Hewlett-Packard Company
ProLiant DL560 Gen9
(2.00 GHz, Intel Xeon E5-4620 v3)

<table>
<thead>
<tr>
<th>SPECfp®2006</th>
<th>SPECfp_base2006</th>
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**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

<table>
<thead>
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<tr>
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<td>481.wrf</td>
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</tr>
<tr>
<td>482.sphinx3</td>
<td>53.0</td>
</tr>
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</table>

**Hardware**
- **CPU Name:** Intel Xeon E5-4620 v3  
- **CPU Characteristics:** Intel Turbo Boost Technology up to 2.60 GHz  
- **CPU MHz:** 2000  
- **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:** 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
(2.00 GHz, Intel Xeon E5-4620 v3)

SPEC CFP2006 Result

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SPECfp2006 = 87.3
SPECfp_base2006 = 83.0

CPU2006 license: 3
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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 1866 MHz)
Disk Subsystem: 2 x 400GB SAS SSD, RAID 1
Other Hardware: None

Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

<table>
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<th>Seconds</th>
<th>Ratio</th>
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<td>51.6</td>
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</tbody>
</table>

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

Continued on next page
SPEC CFP2006 Result

Hewlett-Packard Company
ProLiant DL560 Gen9
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SPECfp2006 = 87.3
SPECfp_base2006 = 83.0

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

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 Wed Jun 10 18:37:27 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 E5-4620 v3 @ 2.00GHz
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
cautions.)
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 : 256500 KB

From /proc/meminfo
MemTotal: 529312800 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

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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 10 11:34 last=5

SPEC is set to: /home/cpu2006

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 331G 6.0G 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 = "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

Continued on next page
Hewlett-Packard Company

ProLiant DL560 Gen9
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### Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

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

### Base Portability Flags

<table>
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<th>Benchmark</th>
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<tr>
<td>481.wrf</td>
<td>-DSPEC_CPU_LP64  -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>-DSPEC_CPU_LP64</td>
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</tbody>
</table>

### 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:**

```bash
icc  -m64
```

Continued on next page
Hewlett-Packard Company

ProLiant DL560 Gen9
(2.00 GHz, Intel Xeon E5-4620 v3)

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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: 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)
    -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
# SPEC CFP2006 Result

## Hewlett-Packard Company

### ProLiant DL560 Gen9
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### Peak Optimization Flags (Continued)

- **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:

- **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 other inquiries, please contact webmaster@spec.org.

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