SPEC® CFP2006 Result

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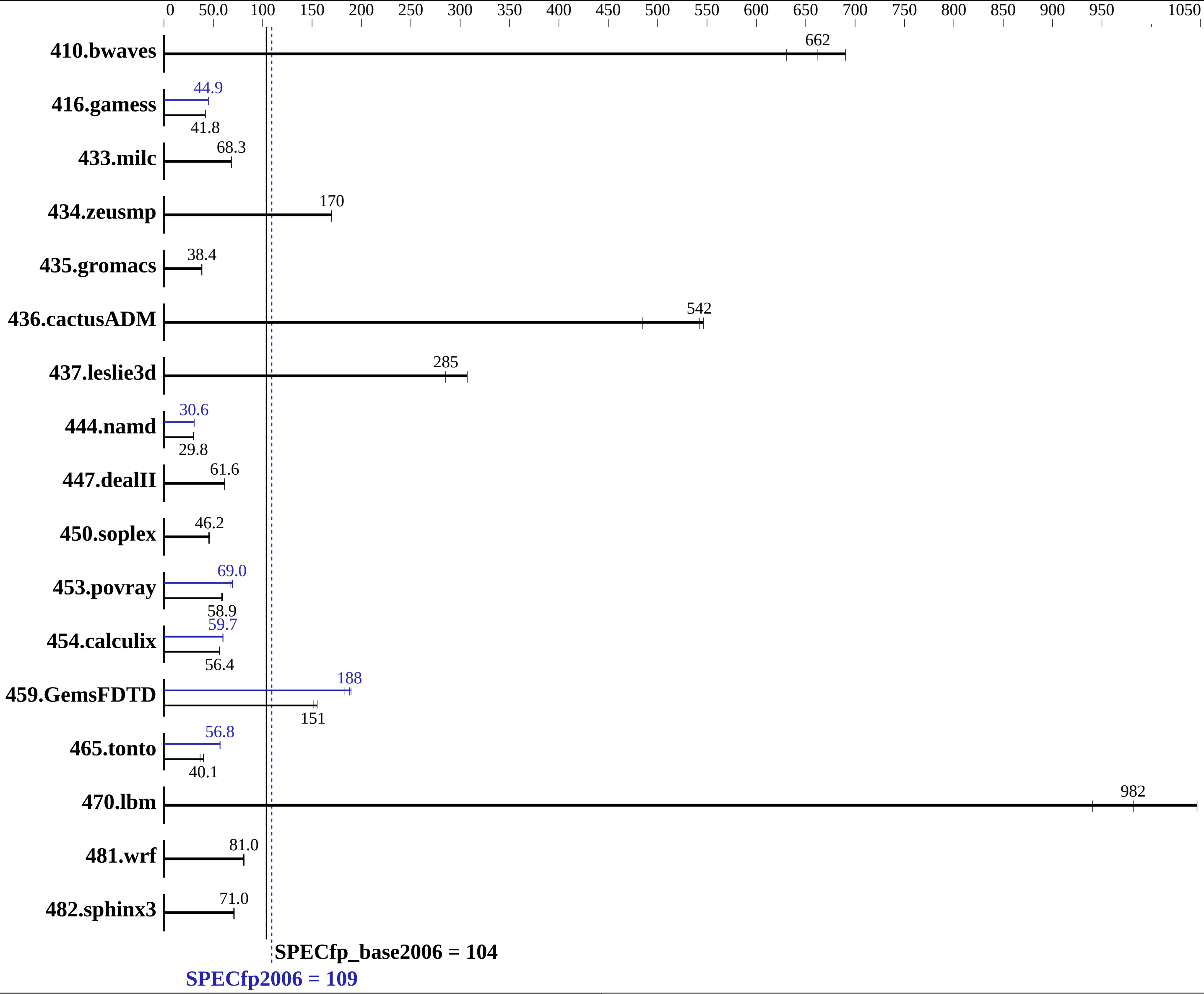
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL580 Gen9
(2.20 GHz, Intel Xeon E7-8890 v4)

SPECfp®2006 = 109
SPECfp_base2006 = 104

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



Hardware

CPU Name:	Intel Xeon E7-8890 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.40 GHz
CPU MHz:	2200
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

Continued on next page

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++ Studio XE for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Studio XE 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: Microquill SmartHeap V10.2

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	19.7	690	**20.5**	**662**	21.5	631	19.7	690	**20.5**	**662**	21.5	631
416.gamess	469	41.8	466	42.0	**468**	**41.8**	**436**	**44.9**	436	44.9	436	44.9
433.milc	135	68.0	134	68.3	**134**	**68.3**	135	68.0	134	68.3	**134**	**68.3**
434.zeusmp	53.5	170	**53.6**	**170**	53.7	169	53.5	170	**53.6**	**170**	53.7	169
435.gromacs	189	37.9	186	38.5	**186**	**38.4**	189	37.9	186	38.5	**186**	**38.4**
436.cactusADM	**22.0**	**542**	24.6	485	21.9	546	**22.0**	**542**	24.6	485	21.9	546
437.leslie3d	30.6	307	**32.9**	**285**	33.0	285	30.6	307	**32.9**	**285**	33.0	285
444.namd	268	29.9	**269**	**29.8**	269	29.8	**262**	**30.6**	262	30.6	262	30.6
447.dealII	186	61.5	186	61.6	**186**	**61.6**	186	61.5	186	61.6	**186**	**61.6**
450.soplex	184	45.3	**180**	**46.2**	179	46.5	184	45.3	**180**	**46.2**	179	46.5
453.povray	**90.4**	**58.9**	91.3	58.3	89.7	59.3	76.6	69.4	**77.1**	**69.0**	79.4	67.0
454.calculix	146	56.4	146	56.4	**146**	**56.4**	138	59.9	138	59.6	**138**	**59.7**
459.GemsFDTD	**70.2**	**151**	70.2	151	68.4	155	57.9	183	**56.5**	**188**	56.0	190
465.tonto	**245**	**40.1**	245	40.1	269	36.6	**173**	**56.8**	173	56.9	174	56.6
470.lbm	**14.0**	**982**	13.1	1050	14.6	940	**14.0**	**982**	13.1	1050	14.6	940
481.wrf	**138**	**81.0**	139	80.6	137	81.3	**138**	**81.0**	139	80.6	137	81.3
482.sphinx3	276	70.6	274	71.2	**274**	**71.0**	276	70.6	274	71.2	**274**	**71.0**

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 Balanced Power and Performance
  QPI Snoop Configuration set to Home Snoop
  Collaborative Power Control set to Disabled
  Thermal Configuration set to Maximum Cooling
  Processor Power and Utilization Monitoring set to Disabled
  Intel Hyper Threading set to Disabled
  Memory Refresh Rate set to 1x Refresh
```

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Platform Notes (Continued)

```
Sysinfo program /home/IC17/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-vi0i Sat Oct  8 09:33:59 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 E7-8890 v4 @ 2.20GHz
      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"

uname -a:
   Linux linux-vi0i 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
   (8d714a0) x86_64 x86_64 x86_64 GNU/Linux
```

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Platform Notes (Continued)

```
 run-level 3 Oct 8 09:32

 SPEC is set to: /home/IC17
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/nvme0n1p4 xfs   703G  101G  602G  15% /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 08/06/2016
   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,1,0"
LD_LIBRARY_PATH = "/home/IC17/libs/32:/home/IC17/libs/64:/home/IC17/sh10.2"
OMP_NUM_THREADS = "96"

 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

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

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/Intel-ic17.0-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-ic17.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml

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