# SPEC® CFP2006 Result

## Hewlett-Packard Company

**ProLiant DL580 Gen9**  
(2.80 GHz, Intel Xeon E7-8891 v3)

<table>
<thead>
<tr>
<th>SPECfp®2006</th>
<th>124</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006</td>
<td>118</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 3  
**Test date:** Apr-2015  
**Test sponsor:** Hewlett-Packard Company  
**Tested by:** Hewlett-Packard Company  
**Hardware Availability:** May-2015  
**Software Availability:** Mar-2015

### Hardware

- **CPU Name:** Intel Xeon E7-8891 v3  
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.50 GHz  
- **CPU MHz:** 2800  
- **FPU:** Integrated  
- **CPU(s) enabled:** 40 cores, 4 chips, 10 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

### Software

- **Operating System:** Red Hat Enterprise Linux Server release 7.1  
  (Maipo)  
  Kernel 3.10.0-229.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:** Yes  
- **File System:** xfs

---

**410.bwaves**  
42.7  
1190

**416.gamess**  
38.3  
1050

**433.milc**  
62.5  
318

**434.zeusmp**  
61.6  
235

**435.gromacs**  
44.0  
253

**436.cactusADM**  
30.3  
29.5

**437.leslie3d**  
53.7  
52.5

**444.namd**  
42.8  
52.6

**447.dealII**  
159  
298

**450.soplex**  
64.3  
1440

**453.povray**  
57.6  
57.5

**454.calculix**  
52.6  
298

**459.GemsFDTD**  
44.0  
1440

**465.tonto**  
39.9  
119

**470.lbm**  
52.5  
235

**481.wrf**  
74.0  
1440

**482.sphinx3**  
74.0  
1440

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**SPECfp_base2006 = 118**  
**SPECfp2006 = 124**

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Continued on next page
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| L3 Cache:        | 45 MB I+D on chip per chip |
| Other Cache:     | None |
| Other Hardware:  | None |
| Memory:          | 512 GB (32 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz) |
| Disk Subsystem:  | 1 x 400 GB SAS SSD, RAID 0 |

<table>
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<th>Ratio</th>
<th>Seconds</th>
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<td>263</td>
<td>74.0</td>
</tr>
</tbody>
</table>

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 Options set to Disabled  
- Power Profile set to Custom  
- Power Regulator set to Static High Performance Mode  
- Minimum Processor Idle Power Core C-State set to C6 State  
- Minimum Processor Idle Power Package C-State set to Package C6 (retention) State  
- Energy/Performance Bias set to Maximum Performance

Continued on next page
SPEC CFP2006 Result

Hewlett-Packard Company

SPECfp2006 = 124
SPECfp_base2006 = 118

Collaborative Power Control set to Enabled
Thermal Configuration set to Maximum Cooling
Processor Power and Utilization Monitoring set to Disabled
Memory Refresh Rate set to 1x Refresh

Sysinfo program /cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Wed Apr 1 21:30:43 2015

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 E7-8891 v3 @ 2.80GHz
4 "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 : 10
physical 0: cores 0 1 2 4 6 8 17 19 20 23
physical 1: cores 0 1 2 4 6 8 17 19 20 23
physical 2: cores 0 1 2 4 6 8 17 19 20 23
physical 3: cores 0 1 2 4 6 8 17 19 20 23
cache size : 46080 KB

From /proc/meminfo
MemTotal: 528076380 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.1 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.1"
PREFRY_NAME="Red Hat Enterprise Linux Server 7.1 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME=cpe:/o:redhat:enterprise_linux:7.1:GA:server
redhat-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)

uname -a:
Linux localhost.localdomain 3.10.0-229.el7.x86_64 #1 SMP Thu Jan 29 18:37:38
EST 2015 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Apr 1 10:07

Continued on next page

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SPECfp2006 = 124
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CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
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Platform Notes (Continued)

SPEC is set to: /cpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 368G 26G 343G 7% /

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 03/13/2015
Memory:
  11x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1600 MHz
  64x UNKNOWN NOT AVAILABLE
  21x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 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 two lines reading as:
  11x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1600 MHz
  21x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1600 MHz

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"
OMP_NUM_THREADS = "40"

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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Test date: Apr-2015
Hardware Availability: May-2015
Software Availability: Mar-2015

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.games: -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 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
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 -opt-prefetch
-ansi-alias

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias

Peak Compiler Invocation

C benchmarks:
icc  -m64

C++ benchmarks:
icpc  -m64

Fortran benchmarks:
ifort  -m64
Peak Compiler Invocation (Continued)

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: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-auto-ilp32 -ansi-alias
```

```
470.lbm: basepeak = yes
```

```
482.sphinx3: basepeak = yes
```

C++ benchmarks:

```
444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-fno-alias -auto-ilp32
```

```
447.dealII: basepeak = yes
```

```
450.soplex: basepeak = yes
```

```
453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-03(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)
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2
-inline-level=0 -scalar-rep-
```

```
434.zeusmp: basepeak = yes
```

```
437.leslie3d: basepeak = yes
```

Continued on next page
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Peak Optimization Flags (Continued)

459.GemsFDTD: -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 -opt-prefetch -parallel

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

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