Hewlett-Packard Company
ProLiant DL560 Gen9
(1.90 GHz, Intel Xeon E5-4640 v3)

SPECfp®2006 = 88.0
SPECfp_base2006 = 82.9

Hardware
CPU Name: Intel Xeon E5-4640 v3
CPU Characteristics: Intel Turbo Boost Technology up to 2.60 GHz
CPU MHz: 1900
FPU: Integrated
CPU(s) enabled: 48 cores, 4 chips, 12 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: SUSE Linux Enterprise Server 12 (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
System State: Run level 3 (multi-user)
Hewlett-Packard Company
ProLiant DL560 Gen9
(1.90 GHz, Intel Xeon E5-4640 v3)

SPECfp2006 = 88.0
SPECfp_base2006 = 82.9

CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
Tested by: Hewlett-Packard Company
L3 Cache: 30 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (32 x 16 GB 2Rx4 PC4-2133P-R, running at 1866 MHz)
Disk Subsystem: 2 x 400 GB SAS SSD, RAID 1
Other Hardware: None

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 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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>382</td>
<td>51.0</td>
</tr>
</tbody>
</table>

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

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled

Operating System Notes
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled

Platform Notes
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Intel Hyperthreading 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
# SPEC CFP2006 Result

## Hewlett-Packard Company

**ProLiant DL560 Gen9**  
(1.90 GHz, Intel Xeon E5-4640 v3)

<table>
<thead>
<tr>
<th>SPECfp2006</th>
<th>88.0</th>
</tr>
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<tbody>
<tr>
<td>SPECfp_base2006</td>
<td>82.9</td>
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<table>
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<td>Tested by</td>
<td>Hewlett-Packard Company</td>
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<tr>
<td>Test date</td>
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<tr>
<td>Hardware Availability</td>
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</tr>
<tr>
<td>Software Availability</td>
<td>Oct-2014</td>
</tr>
</tbody>
</table>

## 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 /home/cpu2006/config/sysinfo.rev6914  
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1  
running on dl560gen9jks Mon Jun 8 23:20:52 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 E5-4640 v3 @ 1.90GHz  
4 "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 : 12  
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  
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13  
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13  
cache size : 30720 KB

From /proc/meminfo  
MemTotal: 529311936 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d  
SUSE Linux Enterprise Server 12

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:  
Continued on next page
Hewlett-Packard Company
ProLiant DL560 Gen9  
(1.90 GHz, Intel Xeon E5-4640 v3)

SPECfp2006 = 88.0
SPECfp_base2006 = 82.9

CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
Tested by: Hewlett-Packard Company

Platform Notes (Continued)

Linux dl560gen9jks 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014  
(9879bd4) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 8 16:20

SPEC is set to: /home/cpu2006

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   331G  6.1G  325G   2% /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 P85 03/05/2015
Memory:
24x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1866 MHz
16x UNKNOWN NOT AVAILABLE
8x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1866 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:
24x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1866 MHz
8x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1866 MHz

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"
OMP_NUM_THREADS = "48"

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
Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

```
icc  -m64 ifort -m64
```

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 -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
```

Continued on next page
Spec CFP2006 Result

Hewlett-Packard Company

ProLiant DL560 Gen9
(1.90 GHz, Intel Xeon E5-4640 v3)

SPECfp2006 = 88.0
SPECfp_base2006 = 82.9

CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
Tested by: Hewlett-Packard Company

Test date: Jun-2015
Hardware Availability: Jun-2015
Software Availability: Oct-2014

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

   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: \(-xCORE-AVX2(pass 2) \-prof-gen(pass 1) \-ipo(pass 2)\)
   \(-03(pass 2) \-no-prec-div(pass 2) \-prof-use(pass 2)\)
   \(-unroll14 \-ansi-alias\)

Fortran benchmarks:
   410.bwaves: basepeak = yes

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

Continued on next page
Hewlett-Packard Company

ProLiant DL560 Gen9
(1.90 GHz, Intel Xeon E5-4640 v3)

**SPEC CFP2006 Result**

**SPECfp2006 = 88.0**

**SPECfp_base2006 = 82.9**

---

**Peak Optimization Flags (Continued)**

```plaintext
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:

```plaintext
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/Intel-ic15.0-official-linux64.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/Intel-ic15.0-official-linux64.xml)
- [http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml](http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml)

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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