SPEC® CINT2006 Result
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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL380 Gen9
(2.10 GHz, Intel Xeon E5-2695 v4)

$SPECint®2006 =$ 67.7
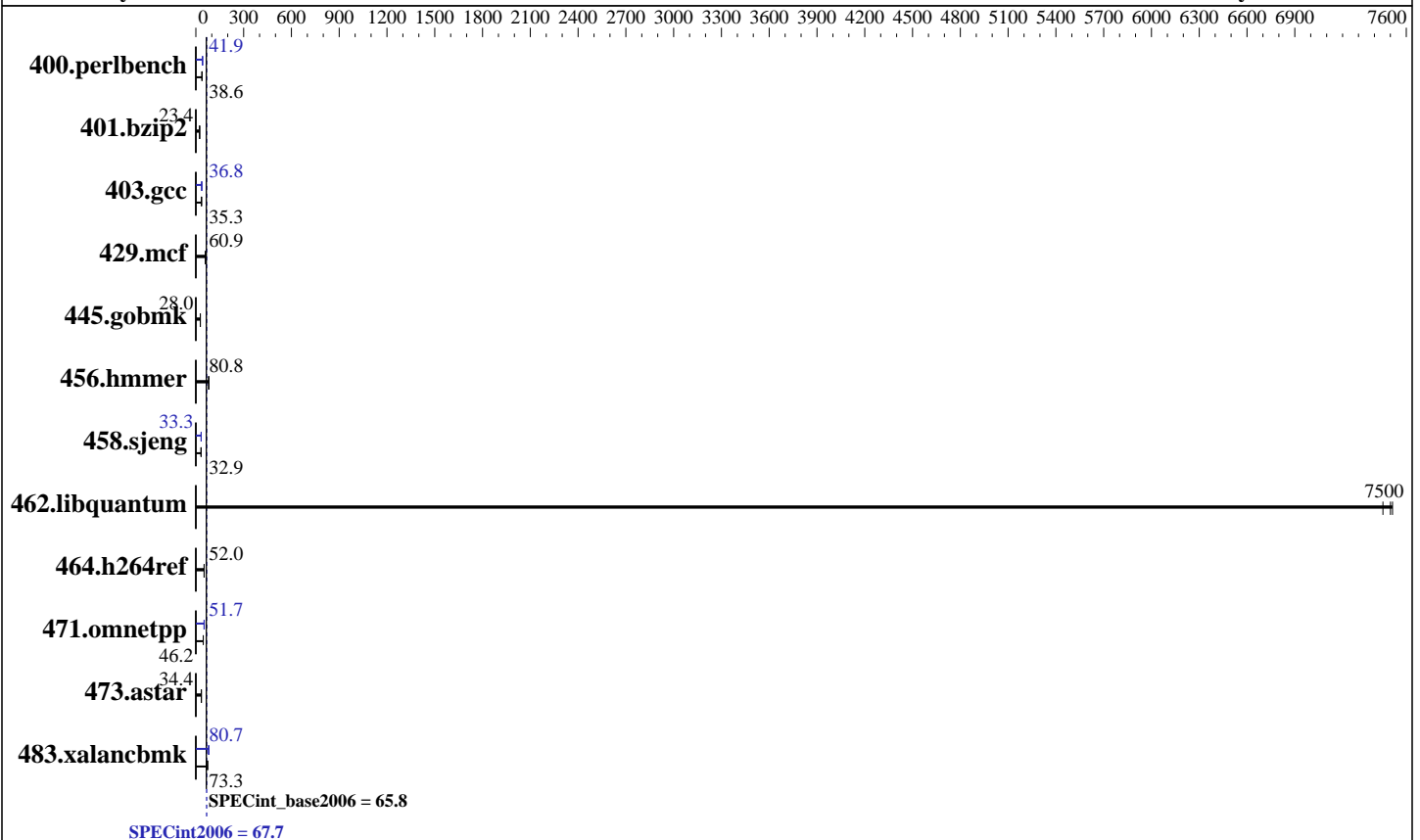
$SPECint\_base2006 =$ 65.8

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

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

400.perlbench 41.9 / 38.6
401.bzip2 23.4
403.gcc 36.8 / 35.3
429.mcf 60.9
445.gobmk 28.0
456.hmmer 80.8
458.sjeng 33.3 / 32.9
462.libquantum 7500
464.h264ref 52.0
471.omnetpp 51.7 / 46.2
473.astar 34.4
483.xalancbmk 80.7 / 73.3

SPECint_base2006 = 65.8

SPECint2006 = 67.7

Hardware

CPU Name:	Intel Xeon E5-2695 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz:	2100
FPU:	Integrated
CPU(s) enabled:	36 cores, 2 chips, 18 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:	45 MB I+D on chip per chip
Other Cache:	None
Memory:	512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)
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	253	38.6	254	38.5	**253**	**38.6**	233	41.9	**233**	**41.9**	233	41.9
401.bzip2	411	23.5	**413**	**23.4**	413	23.4	411	23.5	**413**	**23.4**	413	23.4
403.gcc	228	35.3	**228**	**35.3**	228	35.3	219	36.8	**219**	**36.8**	219	36.8
429.mcf	149	61.3	**150**	**60.9**	151	60.3	149	61.3	**150**	**60.9**	151	60.3
445.gobmk	375	28.0	375	27.9	**375**	**28.0**	375	28.0	375	27.9	**375**	**28.0**
456.hmmer	**115**	**80.8**	115	80.9	116	80.7	**115**	**80.8**	115	80.9	116	80.7
458.sjeng	368	32.9	368	32.9	**368**	**32.9**	363	33.3	**363**	**33.3**	363	33.3
462.libquantum	2.76	7510	**2.76**	**7500**	2.78	7450	2.76	7510	**2.76**	**7500**	2.78	7450
464.h264ref	425	52.0	**426**	**52.0**	426	51.9	425	52.0	**426**	**52.0**	426	51.9
471.omnetpp	**135**	**46.2**	134	46.6	135	46.2	121	51.7	**121**	**51.7**	119	52.7
473.astar	203	34.5	204	34.4	**204**	**34.4**	203	34.5	204	34.4	**204**	**34.4**
483.xalancbmk	**94.1**	**73.3**	94.5	73.0	93.9	73.5	85.4	80.8	86.0	80.2	**85.5**	**80.7**

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 DL380Gen9-Biswa Wed Apr 13 17:09:19 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 E5-2695 v4 @ 2.10GHz
     2 "physical id"s (chips)
     36 "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 : 18
     siblings  : 18
     physical 0: cores 0 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
     physical 1: cores 0 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  cache size : 46080 KB

From /proc/meminfo
  MemTotal:       528066204 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 DL380Gen9-Biswa 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 13 17:00

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 03/30/2016
```

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Platform Notes (Continued)

```
    Memory:
      8x UNKNOWN NOT AVAILABLE
     16x 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 512 GB and the dmidecode description should have one line reading as:
  16x 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,scatter"
LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"
OMP_NUM_THREADS = "36"


  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
   483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
```

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Base Optimization Flags

C benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32
```

C++ benchmarks:
```
-xCORE-AVX2 -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: -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: basepeak = yes
```

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

```
     429.mcf: basepeak = yes
```

```
   445.gobmk: basepeak = yes
```

```
   456.hmmer: basepeak = yes
```

```
   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) -unroll4
```

```
462.libquantum: basepeak = yes
```

```
  464.h264ref: 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)
              -opt-ra-region-strategy=block            -ansi-alias
              -Wl,-z,muldefs -L/sh -lsmartheap
```

```
   473.astar: basepeak = yes
```

```
483.xalancbmk: -xCORE-AVX2 -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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