



# SPEC<sup>®</sup> CFP2006 Result

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## Hewlett-Packard Company

SPECfp<sup>®</sup>\_rate2006 = 799

ProLiant BL460c Gen9  
(2.50 GHz, Intel Xeon E5-2680 v3)

SPECfp\_rate\_base2006 = 777

CPU2006 license: 3

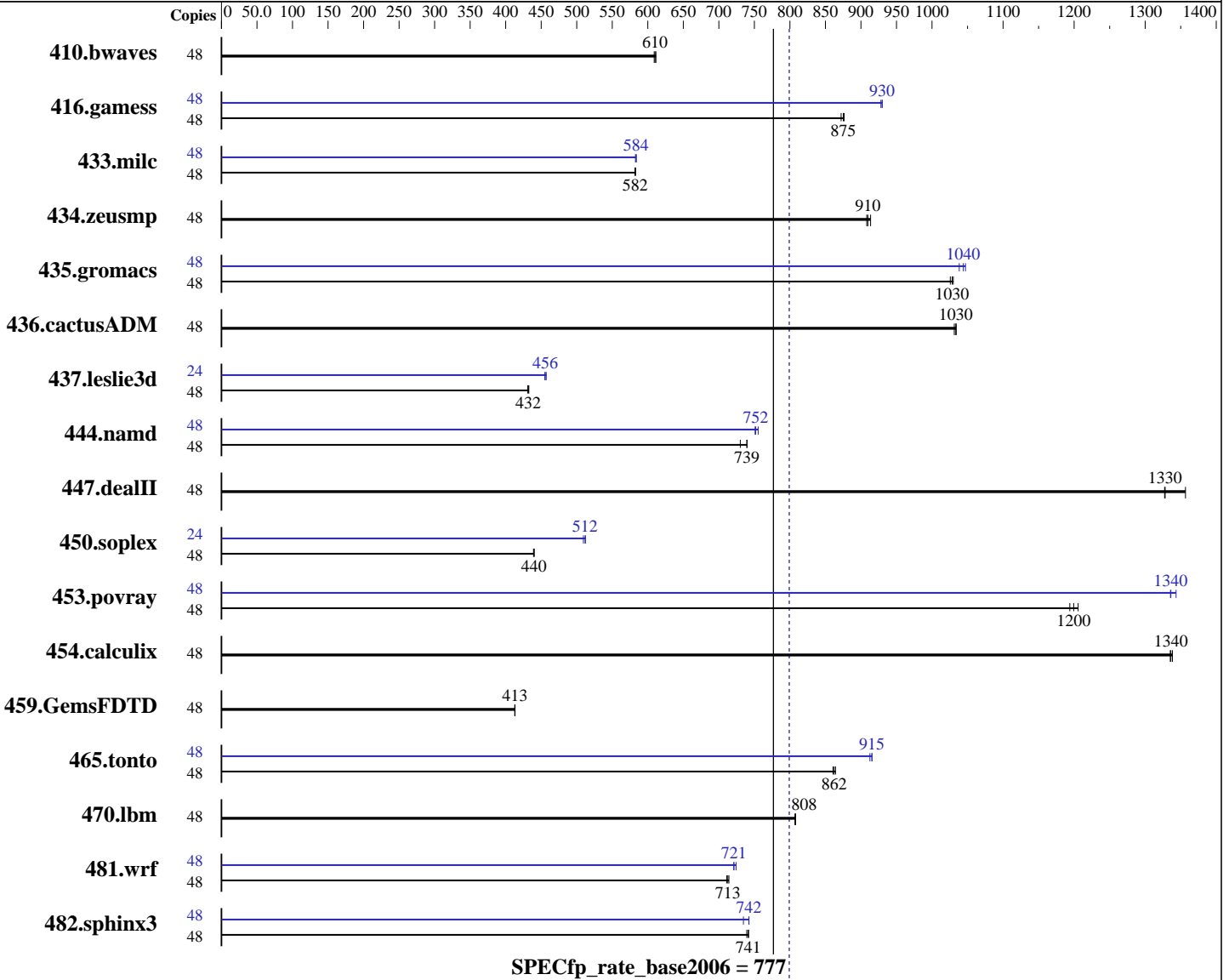
Test sponsor: Hewlett-Packard Company

Tested by: Hewlett-Packard Company

Test date: Dec-2014

Hardware Availability: Sep-2014

Software Availability: Sep-2014



### Hardware

CPU Name: Intel Xeon E5-2680 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2500  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 2 chips, 12 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

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: 30 MB I+D on chip per chip  
Other Cache: None  
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)  
Disk Subsystem: 2 x 400 GB SAS SSD, RAID 1  
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	48	1067	611	<b>1069</b>	<b>610</b>	1071	609	48	1067	611	<b>1069</b>	<b>610</b>	1071	609
416.gamess	48	1078	872	1072	876	<b>1074</b>	<b>875</b>	48	1011	930	1013	928	<b>1011</b>	<b>930</b>
433.milc	48	756	583	757	582	<b>757</b>	<b>582</b>	48	755	584	<b>755</b>	<b>584</b>	756	583
434.zeusmp	48	478	914	481	908	<b>480</b>	<b>910</b>	48	478	914	481	908	<b>480</b>	<b>910</b>
435.gromacs	48	333	1030	<b>333</b>	<b>1030</b>	334	1030	48	327	1050	<b>328</b>	<b>1040</b>	330	1040
436.cactusADM	48	556	1030	555	1030	<b>555</b>	<b>1030</b>	48	556	1030	555	1030	<b>555</b>	<b>1030</b>
437.leslie3d	48	1043	433	1047	431	<b>1045</b>	<b>432</b>	24	496	455	494	457	<b>495</b>	<b>456</b>
444.namd	48	527	730	520	740	<b>521</b>	<b>739</b>	48	510	755	<b>512</b>	<b>752</b>	513	751
447.dealII	48	405	1360	414	1330	<b>413</b>	<b>1330</b>	48	405	1360	414	1330	<b>413</b>	<b>1330</b>
450.soplex	48	<b>910</b>	<b>440</b>	910	440	912	439	24	393	509	<b>391</b>	<b>512</b>	391	512
453.povray	48	214	1190	<b>213</b>	<b>1200</b>	212	1210	48	191	1340	<b>191</b>	<b>1340</b>	190	1340
454.calculix	48	297	1340	296	1340	<b>296</b>	<b>1340</b>	48	297	1340	296	1340	<b>296</b>	<b>1340</b>
459.GemsFDTD	48	1233	413	<b>1233</b>	<b>413</b>	1234	413	48	1233	413	<b>1233</b>	<b>413</b>	1234	413
465.tonto	48	547	864	<b>548</b>	<b>862</b>	549	861	48	516	916	518	913	<b>516</b>	<b>915</b>
470.lbm	48	816	808	817	807	<b>817</b>	<b>808</b>	48	816	808	817	807	<b>817</b>	<b>808</b>
481.wrf	48	754	711	<b>752</b>	<b>713</b>	751	714	48	<b>743</b>	<b>721</b>	744	721	740	724
482.sphinx3	48	1265	739	<b>1262</b>	<b>741</b>	1261	742	48	1260	742	<b>1260</b>	<b>742</b>	1274	735

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 enabled 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 No Package State
QPI Snoop Configuration set to Cluster On Die
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 /cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on W-bl460c_gen9-VP2.1 Mon Dec 15 19:13:55 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 E5-2680 v3 @ 2.50GHz
 2 "physical id"s (chips)
 48 "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  : 12
 physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
 physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
cache size : 15360 KB

```

#### From /proc/meminfo

```

MemTotal:      263842000 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:

```
Linux W-bl460c_gen9-VP2.1 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT
```

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## Platform Notes (Continued)

2014 x86\_64 x86\_64 x86\_64 GNU/Linux

run-level 3 Dec 15 08:09

SPEC is set to: /cpu2006

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda4	xfs	277G	82G	196G	30%	/

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 I36 08/26/2014

Memory:

16x HP NOT AVAILABLE 16 GB 2 rank 2133 MHz

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:  
LD\_LIBRARY\_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/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

## Base Portability Flags

410.bwaves: -DSPEC\_CPU\_LP64

416.gamess: -DSPEC\_CPU\_LP64

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## Base Portability Flags (Continued)

```

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 -opt-mem-layout-trans=3

C++ benchmarks:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

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 -opt-mem-layout-trans=3

## 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

Fortran benchmarks:  
ifort -m64

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## Peak Compiler Invocation (Continued)

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)  
 -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)  
 -auto-ilp32

470.lbm: basepeak = yes

482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3  
 -unroll2

C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
 -O3(pass 2) -no-prec-div(pass 2)  
 -opt-mem-layout-trans=3(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)  
-opt-mem-layout-trans=3(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)  
-opt-mem-layout-trans=3(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)  
-opt-mem-layout-trans=3(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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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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