



SPEC® CFP2006 Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant ML350 Gen9
(1.80 GHz, Intel Xeon E5-2630L v4)

SPECfp®2006 = 105

SPECfp_base2006 = 98.7

CPU2006 license: 3

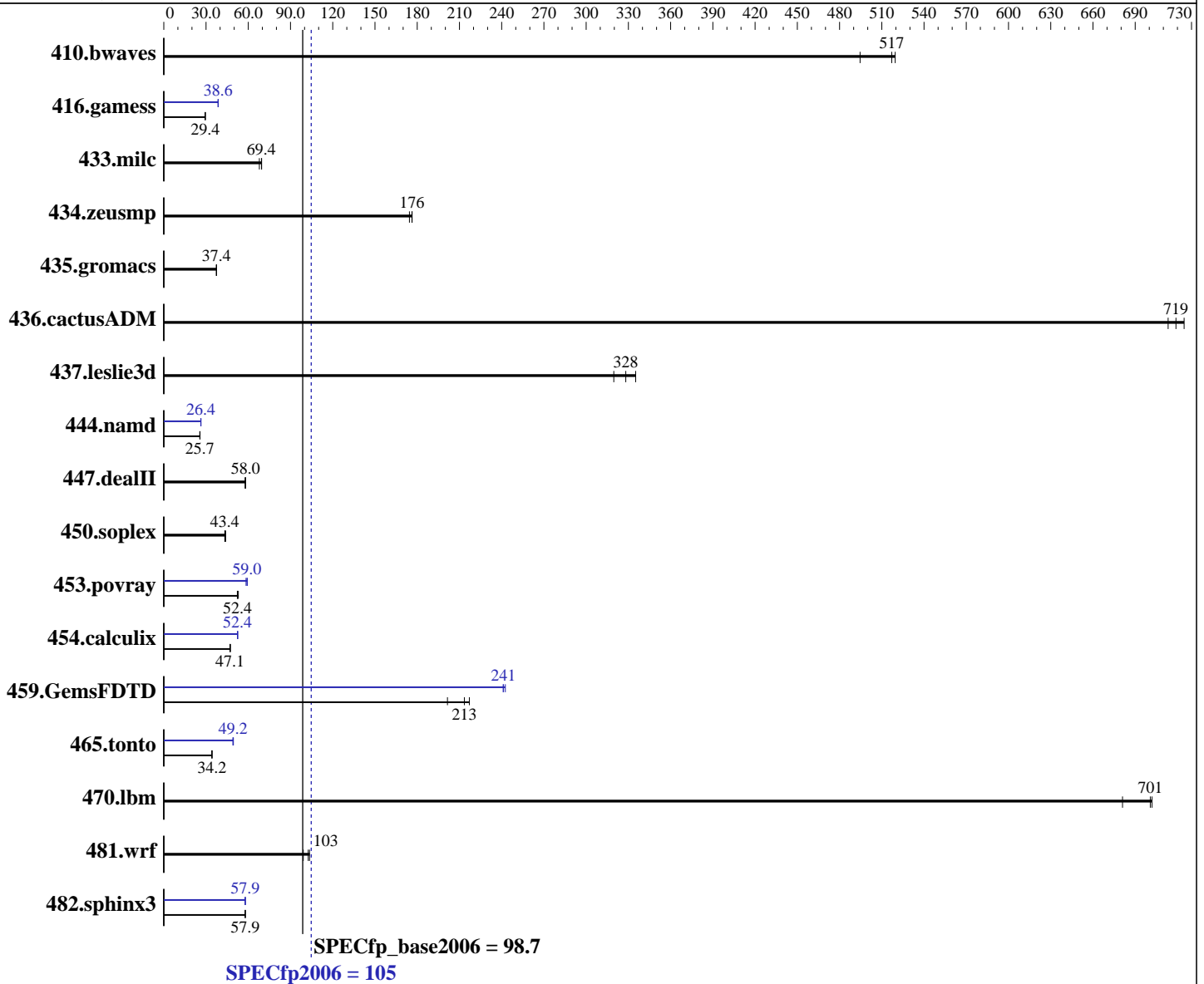
Test sponsor: HPE

Tested by: HPE

Test date: May-2016

Hardware Availability: Mar-2016

Software Availability: Dec-2015



Hardware

CPU Name: Intel Xeon E5-2630L v4
 CPU Characteristics: Intel Turbo Boost Technology up to 2.90 GHz
 CPU MHz: 1800
 FPU: Integrated
 CPU(s) enabled: 20 cores, 2 chips, 10 cores/chip, 2 threads/core
 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

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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 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: xfs
 System State: Run level 3 (multi-user)

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L3 Cache: 25 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2400T-R, running at 2133 MHz)
Disk Subsystem: 1 x 800 GB SAS SSD, RAID 0
Other Hardware: None

Base Pointers: 64-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	26.2	520	<u>26.3</u>	<u>517</u>	27.5	495	26.2	520	<u>26.3</u>	<u>517</u>	27.5	495
416.gamess	663	29.5	668	29.3	<u>665</u>	<u>29.4</u>	509	38.5	506	38.7	<u>507</u>	<u>38.6</u>
433.milc	132	69.5	<u>132</u>	<u>69.4</u>	135	67.9	132	69.5	<u>132</u>	<u>69.4</u>	135	67.9
434.zeusmp	51.6	176	52.2	174	<u>51.6</u>	<u>176</u>	51.6	176	52.2	174	<u>51.6</u>	<u>176</u>
435.gromacs	<u>191</u>	<u>37.4</u>	191	37.5	191	37.3	<u>191</u>	<u>37.4</u>	191	37.5	191	37.3
436.cactusADM	16.5	725	<u>16.6</u>	<u>719</u>	16.8	713	16.5	725	<u>16.6</u>	<u>719</u>	16.8	713
437.leslie3d	<u>28.6</u>	<u>328</u>	29.4	320	28.0	335	<u>28.6</u>	<u>328</u>	29.4	320	28.0	335
444.namd	312	25.7	314	25.6	<u>312</u>	<u>25.7</u>	<u>304</u>	<u>26.4</u>	305	26.3	304	26.4
447.dealII	197	58.0	<u>197</u>	<u>58.0</u>	198	57.8	197	58.0	<u>197</u>	<u>58.0</u>	198	57.8
450.soplex	192	43.4	190	43.9	<u>192</u>	<u>43.4</u>	192	43.4	190	43.9	<u>192</u>	<u>43.4</u>
453.povray	100	53.0	<u>102</u>	<u>52.4</u>	102	52.2	<u>90.1</u>	<u>59.0</u>	91.1	58.4	89.7	59.3
454.calculix	174	47.3	<u>175</u>	<u>47.1</u>	176	47.0	<u>157</u>	<u>52.4</u>	157	52.5	158	52.3
459.GemsFDTD	48.9	217	<u>49.7</u>	<u>213</u>	52.7	201	44.0	241	<u>44.0</u>	<u>241</u>	43.7	243
465.tonto	<u>287</u>	<u>34.2</u>	287	34.3	288	34.1	200	49.1	199	49.4	<u>200</u>	<u>49.2</u>
470.lbm	19.6	702	20.2	681	<u>19.6</u>	<u>701</u>	19.6	702	20.2	681	<u>19.6</u>	<u>701</u>
481.wrf	108	104	113	99.1	<u>109</u>	<u>103</u>	108	104	113	99.1	<u>109</u>	<u>103</u>
482.sphinx3	337	57.9	337	57.8	<u>337</u>	<u>57.9</u>	338	57.7	336	57.9	<u>337</u>	<u>57.9</u>

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:
Intel Hyperthreading Option set to Enabled
Power Profile set to Custom
Power Regulator set to Static High Performance Mode
Minimum Processor Idle Power Core C-State set to C1E State
Minimum Processor Idle Power Package C-State set to No Package State
Collaborative Power Control set to Disabled

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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 Double Refresh Rate set to 1x Refresh
 Energy Performance Bias set to Maximum Performance

Sysinfo program
 /home/specuser/cpu2006/HP_compiled_binaries_latest/cpu2006/config/sysinfo.rev6914
 \$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1
 running on linux-7m51 Sat May 28 11:19:18 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 E5-2630L v4 @ 1.80GHz
 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:        529092452 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"
```

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Platform Notes (Continued)

uname -a:

```
Linux linux-7m51 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 May 28 11:18

SPEC is set to: /home/specuser/cpu2006/HP_compiled_binaries_latest/cpu2006

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4        xfs   703G  236G  468G  34% /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 P92 04/12/2016

Memory:

8x UNKNOWN NOT AVAILABLE

16x UNKNOWN NOT AVAILABLE 32 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 512 GB and the dmidecode description should have one line reading as: 16x UNKNOWN NOT AVAILABLE 32 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"

OMP_NUM_THREADS = "20"

LD_LIBRARY_PATH = "/home/specuser/cpu2006/HP_compiled_binaries_latest/cpu2006/libs/32:/home/specuser/cpu2006/HP_compiled_binaries_latest/cpu2006/libs/64:/home/specuser/cpu2006/HP_compiled_binaries_latest/cpu2006/sh"

Binaries compiled on a system with 1x Intel Xeon E5-2660 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 -qopt-prefetch-issue-excl-hint

```

C++ benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias

```

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 -qopt-prefetch-issue-excl-hint
-fp-model fast=2

```

Peak Compiler Invocation

C benchmarks:

```

icc -m64

```

C++ benchmarks:

```

icpc -m64

```

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Peak Compiler Invocation (Continued)

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: -xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel
-opt-prefetch -ansi-alias
-fp-model fast=2
-qopt-prefetch-issue-excl-hint -funroll-all-loops

-nofor-main

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.dealIII: 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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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-revF.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-revF.xml>

<http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml>

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