SPEC® CFP2006 Result

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Lenovo Group Limited

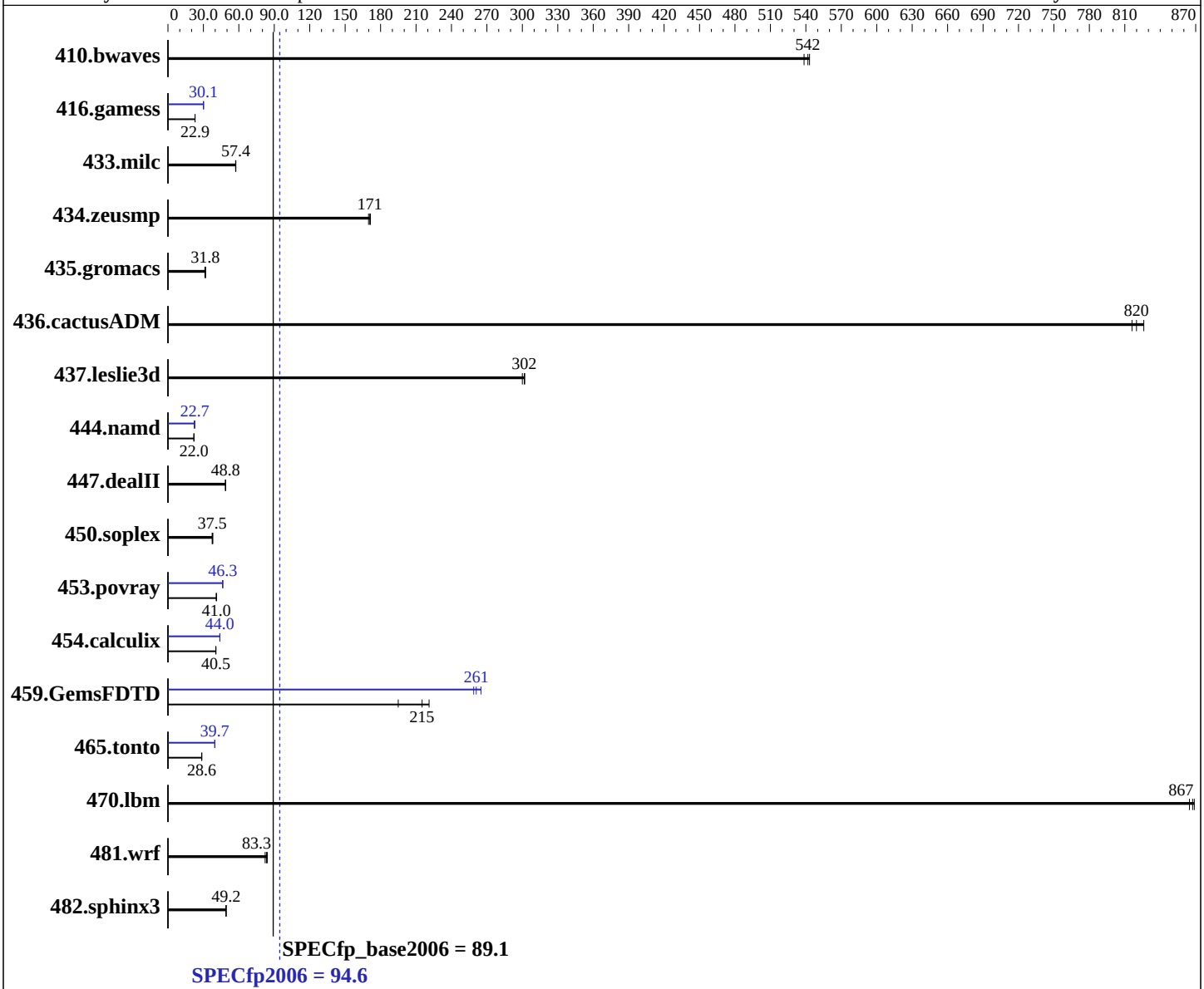
Lenovo ThinkServer RD550
(1.70 GHz, Intel Xeon E5-2650L v4)

SPECfp®2006 = 94.6

SPECfp_base2006 = 89.1

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

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



Hardware

CPU Name:	Intel Xeon E5-2650L v4
CPU Characteristics:	Intel Turbo Boost Technology up to 2.50 GHz
CPU MHz:	1700
FPU:	Integrated
CPU(s) enabled:	28 cores, 2 chips, 14 cores/chip
CPU(s) orderable:	1,2 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core

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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 3 (multi-user)

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L3 Cache: 35 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 1 x 800 GB SATA SSD
Other Hardware: None

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	25.2	538	25.0	543	**25.1**	**542**	25.2	538	25.0	543	**25.1**	**542**
416.gamess	855	22.9	853	22.9	**854**	**22.9**	**651**	**30.1**	650	30.1	652	30.0
433.milc	160	57.4	160	57.3	**160**	**57.4**	160	57.4	160	57.3	**160**	**57.4**
434.zeusmp	**53.3**	**171**	53.1	171	53.6	170	**53.3**	**171**	53.1	171	53.6	170
435.gromacs	224	31.8	**225**	**31.8**	228	31.3	224	31.8	**225**	**31.8**	228	31.3
436.cactusADM	14.6	816	14.5	826	**14.6**	**820**	14.6	816	14.5	826	**14.6**	**820**
437.leslie3d	31.1	302	**31.2**	**302**	31.3	300	31.1	302	**31.2**	**302**	31.3	300
444.namd	**364**	**22.0**	364	22.0	364	22.0	**354**	**22.7**	361	22.2	353	22.7
447.dealII	**234**	**48.8**	235	48.6	234	48.8	**234**	**48.8**	235	48.6	234	48.8
450.soplex	222	37.5	219	38.0	**222**	**37.5**	222	37.5	219	38.0	**222**	**37.5**
453.povray	130	40.9	**130**	**41.0**	129	41.2	**115**	**46.3**	115	46.5	115	46.2
454.calculix	204	40.5	**204**	**40.5**	203	40.6	188	43.9	**188**	**44.0**	188	44.0
459.GemsFDTD	48.0	221	54.4	195	**49.3**	**215**	40.0	265	**40.7**	**261**	41.0	259
465.tonto	**344**	**28.6**	346	28.5	343	28.7	249	39.6	248	39.8	**248**	**39.7**
470.lbm	15.9	865	15.8	869	**15.8**	**867**	15.9	865	15.8	869	**15.8**	**867**
481.wrf	133	84.2	**134**	**83.3**	136	82.3	133	84.2	**134**	**83.3**	136	82.3
482.sphinx3	396	49.3	**396**	**49.2**	396	49.2	396	49.3	**396**	**49.2**	396	49.2

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:
 Hyper-Threading set to Disabled
 Cluster On Die set to Disabled
 Early Snoop set to Enabled
 Performance Profile set to Custom
 C1E Support set to Disabled
 Core C3 set to Disabled
 Core C6 set to Disabled
 Thermal Profile set to High Fan Speed
 Memory Power Savings set to Disabled
```

Continued on next page

Platform Notes (Continued)

```
Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on rd550-mlk-rackA02 Wed Aug 24 18:03:15 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 E5-2650L v4@ 1.70GHz
      2 "physical id"s (chips)
      28 "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 : 14
      siblings  : 14
      physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
      physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
   cache size : 35840 KB

From /proc/meminfo
   MemTotal:       264557972 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 rd550-mlk-rackA02 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 Aug 24 11:32

SPEC is set to: /home/cpu2006-1.2-ic16.0
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda4      xfs   690G  8.0G  682G   2% /home
```

Continued on next page

Platform Notes (Continued)

```
 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 LENOVO VB3TS362 03/24/2016
   Memory:
    16x Hynix Semiconductor HMA42GR7AFR4N-UH 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/cpu2006-1.2-ic16.0/libs/32:/home/cpu2006-1.2-ic16.0/libs/64:/home/cpu2006-1.2-ic16.0/sh"
OMP_NUM_THREADS = "28"

 Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
 memory using RedHat EL 7.1
 Transparent Huge Pages disabled with:
 echo never > /sys/kernel/mm/transparent_hugepage/enabled
```

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
```

Continued on next page

Base Portability Flags (Continued)

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

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

Continued on next page

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/Lenovo-Platform-Settings-V1.2-BDW-revC.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/Lenovo-Platform-Settings-V1.2-BDW-revC.xml

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