## SPEC® CFP2006 Result

### Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E7-8891 v4</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 3.50 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>2800</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>40 cores, 4 chips, 10 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>2.4 chip</td>
</tr>
<tr>
<td>Primary Cache</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache</td>
<td>256 KB I+D on chip per core</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 12 SP1 (x86_64)</td>
</tr>
<tr>
<td></td>
<td>Kernel 3.12.49-11-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux</td>
</tr>
<tr>
<td>Auto Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
</tbody>
</table>

### Test Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECfp®2006</th>
<th>SPECfp_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp®2006</td>
<td>137</td>
<td></td>
</tr>
<tr>
<td>SPECfp_base2006</td>
<td>131</td>
<td></td>
</tr>
</tbody>
</table>

### Test Details

- **CPU2006 license:** 3
- **Test date:** May-2016
- **Software Availability:** Dec-2015
- **Test sponsor:** HPE
- **Hardware Availability:** Jun-2016

- **Tested by:** HPE

- **CPU Name:** Intel Xeon E7-8891 v4
- **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
**SPEC CFP2006 Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL580 Gen9  
(2.80 GHz, Intel Xeon E7-8891 v4)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
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<td>1190</td>
<td>11.2</td>
<td>1210</td>
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<td>478</td>
<td>41.0</td>
<td>422</td>
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<tr>
<td>milc</td>
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<td>69.0</td>
<td>135</td>
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<td>69.5</td>
<td>133</td>
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<td>55.7</td>
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<td>GemsFDTD</td>
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<td>81.9</td>
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<td>237</td>
<td>82.3</td>
<td>234</td>
<td>83.2</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**:
- HP Power Profile set to Custom
- HP Power Regulator to HP Static High Performance Mode
- Minimum Processor Idle Power Core C-State set to C6 State
- Minimum Processor Idle Power Package C-State set to No Package State
- QPI Snoop Configuration set to Home Snoop
- Collaborative Power Control set to Disabled

Continued on next page
 SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL580 Gen9
(2.80 GHz, Intel Xeon E7-8891 v4)

SPECfp2006 = 137
SPECfp_base2006 = 131

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE

Platform Notes (Continued)

Thermal Configuration set to Maximum Cooling
Processor Power and Utilization Monitoring set to Disabled
Intel Hyperthreading set to Disabled

Sysinfo program /home/experiment/fp/new/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-vi0i Tue May 17 02:22:02 2016

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 v4 @ 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 5 9 10 11 13 18 24 26 28 29
   physical 1: cores 5 9 10 11 13 18 24 26 28 29
   physical 2: cores 5 9 10 11 13 18 24 26 28 29
   physical 3: cores 5 9 10 11 13 18 24 26 28 29
cache size : 61440 KB

From /proc/meminfo
MemTotal:       529321304 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
   SUSE Linux Enterprise Server 12 (x86_64)
   VERSION = 12
   PATCHLEVEL = 1
   # 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-SP1"
      VERSION_ID="12.1"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
   Linux linux-vi0i 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
   (8d714a0) x86_64 x86_64 x86_64 GNU/Linux
Continued on next page
## Platform Notes (Continued)

run-level 3 May 16 22:44

SPEC is set to: /home/experiment/fp/new/cpu2006

Filesystem   Type  Size  Used Avail Use% Mounted on
/dev/nvme0n1p4  xfs   703G   34G  669G   5% /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 U17 04/26/2016
Memory:
64x UNKNOWN NOT AVAILABLE
32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 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 one line reading as:
32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1600 MHz

## General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
OMP_NUM_THREADS = "40"
LD_LIBRARY_PATH = "/home/experiment/fp/new/cpu2006/11bs/32:/home/experiment/fp/new/cpu2006/11bs/64:/home/experiment/fp/new/cpu2006/sh"

Binaries compiled on a system with 1x Intel Xeon E5-2660 v4 CPU + 128GB memory using RedHat EL 7.2

## Base Compiler Invocation

C benchmarks:
```plaintext
icc  -m64
```

C++ benchmarks:
```plaintext
icpc  -m64
```

Fortran benchmarks:
```plaintext
ifort  -m64
```

Benchmarks using both Fortran and C:
```plaintext
icc  -m64  ifort  -m64
```
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL580 Gen9
(2.80 GHz, Intel Xeon E7-8891 v4)

SPECfp2006 = 137
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CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE

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
460.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 -static -parallel -opt-prefetch
-ansi-alias -qopt-prefetch-issue-excl-hint -auto-ilp32

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

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-fp-model fast=2
-qopt-prefetch-issue-excl-hint

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-ansi-alias -qopt-prefetch-issue-excl-hint -auto-ilp32
-fp-model fast=2

Peak Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Continued on next page
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL580 Gen9
(2.80 GHz, Intel Xeon E7-8891 v4)

SPECfp2006 = 137
SPECfp_base2006 = 131

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE
Test date: May-2016
Hardware Availability: Jun-2016
Software Availability: Dec-2015

Peak Compiler Invocation (Continued)

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: -xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel
                 -opt-prefetch -ansi-alias
                 -fp-model fast=2
                 -qopt-prefetch-issue-excl-hint -funroll-all-loops
                 -nofor-main

C++ benchmarks:

    444.namd: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
               -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
               -par-num-threads=1(pass 1) -prof-use(pass 2) -fno-alias
               -auto-ilp32
    447.dealII: basepeak = yes
    450.soplex: basepeak = yes
    453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
                 -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
                 -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4
                 -ansi-alias

Fortran benchmarks:

    410.bwaves: -xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel
                 -opt-prefetch
                 -fp-model fast=2
                 -qopt-prefetch-issue-excl-hint -funroll-all-loops

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Hewlett Packard Enterprise
(Test Sponsor: HPE)
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CPU2006 license: 3
Test date: May-2016
Test sponsor: HPE
Hardware Availability: Jun-2016
Tested by: HPE
Software Availability: Dec-2015

Peak Optimization Flags (Continued)

416.gamess: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
    -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
    -par-num-threads=1(pass 1) -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:threadsafe(pass 1)
    -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
    -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
    -inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
    -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
    -par-num-threads=1(pass 1) -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/HP-Compiler-Flags-Intel-V1.2-HSW-revF.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/HP-Compiler-Flags-Intel-V1.2-HSW-revF.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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