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

Synergy 480 Gen9
(1.70 GHz, Intel Xeon E5-2603 v4)

$SPECint®2006 =$ 36.2

$SPECint\_base2006 =$ 34.8

CPU2006 license: 3	**Test date:** Oct-2016
Test sponsor: HPE	**Hardware Availability:** Dec-2016
Tested by: HPE	**Software Availability:** Sep-2016

Graph scale: 0 100 200 300 400 500 600 700 800 900 1000 1150 1300 1450 1600 1750 1900 2050 2200 2350 2500 2650 2800

- 400.perlbench: 23.1 / 20.1
- 401.bzip2: 13.5 / 13.3
- 403.gcc: 21.1 / 21.1
- 429.mcf: 42.6 / 42.5
- 445.gobmk: 15.3 / 15.0
- 456.hmmer: 41.8
- 458.sjeng: 17.7 / 17.1
- 462.libquantum: 2760
- 464.h264ref: 30.8
- 471.omnetpp: 24.8 / 19.7
- 473.astar: 18.1 / 18.1
- 483.xalancbmk: 42.0 / 40.7

SPECint_base2006 = 34.8

SPECint2006 = 36.2

Hardware

CPU Name:	Intel Xeon E5-2603 v4
CPU Characteristics:	
CPU MHz:	1700
FPU:	Integrated
CPU(s) enabled:	12 cores, 2 chips, 6 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:	15 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 1866 MHz)
Disk Subsystem:	1 x 600 GB 10 K SAS, RAID 0
Other Hardware:	None

Software

Operating System:	SUSE Linux Enterprise Server 12 (x86_64) SP1 Kernel 3.12.49-11-default
Compiler:	C/C++: Version 17.0.0.098 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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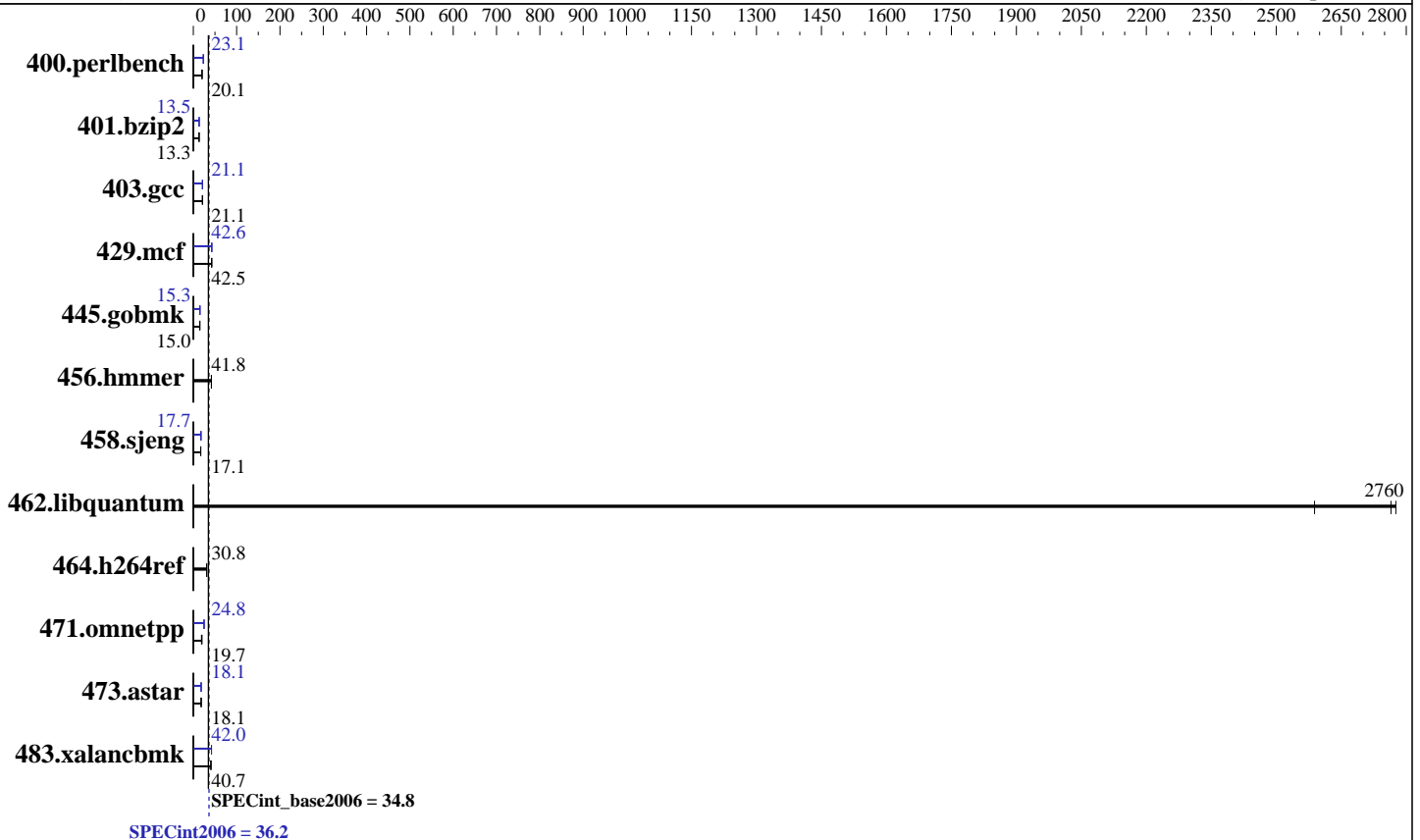SPECint_base2006 =   34.8

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Results Table

Benchmark	Base						Peak					
	Seconds	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
400.perlbench	**486**	**20.1**	486	20.1	485	20.2	**422**	**23.1**	422	23.1	423	23.1
401.bzip2	**727**	**13.3**	726	13.3	729	13.2	716	13.5	717	13.5	**716**	**13.5**
403.gcc	381	21.1	**381**	**21.1**	381	21.1	**381**	**21.1**	381	21.1	381	21.1
429.mcf	215	42.4	214	42.5	**215**	**42.5**	213	42.7	**214**	**42.6**	214	42.6
445.gobmk	699	15.0	700	15.0	**699**	**15.0**	**686**	**15.3**	686	15.3	686	15.3
456.hmmer	**223**	**41.8**	223	41.9	223	41.8	**223**	**41.8**	223	41.9	223	41.8
458.sjeng	708	17.1	**707**	**17.1**	706	17.1	**685**	**17.7**	685	17.7	685	17.7
462.libquantum	**7.49**	**2760**	8.01	2590	7.46	2780	**7.49**	**2760**	8.01	2590	7.46	2780
464.h264ref	720	30.8	714	31.0	**718**	**30.8**	720	30.8	714	31.0	**718**	**30.8**
471.omnetpp	332	18.8	315	19.8	**317**	**19.7**	251	24.9	**252**	**24.8**	252	24.8
473.astar	387	18.1	388	18.1	**387**	**18.1**	392	17.9	**388**	**18.1**	388	18.1
483.xalancbmk	169	40.7	170	40.7	**170**	**40.7**	**164**	**42.0**	165	41.9	164	42.0

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:
  Power Profile set to Custom
  Power Regulator to Static High Performance Mode
  Minimum Processor Idle Power Core C-State set to C6 State
  Minimum Processor Idle Power Package C-State set to No Package State
  Energy/Performance Bias set to Maximum Performance
  Collaborative Power Control set to Disabled
  QPI Snoop Configuration set to Home Snoop
  Thermal Configuration set to Maximum Cooling
  Processor Power and Utilization Monitoring set to Disabled
  Memory Refresh Rate set to 1x Refresh

 Sysinfo program /home/cpu2006/config/sysinfo.rev6993
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
 running on linux-8p7b Wed Oct 12 09:17:05 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 E5-2603 v4 @ 1.70GHz
      2 "physical id"s (chips)
      12 "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 : 6
      siblings  : 6
      physical 0: cores 0 1 2 3 4 5
      physical 1: cores 0 1 2 3 4 5
   cache size : 15360 KB

From /proc/meminfo
   MemTotal:       264549752 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12 SP1

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 1
      # 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-SP1"
      VERSION_ID="12.1"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
   Linux linux-8p7b 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
   (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Oct 12 09:13

SPEC is set to: /home/cpu2006
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda4      xfs   517G   31G  486G   6% /home
Additional information from dmidecode:
```

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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 I37 09/14/2016
    Memory:
    8x UNKNOWN NOT AVAILABLE
    16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1866 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:
  16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1866 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/sh10.2"
OMP_NUM_THREADS = "12"

 Binaries compiled on a system with 1x Intel Core i7-4790 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
```

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Base Portability Flags (Continued)

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
```

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

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Peak Portability Flags (Continued)

```
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
```

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

    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: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
               -auto-p32 -Wl,-z,muldefs -L/sh10.2 -lsmartheap64
```

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Peak Optimization Flags (Continued)

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`

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-ic17.0-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-ic17.0-official-linux64.xml

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