SPEC® CFP2006 Result
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Huawei

Huawei RH2288 V3 (Intel Xeon E5-2683 v4)

$SPECfp^{®}2006 = $ 107

$SPECfp_base2006 = $ 101
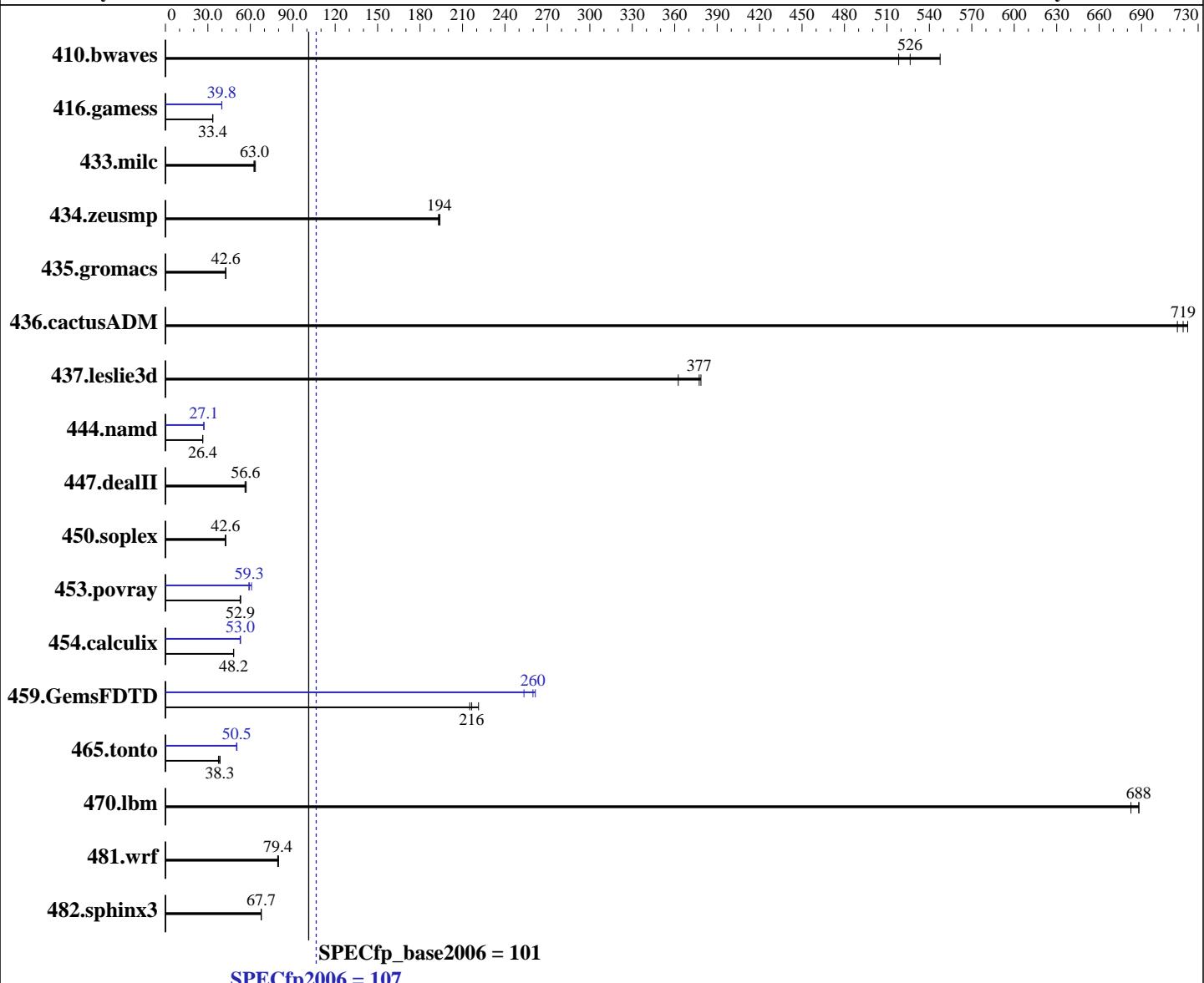
CPU2006 license: 3175
Test sponsor: Huawei
Tested by: Huawei

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

SPECfp_base2006 = 101
SPECfp2006 = 107

Benchmark	Score
410.bwaves	526
416.gamess	39.8 / 33.4
433.milc	63.0
434.zeusmp	194
435.gromacs	42.6
436.cactusADM	719
437.leslie3d	377
444.namd	27.1 / 26.4
447.dealII	56.6
450.soplex	42.6
453.povray	59.3 / 52.9
454.calculix	53.0 / 48.2
459.GemsFDTD	260 / 216
465.tonto	50.5 / 38.3
470.lbm	688
481.wrf	79.4
482.sphinx3	67.7

Hardware

CPU Name: Intel Xeon E5-2683 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz: 2100
FPU: Integrated
CPU(s) enabled: 32 cores, 2 chips, 16 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
Continued on next page

Software

Operating System: SUSE Linux Enterprise Server 12 SP1 (x86_64) 3.12.49-11-default
Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
Auto Parallel: Yes
File System: ext4
System State: Run level 3 (multi-user)
Continued on next page

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L3 Cache:	40 MB I+D on chip per chip	Base Pointers:	64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	256 GB (16 x 16 GB 2Rx8 PC4-2400T-R)	Other Software:	None
Disk Subsystem:	1 x 800 GB SATA SSD		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	24.8	548	26.2	518	**25.8**	**526**	24.8	548	26.2	518	**25.8**	**526**
416.gamess	587	33.4	584	33.5	**586**	**33.4**	491	39.9	**492**	**39.8**	492	39.8
433.milc	147	62.6	**146**	**63.0**	144	63.6	147	62.6	**146**	**63.0**	144	63.6
434.zeusmp	**47.0**	**194**	47.2	193	46.9	194	**47.0**	**194**	47.2	193	46.9	194
435.gromacs	167	42.7	168	42.6	**167**	**42.6**	167	42.7	168	42.6	**167**	**42.6**
436.cactusADM	16.5	723	16.7	715	**16.6**	**719**	16.5	723	16.7	715	**16.6**	**719**
437.leslie3d	25.9	363	24.8	379	**24.9**	**377**	25.9	363	24.8	379	**24.9**	**377**
444.namd	305	26.3	**304**	**26.4**	304	26.4	295	27.2	**295**	**27.1**	296	27.1
447.dealII	200	57.1	203	56.3	**202**	**56.6**	200	57.1	203	56.3	**202**	**56.6**
450.soplex	**196**	**42.6**	197	42.3	196	42.6	**196**	**42.6**	197	42.3	196	42.6
453.povray	99.9	53.2	**101**	**52.9**	101	52.8	90.1	59.0	87.4	60.9	**89.8**	**59.3**
454.calculix	**171**	**48.2**	171	48.1	171	48.3	**156**	**53.0**	156	52.8	156	53.0
459.GemsFDTD	**49.0**	**216**	49.3	215	47.9	221	40.6	261	41.9	253	**40.8**	**260**
465.tonto	263	37.5	**257**	**38.3**	255	38.6	196	50.2	195	50.6	**195**	**50.5**
470.lbm	**20.0**	**688**	20.0	688	20.1	683	**20.0**	**688**	20.0	688	20.1	683
481.wrf	141	79.4	140	80.0	**141**	**79.4**	141	79.4	140	80.0	**141**	**79.4**
482.sphinx3	**288**	**67.7**	288	67.6	288	67.8	**288**	**67.7**	288	67.6	288	67.8

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

    Stack size set to unlimited using "ulimit -s unlimited"

Platform Notes

    BIOS configuration:
    Set Power Efficiency Mode to Custom
    Set Snoop Mode to HS mode
    Set Patrol Scrub to Disable
    Set Hyper-Threading to Disable
    Sysinfo program /spec/spec16/config/sysinfo.rev6914
    $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
    running on linux-n8wl Mon Nov 28 10:19:05 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 E5-2683 v4 @ 2.10GHz
      2 "physical id"s (chips)
      32 "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 : 16
      siblings  : 16
      physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
   cache size : 40960 KB

From /proc/meminfo
   MemTotal:       264055460 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

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-n8wl 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 Nov 28 09:50

SPEC is set to: /spec/spec16
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda3       ext4  632G  7.6G  623G   2% /spec
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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Tested by: Huawei	**Software Availability:** Dec-2015

Platform Notes (Continued)

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

  BIOS Insyde Corp. 3.31 08/22/2016
  Memory:
   16x Samsung M393A2K43BB1-CRC 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,1,0"
LD_LIBRARY_PATH = "/spec/spec16/libs/32:/spec/spec16/libs/64:/spec/spec16/sh"
OMP_NUM_THREADS = "32"

 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
 runspec command invoked through numactl i.e.:
 numactl --interleave=all runspec <etc>
```

Base Compiler Invocation

C benchmarks:
```
    icc    -m64
```

C++ benchmarks:
```
    icpc   -m64
```

Fortran benchmarks:
```
    ifort -m64
```

Benchmarks using both Fortran and C:
```
    icc    -m64 ifort -m64
```

Base Portability Flags

```
    410.bwaves: -DSPEC_CPU_LP64
   416.gamess: -DSPEC_CPU_LP64
      433.milc: -DSPEC_CPU_LP64
    434.zeusmp: -DSPEC_CPU_LP64
   435.gromacs: -DSPEC_CPU_LP64 -nofor_main
 436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
   437.leslie3d: -DSPEC_CPU_LP64
      444.namd: -DSPEC_CPU_LP64
```

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Software Availability: Dec-2015

Base Portability Flags (Continued)

```
   447.dealII: -DSPEC_CPU_LP64
   450.soplex: -DSPEC_CPU_LP64
   453.povray: -DSPEC_CPU_LP64
  454.calculix: -DSPEC_CPU_LP64 -nofor_main
 459.GemsFDTD: -DSPEC_CPU_LP64
    465.tonto: -DSPEC_CPU_LP64
     470.lbm: -DSPEC_CPU_LP64
      481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
  482.sphinx3: -DSPEC_CPU_LP64
```

Base Optimization Flags

C benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias
```

Fortran benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias
```

Peak Compiler Invocation

C benchmarks:
```
icc    -m64
```

C++ benchmarks:
```
icpc   -m64
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc    -m64 ifort -m64
```

Peak Portability Flags

```
Same as Base Portability Flags
```

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Peak Optimization Flags

C benchmarks:

      433.milc: `basepeak = yes`

      470.lbm: `basepeak = yes`

    482.sphinx3: `basepeak = yes`

C++ benchmarks:

     444.namd: `-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) -fno-alias`
              `-auto-ilp32`

     447.dealII: `basepeak = yes`

    450.soplex: `basepeak = yes`

    453.povray: `-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`
              `-ansi-alias`

Fortran benchmarks:

    410.bwaves: `basepeak = yes`

    416.gamess: `-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) -unroll2`
              `-inline-level=0 -scalar-rep-`

   434.zeusmp: `basepeak = yes`

   437.leslie3d: `basepeak = yes`

  459.GemsFDTD: `-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) -unroll2`
              `-inline-level=0 -opt-prefetch -parallel`

     465.tonto: `-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) -inline-calloc`
              `-opt-malloc-options=3 -auto -unroll4`

Benchmarks using both Fortran and C:

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Tested by: Huawei		**Software Availability:**	Dec-2015

Peak Optimization Flags (Continued)

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

481.wrf: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-BDW-V1.0.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-BDW-V1.0.xml

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