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

ProLiant ML30 Gen9
(3.90 GHz, Intel Xeon E3-1280 v6)

$SPECint®2006 =$ 80.2
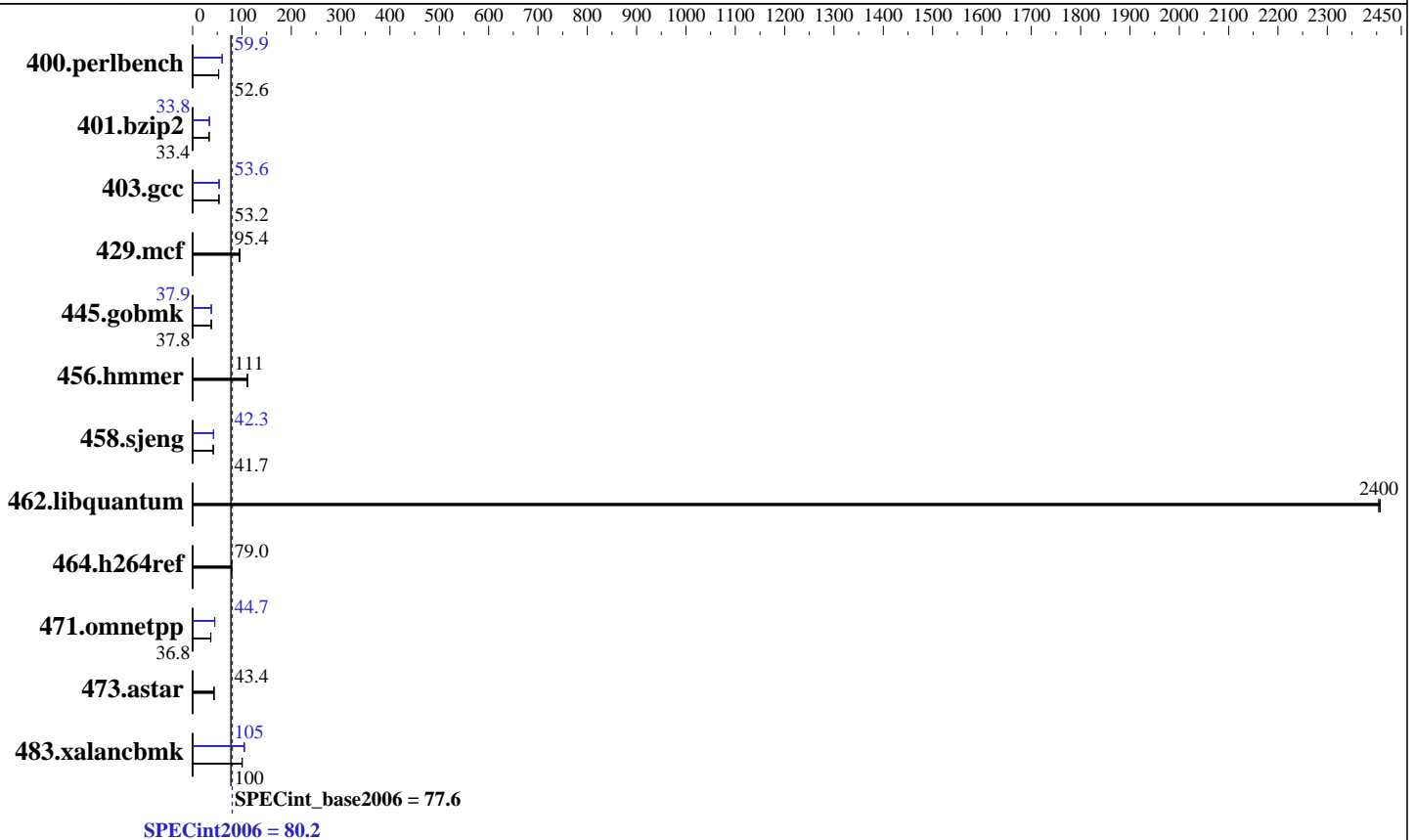
$SPECint\_base2006 =$ 77.6

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

Test date: Feb-2017
Hardware Availability: May-2017
Software Availability: Nov-2016

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2450

Benchmark	Peak	Base
400.perlbench	59.9	52.6
401.bzip2	33.8	33.4
403.gcc	53.6	53.2
429.mcf		95.4
445.gobmk	37.9	37.8
456.hmmer		111
458.sjeng	42.3	41.7
462.libquantum		2400
464.h264ref		79.0
471.omnetpp	44.7	36.8
473.astar		43.4
483.xalancbmk	105	100

SPECint_base2006 = 77.6

SPECint2006 = 80.2

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 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:	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 1 TB 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						Peak					
	Seconds	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
400.perlbench	185	52.8	**186**	**52.6**	186	52.6	163	59.8	**163**	**59.9**	163	59.9
401.bzip2	**289**	**33.4**	290	33.3	288	33.5	**285**	**33.8**	285	33.8	285	33.9
403.gcc	151	53.3	151	53.2	**151**	**53.2**	**150**	**53.6**	151	53.5	150	53.7
429.mcf	95.3	95.7	96.7	94.3	**95.6**	**95.4**	95.3	95.7	96.7	94.3	**95.6**	**95.4**
445.gobmk	278	37.8	**278**	**37.8**	278	37.8	**277**	**37.9**	277	37.9	277	37.8
456.hmmer	**84.1**	**111**	84.2	111	83.9	111	**84.1**	**111**	84.2	111	83.9	111
458.sjeng	290	41.7	290	41.7	**290**	**41.7**	286	42.3	286	42.3	**286**	**42.3**
462.libquantum	8.61	2410	8.62	2400	**8.62**	**2400**	8.61	2410	8.62	2400	**8.62**	**2400**
464.h264ref	281	78.8	**280**	**79.0**	280	79.1	281	78.8	**280**	**79.0**	280	79.1
471.omnetpp	171	36.5	170	36.8	**170**	**36.8**	140	44.6	**140**	**44.7**	139	44.9
473.astar	162	43.4	162	43.3	**162**	**43.4**	162	43.4	162	43.3	**162**	**43.4**
483.xalancbmk	68.9	100	68.7	100	**68.7**	**100**	65.7	105	**65.8**	**105**	66.3	104

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:
        Intel HyperThreading set to Disabled
        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

    Sysinfo program /home/cpu2006/config/sysinfo.rev6993
    Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
    running on ml30-g9-sles12-sp2 Thu Feb 23 16:14:55 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:      65572320 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 ml30-g9-sles12-sp2 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 Feb 22 21:05

SPEC is set to: /home/cpu2006
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda4       xfs   500G  3.8G  497G   1% /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.
```

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Platform Notes (Continued)

```
   BIOS HP U23 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,compact"
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
```

Continued on next page

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

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