SPEC® CINT2006 Result
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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL380 Gen9
(2.60 GHz, Intel Xeon E5-2623 v4)

$SPECint®2006 = $ 54.5
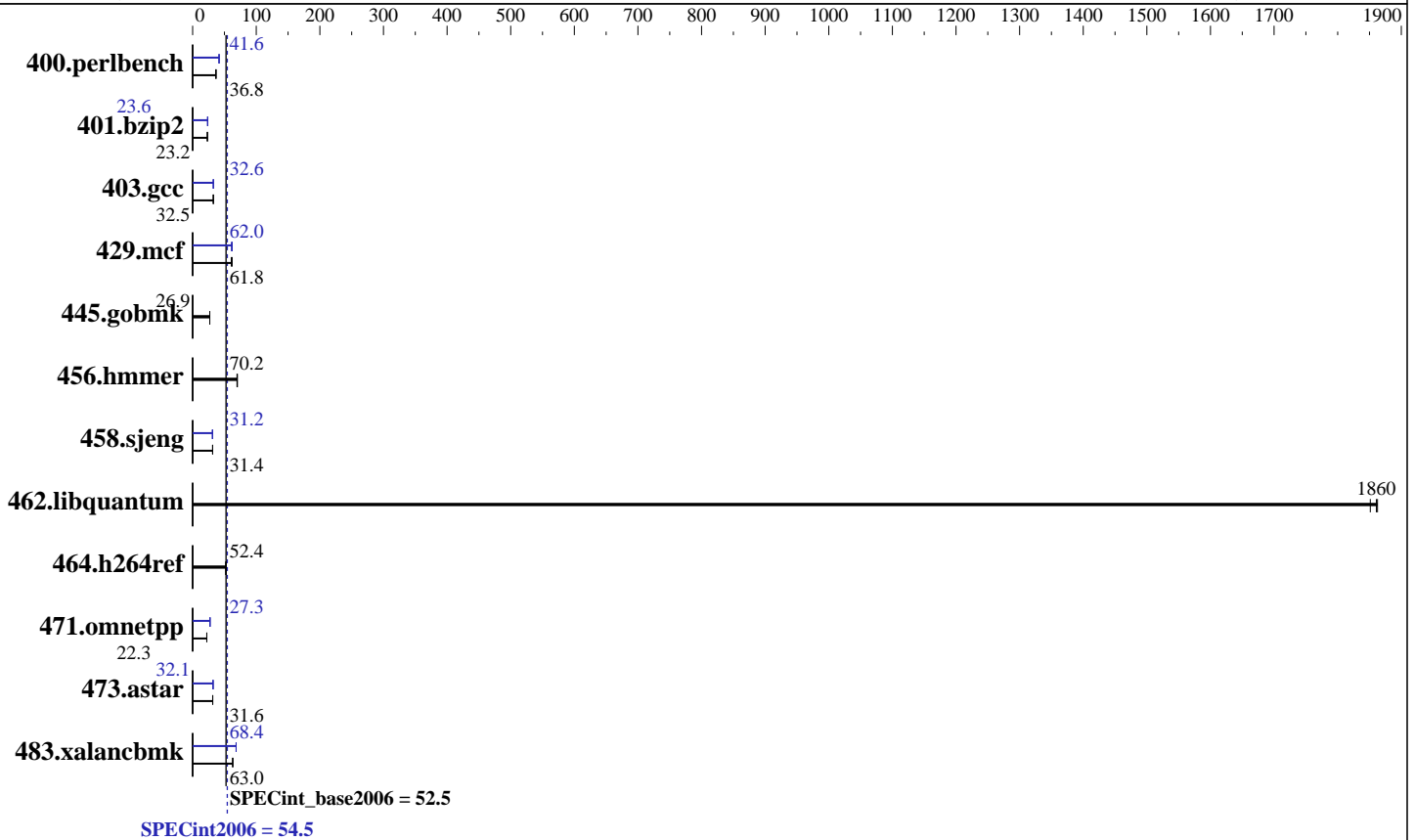
$SPECint_base2006 = $ 52.5

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Benchmark	Value
400.perlbench	41.6 / 36.8
401.bzip2	23.6 / 23.2
403.gcc	32.6 / 32.5
429.mcf	62.0 / 61.8
445.gobmk	26.9
456.hmmer	70.2
458.sjeng	31.2 / 31.4
462.libquantum	1860
464.h264ref	52.4
471.omnetpp	27.3 / 22.3
473.astar	32.1 / 31.6
483.xalancbmk	68.4 / 63.0

SPECint_base2006 = 52.5

SPECint2006 = 54.5

Hardware

CPU Name:	Intel Xeon E5-2623 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.20 GHz
CPU MHz:	2600
FPU:	Integrated
CPU(s) enabled:	8 cores, 2 chips, 4 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:	10 MB I+D on chip per chip
Other Cache:	None
Memory:	512 GB (16 x 32 GB 2Rx4 PC4-2400T-R, running at 2133 MHz)
Disk Subsystem:	1 x 400 GB SAS SSD, RAID 0
Other Hardware:	None

Software

Operating System:	Red Hat Enterprise Linux Server release 7.2, (Maipo) Kernel 3.10.0-327.el7.x86_64
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-bit
Peak Pointers:	32/64-bit
Other Software:	Microquill SmartHeap V10.2

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Results Table

Benchmark	Base						Peak					
	Seconds	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
400.perlbench	270	36.1	265	36.9	**266**	**36.8**	**235**	**41.6**	236	41.5	235	41.6
401.bzip2	418	23.1	**416**	**23.2**	415	23.2	408	23.6	**409**	**23.6**	410	23.5
403.gcc	248	32.5	**248**	**32.5**	247	32.6	247	32.6	**247**	**32.6**	247	32.5
429.mcf	**148**	**61.8**	150	60.7	147	61.9	150	61.0	**147**	**62.0**	147	62.1
445.gobmk	389	26.9	**390**	**26.9**	390	26.9	389	26.9	**390**	**26.9**	390	26.9
456.hmmer	133	70.2	**133**	**70.2**	134	69.7	133	70.2	**133**	**70.2**	134	69.7
458.sjeng	385	31.4	**385**	**31.4**	384	31.5	388	31.2	**388**	**31.2**	388	31.2
462.libquantum	**11.1**	**1860**	11.2	1850	11.1	1860	**11.1**	**1860**	11.2	1850	11.1	1860
464.h264ref	**423**	**52.4**	422	52.4	423	52.3	**423**	**52.4**	422	52.4	423	52.3
471.omnetpp	**280**	**22.3**	281	22.2	280	22.3	**229**	**27.3**	229	27.3	228	27.4
473.astar	222	31.6	**222**	**31.6**	223	31.5	220	32.0	**218**	**32.1**	218	32.2
483.xalancbmk	109	63.1	**109**	**63.0**	110	62.9	**101**	**68.4**	101	68.3	101	68.4

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 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 C1E 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
  Memory Refresh Rate set to 1x Refresh
  Intel Hyperthreading set to Disabled

Sysinfo program /home/intel_binary/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on DL380Gen9allbin Mon Mar 28 22:13:19 2016

This section contains SUT (System Under Test) info as seen by

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Platform Notes (Continued)

```
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 E5-2623 v4@ 2.60GHz
      2 "physical id"s (chips)
      8 "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 : 4
      siblings  : 4
      physical 0: cores 0 1 2 3
      physical 1: cores 0 1 2 3
   cache size : 10240 KB

From /proc/meminfo
   MemTotal:       528069676 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)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.2:ga:server

uname -a:
   Linux DL380Gen9allbin 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 Mar 28 21:35

SPEC is set to: /home/intel_binary/cpu2006
   Filesystem     Type   Size  Used Avail Use% Mounted on
   /dev/sda5      xfs    318G   78G  241G  25% /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 P89 03/10/2016
```

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Platform Notes (Continued)

```
    Memory:
     8x UNKNOWN NOT AVAILABLE
     16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz, configured at 2133 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:
   16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz, configured at 2133 MHz
```

General Notes

```
  Environment variables set by runspec before the start of the run:
  KMP_AFFINITY = "granularity=fine,scatter"
  LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"
  OMP_NUM_THREADS = "8"

   Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
   memory using RedHat EL 7.1
   Transparent Huge Pages enabled with:
   echo always > /sys/kernel/mm/transparent_hugepage/enabled
```

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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Base Optimization Flags

C benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32
```

C++ benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -Wl,-z,muldefs
-L/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/compiler/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_LINUX_IA32`
> 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: `-D_FILE_OFFSET_BITS=64`
> 473.astar: `-DSPEC_CPU_LP64`
> 483.xalancbmk: `-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX`

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Peak Optimization Flags

C benchmarks:

```
400.perlbench: -xAVX(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: -xAVX(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: -xAVX -ipo -O3 -no-prec-div -inline-calloc
               -opt-malloc-options=3 -auto-ilp32

      429.mcf: -xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch
               -auto-p32
```

445.gobmk: basepeak = yes

456.hmmer: basepeak = yes

```
    458.sjeng: -xAVX(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
```

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

```
  471.omnetpp: -xAVX(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-ra-region-strategy=block
               -ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap

    473.astar: -xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
               -Wl,-z,muldefs -L/sh -lsmartheap64

483.xalancbmk: -xAVX -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias
               -Wl,-z,muldefs -L/sh -lsmartheap
```

Peak Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca

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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/Intel-ic16.0-official-linux64.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/Intel-ic16.0-official-linux64.xml

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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