SPEC® CFP2006 Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

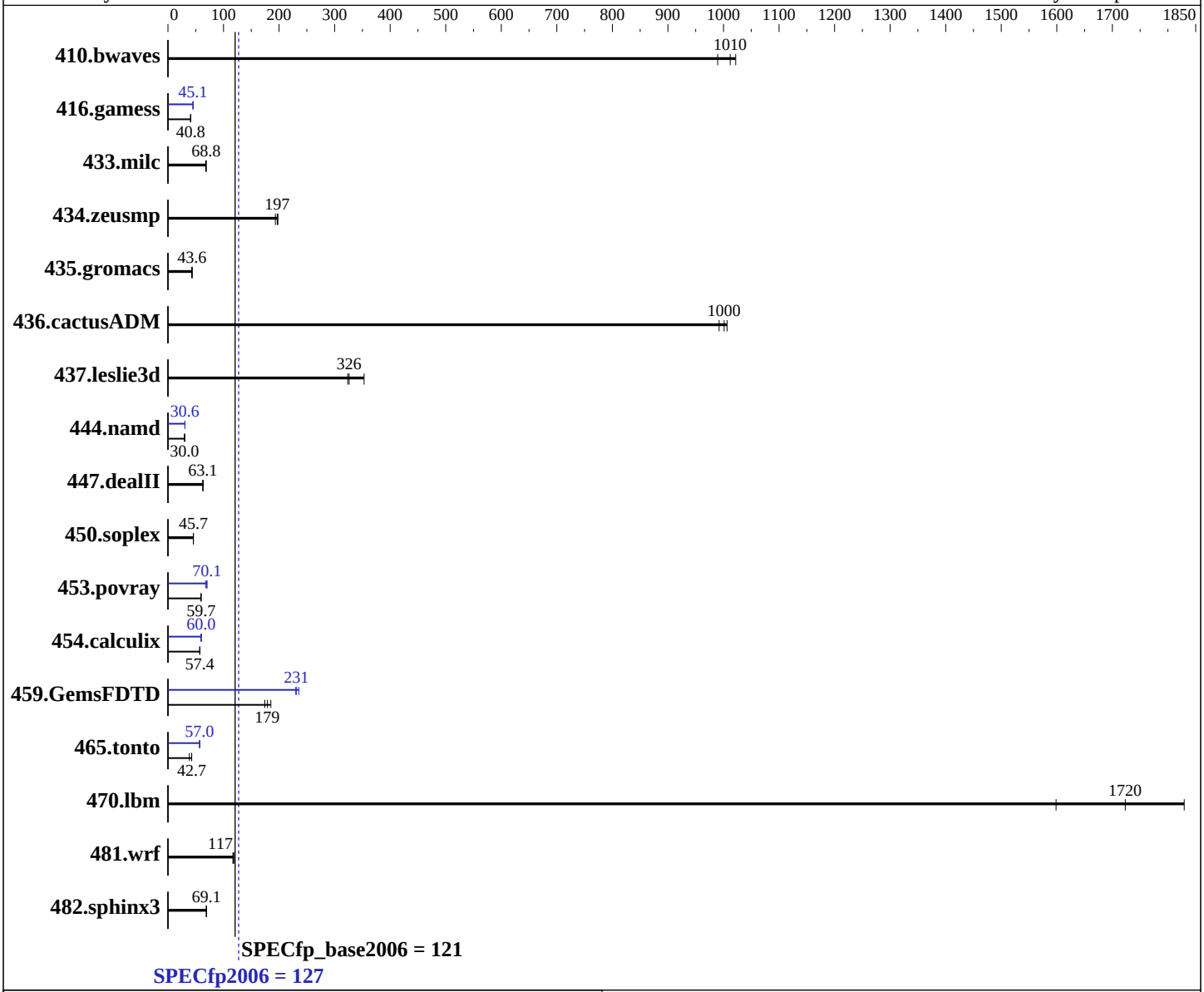
ProLiant DL580 Gen9
(2.40 GHz, Intel Xeon E7-8894 v4)

SPECfp®2006 = 127

SPECfp_base2006 = 121

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

Test date: Jan-2017
Hardware Availability: Mar-2017
Software Availability: Sep-2016



Hardware

CPU Name:	Intel Xeon E7-8894 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.40 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	96 cores, 4 chips, 24 cores/chip
CPU(s) orderable:	2,4 chip
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core

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Software

Operating System:	SUSE Linux Enterprise Server 12 (x86_64) SP1, Kernel 3.12.49-11-default
Compiler:	C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux
Auto Parallel:	Yes
File System:	xfs
System State:	Run level 3 (multi-user)

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L3 Cache: 60 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (32 x 16 GB 2Rx4 PC4-2400T-R, running at 1600 MHz)
Disk Subsystem: 1 x 800 GB NVMe PCIe SSD, RAID 0
Other Hardware: DL580 Gen9 NVMe SSD Express Bay Enablement Kit

Base Pointers: 32-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	13.3	1020	13.7	990	**13.4**	**1010**	13.3	1020	13.7	990	**13.4**	**1010**
416.gamess	480	40.8	**480**	**40.8**	480	40.8	**434**	**45.1**	435	45.0	434	45.1
433.milc	**133**	**68.8**	133	68.8	135	67.9	**133**	**68.8**	133	68.8	135	67.9
434.zeusmp	47.1	193	46.0	198	**46.3**	**197**	47.1	193	46.0	198	**46.3**	**197**
435.gromacs	164	43.6	167	42.7	**164**	**43.6**	164	43.6	167	42.7	**164**	**43.6**
436.cactusADM	**11.9**	**1000**	11.9	1010	12.0	992	**11.9**	**1000**	11.9	1010	12.0	992
437.leslie3d	26.6	353	**28.8**	**326**	29.0	324	26.6	353	**28.8**	**326**	29.0	324
444.namd	**268**	**30.0**	268	30.0	268	29.9	262	30.6	**262**	**30.6**	263	30.5
447.dealII	181	63.1	**181**	**63.1**	182	62.8	181	63.1	**181**	**63.1**	182	62.8
450.soplex	182	45.9	183	45.6	**182**	**45.7**	182	45.9	183	45.6	**182**	**45.7**
453.povray	89.0	59.8	**89.2**	**59.7**	89.9	59.2	75.8	70.1	**75.9**	**70.1**	78.5	67.8
454.calculix	144	57.4	144	57.3	**144**	**57.4**	**137**	**60.0**	137	60.1	139	59.3
459.GemsFDTD	57.3	185	60.9	174	**59.3**	**179**	**45.9**	**231**	45.0	236	46.1	230
465.tonto	255	38.6	**230**	**42.7**	230	42.7	**173**	**57.0**	173	57.0	172	57.1
470.lbm	8.59	1600	**7.97**	**1720**	7.51	1830	8.59	1600	**7.97**	**1720**	7.51	1830
481.wrf	**95.2**	**117**	95.4	117	94.2	119	**95.2**	**117**	95.4	117	94.2	119
482.sphinx3	281	69.4	**282**	**69.1**	282	69.1	281	69.4	**282**	**69.1**	282	69.1

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 by default.
```

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 C6 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
```

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Platform Notes (Continued)

```
      Processor Power and Utilization Monitoring set to Disabled
      Intel Hyper Threading set to Disabled
      Memory Refresh Rate set to 1x Refresh

    Sysinfo program /home/ic17_latest/cpu2006_copy/config/sysinfo.rev6993
    Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
    running on dl580_manju Tue Jan 10 10:30:08 2017

    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 E7-8894 v4 @ 2.40GHz
          4 "physical id"s (chips)
          96 "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 : 24
          siblings  : 24
          physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
          27 28 29
          physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
          27 28 29
          physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
          27 28 29
          physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
          27 28 29
       cache size : 61440 KB

    From /proc/meminfo
       MemTotal:       529314968 kB
       HugePages_Total:       0
       Hugepagesize:       2048 kB

    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"
```

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Platform Notes (Continued)

```
uname -a:
   Linux dl580_manju 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 Jan 10 10:25

SPEC is set to: /home/ic17_latest/cpu2006_copy
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/nvme0n1p4 xfs   703G  309G  394G  44% /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 U17 12/08/2016
  Memory:
   64x UNKNOWN NOT AVAILABLE
   32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1600 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:
32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1600 MHz
```

General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/ic17_latest/cpu2006_copy/libs/32:/home/ic17_latest/cpu2006_copy/libs/64:/home/ic17_latest/cpu2006_copy/sh10.2"
OMP_NUM_THREADS = "96"

 Binaries compiled on a system with 1x Intel Core i7-4790K 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
```

Continued on next page

Base Compiler Invocation (Continued)

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
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 -qopt-prefetch
-ansi-alias -fp-model fast=2

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -static -qopt-prefetch
-ansi-alias -fp-model fast=2

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel -qopt-prefetch
-fp-model fast=2

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel -qopt-prefetch
-ansi-alias -fp-model fast=2

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

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=threadsafe(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=threadsafe(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=threadsafe(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

Continued on next page

Peak Optimization Flags (Continued)

416.gamess (continued):
-scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -prof-gen=threadsafe(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=threadsafe(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

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-Platform-Flags-Intel-V1.2-HSW-revE.html
http://www.spec.org/cpu2006/flags/HPE-Compiler-Flags-Intel-V1.2-HSW-revH.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/HPE-Compiler-Flags-Intel-V1.2-HSW-revH.xml

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