



SPEC CFP2006 Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant ML350 Gen9

(2.10 GHz, Intel Xeon E5-2620 v4)

SPECfp2006 =

106

SPECfp_base2006 =

101

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Apr-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

L3 Cache: 20 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 400 GB SAS SSD, RAID 1
Other Hardware: None

System State: Run level 3 (multi-user)
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	<u>26.1</u>	<u>521</u>	25.9	525	26.2	520	<u>26.1</u>	<u>521</u>	25.9	525	26.2	520
416.gamess	<u>631</u>	<u>31.0</u>	632	31.0	630	31.1	<u>492</u>	<u>39.8</u>	491	39.9	494	39.7
433.milc	132	69.7	<u>132</u>	<u>69.6</u>	132	69.4	132	69.7	<u>132</u>	<u>69.6</u>	132	69.4
434.zeusmp	50.7	179	50.3	181	<u>50.4</u>	<u>181</u>	50.7	179	50.3	181	<u>50.4</u>	<u>181</u>
435.gromacs	171	41.9	<u>167</u>	<u>42.8</u>	167	42.9	171	41.9	<u>167</u>	<u>42.8</u>	167	42.9
436.cactusADM	<u>17.9</u>	<u>668</u>	17.7	674	18.7	641	<u>17.9</u>	<u>668</u>	17.7	674	18.7	641
437.leslie3d	32.4	290	<u>32.3</u>	<u>291</u>	32.3	291	32.4	290	<u>32.3</u>	<u>291</u>	32.3	291
444.namd	302	26.6	302	26.6	<u>302</u>	<u>26.6</u>	<u>295</u>	<u>27.2</u>	295	27.2	295	27.2
447.dealII	194	59.0	193	59.4	<u>193</u>	<u>59.2</u>	194	59.0	193	59.4	<u>193</u>	<u>59.2</u>
450.soplex	193	43.3	<u>190</u>	<u>43.8</u>	190	44.0	193	43.3	<u>190</u>	<u>43.8</u>	190	44.0
453.povray	98.3	54.1	98.2	54.2	<u>98.2</u>	<u>54.2</u>	<u>87.0</u>	<u>61.1</u>	85.3	62.4	88.4	60.2
454.calculix	170	48.6	170	48.6	<u>170</u>	<u>48.6</u>	153	53.8	153	53.8	<u>153</u>	<u>53.8</u>
459.GemsFDTD	49.9	213	49.2	215	<u>49.4</u>	<u>215</u>	44.9	237	44.5	238	<u>44.8</u>	<u>237</u>
465.tonto	<u>259</u>	<u>38.0</u>	259	37.9	258	38.2	<u>193</u>	<u>51.0</u>	193	51.0	194	50.6
470.lbm	<u>21.0</u>	<u>653</u>	21.0	653	21.1	650	<u>21.0</u>	<u>653</u>	21.0	653	21.1	650
481.wrf	<u>107</u>	<u>104</u>	108	104	107	105	<u>107</u>	<u>104</u>	108	104	107	105
482.sphinx3	297	65.6	<u>298</u>	<u>65.3</u>	300	65.0	297	65.6	<u>298</u>	<u>65.3</u>	300	65.0

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

Sysinfo program
 /home/specuser/specsuite/HP_build_ic16_suite_corrected_int_bins/cpu2006/config/sysinfo.rev6914
 \$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1
 running on ml350bdwspec Sat Apr 30 14:20:20 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 E5-2620 v4 @ 2.10GHz
 2 "physical id"s (chips)
 32 "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    : 8
  siblings     : 16
  physical 0: cores 0 1 2 3 4 5 6 7
  physical 1: cores 0 1 2 3 4 5 6 7
cache size     : 20480 KB
```

```
From /proc/meminfo
MemTotal:      528066696 kB
HugePages_Total: 0
Hugepagesize:  2048 kB
```

```
From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.2 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.2"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.2:ga:server
```

```
uname -a:
Linux ml350bdwspec 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT 2015
x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Apr 30 14:19

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Platform Notes (Continued)

SPEC is set to:

/home/specuser/specsuite/HP_build_icl6_suite_corrected_int_bins/cpu2006

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda5	xfs	318G	108G	211G	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 02/22/2016

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 = "16"

ID_LIBRARY_PATH = "/home/specuser/specsuite/HP_build_icl6_suite_corrected_int_bins/cpu2006/libs/32:/home/specuser/specsuite/HP_build_icl6_suite_corrected_int_bins/cpu2006/libs/64:/home/specuser/specsuite/HP_build_icl6_suite_corrected_int_bins/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 -fp-model fast=2
-qopt-prefetch-issue-excl-hint

```

C++ benchmarks:

```

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

```

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

```

Peak Compiler Invocation

C benchmarks:

```
icc -m64
```

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Peak Compiler Invocation (Continued)

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: -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-HSW-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-HSW-revF.xml>

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

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