**SPEC® CFP2006 Result**

Hewlett Packard Enterprise  
(Test Sponsor: HPE)
Synergy 620 Gen9  
(2.40 GHz, Intel Xeon E7-8894 v4)

### SPECfp2006 = 117  
### SPECfp_base2006 = 112

<table>
<thead>
<tr>
<th>Test date:</th>
<th>Feb-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Mar-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Nov-2016</td>
</tr>
</tbody>
</table>

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

**Hardware**
- **CPU Name:** Intel Xeon E7-8894 v4
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.40 GHz
- **CPU MHz:** 2400
- **FPU:** Integrated
- **CPU(s) enabled:** 48 cores, 2 chips, 24 cores/chip
- **CPU(s) orderable:** 1.2 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) SP2, Kernel 4.4.21-69-default
- **Compiler:** C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux
- **Auto Parallel:** Yes
- **File System:** xfs
- **System State:** Run level 3 (multi-user)

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<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Result</th>
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<tbody>
<tr>
<td>410.bwaves</td>
<td>627</td>
</tr>
<tr>
<td>416.gamess</td>
<td>45.0</td>
</tr>
<tr>
<td>433.milc</td>
<td>67.7</td>
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<tr>
<td>434.zeusmp</td>
<td>187</td>
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<tr>
<td>435.gromacs</td>
<td>47.0</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>562</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>350</td>
</tr>
<tr>
<td>444.namd</td>
<td>30.6</td>
</tr>
<tr>
<td>447.dealII</td>
<td>45.6</td>
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<tr>
<td>450.soplex</td>
<td>68.7</td>
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<tr>
<td>453.povray</td>
<td>59.9</td>
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<tr>
<td>454.calculix</td>
<td>57.7</td>
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<tr>
<td>459.GemsFDTD</td>
<td>250</td>
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<tr>
<td>465.tonto</td>
<td>57.2</td>
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<tr>
<td>470.lbm</td>
<td>43.7</td>
</tr>
<tr>
<td>481.wrf</td>
<td>119</td>
</tr>
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L3 Cache: 60 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (32 x 16 GB 2Rx4 PC4-2400T-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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds Base</th>
<th>Seconds Ratio</th>
<th>Seconds Peak</th>
<th>Seconds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>21.1</td>
<td>645</td>
<td>21.7</td>
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<td>416.gamess</td>
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<td>40.7</td>
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<td>444.namd</td>
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<td>29.9</td>
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<td>29.9</td>
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<tr>
<td>447.dealII</td>
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<td>62.4</td>
<td>184</td>
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<td>450.soplex</td>
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<td>54.1</td>
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<td>53.7</td>
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<td>465.tonto</td>
<td>243</td>
<td>40.5</td>
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<td>13.7</td>
<td>1000</td>
<td>14.0</td>
<td>978</td>
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<td>93.8</td>
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<td>114</td>
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<td>267</td>
<td>72.9</td>
<td>269</td>
<td>72.6</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 by default.

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
Thermal Configuration set to Maximum Cooling

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Platform Notes (Continued)

Processor Power and Utilization Monitoring set to Disabled
Intel Hyper Threading set to Disabled
Memory Refresh Rate set to 1x Refresh

Sysinfo program /home/cpu2006_copy/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on synergy620_manju Thu Feb 16 17:41:37 2017

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 E7-8894 v4 @ 2.40GHz
  2 "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 : 24
siblings : 24
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
          27 28 29
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
          27 28 29
cache size : 61440 KB

From /proc/meminfo
MemTotal: 528268940 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 2
    # 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-SP2"
        VERSION_ID="12.2"
        PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
        ID="sles"
        ANSI_COLOR="0;32"
        CPE_NAME="cpe:/o:suse:sles:12:sp2"

        uname -a:
        (9464f67) x86_64 x86_64 x86_64 GNU/Linux

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Platform Notes (Continued)

run-level 3 Feb 16 17:36

SPEC is set to: /home/cpu2006_copy
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 331G 41G 290G 13% /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 I40 12/08/2016
Memory:
16x 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"
LD_LIBRARY_PATH = "/home/cpu2006_copy/libs/32:/home/cpu2006_copy/libs/64:/home/cpu2006_copy/sh10.2"
OMP_NUM_THREADS = "48"

Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.2

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

Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
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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
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 -static -parallel -qopt-prefetch
-ansi-alias -fp-model fast=2

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -static -qopt-prefetch
-ansi-alias -fp-model fast=2

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

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

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:

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

Fortran benchmarks:

- 410.bwaves: basepeak = yes
- 416.gamess: -prof-gen=threadsafe(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2) -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -unroll2 -inline-level=0 -scalar-rep-
- 434.zeusmp: basepeak = yes
- 437.leslie3d: basepeak = yes
- 459.GemsFDTD: -prof-gen=threadsafe(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2) -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -unroll2 -inline-level=0

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Peak Optimization Flags (Continued)

459.GemsFDTD (continued):
-qopt-prefetch -parallel

465.tonto: -prof-gen=threadsafe(pass 1) -prof-use(pass 2)
-xCORE-AVX2(pass 2) -par-num-threads=1(pass 1) -ipo(pass 2)
-03(pass 2) -no-prec-div(pass 2) -inline-calloc
-qopt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
454.calculix: -xCORE-AVX2 -ipo -03 -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-Platform-Flags-Intel-V1.2-HSW-revE.html
http://www.spec.org/cpu2006/flags/HPE-Compiler-Flags-Intel-V1.2-HSW-revH.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml
http://www.spec.org/cpu2006/flags/HPE-Compiler-Flags-Intel-V1.2-HSW-revH.xml

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

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