SPEC® CFP2006 Result

Hewlett Packard Enterprise

(Test Sponsor: HPE)

Synergy 480 Gen9
(2.40 GHz, Intel Xeon E5-2640 v4)

$SPECfp^{®}2006 =$ 119
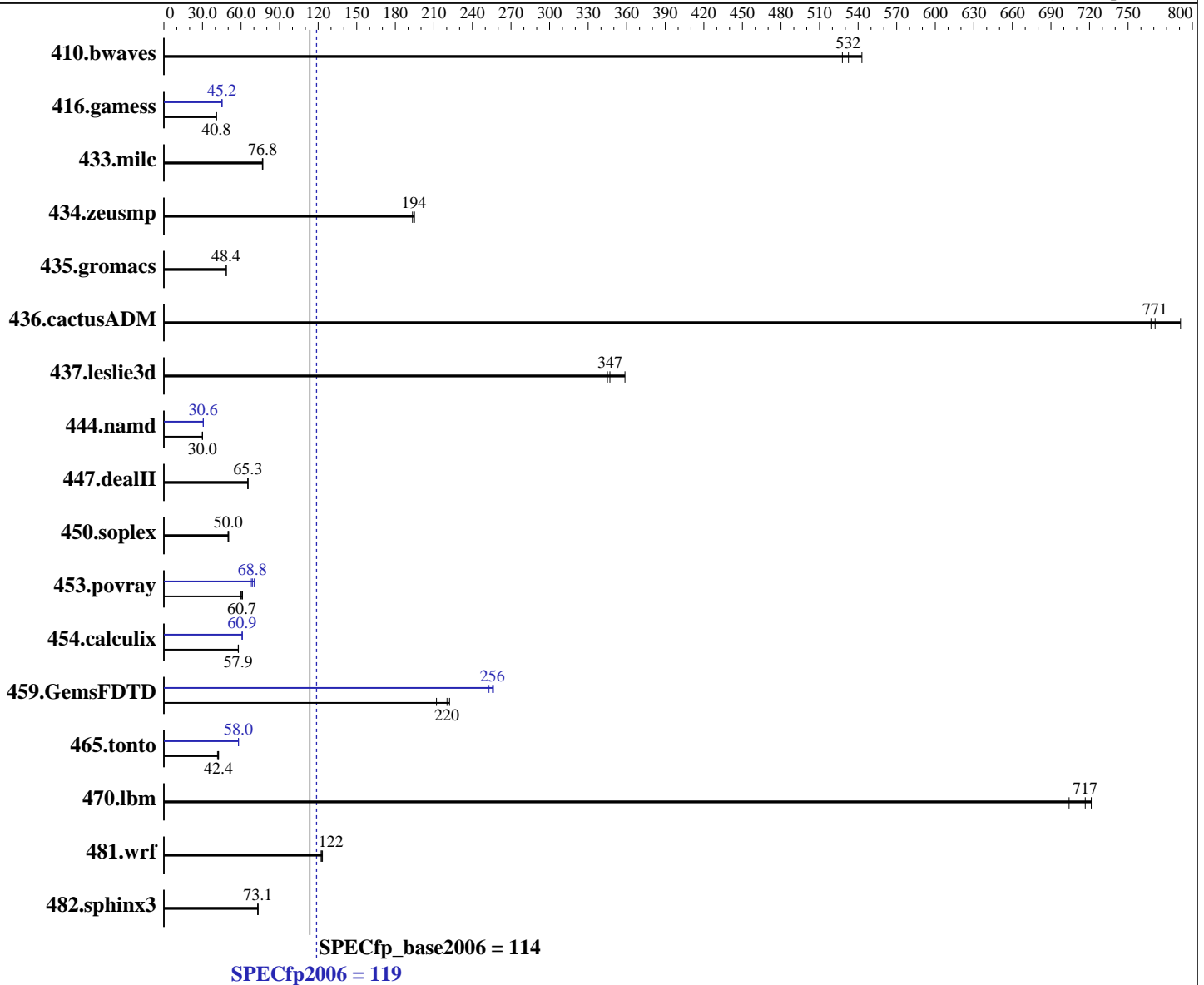
$SPECfp\_base2006 =$ 114

CPU2006 license: 3		**Test date:**	Oct-2016
Test sponsor:	HPE	**Hardware Availability:**	Dec-2016
Tested by:	HPE	**Software Availability:**	Sep-2016

SPECfp_base2006 = 114

SPECfp2006 = 119

	Hardware		Software	
CPU Name:	Intel Xeon E5-2640 v4	Operating System:	SUSE Linux Enterprise Server 12 (x86_64) SP1, Kernel 3.12.49-11-default	
CPU Characteristics:	Intel Turbo Boost Technology up to 3.40 GHz	Compiler:	C/C++: Version 17.0.0.098 of Intel C++ Studio XE for Linux;	
CPU MHz:	2400		Fortran: Version 17.0.0.098 of Intel Fortran Studio XE for Linux	
FPU:	Integrated			
CPU(s) enabled:	20 cores, 2 chips, 10 cores/chip, 2 threads/core	Auto Parallel:	Yes	
CPU(s) orderable:	1,2 chip	File System:	xfs	
Primary Cache:	32 KB I + 32 KB D on chip per core	System State:	Run level 3 (multi-user)	
Secondary Cache:	256 KB I+D on chip per core			
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L3 Cache:	25 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 PC4-2400T-R, running at 2133 MHz)	Other Software:	None
Disk Subsystem:	1 x 600 GB 10 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	25.0	543	25.8	528	**25.5**	**532**	25.0	543	25.8	528	**25.5**	**532**
416.gamess	480	40.8	**480**	**40.8**	481	40.7	**434**	**45.2**	434	45.1	433	45.2
433.milc	**120**	**76.8**	119	77.0	120	76.6	**120**	**76.8**	119	77.0	120	76.6
434.zeusmp	47.1	193	46.7	195	**46.8**	**194**	47.1	193	46.7	195	**46.8**	**194**
435.gromacs	150	47.6	147	48.6	**148**	**48.4**	150	47.6	147	48.6	**148**	**48.4**
436.cactusADM	15.1	791	15.6	768	**15.5**	**771**	15.1	791	15.6	768	**15.5**	**771**
437.leslie3d	26.2	359	**27.1**	**347**	27.2	345	26.2	359	**27.1**	**347**	27.2	345
444.namd	267	30.0	**267**	**30.0**	267	30.0	262	30.7	**262**	**30.6**	262	30.6
447.dealII	**175**	**65.3**	175	65.3	175	65.4	**175**	**65.3**	175	65.3	175	65.4
450.soplex	165	50.4	**167**	**50.0**	167	50.0	165	50.4	**167**	**50.0**	167	50.0
453.povray	87.0	61.2	88.8	59.9	**87.7**	**60.7**	**77.3**	**68.8**	75.8	70.2	78.2	68.0
454.calculix	143	57.8	142	58.0	**143**	**57.9**	**136**	**60.9**	136	60.8	135	61.0
459.GemsFDTD	50.0	212	47.7	222	**48.2**	**220**	**41.5**	**256**	42.0	253	41.4	256
465.tonto	**232**	**42.4**	231	42.5	236	41.7	170	58.0	**170**	**58.0**	169	58.1
470.lbm	19.0	721	**19.2**	**717**	19.5	704	19.0	721	**19.2**	**717**	19.5	704
481.wrf	90.6	123	91.3	122	**91.2**	**122**	90.6	123	91.3	122	**91.2**	**122**
482.sphinx3	267	72.9	266	73.2	**266**	**73.1**	267	72.9	266	73.2	**266**	**73.1**

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 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
     Collaborative Power Control set to Disabled
```
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Test date: Oct-2016
Hardware Availability: Dec-2016
Software Availability: Sep-2016

Platform Notes (Continued)

```
     QPI Snoop Configuration set to Home Snoop
     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.rev6993
  Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
  running on linux-xxgs Fri Oct 21 09:41:19 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 E5-2640 v4 @ 2.40GHz
        2 "physical id"s (chips)
        40 "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 : 10
        siblings  : 20
        physical 0: cores 0 1 2 3 4 8 9 10 11 12
        physical 1: cores 0 1 2 3 4 8 9 10 11 12
     cache size : 25600 KB

  From /proc/meminfo
     MemTotal:       264546416 kB
     HugePages_Total:        0
     Hugepagesize:        2048 kB

  /usr/bin/lsb_release -d
     SUSE Linux Enterprise Server 12 SP1

  From /etc/*release* /etc/*version*
     SuSE-release:
        SUSE Linux Enterprise Server 12 (x86_64)
        VERSION = 12
        PATCHLEVEL = 1
        # 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-SP1"
        VERSION_ID="12.1"
        PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
        ID="sles"
        ANSI_COLOR="0;32"
        CPE_NAME="cpe:/o:suse:sles:12:sp1"

  uname -a:
```

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Platform Notes (Continued)

```
    Linux linux-xxgs 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
    (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Oct 21 09:17

  SPEC is set to: /home/cpu2006
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda4       xfs   424G   75G  350G  18% /home
  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 I37 09/14/2016
    Memory:
    8x UNKNOWN NOT AVAILABLE
    16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 2133 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:
 16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 2133 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/sh10.2"
 OMP_NUM_THREADS = "20"

  Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
  memory using Redhat Enterprise Linux 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 -parallel -qopt-prefetch
```

C++ benchmarks:
```
     -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
```

Fortran benchmarks:
```
     -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
```

Benchmarks using both Fortran and C:
```
     -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
```

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
```

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Hardware Availability: Dec-2016
Software Availability: Sep-2016

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: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
        -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
        -no-prec-div(pass 2) -fno-alias -auto-ilp32

    447.dealII: basepeak = yes

    450.soplex: basepeak = yes

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

Fortran benchmarks:

    410.bwaves: basepeak = yes

    416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
        -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
        -no-prec-div(pass 2) -unroll2 -inline-level=0 -scalar-rep-

    434.zeusmp: basepeak = yes

    437.leslie3d: basepeak = yes

  459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
        -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
        -no-prec-div(pass 2) -unroll2 -inline-level=0
        -qopt-prefetch -parallel

    465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
        -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
        -no-prec-div(pass 2) -inline-calloc -qopt-malloc-options=3
        -auto -unroll4

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Peak Optimization Flags (Continued)

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

> 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-ic17.0-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-ic17.0-official-linux64.xml

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