The document contains a SPECfp2006 result for Hewlett Packard Enterprise on a ProLiant XL420 Gen9 server. The CPU used is an Intel Xeon E5-2698 v4 with 2.20 GHz and Intel Turbo Boost Technology up to 3.60 GHz. The operating system is Red Hat Enterprise Linux Server release 7.2 (Maipo) with Kernel 3.10.0-327.el7.x86_64. The compiler is Intel C++ Studio XE for Linux, version 16.0.0.101 of Intel C++. For Fortran, it uses Intel Fortran Studio XE for Linux, version 16.0.0.101. The test was conducted in April 2016, and the results show a SPECfp2006 score of 125 and a SPECfp_base2006 score of 118. The software is available on November 2015.
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant XL420 Gen9
(2.20 GHz, Intel Xeon E5-2698 v4)

SPEC CFP2006 Result
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SPECfp2006 = 125
SPECfp_base2006 = 118

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<th>CPU2006 license:</th>
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<td>Mar-2016</td>
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L3 Cache: 50 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (8 x 32 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 2 x 400 GB SAS SSD, RAID 1
Other Hardware: None

System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

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</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:
Intel Hyperthreading set to Disabled
Power Profile set to Maximum Performance
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
Memory Refresh Rate set to 1x Refresh

Continued on next page
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant XL420 Gen9
(2.20 GHz, Intel Xeon E5-2698 v4)

SPECfp2006 = 125
SPECfp_base2006 = 118

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

Test sponsor: HPE
Hardware Availability: Mar-2016
Software Availability: Nov-2015

Platform Notes (Continued)

Sysinfo program /home/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219el

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 E5-2698 v4 @ 2.20GHz
2 "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 : 20
siblings : 20
physical 0: cores 0 2 3 4 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 1: cores 0 2 3 4 9 10 11 12 16 17 18 19 20 24 25 26 27 28
cache size : 51200 KB

From /proc/meminfo
MemTotal: 263890020 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.2 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.2"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)

uname -a:
Linux Pilot-XL420-G9 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT
2015 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Apr 6 13:21

SPEC is set to: /home/cpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 ext4 361G 21G 322G 7% /
Additional information from dmidecode:

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SPEC CFP2006 Result

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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 U19 03/23/2016
Memory:
8x UNKNOWN NOT AVAILABLE
8x UNKNOWN NOT AVAILABLE 32 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:
8x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 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"

Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"

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

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant XL420 Gen9
(2.20 GHz, Intel Xeon E5-2698 v4)

| SPECfp2006 = | 125 |
| SPECfp_base2006 = | 118 |

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

Test date: Apr-2016
Hardware Availability: Mar-2016
Software Availability: Nov-2015

Base Portability Flags (Continued)

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 -opt-prefetch
-ansi-alias -qopt-prefetch-issue-excl-hint

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

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
-fp-model fast=2

Peak Compiler Invocation

C benchmarks:
icc  -m64

C++ benchmarks:
icpc  -m64

Fortran benchmarks:
ifort -m64

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

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant XL420 Gen9  
(2.20 GHz, Intel Xeon E5-2698 v4)  

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SPECfp_base2006 = 118

CPU2006 license: 3  
Test date: Apr-2016

Test sponsor: HPE  
Hardware Availability: Mar-2016

Tested by: HPE  
Software Availability: Nov-2015

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**Peak Portability Flags**

Same as Base Portability Flags

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**Peak Optimization Flags**

C benchmarks:

- 433.milc: basepeak = yes
- 470.lbm: basepeak = yes
- 482.sphinx3: basepeak = yes

C++ benchmarks:

- 444.namd: -xCORE-AVX2(pas 2) -prof-gen:threadsafe(pas 1)  
  -ipo(pas 2) -O3(pas 2) -no-prec-div(pas 2)  
  -par-num-threads=1(pas 1) -prof-use(pas 2) -fno-alias  
  -auto-ilp32
- 447.dealII: basepeak = yes
- 450.soplex: basepeak = yes
- 453.povray: -xCORE-AVX2(pas 2) -prof-gen:threadsafe(pas 1)  
  -ipo(pas 2) -O3(pas 2) -no-prec-div(pas 2)  
  -par-num-threads=1(pas 1) -prof-use(pas 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
- 416.gamess: -xCORE-AVX2(pas 2) -prof-gen:threadsafe(pas 1)  
  -ipo(pas 2) -O3(pas 2) -no-prec-div(pas 2)  
  -par-num-threads=1(pas 1) -prof-use(pas 2) -unroll2  
  -inline-level=0 -ansi-alias
- 434.zeusmp: basepeak = yes
- 437.leslie3d: basepeak = yes
- 459.GemsFDTD: -xCORE-AVX2(pas 2) -prof-gen:threadsafe(pas 1)  
  -ipo(pas 2) -O3(pas 2) -no-prec-div(pas 2)  
  -par-num-threads=1(pas 1) -prof-use(pas 2) -unroll2  
  -inline-level=0 -opt-prefetch -parallel

Continued on next page
Peak Optimization Flags (Continued)

465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafepass 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-Platform-Flags-Intel-V1.2-HSW-revE.html
http://www.spec.org/cpu2006/flags/HP-Compiler-Flags-Intel-V1.2-BDW-revE.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/HP-Compiler-Flags-Intel-V1.2-BDW-revE.xml

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

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