SPEC® CFP2006 Result
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Huawei

Huawei CH226 V3(Intel Xeon E5-2620 v4)

$SPECfp^{®}2006 =$ 104
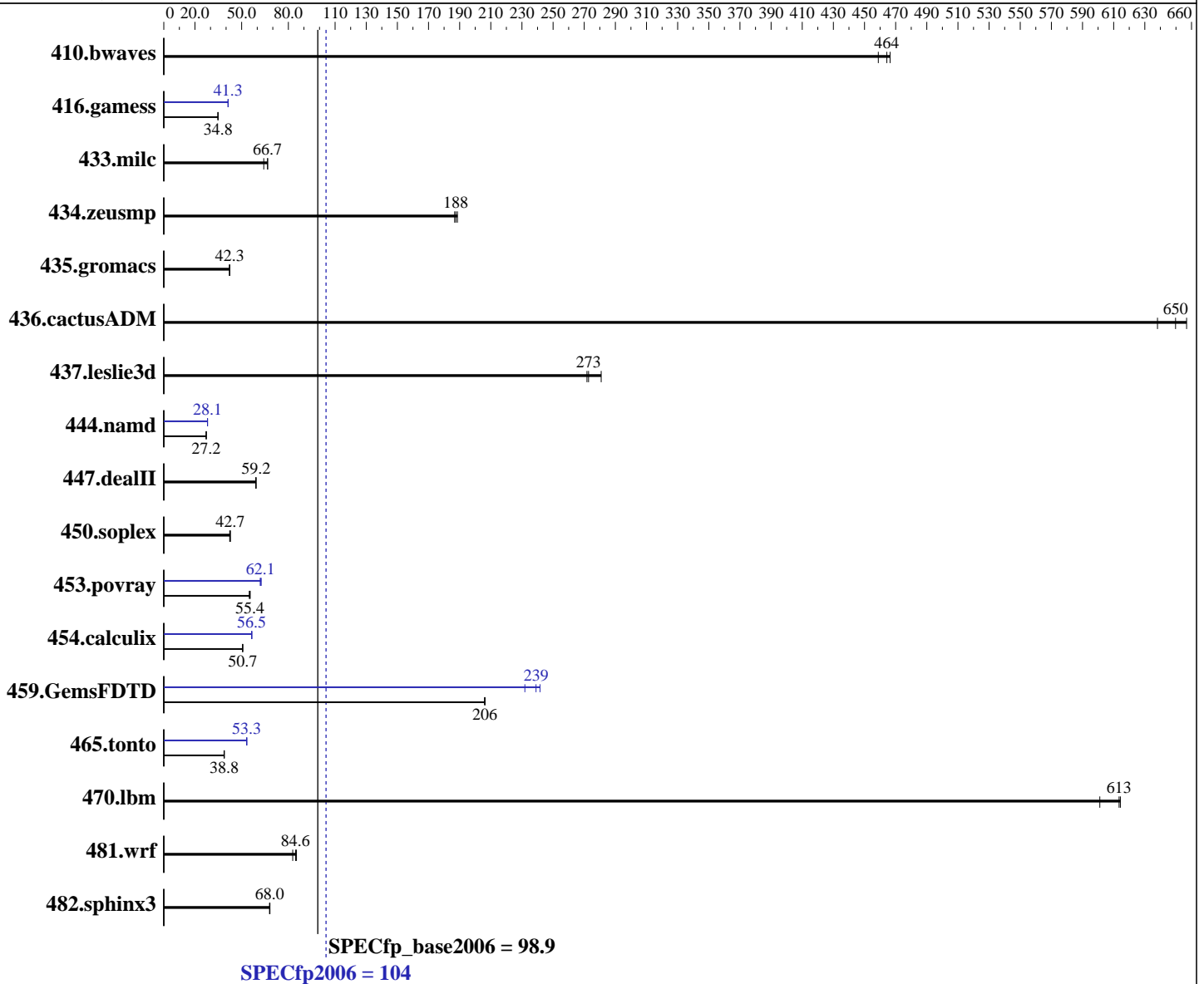
$SPECfp\_base2006 =$ 98.9

CPU2006 license: 3175
Test sponsor: Huawei
Tested by: Huawei

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

Benchmark	Result
410.bwaves	464
416.gamess	41.3 / 34.8
433.milc	66.7
434.zeusmp	188
435.gromacs	42.3
436.cactusADM	650
437.leslie3d	273
444.namd	28.1 / 27.2
447.dealII	59.2
450.soplex	42.7
453.povray	62.1 / 55.4
454.calculix	56.5 / 50.7
459.GemsFDTD	239 / 206
465.tonto	53.3 / 38.8
470.lbm	613
481.wrf	84.6
482.sphinx3	68.0

SPECfp_base2006 = 98.9
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Hardware

CPU Name: Intel Xeon E5-2620 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz: 2100
FPU: Integrated
CPU(s) enabled: 16 cores, 2 chips, 8 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: Red Hat Enterprise Linux Server release 7.2 (Maipo)
3.10.0-327.el7.x86_64
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: xfs
Continued on next page

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L3 Cache:	20 MB I+D on chip per chip
Other Cache:	None
Memory:	512 GB (16 x 32 GB 2Rx4 PC4-2400T-R, running at 2133 MHz)
Disk Subsystem:	1 x 1000 GB SATA, 7200 RPM
Other Hardware:	None

System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other Software:	None

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	**29.3**	**464**	29.6	459	29.1	466	**29.3**	**464**	29.6	459	29.1	466
416.gamess	563	34.8	562	34.8	**563**	**34.8**	**474**	**41.3**	474	41.4	475	41.3
433.milc	**138**	**66.7**	143	64.2	138	66.7	**138**	**66.7**	143	64.2	138	66.7
434.zeusmp	48.7	187	48.3	189	**48.5**	**188**	48.7	187	48.3	189	**48.5**	**188**
435.gromacs	169	42.3	**169**	**42.3**	169	42.2	169	42.3	**169**	**42.3**	169	42.2
436.cactusADM	18.2	657	18.7	638	**18.4**	**650**	18.2	657	18.7	638	**18.4**	**650**
437.leslie3d	33.5	281	**34.5**	**273**	34.6	272	33.5	281	**34.5**	**273**	34.6	272
444.namd	294	27.2	**294**	**27.2**	294	27.3	286	28.1	286	28.1	**286**	**28.1**
447.dealII	193	59.2	**193**	**59.2**	194	59.1	193	59.2	**193**	**59.2**	194	59.1
450.soplex	195	42.7	**195**	**42.7**	197	42.3	195	42.7	**195**	**42.7**	197	42.3
453.povray	96.9	54.9	96.0	55.4	**96.1**	**55.4**	85.0	62.6	85.9	62.0	**85.7**	**62.1**
454.calculix	**163**	**50.7**	163	50.7	163	50.6	146	56.4	**146**	**56.5**	146	56.6
459.GemsFDTD	**51.4**	**206**	51.4	206	51.5	206	43.9	242	**44.4**	**239**	45.8	232
465.tonto	**254**	**38.8**	253	38.9	254	38.7	**185**	**53.3**	185	53.2	185	53.3
470.lbm	**22.4**	**613**	22.4	614	22.9	601	**22.4**	**613**	22.4	614	22.9	601
481.wrf	135	82.8	131	85.2	**132**	**84.6**	135	82.8	131	85.2	**132**	**84.6**
482.sphinx3	**286**	**68.0**	286	68.2	287	67.9	**286**	**68.0**	286	68.2	287	67.9

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 /spec16/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Sat Nov 26 14:18:42 2016
```

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Platform Notes (Continued)

```
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

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E5-2620 v4 @ 2.10GHz
      2 "physical id"s (chips)
      16 "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 : 8
      siblings  : 8
      physical 0: cores 0 1 2 3 4 5 6 7
      physical 1: cores 0 1 2 3 4 5 6 7
   cache size : 20480 KB

From /proc/meminfo
   MemTotal:       527794600 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 localhost.localdomain 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 Nov 26 09:21

SPEC is set to: /spec16
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       xfs   254G   62G  193G  25% /
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 Insyde Corp. 3.32 09/14/2016
   Memory:
    16x Micron 36ASF4G72PZ-2G3A1 32 GB 2 rank 2400 MHz, configured at 2133 MHz
    8x NO DIMM NO DIMM

  (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 = "/spec16/libs/32:/spec16/libs/64:/spec16/sh"
OMP_NUM_THREADS = "16"

 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
     447.dealII: -DSPEC_CPU_LP64
```

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Base Portability Flags (Continued)

```
 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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Hardware Availability: Mar-2016
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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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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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