



SPEC® CFP2006 Result

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Hewlett-Packard Company

SPECfp®_rate2006 = 285

ProLiant DL360 Gen9
(1.60 GHz, Intel Xeon E5-2603 v3)

SPECfp_rate_base2006 = 278

CPU2006 license: 3

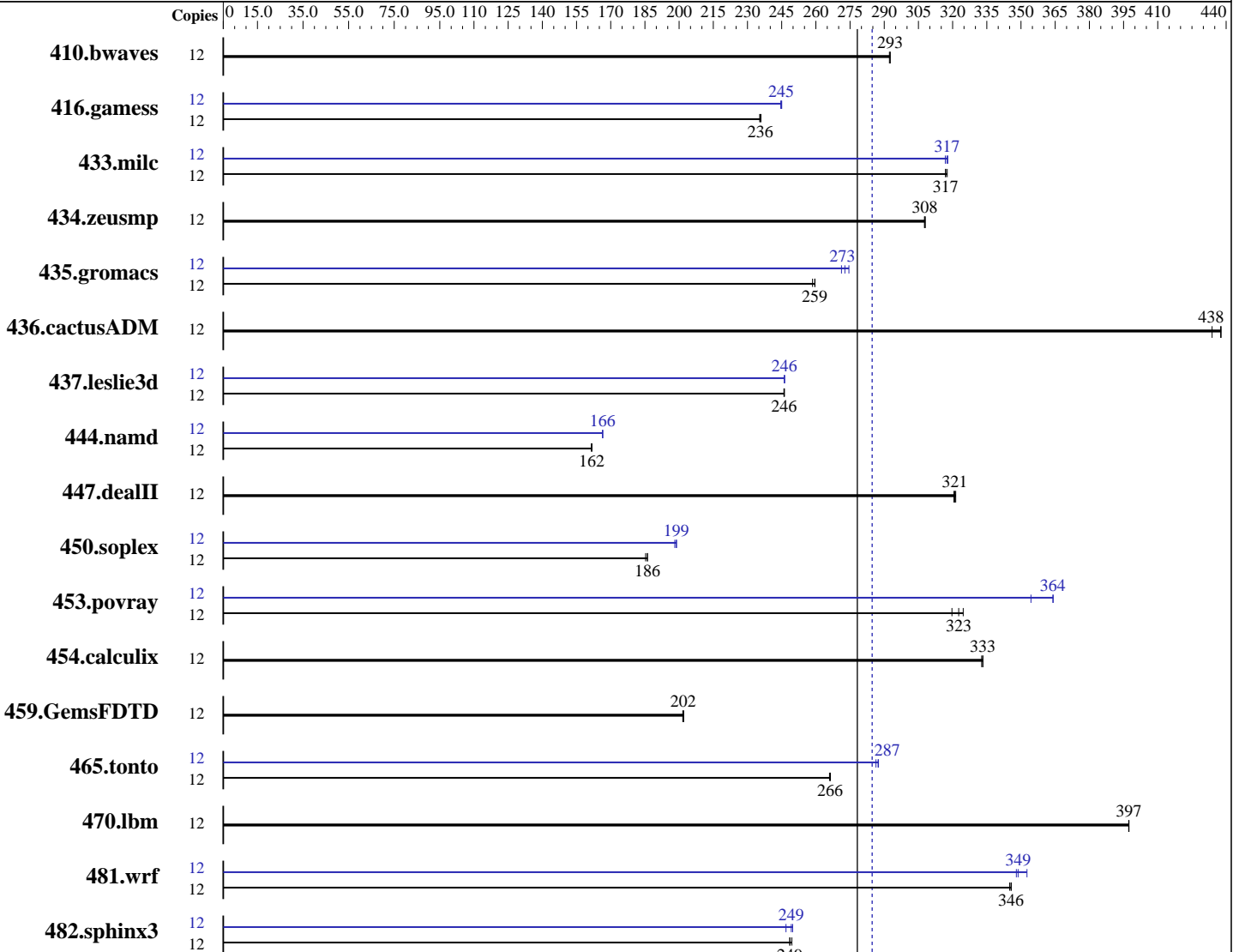
Test date: Oct-2014

Test sponsor: Hewlett-Packard Company

Hardware Availability: Sep-2014

Tested by: Hewlett-Packard Company

Software Availability: Sep-2014



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Hardware

CPU Name: Intel Xeon E5-2603 v3
 CPU Characteristics:
 CPU MHz: 1600
 FPU: Integrated
 CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip
 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

Continued on next page

Software

Operating System: Red Hat Enterprise Linux Server release 7.0 (Maipo)
 Kernel 3.10.0-123.el7.x86_64
 Compiler: C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux;
 Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux
 Auto Parallel: No
 File System: xfs

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L3 Cache: 15 MB I+D on chip per chip
Other Cache: None
Memory: 128 GB (16 x 8 GB 1Rx4 PC4-2133P-R, running at 1600 MHz)
Disk Subsystem: 1 x 400 GB SSD SAS, RAID 0
Other Hardware: None

System State: Run level 3 (multi-user)
Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	12	558	292	<u>557</u>	<u>293</u>	557	293	12	558	292	<u>557</u>	<u>293</u>	557	293		
416.gamess	12	998	235	<u>997</u>	<u>236</u>	996	236	12	961	245	959	245	<u>960</u>	<u>245</u>		
433.milc	12	<u>348</u>	<u>317</u>	348	317	347	318	12	347	318	<u>347</u>	<u>317</u>	348	317		
434.zeusmp	12	<u>355</u>	<u>308</u>	355	308	355	308	12	<u>355</u>	<u>308</u>	355	308	355	308		
435.gromacs	12	<u>330</u>	<u>259</u>	331	259	330	260	12	316	271	312	274	<u>314</u>	<u>273</u>		
436.cactusADM	12	328	438	331	434	<u>328</u>	<u>438</u>	12	328	438	331	434	<u>328</u>	<u>438</u>		
437.leslie3d	12	459	246	458	246	<u>458</u>	<u>246</u>	12	458	246	458	246	<u>458</u>	<u>246</u>		
444.namd	12	596	162	<u>595</u>	<u>162</u>	595	162	12	578	166	578	166	<u>578</u>	<u>166</u>		
447.dealII	12	<u>428</u>	<u>321</u>	428	321	427	321	12	<u>428</u>	<u>321</u>	428	321	427	321		
450.soplex	12	<u>538</u>	<u>186</u>	540	185	538	186	12	503	199	<u>504</u>	<u>199</u>	505	198		
453.povray	12	197	325	<u>198</u>	<u>323</u>	200	320	12	<u>175</u>	<u>364</u>	180	354	175	364		
454.calculix	12	297	333	<u>297</u>	<u>333</u>	298	333	12	297	333	<u>297</u>	<u>333</u>	298	333		
459.GemsFDTD	12	630	202	<u>631</u>	<u>202</u>	632	202	12	630	202	<u>631</u>	<u>202</u>	632	202		
465.tonto	12	444	266	<u>444</u>	<u>266</u>	443	266	12	412	286	<u>411</u>	<u>287</u>	411	287		
470.lbm	12	415	397	<u>415</u>	<u>397</u>	415	397	12	415	397	<u>415</u>	<u>397</u>	415	397		
481.wrf	12	<u>388</u>	<u>346</u>	388	346	388	345	12	380	353	<u>384</u>	<u>349</u>	385	348		
482.sphinx3	12	<u>941</u>	<u>249</u>	941	249	937	249	12	<u>938</u>	<u>249</u>	936	250	947	247		

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages disabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled
Filesystem page cache cleared with:
echo 1 > /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>



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Platform Notes

BIOS Configuration:

HP Power Profile set to Custom
HP Power Regulator to HP Static High Performance Mode
Minimum Processor Idle Power Core State set to C6 State
Minimum Processor Idle Power Package State set to Package C6 (non-retention) State
QPI Snoop Configuration set to Home Snoop
Thermal Configuration set to Maximum Cooling
Collaborative Power Control set to Disabled
Processor Power and Utilization Monitoring set to Disabled
Memory Double Refresh Rate set to 1x Refresh

Sysinfo program /home/cpu2006/config/sysinfo.rev6914
\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1
running on DL360-G9 Fri Oct 31 12:57:21 2014

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 E5-2603 v3 @ 1.60GHz
 2 "physical id"s (chips)
 12 "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 : 6
  siblings  : 6
  physical 0: cores 0 1 2 3 4 5
  physical 1: cores 0 1 2 3 4 5
cache size : 15360 KB
```

```
From /proc/meminfo
MemTotal:      131734972 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

```
From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.0 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.0"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server
```

uname -a:

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Platform Notes (Continued)

```
Linux DL360-G9 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT 2014
x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Oct 31 12:54
```

```
SPEC is set to: /home/cpu2006
```

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/mapper/rhel_dl360--g9-home	xfs	318G	156G	163G	49%	/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 P89 07/11/2014
```

```
Memory:
```

```
16x HP NOT AVAILABLE 8 GB 1 rank 2133 MHz, configured at 1600 MHz
8x UNKNOWN NOT AVAILABLE
```

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:

```
LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"
```

Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB memory using RedHat EL 7.0

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 -opt-prefetch -auto-p32
-ansi-alias

```

C++ benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias

```

Fortran benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

```

Benchmarks using both Fortran and C:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias

```

Peak Compiler Invocation

C benchmarks:

```

icc -m64

```

C++ benchmarks (except as noted below):

```

icpc -m64

```

```

450.soplex: icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

```

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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

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
 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

Peak Optimization Flags

C benchmarks:

433.milc: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-auto-ilp32

470.lbm: basepeak = yes

482.sphinx3: -xCORE-AVX2 -prof-gen(pass 1) -ipo -O3 -no-prec-div
-prof-use(pass 2) -unroll2

C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-fno-alias -auto-ilp32

447.dealII: basepeak = yes

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Peak Optimization Flags (Continued)

450.soplex: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-opt-malloc-options=3

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

Fortran benchmarks:

410.bwaves: basepeak = yes

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

434.zeusmp: basepeak = yes

437.leslie3d: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

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

Benchmarks using both Fortran and C:

435.gromacs: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Intel-ic15.0-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-ic15.0-official-linux64.xml>

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Tested with SPEC CPU2006 v1.2.
Report generated on Tue Nov 18 16:34:48 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 18 November 2014.