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

ProLiant DL20 Gen9
(3.90 GHz, Intel Xeon E3-1280 v6)

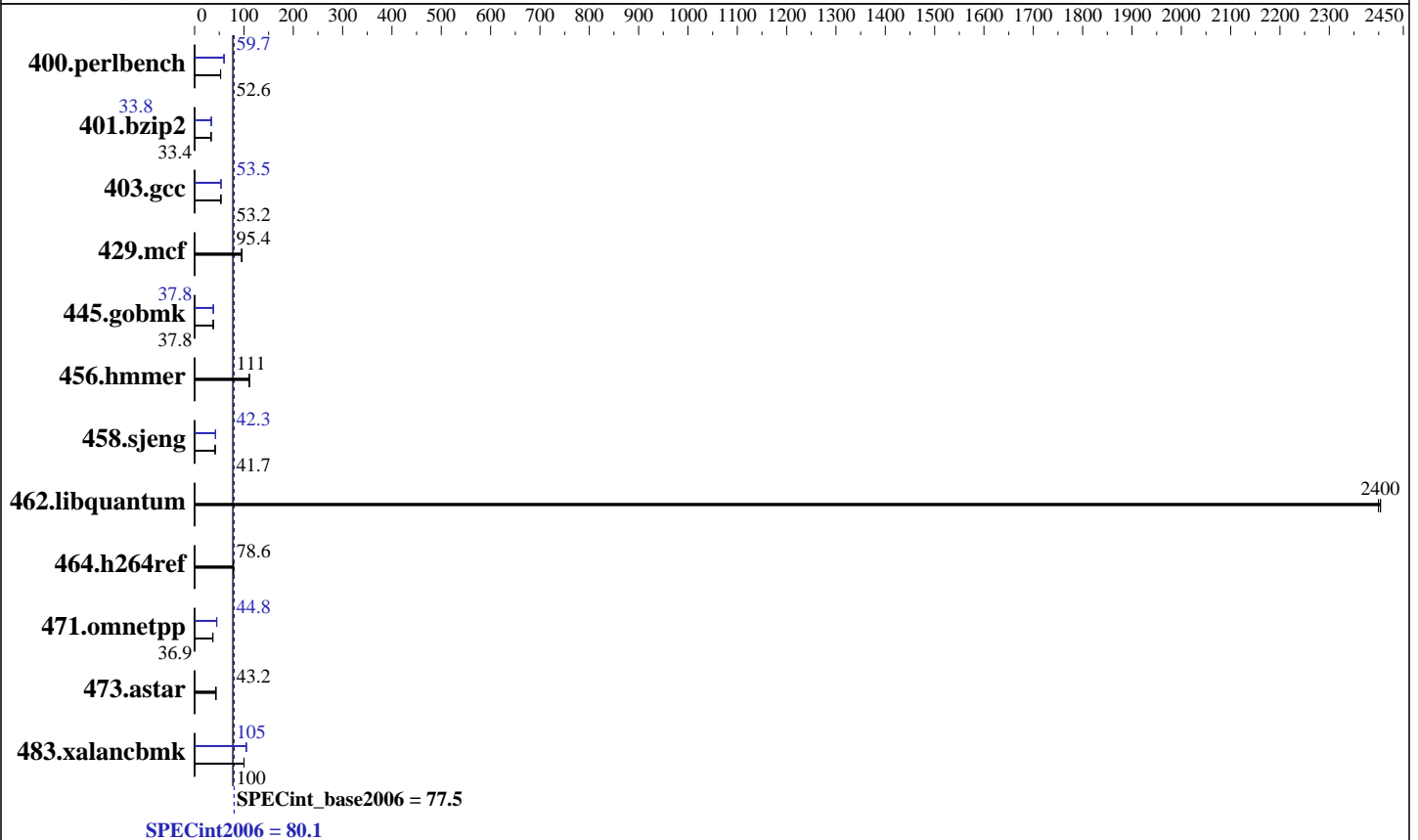$SPECint^{®}2006 =$ 80.1

$SPECint\_base2006 =$ 77.5

CPU2006 license: 3	**Test date:** Mar-2017
Test sponsor: HPE	**Hardware Availability:** May-2017
Tested by: HPE	**Software Availability:** Nov-2016

Benchmark results (scale 0 to 2450):

- **400.perlbench** — 59.7 / 52.6
- **401.bzip2** — 33.8 / 33.4
- **403.gcc** — 53.5 / 53.2
- **429.mcf** — 95.4
- **445.gobmk** — 37.8 / 37.8
- **456.hmmer** — 111
- **458.sjeng** — 42.3 / 41.7
- **462.libquantum** — 2400
- **464.h264ref** — 78.6
- **471.omnetpp** — 44.8 / 36.9
- **473.astar** — 43.2
- **483.xalancbmk** — 105 / 100

SPECint_base2006 = 77.5

SPECint2006 = 80.1

Hardware

CPU Name:	Intel Xeon E3-1280 v6
CPU Characteristics:	Intel Turbo Boost Technology up to 4.20 GHz
CPU MHz:	3900
FPU:	Integrated
CPU(s) enabled:	4 cores, 1 chip, 4 cores/chip
CPU(s) orderable:	1 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:	8 MB I+D on chip per chip
Other Cache:	None
Memory:	64 GB (4 x 16 GB 2Rx8 PC4-2400T-E)
Disk Subsystem:	1 x 500 GB SATA 7.2 K RPM, 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

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Results Table

Benchmark	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
400.perlbench	185	52.8	186	52.5	**186**	**52.6**	**164**	**59.7**	164	59.6	164	59.7
401.bzip2	289	33.3	**289**	**33.4**	288	33.5	285	33.8	**285**	**33.8**	285	33.8
403.gcc	150	53.5	**151**	**53.2**	152	53.0	150	53.6	**150**	**53.5**	150	53.5
429.mcf	96.0	95.0	94.8	96.2	**95.6**	**95.4**	96.0	95.0	94.8	96.2	**95.6**	**95.4**
445.gobmk	278	37.8	278	37.8	**278**	**37.8**	277	37.8	277	37.9	**277**	**37.8**
456.hmmer	84.2	111	**84.1**	**111**	84.0	111	84.2	111	**84.1**	**111**	84.0	111
458.sjeng	291	41.5	290	41.7	**290**	**41.7**	286	42.3	**286**	**42.3**	286	42.3
462.libquantum	8.64	2400	**8.62**	**2400**	8.62	2400	8.64	2400	**8.62**	**2400**	8.62	2400
464.h264ref	282	78.6	281	78.7	**281**	**78.6**	282	78.6	281	78.7	**281**	**78.6**
471.omnetpp	170	36.9	169	36.9	**169**	**36.9**	**140**	**44.8**	139	45.0	140	44.6
473.astar	162	43.4	**162**	**43.2**	164	42.9	162	43.4	**162**	**43.2**	164	42.9
483.xalancbmk	**68.9**	**100**	68.8	100	69.1	99.9	**65.8**	**105**	65.8	105	65.9	105

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:
 Power Profile set to Custom
 Minimum Processor Idle Power Core C-State set to C3 State
 Minimum Processor Idle Power Package C-State set to Package C6 (retention) State
 Energy/Performance Bias set to Maximum Performance
 Thermal Configuration set to Maximum Cooling
 Processor Power and Utilization Monitoring set to Disabled
 Memory Double Refresh Rate set to 1x Refresh
 NUMA Group Size Optimization set to Flat
 Intel HyperThreading set to Disabled

 Sysinfo program /home/cpu2006/config/sysinfo.rev6993
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
 running on dl120-g9 Thu Mar 30 11:14:31 2017

 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
```

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Platform Notes (Continued)

```
From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E3-1280 v6 @ 3.90GHz
      1 "physical id"s (chips)
      4 "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
   cache size : 8192 KB

From /proc/meminfo
   MemTotal:       65753568 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12 SP2

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 dl120-g9 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 Mar 30 11:14

SPEC is set to: /home/cpu2006
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda4      xfs   424G  5.9G  418G   2% /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
```

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Platform Notes (Continued)

```
     hardware, firmware, and the "DMTF SMBIOS" standard.

     BIOS HP U22 01/17/2017
     Memory:
       4x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz

   (End of data from sysinfo program)
```

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/sh10.2"
OMP_NUM_THREADS = "4"

 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
```

Base Optimization Flags

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

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Base Optimization Flags (Continued)

C++ benchmarks:

      -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
      -Wl,-z,muldefs -L/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

      445.gobmk: 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: -DSPEC_CPU_LP64
         429.mcf: -DSPEC_CPU_LP64
       445.gobmk: -D_FILE_OFFSET_BITS=64
      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: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
                   -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
                   -no-prec-div(pass 2) -qopt-prefetch

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

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

        429.mcf: basepeak = yes

     445.gobmk: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
                -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
                -no-prec-div(pass 2)

     456.hmmer: basepeak = yes

      458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
                 -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
                 -no-prec-div(pass 2) -unroll4

   462.libquantum: basepeak = yes

    464.h264ref: basepeak = yes

C++ benchmarks:

    471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
                 -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
                 -no-prec-div(pass 2) -qopt-ra-region-strategy=block
                 -Wl,-z,muldefs -L/sh10.2 -lsmartheap

       473.astar: basepeak = yes

    483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
                   -Wl,-z,muldefs -L/sh10.2 -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/HPE-Platform-Flags-Intel-V1.2-HSW-revG.html
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revD.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/HPE-Platform-Flags-Intel-V1.2-HSW-revG.xml
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revD.xml

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

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