SPEC® CFP2006 Result

Fujitsu

PRIMERGY RX2540 M2, Intel Xeon E5-2640 v4, 2.40 GHz

$SPECfp^{®}2006 = $ 117
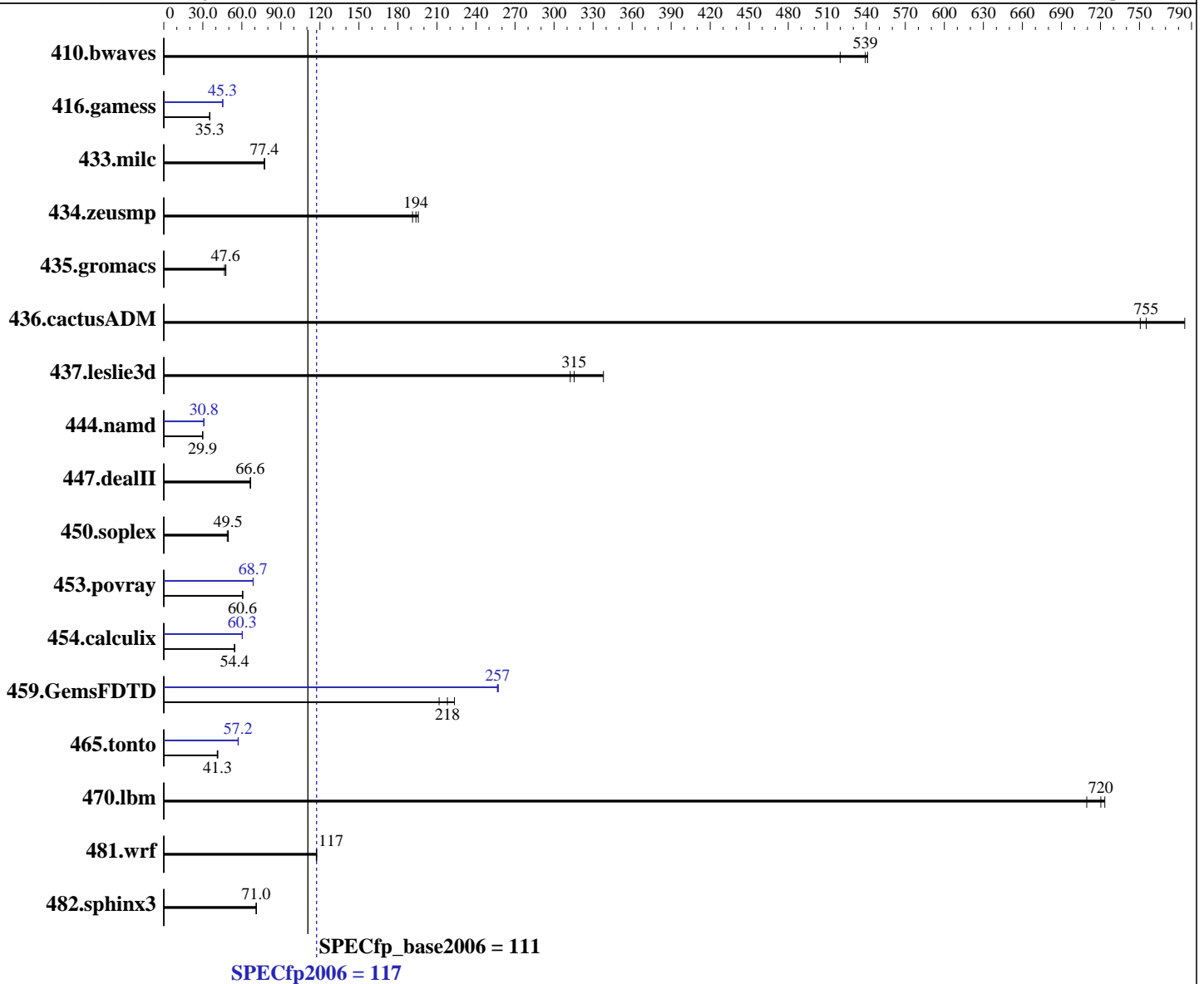
$SPECfp_base2006 = $ 111

CPU2006 license: 19
Test sponsor: Fujitsu
Tested by: Fujitsu

Test date: Mar-2016
Hardware Availability: Apr-2016
Software Availability: Sep-2015

Benchmark	Value
410.bwaves	539
416.gamess	45.3 / 35.3
433.milc	77.4
434.zeusmp	194
435.gromacs	47.6
436.cactusADM	755
437.leslie3d	315
444.namd	30.8 / 29.9
447.dealII	66.6
450.soplex	49.5
453.povray	68.7 / 60.6
454.calculix	60.3 / 54.4
459.GemsFDTD	257 / 218
465.tonto	57.2 / 41.3
470.lbm	720
481.wrf	117
482.sphinx3	71.0

SPECfp_base2006 = 111
SPECfp2006 = 117

Hardware

CPU Name:	Intel Xeon E5-2640 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.40 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	20 cores, 2 chips, 10 cores/chip, 2 threads/core
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

Software

Operating System:	SUSE Linux Enterprise Server 12 SP1 (x86_64) Kernel 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:	xfs
System State:	Run level 5 (multi-user)

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L3 Cache:	25 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 2Rx4 PC4-2400T-R, running at 2133 MHz)	Other Software:	None
Disk Subsystem:	1 x SATA, 500 GB, 7200 RPM		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	26.1	520	**25.2**	**539**	25.1	541	26.1	520	**25.2**	**539**	25.1	541
416.gamess	556	35.2	552	35.4	**555**	**35.3**	**432**	**45.3**	433	45.3	432	45.3
433.milc	**119**	**77.4**	119	77.3	119	77.5	**119**	**77.4**	119	77.3	119	77.5
434.zeusmp	47.6	191	46.5	196	**47.0**	**194**	47.6	191	46.5	196	**47.0**	**194**
435.gromacs	**150**	**47.6**	150	47.7	153	46.6	**150**	**47.6**	150	47.7	153	46.6
436.cactusADM	**15.8**	**755**	15.2	785	15.9	751	**15.8**	**755**	15.2	785	15.9	751
437.leslie3d	**29.8**	**315**	27.8	338	30.1	312	**29.8**	**315**	27.8	338	30.1	312
444.namd	268	29.9	268	29.9	**268**	**29.9**	**260**	**30.8**	260	30.8	260	30.8
447.dealII	**172**	**66.6**	171	66.7	172	66.5	**172**	**66.6**	171	66.7	172	66.5
450.soplex	171	48.8	**168**	**49.5**	168	49.6	171	48.8	**168**	**49.5**	168	49.6
453.povray	**87.8**	**60.6**	87.8	60.6	87.7	60.7	77.5	68.6	77.4	68.8	**77.4**	**68.7**
454.calculix	152	54.4	152	54.4	**152**	**54.4**	**137**	**60.3**	137	60.4	137	60.3
459.GemsFDTD	50.1	212	**48.7**	**218**	47.5	223	41.4	256	**41.4**	**257**	41.3	257
465.tonto	**238**	**41.3**	237	41.5	240	41.1	**172**	**57.2**	172	57.3	172	57.1
470.lbm	19.4	709	**19.1**	**720**	19.0	723	19.4	709	**19.1**	**720**	19.0	723
481.wrf	95.3	117	95.0	118	**95.2**	**117**	95.3	117	95.0	118	**95.2**	**117**
482.sphinx3	274	71.0	274	71.1	**274**	**71.0**	274	71.0	274	71.1	**274**	**71.0**

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:
Energy Performance = Performance
Utilization Profile = Unbalanced
QPI snoop mode: Home Directory Snoop with OSB
    COD Enable = Disabled, Early Snoop = Disabled, Home Snoop Dir OSB = Enabled
CPU C1E Support = Disabled
Sysinfo program /home/SPECcpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
```

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Test date: Mar-2016
Hardware Availability: Apr-2016
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Platform Notes (Continued)

```
running on RX2540M2 Tue Mar 22 17:45:46 2016

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 E5-2640 v4 @ 2.40GHz
      2 "physical id"s (chips)
      40 "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 : 10
      siblings  : 20
      physical 0: cores 0 1 2 3 4 8 9 10 11 12
      physical 1: cores 0 1 2 3 4 8 9 10 11 12
   cache size : 25600 KB

From /proc/meminfo
   MemTotal:       264399696 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 RX2540M2 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 5 Mar 22 12:44

SPEC is set to: /home/SPECcpu2006
   Filesystem      Type   Size  Used Avail Use% Mounted on
```

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Platform Notes (Continued)

```
   /dev/sda4     xfs   424G  123G  302G  29% /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.

   BIOS FUJITSU // American Megatrends Inc. V5.0.0.11 R1.6.0 for D3289-B1x
   03/11/2016
   Memory:
    16x Micron 36ASF2G72PZ-2G3A3 16 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 = "/home/SPECcpu2006/libs/32:/home/SPECcpu2006/libs/64:/home/SPECcpu2006/sh"
OMP_NUM_THREADS = "20"

 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
 For information about Fujitsu please visit: http://www.fujitsu.com
```

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

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Base Portability Flags (Continued)

```
    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
     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
```

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CPU2006 license: 19　　　　　　　　　　　　　　　　**Test date:** Mar-2016
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Tested by: Fujitsu　　　　　　　　　　　　　　　　**Software Availability:** Sep-2015

Peak Portability Flags

```
Same as Base Portability Flags
```

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

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Peak Optimization Flags (Continued)

465.tonto (continued):
```
-opt-malloc-options=3 -auto -unroll4
```

Benchmarks using both Fortran and C:

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/Fujitsu-Platform-Settings-V1.2-HSW-RevA.20160517.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/Fujitsu-Platform-Settings-V1.2-HSW-RevA.20160517.xml

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