)	Other Software:	None
Disk Subsystem:	1 x 300 GB 15 K SAS, RAID 0		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	34.8	390	**33.5**	**406**	32.6	417	34.8	390	**33.5**	**406**	32.6	417
416.gamess	462	42.4	**462**	**42.4**	464	42.2	425	46.1	**424**	**46.1**	422	46.4
433.milc	123	74.9	**123**	**74.8**	123	74.7	123	74.9	**123**	**74.8**	123	74.7
434.zeusmp	61.6	148	**61.5**	**148**	61.3	149	61.6	148	**61.5**	**148**	61.3	149
435.gromacs	138	51.9	138	51.8	**138**	**51.8**	138	51.9	138	51.8	**138**	**51.8**
436.cactusADM	43.8	273	42.7	280	**43.2**	**276**	43.8	273	42.7	280	**43.2**	**276**
437.leslie3d	**76.4**	**123**	73.5	128	78.0	121	**76.4**	**123**	73.5	128	78.0	121
444.namd	**257**	**31.3**	257	31.2	256	31.3	250	32.1	**250**	**32.1**	250	32.1
447.dealII	196	58.4	192	59.7	**192**	**59.7**	196	58.4	192	59.7	**192**	**59.7**
450.soplex	204	40.8	**201**	**41.6**	199	41.8	204	40.8	**201**	**41.6**	199	41.8
453.povray	86.6	61.4	**86.7**	**61.4**	87.6	60.7	**77.4**	**68.7**	77.0	69.1	77.7	68.5
454.calculix	138	60.0	**138**	**60.0**	137	60.1	130	63.6	130	63.5	**130**	**63.6**
459.GemsFDTD	**71.6**	**148**	84.6	125	70.9	150	**63.5**	**167**	67.1	158	62.8	169
465.tonto	**206**	**47.8**	205	47.9	206	47.8	**172**	**57.2**	172	57.1	172	57.2
470.lbm	31.5	436	29.0	473	**29.8**	**461**	31.5	436	29.0	473	**29.8**	**461**
481.wrf	133	83.7	137	81.7	**136**	**81.9**	133	83.7	137	81.7	**136**	**81.9**
482.sphinx3	**218**	**89.6**	218	89.6	217	89.7	**218**	**89.6**	218	89.6	217	89.7

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
Filesystem page cache cleared with:
 echo 1 >        /proc/sys/vm/drop_caches
```

Platform Notes

```
BIOS Configuration
HP 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
Energy/Performance Bias set to Maximum Performance
```

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Platform Notes (Continued)

```
    Collaborative Power Control set to Disabled
    QPI Snoop Configuration set to Early Snoop
    Thermal Configuration set to Maximum Cooling
    Processor Power and Utilization Monitoring set to Disabled
    Memory Refresh Rate set to 1x Refresh
    Intel Hyperthreading set to Disabled

    Sysinfo program /root/cpu2006/config/sysinfo.rev6914
    $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
    running on linux-u2pv Mon Nov  2 08:05:03 2015

    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 E5-2637 v3 @ 3.50GHz
          2 "physical id"s (chips)
          8 "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 : 4
          siblings  : 4
          physical 0: cores 0 1 4 5
          physical 1: cores 0 1 4 5
       cache size : 15360 KB

    From /proc/meminfo
       MemTotal:       264299712 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"
```

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Platform Notes (Continued)

```
   uname -a:
      Linux linux-u2pv 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
      (9879bd4) x86_64 x86_64 x86_64 GNU/Linux

   run-level 3 Nov 2 08:04 last=5

   SPEC is set to: /root/cpu2006
      Filesystem     Type   Size  Used Avail Use% Mounted on
      /dev/sda3      btrfs  278G   13G  264G   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 U14 07/20/2015
      Memory:
      16x HP 752369-081 16 GB 2 rank 2133 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"
LD_LIBRARY_PATH = "/root/cpu2006/libs/32:/root/cpu2006/libs/64:/root/cpu2006/sh"
OMP_NUM_THREADS = "8"

 Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB
 memory using RedHat EL 7.0
```

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 -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
```

Continued on next page

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Peak Compiler Invocation (Continued)

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(pass 1) -ipo(pass 2)
          -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
          -fno-alias -auto-ilp32

    447.dealII: basepeak = yes

    450.soplex: basepeak = yes

    453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
          -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4
          -ansi-alias

Fortran benchmarks:

    410.bwaves: basepeak = yes

    416.gamess: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
          -O3(pass 2) -no-prec-div(pass 2) -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(pass 1) -ipo(pass 2)
          -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2
          -inline-level=0 -opt-prefetch -parallel

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Peak Optimization Flags (Continued)

465.tonto: `-xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
`-O3(pass 2) -no-prec-div(pass 2) -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/Intel-ic15.0-official-linux64.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/Intel-ic15.0-official-linux64.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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