Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

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

CPU Name: Intel Xeon E5-2699 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz: 2200
FPU: Integrated
CPU(s) enabled: 44 cores, 2 chips, 22 cores/chip
CPU(s) orderable: 1, 2 chips
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per core
L3 Cache: 55 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 1 x 800 GB SAS SSD, RAID 0
Other Hardware: None

Operating System: SUSE Linux Enterprise Server 12 (x86_64) SP1
Kernel 3.12.49-11-default
Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE 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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SPECint_base2006 = 72.9

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Test date: Aug-2016
Hardware Availability: Apr-2016
Software Availability: Dec-2015

Results Table

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<th>Ratio</th>
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<td>79.0</td>
<td>79.4</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"

Platform Notes

BIOS Configuration:
- Intel Hyperthreading Option set to Disabled
- Power Profile set to Custom
- Power Regulator set to Static High Performance Mode
- Minimum Processor Idle Power Core C-State set to C1E State
- Minimum Processor Idle Power Package C-State set to C6 (retention) state
- Collaborative Power Control set to Disabled
- QPI Snoop Configuration set to Home Snoop
- Thermal Configuration set to Maximum Cooling
- Processor Power and Utilization Monitoring set to Disabled
- Memory Double Refresh Rate set to 1x Refresh
- Energy Performance Bias set to Balanced Performance

Sysinfo program
/home/specuser/cpu2006/HP_build_ic16_suite_latest_smartheap_linked/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 $$ e3fbb8667b5a285932ceab81e28219e1
running on linux-szds Fri Aug 19 21:03:22 2016

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
Hewlett Packard Enterprise  
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Platform Notes (Continued)

http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
- model name: Intel(R) Xeon(R) CPU E5-2699 v4 @ 2.20GHz
- 2 "physical id"s (chips)
- 44 "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: 22
- siblings: 22
- physical 0: cores 0 2 3 4 8 10 11 12 16 17 18 19 20 21 24 25 26 27 28
- physical 1: cores 0 2 3 4 8 10 11 12 16 17 18 19 20 21 24 25 26 27 28
- cache size: 56320 KB

From /proc/meminfo
- MemTotal: 264326744 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
- SUSE Linux Enterprise Server 12 SP1

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:
  (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Aug 19 21:02

SPEC is set to:
- /home/specuser/cpu2006/HP_build_ic16_suite_latest_smartheap_linked/cpu2006

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4     xfs  703G  115G  588G  17% /home

Additional information from dmidecode:
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Platform Notes (Continued)

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 P92 04/12/2016
Memory:
8x UNKNOWN NOT AVAILABLE
16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz

(End of data from sysinfo program)
Regarding the sysinfo display about the memory installed, the correct amount of
memory is 256 GB and the dmidecode description should have one line reading as:
16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
OMP_NUM_THREADS = "44"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
memory using RedHat EL 7.1

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

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Base Portability Flags (Continued)

483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -static -parallel -opt-prefetch
-auto-llp32 -complex-limited-range -qo-opt-prefetch-issue-excl-hint
-ansi-alias

C++ benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -opt-prefetch -Wl,-z,muldefs
-L/home/experiment/last_test/cpu2006/sh -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_2016/linux/lib/ia32_lin
403.gcc: icc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/lib/ia32_lin
429.mcf: icc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/lib/ia32_lin

C++ benchmarks (except as noted below):
icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
473.astar: icpc -m64

Peak Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -D_FILE_OFFSET_BITS=64
429.mcf: -D_FILE_OFFSET_BITS=64

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SPEC CINT2006 Result

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Peak Portability Flags (Continued)

445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.hmmer: -DSPEC_CPU_LP64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

400.perlbench: -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) -opt-prefetch
                 -ansi-alias

401.bzip2: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
           -ipo(pass 2) -O3(pass 2) -no-prec-div
           -par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32
           -opt-prefetch -ansi-alias

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc
         -opt-malloc-options=3 -auto-ilp32 -static

429.mcf: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel
        -opt-prefetch -auto-p32 -complex-limited-range -static

445.gobmk: basepeak = yes

456.hmmer: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel
           -opt-prefetch -funroll-all-loops

458.sjeng: -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) -unroll14

462.libquantum: -xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel
               -opt-prefetch -inline-cALLOC -opt-malloc-options=3
               -auto-p32

464.hmmer: basepeak = yes

C++ benchmarks:

471.omnetpp: -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)

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SPEC CINT2006 Result

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Peak Optimization Flags (Continued)

471.omnetpp (continued):
    -opt-ra-region-strategy=block
    -ansi-alias
    -Wl,-z,muldefs
    -L/home/experiment/last_test/cpu2006/sh -lsmartheap

473.astar: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
    -auto-p32 -Wl,-z,muldefs
    -L/home/experiment/last_test/cpu2006/sh -lsmartheap64

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
    -ansi-alias -Wl,-z,muldefs
    -L/home/experiment/last_test/cpu2006/sh -lsmartheap

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-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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