Hewlett-Packard Company  
ProLiant BL660c Gen9  
(1.70 GHz, Intel Xeon E5-4610 v3)

**SPECfp®2006** = 67.1

**SPECfp_base2006** = 64.4

**CPU2006 license:** 3  
**Test date:** May-2015

**Test sponsor:** Hewlett-Packard Company  
**Hardware Availability:** Jun-2015

**Tested by:** Hewlett-Packard Company

**Software Availability:** Oct-2014

---

### Benchmark Results

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<tr>
<th>Benchmark</th>
<th>Score</th>
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<tbody>
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<td>410.bwaves</td>
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<tr>
<td>416.gamess</td>
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<td>433.milc</td>
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<td>435.gromacs</td>
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<td>436.cactusADM</td>
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<td>437.leslie3d</td>
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<td>482.sphinx3</td>
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</tr>
</tbody>
</table>

**SPECfp_base2006** = 64.4

---

### Hardware

- **CPU Name:** Intel Xeon E5-4610 v3  
- **CPU Characteristics:**  
  - CPU MHz: 1700  
  - FPU: Integrated  
  - CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip  
  - CPU(s) orderable: 2.4 chips  
  - 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:** SUSE Linux Enterprise Server 12 (x86_64)  
  Kernel 3.12.28-4-default
- **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  
- **System State:** Run level 3 (multi-user)

---

Continued on next page
**SPEC CFP2006 Result**

Hewlett-Packard Company

ProLiant BL660c Gen9
(1.70 GHz, Intel Xeon E5-4610 v3)

**SPECfp2006** = 67.1

**SPECfp_base2006** = 64.4

---

**CPU2006 license:** 3

**Test sponsor:** Hewlett-Packard Company

**Tested by:** Hewlett-Packard Company

**Test date:** May-2015

**Hardware Availability:** Jun-2015

**Software Availability:** Oct-2014

**L3 Cache:** 25 MB I+D on chip per chip

**Other Cache:** 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

**Other Hardware:** None

**Base Pointers:** 64-bit

**Peak Pointers:** 32/64-bit

**Other Software:** None

---

### Results Table

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</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
- 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
- Energy/Performance Bias set to Maximum Performance
- Collaborative Power Control set to Disabled

Continued on next page
Hewlett-Packard Company
ProLiant BL660c Gen9
(1.70 GHz, Intel Xeon E5-4610 v3)

SPECfp2006 = 67.1
SPECfp_base2006 = 64.4

CPU2006 license: 3
Test date: May-2015
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Hardware Availability: Jun-2015
Tested by: Hewlett-Packard Company
Software Availability: Oct-2014

Platform Notes (Continued)

Thermal Configuration set to Maximum Cooling
Processor Power and Utilization Monitoring set to Disabled
Memory Refresh Rate set to 1x Refresh
Sysinfo program /root/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-mava Sun May 31 21:56:28 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 E5-4610 v3 @ 1.70GHz
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 2 3 4 8 9 10 11 12
physical 1: cores 0 2 3 4 8 9 10 11 12
physical 2: cores 0 2 3 4 8 9 10 11 12
physical 3: cores 0 2 3 4 8 9 10 11 12
cache size : 25600 KB

From /proc/meminfo
MemTotal: 529310712 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 0
# 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"
VERSION_ID="12"
PRETTY_NAME="SUSE Linux Enterprise Server 12"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12"

uname -a:
Linux linux-mava 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
(9879bd4) x86_64 x86_64 x86_64 GNU/Linux

Continued on next page
Hewlett-Packard Company

ProLiant BL660c Gen9
(1.70 GHz, Intel Xeon E5-4610 v3)

SPECfp2006 = 67.1
SPECfp_base2006 = 64.4

Platform Notes (Continued)

run-level 3 May 31 21:43

SPEC is set to: /root/cpu2006
  Filesystem Type  Size  Used Avail Use% Mounted on
  /dev/sda3  xfs  341G  8.8G  332G   3% /

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 I38 03/05/2015
Memory:
  4x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1600 MHz
  28x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1600 MHz

(End of data from sysinfo program)

General Notes

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

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64

Continued on next page
SPEC CFP2006 Result

Hewlett-Packard Company
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Base Portability Flags (Continued)

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 -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

Benchmarks using both Fortran and C:
icc -m64 ifort -m64
Hewlett-Packard Company
ProLiant BL660c Gen9
(1.70 GHz, Intel Xeon E5-4610 v3)

SPECfp2006 = 67.1
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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(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
450.soplex: basepeak = yes
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: basepeak = yes

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:
Continued on next page
Hewlett-Packard Company

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Peak Optimization Flags (Continued)

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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For other inquiries, please contact webmaster@spec.org.

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