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

SPECint®2006 = 73.2
SPECint_base2006 = 68.9

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
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

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
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.2
SPEC CINT2006 Result

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Test sponsor:
HPE
Hardware Availability: Mar-2017
Software Availability: Nov-2016

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds Base</th>
<th>Ratio Base</th>
<th>Seconds Peak</th>
<th>Ratio Peak</th>
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<tbody>
<tr>
<td>400.perlbench</td>
<td>253</td>
<td>38.6</td>
<td>255</td>
<td>38.3</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>398</td>
<td>24.2</td>
<td>399</td>
<td>24.2</td>
</tr>
<tr>
<td>403.mcf</td>
<td>219</td>
<td>36.8</td>
<td>219</td>
<td>36.7</td>
</tr>
<tr>
<td>429.mcf</td>
<td>144</td>
<td>63.4</td>
<td>145</td>
<td>63.0</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>361</td>
<td>29.1</td>
<td>361</td>
<td>29.1</td>
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<tr>
<td>456.hmmer</td>
<td>113</td>
<td>82.8</td>
<td>113</td>
<td>82.5</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>369</td>
<td>32.8</td>
<td>372</td>
<td>32.6</td>
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<tr>
<td>462.libquantum</td>
<td>2.10</td>
<td>9850</td>
<td>2.11</td>
<td>9830</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>393</td>
<td>56.3</td>
<td>392</td>
<td>56.5</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>129</td>
<td>48.3</td>
<td>125</td>
<td>49.9</td>
</tr>
<tr>
<td>473.astar</td>
<td>204</td>
<td>34.3</td>
<td>205</td>
<td>34.3</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>94.2</td>
<td>73.2</td>
<td>94.5</td>
<td>73.1</td>
</tr>
</tbody>
</table>

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

Submit Notes

The config file option 'submit' was used.

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
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 23:07:27 2017

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:
Continued on next page
Platform Notes (Continued)

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:

Linux synergy620_manju 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3

Feb 16 17:36

SPEC is set to: /home/cpu2006_copy

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 Continued on next page
**SPEC CINT2006 Result**

**Hewlett Packard Enterprise**

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### Platform Notes (Continued)

"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`

---

### Base Portability Flags

- `400.perlbench`: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64`
- `401.bzip2`: `-DSPEC_CPU_LP64`
- `403.gcc`: `-DSPEC_CPU_LP64`
- `429.mcf`: `-DSPEC_CPU_LP64`
- `445.gobmk`: `-DSPEC_CPU_LP64`
- `456.hmmer`: `-DSPEC_CPU_LP64`
- `458.sjeng`: `-DSPEC_CPU_LP64`
- `462.libquantum`: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX`
- `464.h264ref`: `-DSPEC_CPU_LP64`
- `471.omnetpp`: `-DSPEC_CPU_LP64`
- `473.astar`: `-DSPEC_CPU_LP64`
- `483.xalancbmk`: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX`
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</tbody>
</table>

**Base Optimization Flags**

C benchmarks:
- `-xCORE-AVX2` `-ipo` `-O3` `-no-prec-div` `-static` `-parallel` `-qopt-prefetch`
- `auto-ilp32` `-complex-limited-range` `-qopt-prefetch-issue-excl-hint`
- `-ansi-alias`

C++ benchmarks:
- `-xCORE-AVX2` `-ipo` `-O3` `-no-prec-div` `-qopt-prefetch` `-auto-p32`
- `-Wl,-z,muldefs` `-L/home/cpu2006_copy/sh10.2` `-lsmartheap64`

**Base Other Flags**

C benchmarks:
- `403.gcc` `-Dalloca=_alloca`

**Peak Compiler Invocation**

C benchmarks (except as noted below):
- `icc -m64`

- `400.perlbench: icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`
- `403.gcc: icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`
- `429.mcf: icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

C++ benchmarks (except as noted below):
- `icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

- `473.astar: icpc -m64`

**Peak Portability Flags**

- `400.perlbench: -D_FILE_OFFSET_BITS=64` `-DSPEC_CPU_LINUX_IA32`
- `401.bzip2: -DSPEC_CPU_LP64`
- `403.gcc: -D_FILE_OFFSET_BITS=64`
- `429.mcf: -D_FILE_OFFSET_BITS=64`
- `445.gobmk: -DSPEC_CPU_LP64`
- `456.hmmer: -DSPEC_CPU_LP64`
- `458.sjeng: -DSPEC_CPU_LP64`
- `462.libquantum: -DSPEC_CPU_LP64` `-DSPEC_CPU_LINUX`
- `464.h264ref: -DSPEC_CPU_LP64`
- `471.omnetpp: -D_FILE_OFFSET_BITS=64`

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Peak Portability Flags (Continued)
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:
400.perlbench: -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) -qopt-prefetch
-ansi-alias
401.hzip2: -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 -auto-ilp32 -qopt-prefetch
-ansi-alias
403.gcc: -xCORE-AVX2 -ipo -03 -no-prec-div -inline-cALLOC
-qopt-malloc-options=3 -auto-ilp32 -static
429.mcf: -xCORE-AVX2 -ipo -03 -no-prec-div -parallel
-qopt-prefetch -auto-p32 -complex-limited-range -static
445.gobmk: basepeak = yes
456.hmmer: -xCORE-AVX2 -ipo -03 -no-prec-div -parallel
-qopt-prefetch -funroll-all-loops
458.sjeng: -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) -unroll4
462.libquantum: basepeak = yes
464.h264ref: basepeak = yes

C++ benchmarks:
471.omnetpp: -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)
-qopt-ra-region-strategy=block -ansi-alias
-Wl,-z,muldefs -L/home/cpu2006_copy/sh10.2 -lsmartheap
473.astar: basepeak = yes
483.xalancbmk: -xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch
-ansi-alias -Wl,-z,muldefs
-L/home/cpu2006_copy/sh10.2 -lsmartheap
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Peak Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca

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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